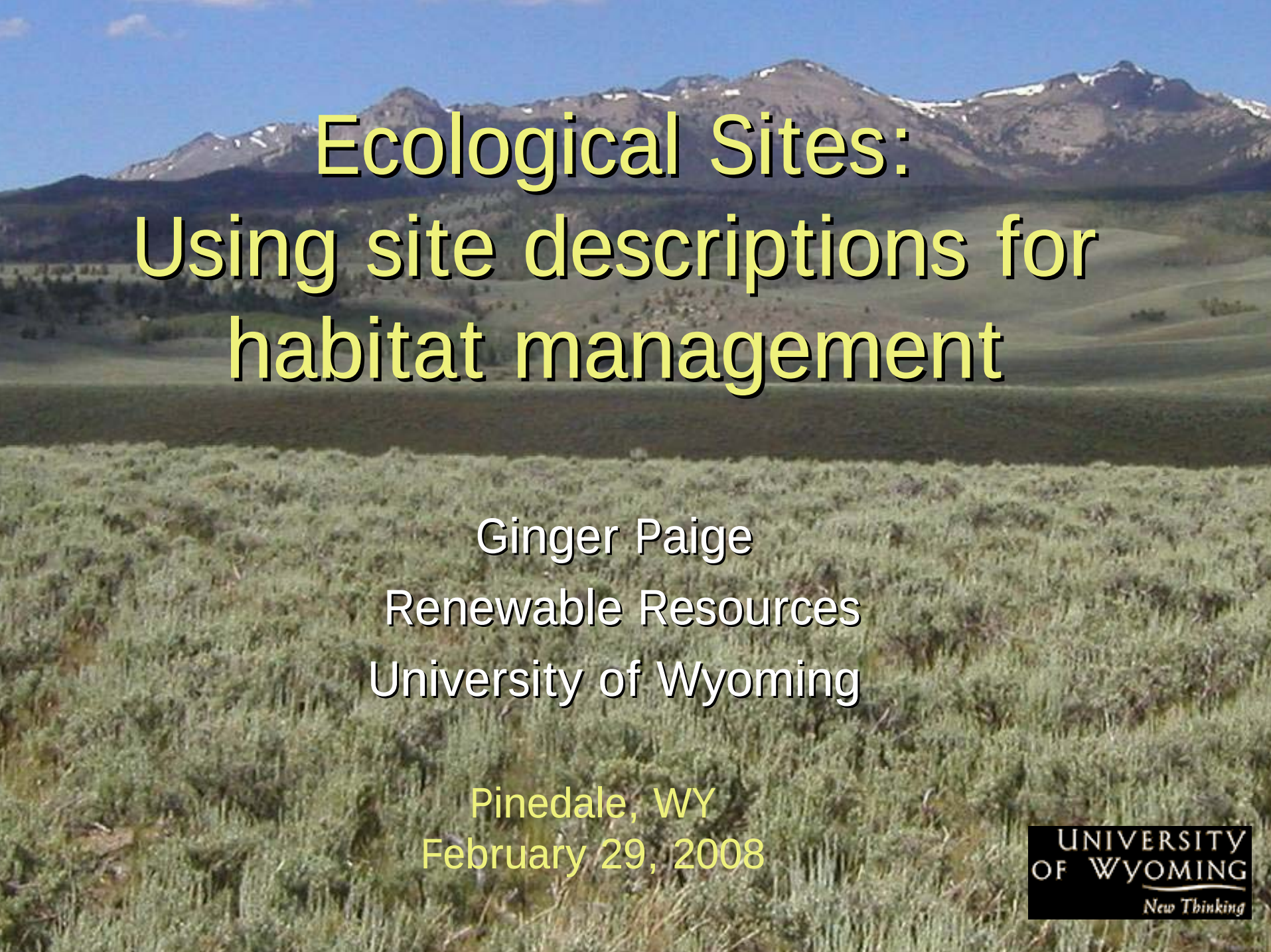


Ecological Sites: Using site descriptions for habitat management

Ginger Paige
Renewable Resources
University of Wyoming

Pinedale, WY
February 29, 2008

UNIVERSITY OF WYOMING
New Thinking

Acknowledgments

Much of the information presented on Ecological Sites, Site Descriptions and Wildlife Habitat was originally presented at the Society for Range Management Workshop:

Ecological Site Descriptions as Management Tools: Understanding and improving applications for wildlife habitat management in sagebrush ecosystems

Park City, UT

October 23 - 25, 2007

For additional information:

http://www.rangelands.org/esd_presentations.shtml

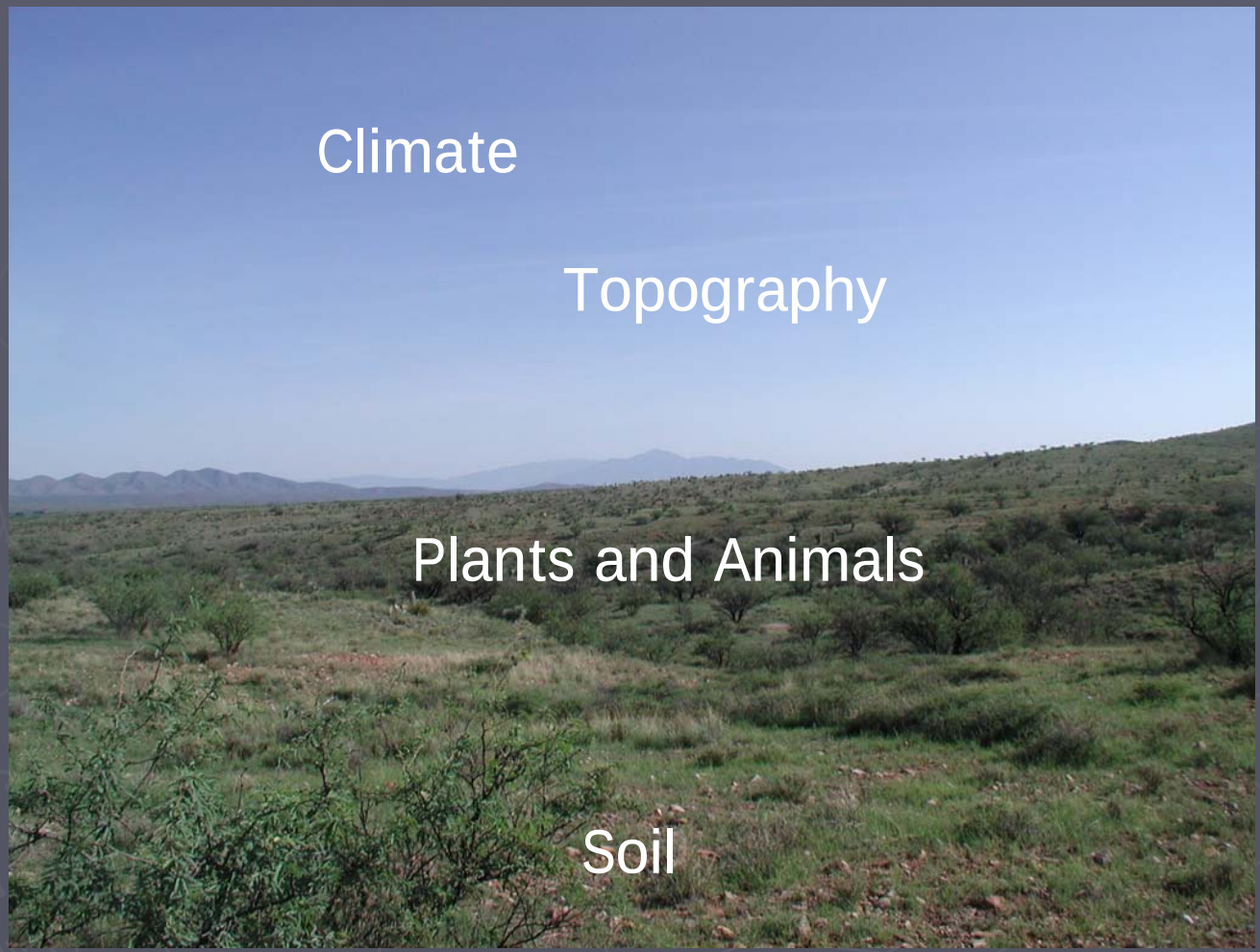
Overview

- What are Ecological Sites
- Where do Ecological Sites fit on the landscape scale
- Constraints on Ecological Sites & Descriptions
- Site Descriptions and State and Transition Models
- How to use ESDs for wildlife habitat management

Ecological Sites

- Basic management, planning and evaluation unit for NRCS, BLM, State Land Agencies
- Soil vegetation associations determined by soil type, topography, and climate
- “Hillslope scale”

Clay Loam Upland



Ecological Site

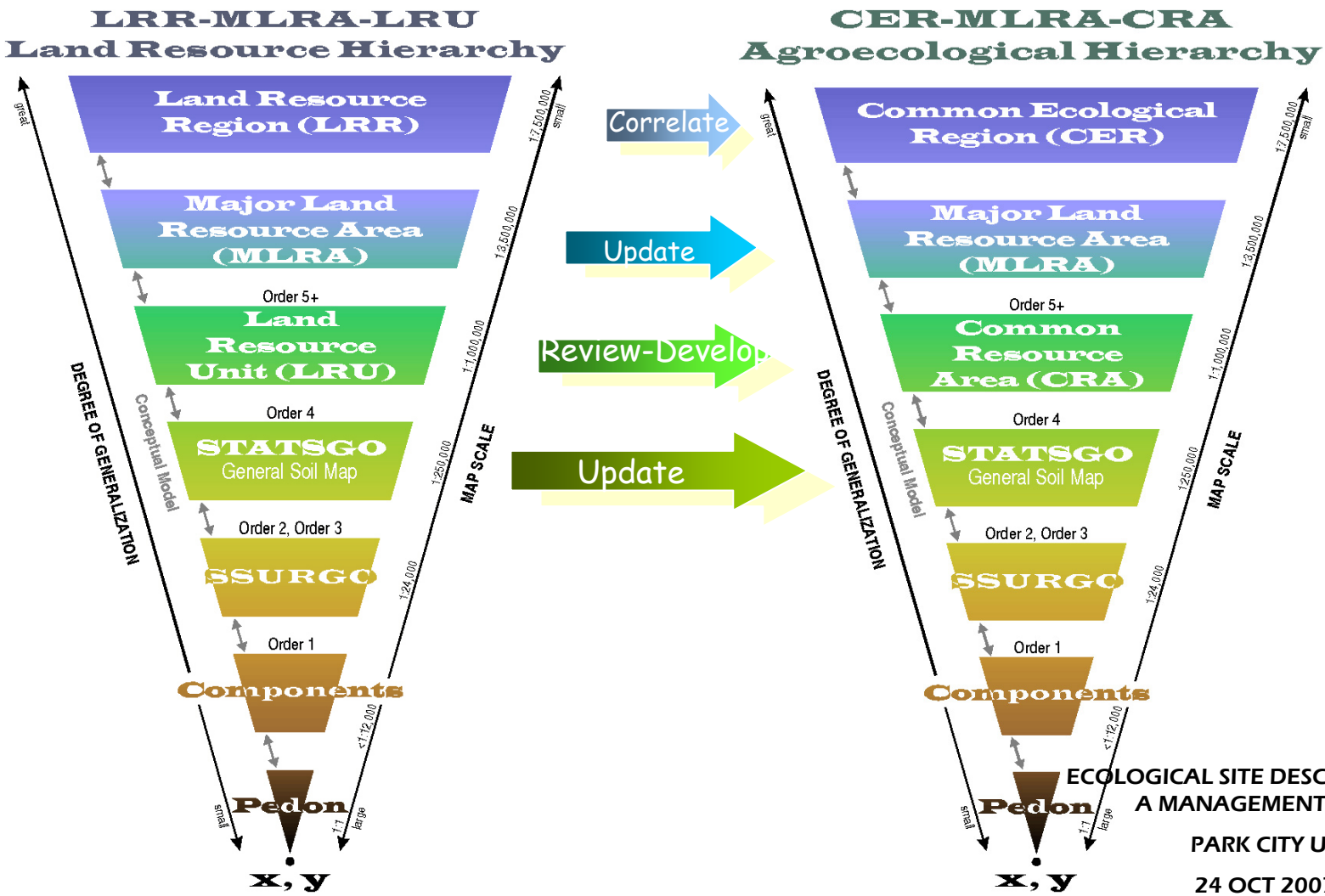
- An ecological site is an area of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and to respond to management.

Ecological Sites

- Differentiate between ecological sites based on significant differences in physical factors (topography, soils, climate) that result in:
  - Significant differences in the species that are in the characteristic plant community
  - Significant differences in the relative proportion of species in the characteristic plant community

WHERE DO ESDs FIT?

SOME HYPOTHETICAL RELATIONSHIPS



ECOLOGICAL SITE DESCRIPTIONS AS A MANAGEMENT TOOL

PARK CITY UT

24 OCT 2007

Soil-site correlation “rules”

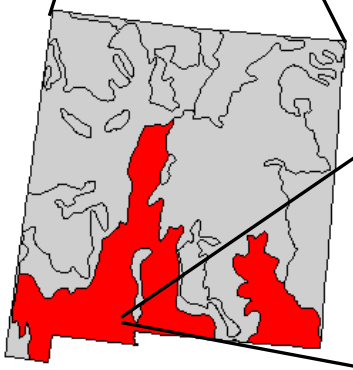
An ***ecological site*** can include more than one soil series, provided that the soils are similar

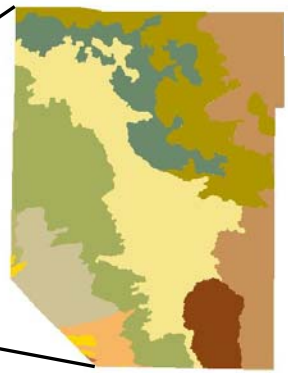
A ***soil map unit*** can include more than one ecological site. Soil map units often include many different soils, with different potentials to support plant communities

Even a ***soil series*** can include more than one ecological site. Soil surface texture often varies within a soil series. Soil surface texture is very important in distinguishing ecological sites.

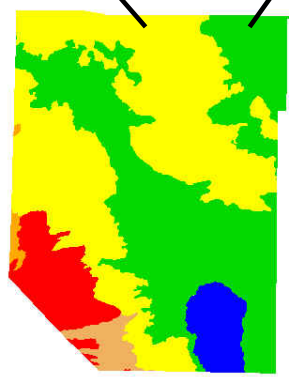
Where do ESDs fit?
Some real relationships

Climatically-similar subregions





Order 2 or 3 soil map



Ecological site map

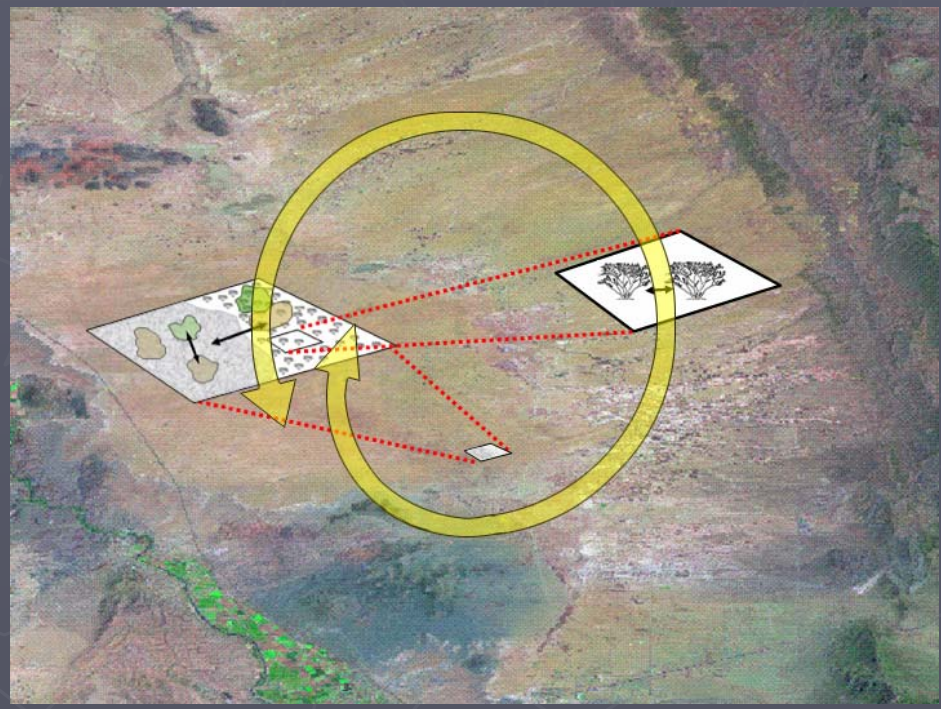
Community Types

Black grama-Tobosa grassland

Tobosa-Burrograss grassland

Ecological sites and landscape processes

- Even though there is an assumed hierarchical relationship in soil classification and mapping, it is from a classification, not a functional standpoint
- Few, if any, important ecosystem services (wildlife habitat, water yield, open space, forage) can be assessed by adding up landscape components. Important ecological processes transcend and integrate individual sites.
- While ecological sites are inadequate for making these predictions, the information in ESDs are critical to the models that can be used for larger scale predictions.



ECOLOGICAL SITE DESCRIPTIONS AND SOILS

Ecological sites are concepts (not reality) associated with the soil survey

This association has benefits and costs, but if you are interested in the POTENTIAL of land and land management, it makes sense

Ecological sites are groupings of soils, as mapped, and may include individual soil units that are different (inclusions)

These inclusions (both soil and site) are not failures of the mapping and classification system, but reflect reality

CONSTRAINTS ON ECOLOGICAL SITE DESCRIPTION DEVELOPMENT AND USE

They are tied to the national soil survey for some of the basic information to build them and to distribute the information that we add

Ecological sites only cover one level in the spatial hierarchy, they integrate what occurs at finer scales and influence what occurs at coarser scales

While the information that goes into an ESD is the best possible, we still need to improve. ESDs will be used for interim decision making

ESD COMPONENT PARTS

- **SITE CHARACTERISTICS** INCLUDE RELATIVELY OBJECTIVE INFORMATION ABOUT THE SITE AND ITS DYNAMICS

- **SITE INTERPRETATIONS** INCLUDE INFORMATION ON THE VALUE OF GOODS AND SERVICES FROM THE SITE

SITE CHARACTERISTICS

PHYSIOGRAPHIC FEATURES

- LANDFORM
- ASPECT
- ELEVATION
- SLOPE
- WATER TABLE DEPTH
- FLOODING (frequency and duration)
- PONDING (duration and depth)
- RUNOFF CLASS

CLIMATIC FEATURES

- FROST FREE PERIOD
- FREEZE FREE PERIOD
- PRECIPITATION (mean and monthly min/max)
- TEMPERATURE (monthly mean, min/max)

WATER FEATURES

- ROSGEN STREAM CLASSIFICATION
- COWARDIN WETLAND CLASSIFICATION

REPRESENTATIVE SOIL FEATURES

- PARENT MATERIALS, DEPTH
- TEXTURE, FRAGMENTS
- DRAINAGE, PERMEABILITY
- AVAILABLE WATER CAPACITY
- pH

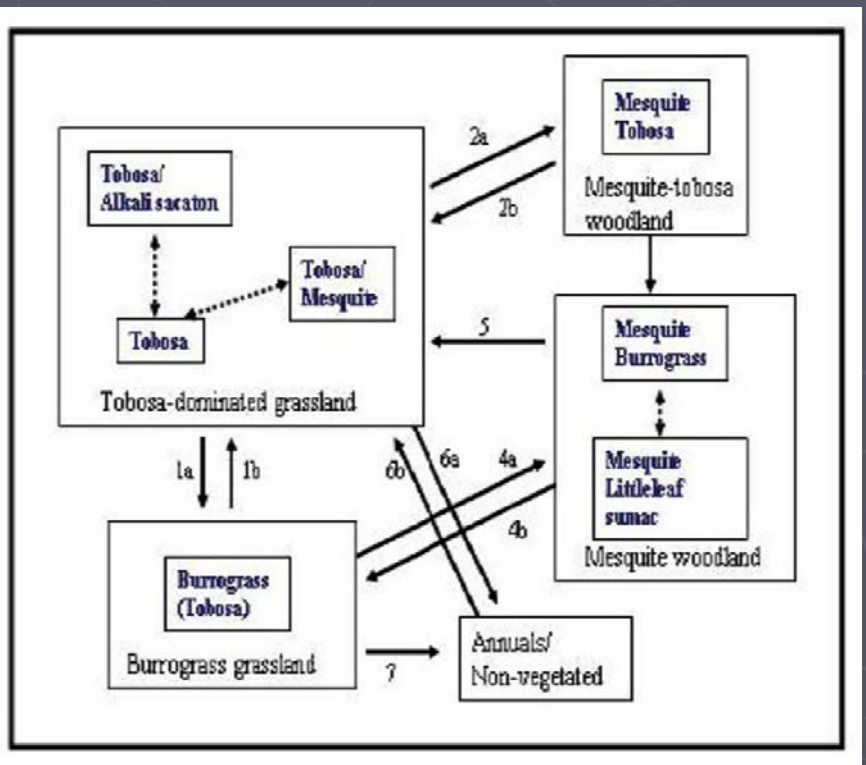
SITE CHARACTERISTICS

PLANT COMMUNITIES

SITE DYNAMICS

STATE AND TRANSITION MODEL

- NARRATIVE
- DIAGRAM
- SUPPORTING DOCUMENTATION



ECOLOGICAL SITE DESCRIPTIONS AS A MANAGEMENT TOOL

PARK CITY UT

24 OCT 2007

STM DEFINITIONS

STRINGHAM ET AL 2003

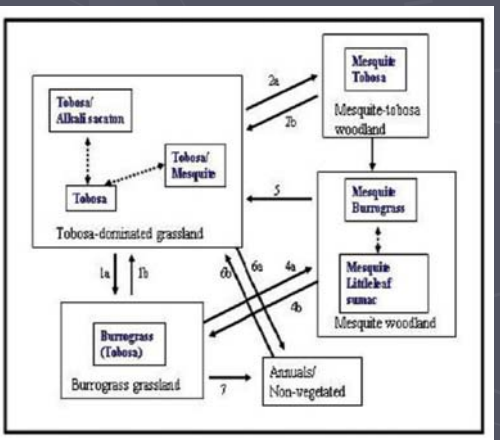
STATE-A RECOGNIZABLE, RESILIENT AND RESISTANT COMBINATION OF SOIL AND VEGETATION COMPONENTS

TRANSITION-A TRAJECTORY OF SYSTEM CHANGE AWAY FROM THE CURRENT STABLE STATE TRIGGERED BY NATURAL EVENTS, MANAGEMENT OR BOTH

THRESHOLD-BOUNDARY IN SPACE OR TIME BETWEEN TWO STATES, POINT AT WHICH ONE OR MORE PRIMARY ECOLOGICAL PROCESS HAS BEEN IRREVERSIBLY CHANGED AND REQUIRES CULTURAL ENERGY INPUT TO REVERSE

PLANT COMMUNITY PHASE-SERAL STAGES WITHIN A STATE THAT CHANGE IN RESPONSE TO MANAGEMENT OR CLIMATE WITHOUT INPUT OF CULTURAL ENERGY

PLANT COMMUNITY PATHWAYS-TRAJECTORIES AMONG PLANT COMMUNITIES, DO NOT REQUIRE CULTURAL INPUT TO REVERSE



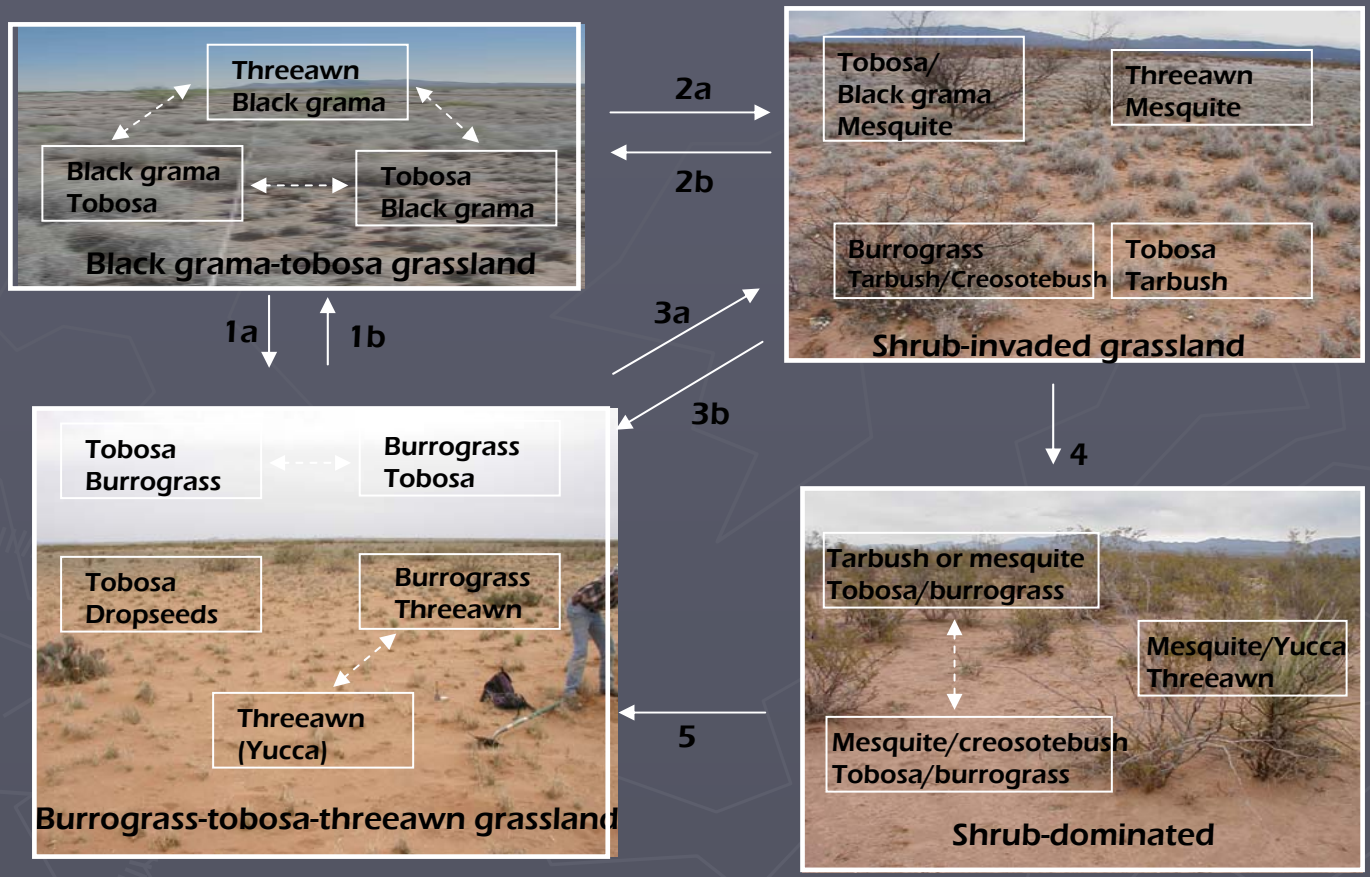
ECOLOGICAL SITE DESCRIPTIONS AS A MANAGEMENT TOOL

PARK CITY UT

24 OCT 2007

This type of ESD/STM represents a hypothesis to be tested, not a rule to be followed !!

Loamy SD-2

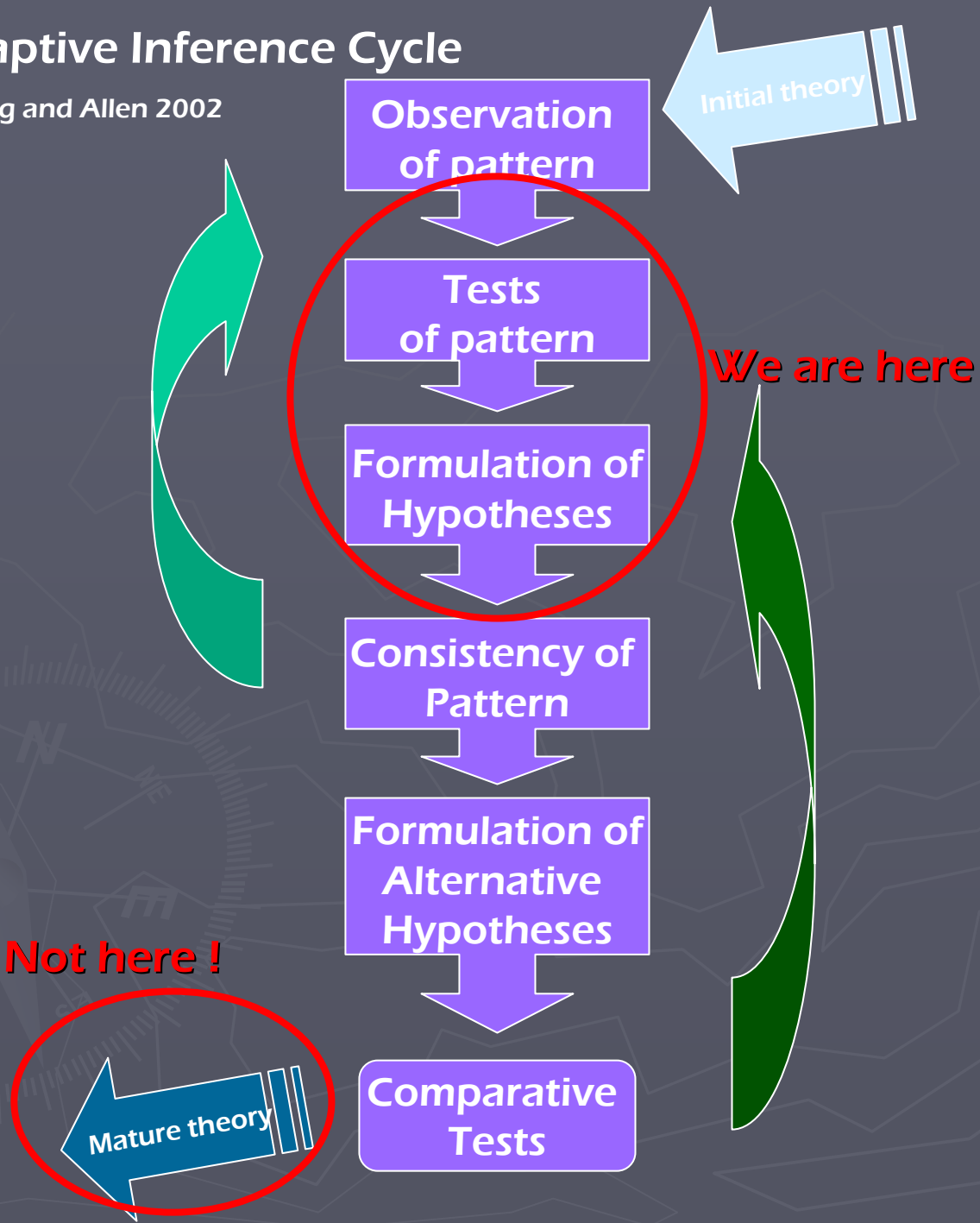


1a-Overgrazing, soil fertility loss, erosion and sand loss; 1b-Soil stabilization or modification
2a-Shrub invasion due to overgrazing and/or lack of fire; 2b-Shrub removal, restore cover
3a-Shrub invasion; 3b-Shrub removal with grass recovery
4. Persistent reduction in grasses, competition by shrubs, erosion and soil truncation
5. Shrub removal with soil addition?

(Bestelmeyer et al 2003)

Adaptive Inference Cycle

Holling and Allen 2002



Avoid Type II Error

Coarse Filter (accuracy)

Avoid Type I Error

Fine Filter (precision)

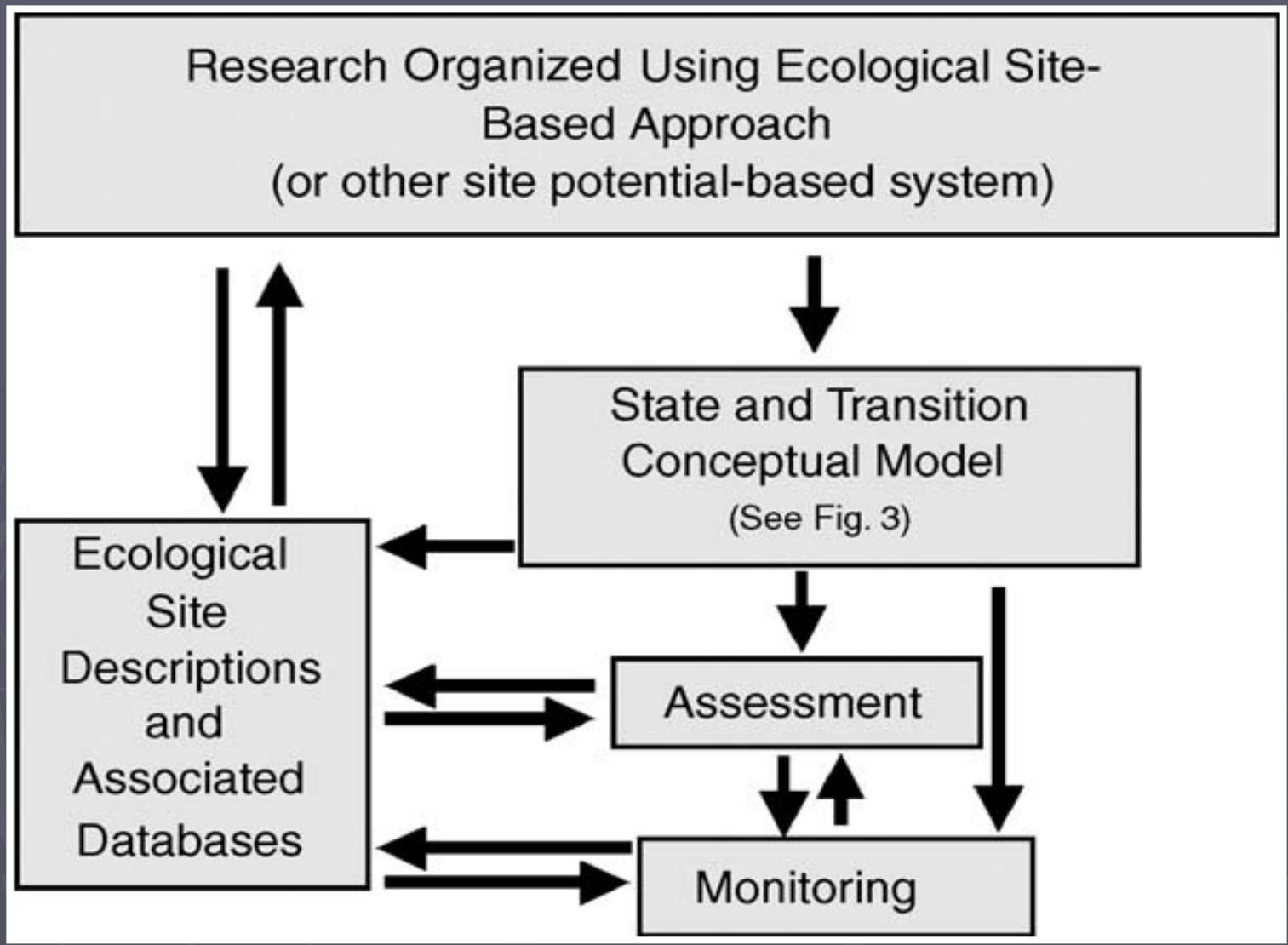
ESDs for Habitat Management

- ESDs are designed to provide information for all potential plant communities for specific soils
  - Soil and plant communities govern the quality of wildlife habitat
- ESDs forever evolving/improving
  - inclusion of wildlife habitat information
- Identified refinements needed to ESDs for wildlife habitat management
    - Vegetation structure/height/spatial distribution

ESDs for Habitat Management

- EDSs are a tool that identifies potential & specifies management/input necessary to achieve a particular future state.
- Valuable in identifying monitoring systems
  - Descriptions of habitat indicator changes can be incorporated into monitoring programs to make determinations of management success

Ecological Sites and Integrated Management Framework



J.E. Herrick et al. / Journal of Arid Environments 65 (2006) 319–335


Thank You
Questions?


N
NW
NE
W
E
SW
SE
S