Multi-Scale Archaeological Monitoring: Stressors, Indicators and Triggers
Lawrence C. Todd and Jillian Bechberger
ltcdd@lamar.colostate.edu

ABSTRACT
Monitoring is a component of most natural resource management programs and numerous protocols have been developed, stressors and indicators identified, and responses to change in condition developed. On the other hand, conceptual and methodological approaches to monitoring heritage resource condition, such as prehistoric archaeological sites, are very newly established. Beginning in 2002, survey and site documentation within the eastern margin of the Greater Yellowstone Ecosystem (Bighorn National Forest) have developed a series of baseline data sets to help monitor changes in heritage resource condition. In a multi-level approach that integrates anthropogenic and abiotic influences, this study provides a method to monitor and evaluate either short-term dramatic events, such as floods or fires, as well as longer-term processes such as changes in artifact visibility and positioning, but may not cause the more severe consequences produced by human artifact collection, which often focuses on only a limited number of artifact classes and removes them entirely and irreversibly alter an important landscape component.

In designing protocols to monitor a heritage site condition, actions of biological and physical processes and human activities (including resource managers) need to be assessed. Of these three domains of stressors, the anthropogenic can be the most damaging, but also have a great potential for effectively mitigated.

Anthropogenic Stressors
- hunters, bikers, & hikers (etc)
- trails and trailheads
- roads
- roadsides
- game trails
- rodent burrows
- root stumps
- vegetation change
- erosion/deposition
- climate change
- mass wasting
- erosion
- deposition
- mass wasting
- climate change
- erosion/deposition

Abiotic Stressors
- vegetation ground cover
- game animal grazing intensity
- rodent activity
- vegetation change
- erosion/deposition
- climate change
- mass wasting
- deposition
- vegetation ground cover
- game animal grazing intensity
- rodent activity
- vegetation change
- erosion/deposition
- climate change
- mass wasting
- deposition

Biotic Stressors
- game trails
- road workings
- roadsides

An archaeological “indicator species”

Monitoring allows direct assessment of changes in physical properties of archaeological sites and also provides a method for assessing a series of social values, public attitudes, and management targets.

What responses should come into play when significant anthropologically induced changes in the archaeological record are documented?
- removal of the archaeological resource?
- alternative, adaptive management?