Inventory and Monitoring of Paleontological Sites

with examples from
Florissant Fossil Beds National Monument, Colorado, USA
and
Piedra Chamana Petrified Forest, Sexi, Peru

Herb Meyer
National Park Service, Florissant, Colorado, USA

Inventory and Monitoring

- Inventory: Documents location and baseline conditions
  - GPS
    - Determine precise location of fossil sites
    - Map site boundary outlines
    - Plot significant features
  - Photography
    - Establishment of photo points
    - Baseline photographs
  - Manual

Inventory and Monitoring

- Monitoring: Provides follow up observation and evaluation to assess changing conditions
  - Evaluate
    - Sites are monitored at variable cyclic intervals
    - Standardized scoring matrix to assess “condition”
    - Annual report based on the year’s sample of sites
  - Repeat photography to show changes
  - Records maintained in database

Florissant Fossil Beds National Monument

Manual

P-17-P1-SSW

P-17-P3-SW

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Inventory and Monitoring of the Paleontological Sites

at

Florissant Fossil Beds National Monument

By

Herbert W. Meyer, U.S. National Park Service, Florissant, CO USA

Bret Buskirk, Florissant Fossil Beds NM

Eva Lyon, Florissant Fossil Beds NM

Adrian Maxwell, Florissant Fossil Beds NM

Allison Platsky, Florissant Fossil Beds NM

Kathy Salas, Florissant Fossil Beds NM

Maps Created by

Jeff Pinkard, U.S. National Park Service, Intermountain Region Geographic Resources

Sage Wall, U.S. National Park Service, Intermountain Region Geographic Resources

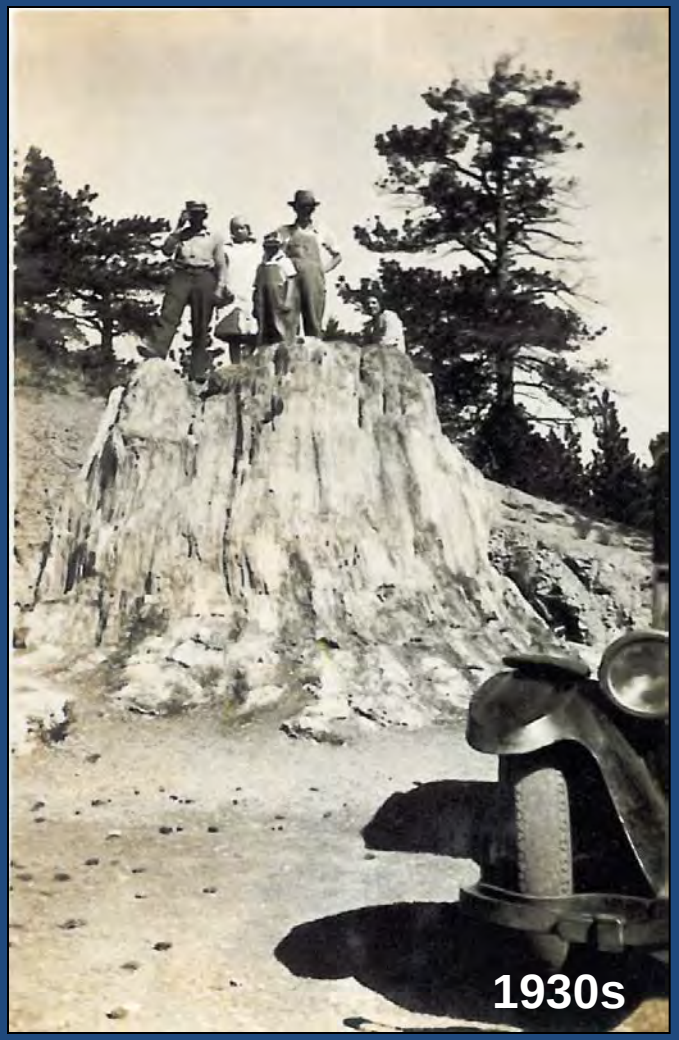
July, 2011

P-17-P6-SW

P-17-P8-SW

Observed changes 1998-2008

Historic photos



Evaluation of "Condition"

- Disturbance
- Fragility
- Fossil Abundance
- Loss
- Site Access

SITE EVALUATION FORM

Evaluator	Whitmore	Date	6/3/08	Site	90

Disturbance	10	Actual Loss	10
Disturbance Mitigation:	15	Loss Mitigation	10
Fragility	20	Site Access	0
Fragility Mitigation	0	Access Mitigation	20
Fossil Abundance	0		

85
GOOD

Specimen Observed	Petrified Stump
Specimens Collected	None

Notes

Illegal collecting evident, moderate loss, mitigation by way of barrier and increased patrolling in process

DISTURBANCE
(0) Poor condition – the locality is being rapidly eroded or there are high levels of illegal removal of fossils.
(10) Moderate condition – a slight increase of erosion above normal levels, occasional removal of fossils illegally.
(20) Outstanding condition – erosion and exposure of locality is within normal rates for the area, no evidence of illegal collecting or removal of fossils.

DISTURBANCE MITIGATION
(0) No action
(15) Cause of erosion due to human activity has been stopped, increase in monitoring by resource managers or law enforcement has reduced illegal removal of fossils

FRAGILITY
(0) High fragility – the lithology of the locality is unconsolidated and easily eroded, fossils are exposed on a seasonal basis
(10) Moderate fragility – the erosion of the locality and exposure of fossils takes longer than a single season but occurs within a few years
(20) Low fragility – the lithology of the locality does not erode quickly, fossils are exposed at a low rate and the locality is not modified except over long periods of time

FRAGILITY MITIGATION
(0)No action
(15) Fossils are collected and documented on a regular basis as part of cyclic monitoring in order to prevent loss

FOSSIL ABUNDANCE
(0) High abundance – fossils occur in large numbers whether of a single species or multiple species, highly concentrated in a relatively small area and easily spotted and recognized
(10) Moderate abundance – fossils are present and recognizable but in relatively low numbers and are distributed over a larger area and may not be easily spotted and recognized.
(20) Low abundance – fossils occur sporadically, are widely distributed and not easily spotted and recognized except by professionals

ACTUAL LOSS
Significant and noticeable disappearance of fossils from area on a seasonal basis
(10) Number of fossils in area is reduced by a small amount on a yearly basis
(20) Number of fossils in area does not change significantly from year to year

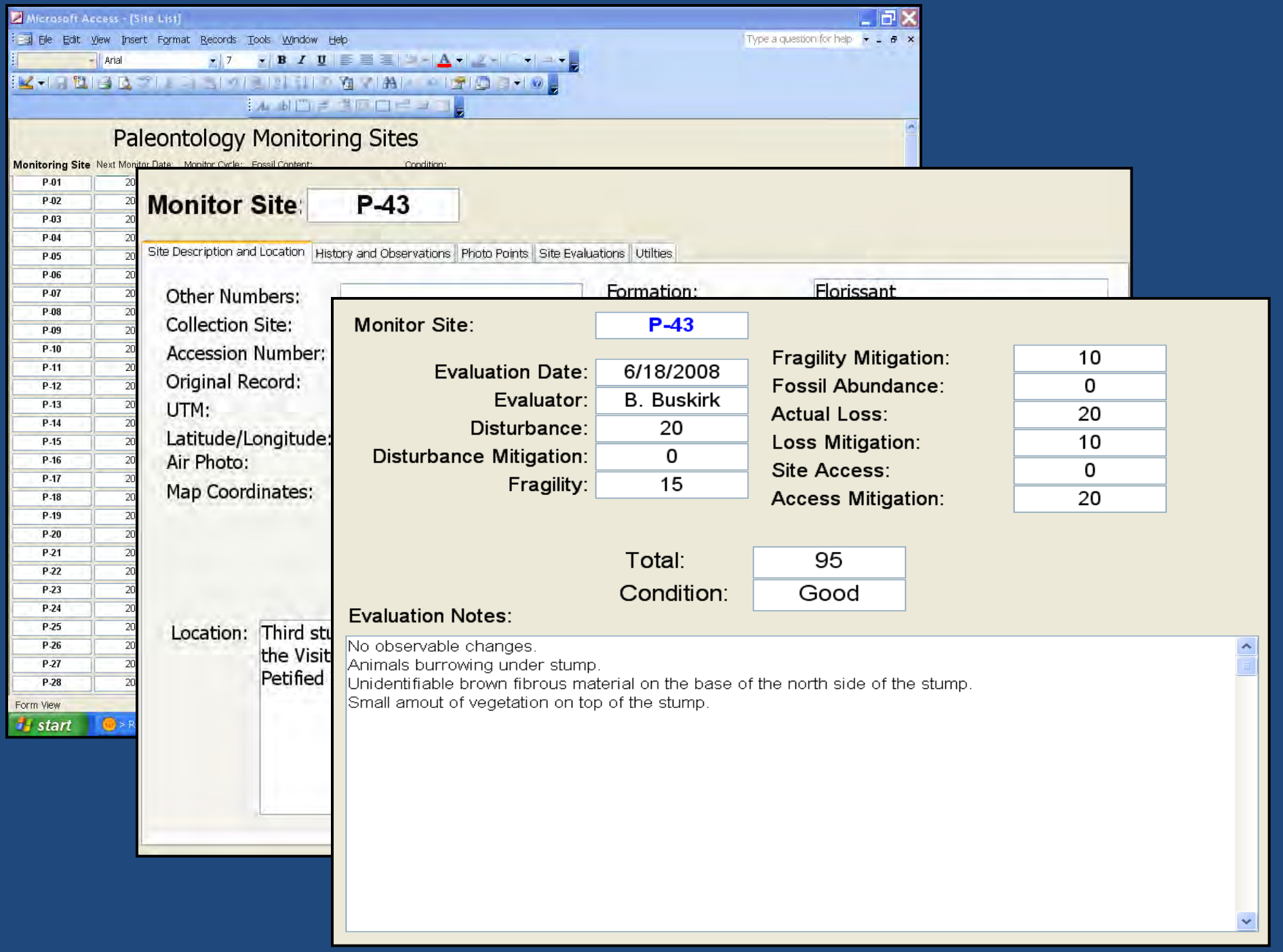
LOSS MITIGATION
(0) No Action
(10) Fossils are monitored on a regular basis in order to determine if they are being lost or destroyed
(20) Fossils are collected and documented on a regular basis in order to prevent loss

SITE ACCESS
(0) Easy – site is close to roads, trails, or is located in easily traversed terrain
(10) Moderate – site is not close to roads, trails and site is in a location that is relatively inaccessible or not likely to be visited
(20) Difficult – site is located in back country, not easily accessible and difficult to locate

ACCESS MITIGATION
(0) No action
(5) Site is monitored by park staff
(10) Actively patrolled or collected on occasion as needed
(10) Site is protected by a physical barrier or structure
(20) Active law enforcement protection, either visitation, surveillance or ongoing collection by researchers
(10) The locality has been evaluated and is included in an established program of cyclic monitoring

OVER

Form Generated: 5/14/2008


Microsoft Access - [Site List]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Paleontology Monitoring Sites
Monitoring Site
Next Monitor Date:
Monitor Cycle:
Fossil Content:
Condition:
P-01
P-02
P-03
P-04
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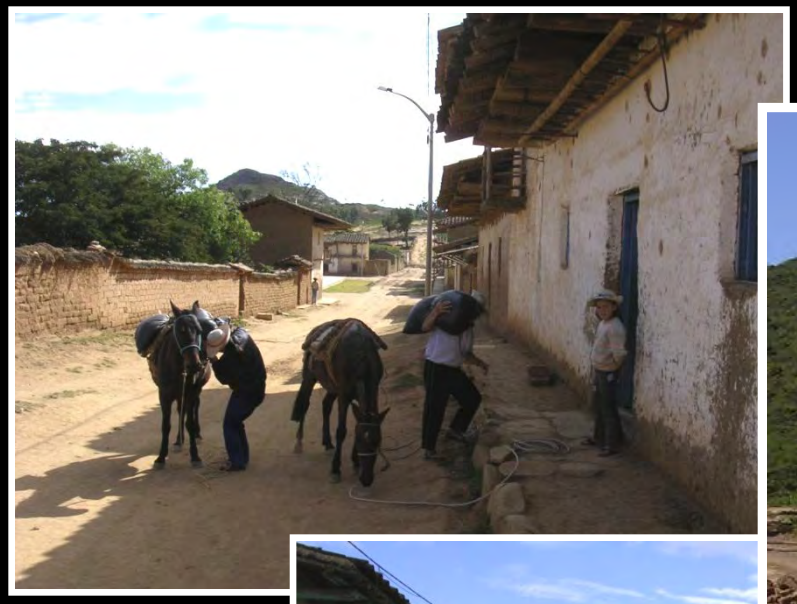
P-28
Form View
start
Monitor Site: P-43
Site Description and Location
History and Observations
Photo Points
Site Evaluations
Utilties
Other Numbers:
Collection Site:
Accession Number:
Original Record:
UTM:
Latitude/Longitude:
Air Photo:
Map Coordinates:
Formation:
Florissant
Location:
Third stu
the Visit
Petified
Monitor Site: P-43
Evaluation Date: 6/18/2008
Evaluator: B. Buskirk
Disturbance: 20
Disturbance Mitigation: 0
Fragility: 15
Fragility Mitigation: 10
Fossil Abundance: 0
Actual Loss: 20
Loss Mitigation: 10
Site Access: 0
Access Mitigation: 20
Total: 95
Condition: Good
Evaluation Notes:
No observable changes.
Animals burrowing under stump.
Unidentifiable brown fibrous material on the base of the north side of the stump.
Small amout of vegetation on top of the stump.

Piedra Chamana Petrified Forest

Sexi, Peru

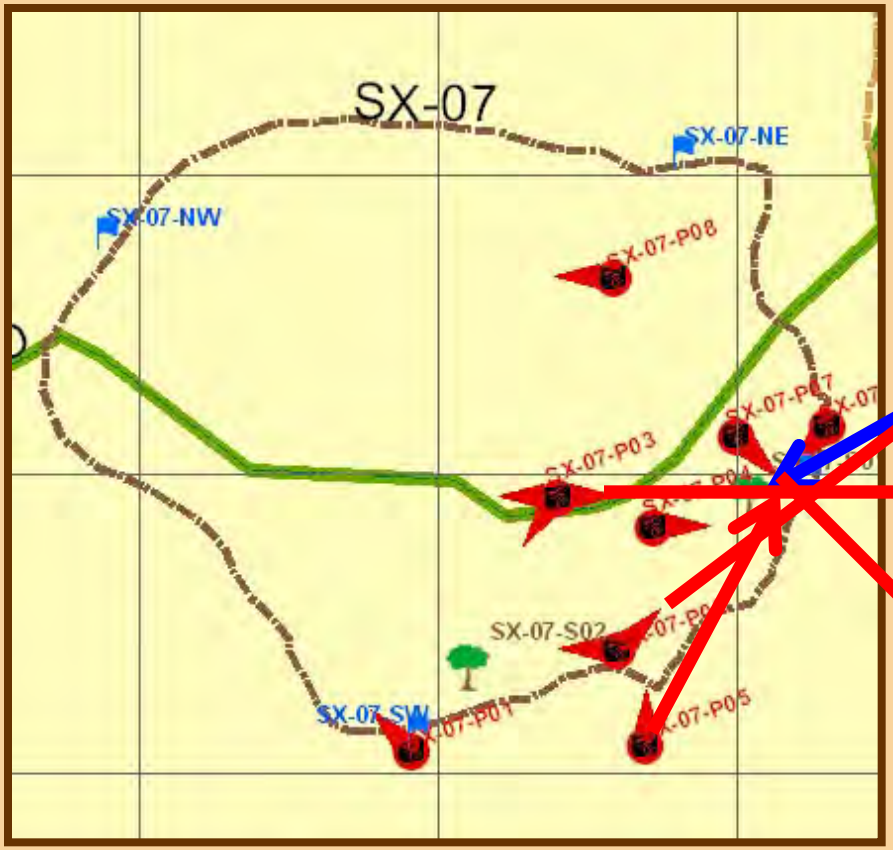
Promoting conservation and economic development in Sexi, Peru

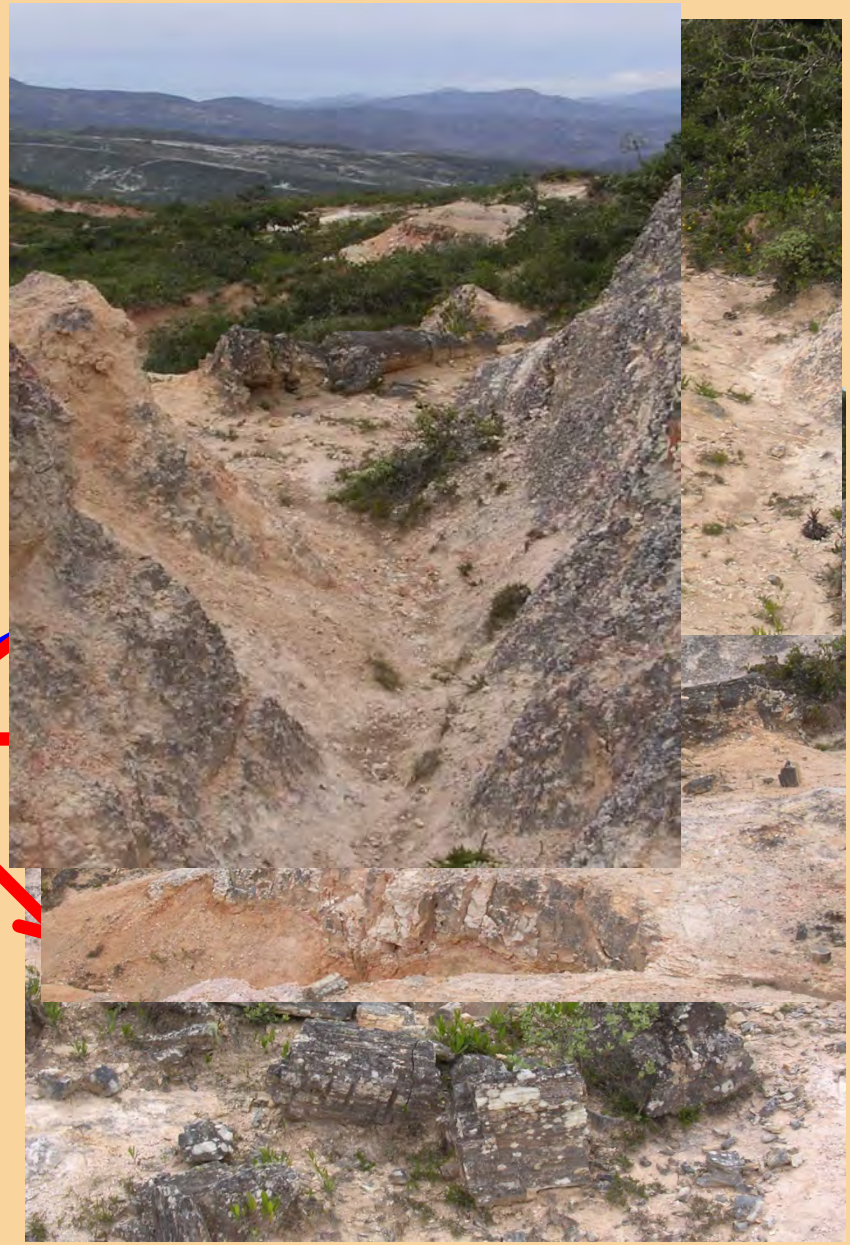


Paleontological Site Inventory

- **GPS documentation**
  - Perimeters of individual sites
  - Significant features
  - Designation of photo stops

Photographic Documentation





Photographic Documentation

Where did the palm trunk go?

2003

2009

Results and Benefits

- Observe changes in “vital signs” due to:
  - Human impacts
    - Vandalism or illegal collecting
    - Livestock
    - Active research excavations
  - Natural processes
    - Erosion (Geologic and climatic factors)
    - Catastrophic geohazards (earthquakes and volcanoes)
    - Hydrologic exposure (submersion by rivers or tides)
    - Vegetation
- Provides measurable scientific data useful for assessing and managing fossil resources