Monitoring for Adaptive Management of the Grassland-Watershed at Las Cienegas NCA

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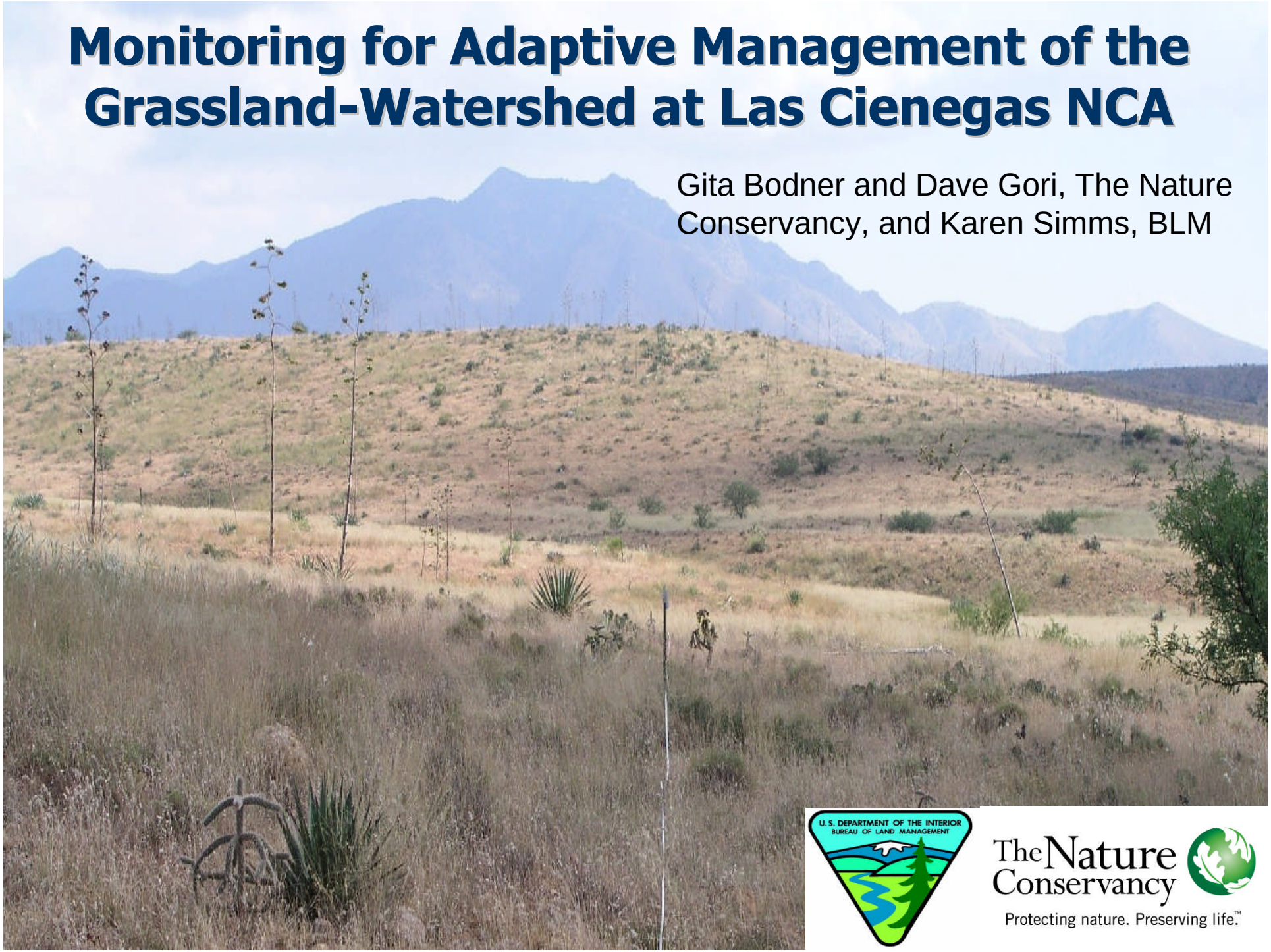

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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BLM - TNC Cooperative Agreement

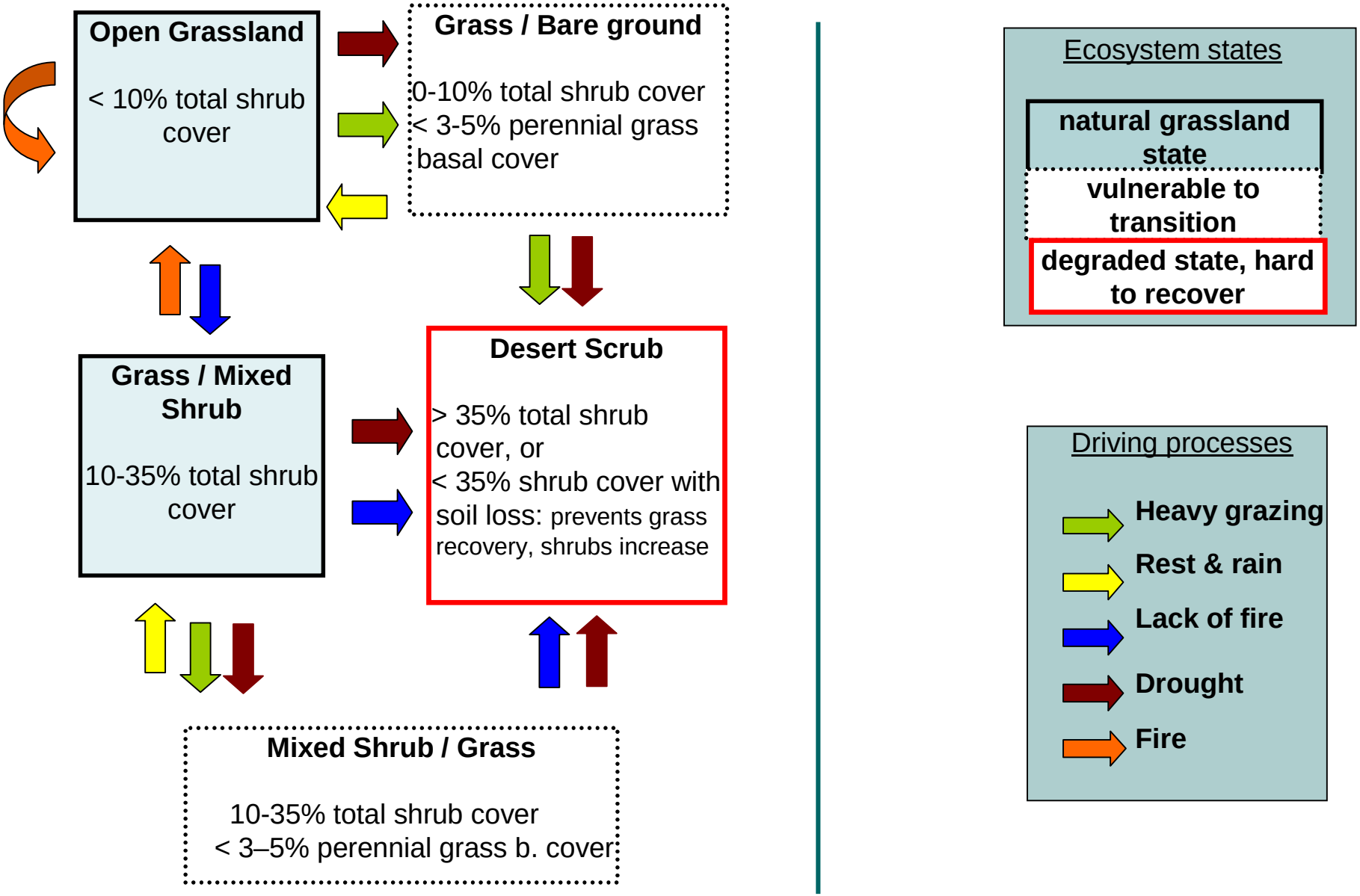
- Quantitative review of existing monitoring data & protocols:
  - how well do they address management objectives?
  - statistical power to detect change?
  - implementation cost?

- Help identify gaps monitoring program and analyze ways to fill; help implement monitoring on the ground

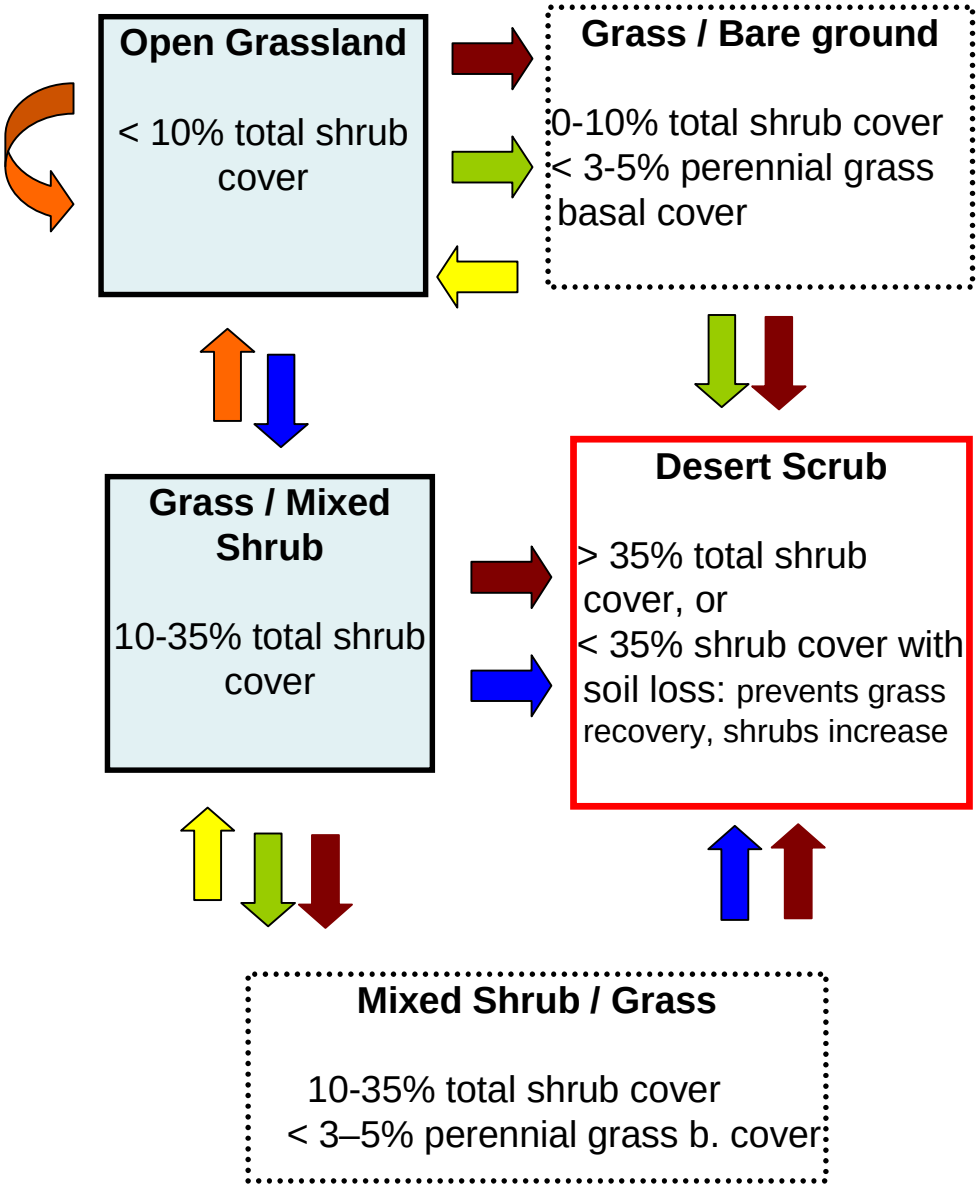
Las Cienegas RMP Upland Vegetation Objectives

- Maintain/achieve a *high similarity index* to historic climax vegetation on at least 80% of the ecological sites [Desired plant communities]
- Maintain/achieve < 30% *bare ground cover* in grassland communities [Desired ground cover]

Monitoring Protocol	Grassland Variable Estimate	Addresses Management Objective?
Point Cover	Substrate cover including bare ground, litter cover Change in perennial grass cover, composition	Yes
Dry Weight Rank	Similarity Index; percent similarity to historic climax	Yes
Pace Frequency	Combination of density and dispersion of plant species	No
Line-intercept Cover	Shrub cover by species	No, Critical threat



Conceptual model of Southern Arizona desert grasslands



Additional Objectives

- Maintain perennial grass basal cover >5%
- Maintain shrub canopy cover <35% (mesquite <20%)

Follow-up actions

- 4 new paired exclosure plots
- Burn/shrub control program activated

Heavy grazing

Rest & rain

Lack of fire

Drought

Fire

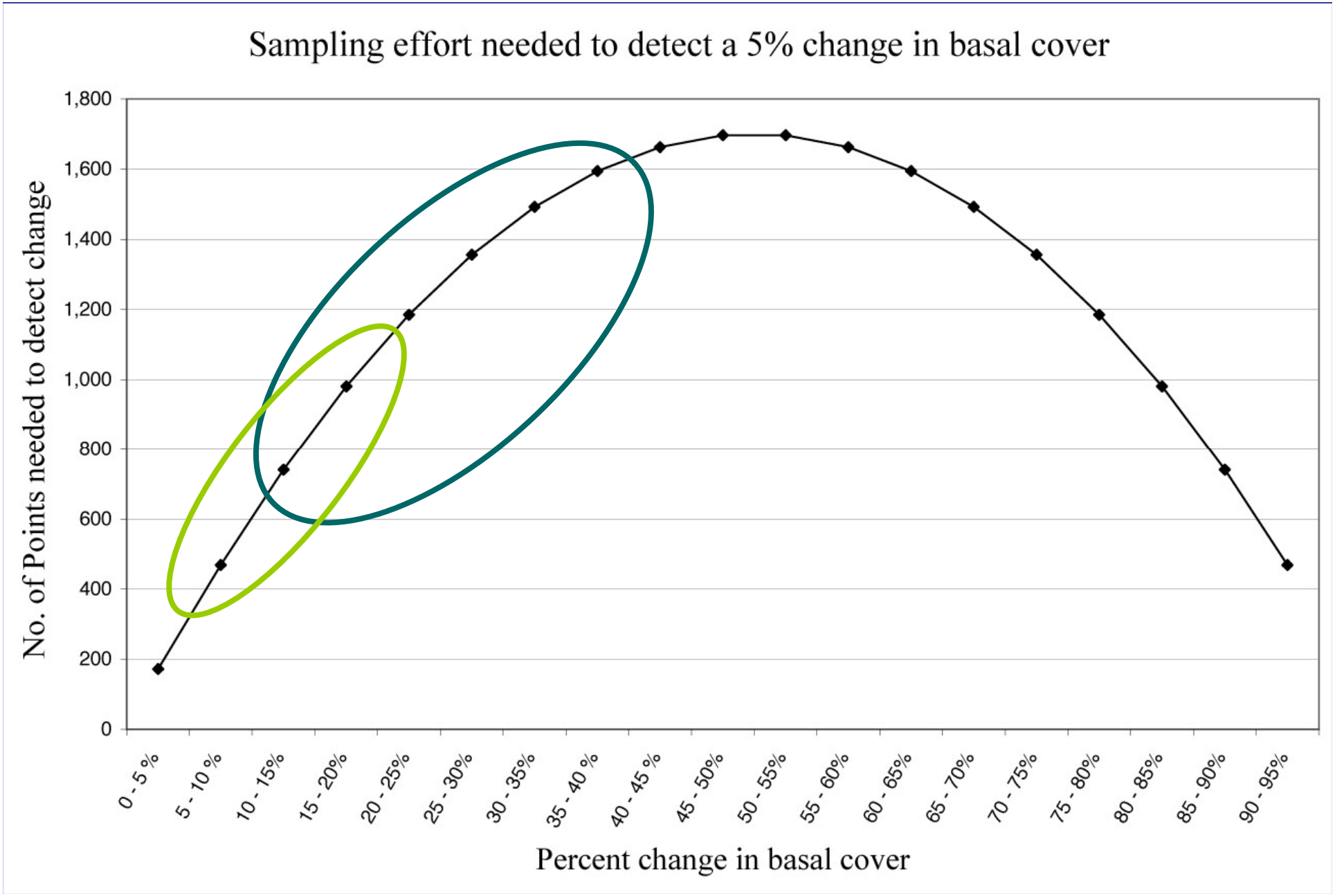
Conceptual model of Southern Arizona desert grasslands; shrub cover values based on published lit., work by NRCS, TNC; grass cover values based on less- extensive field data

Statistical power to detect change:

…monitoring system … established to reduce uncertainty

…Poor monitoring precision does more than simply slow the rate of learning; imprecise monitoring can produce misleading evidence that supports inappropriate management. Inaccurate or imprecise monitoring can actually be counterproductive to the goals of management. *(Adaptive Management Technical Guide 2:16)*

Statistical power to detect change:

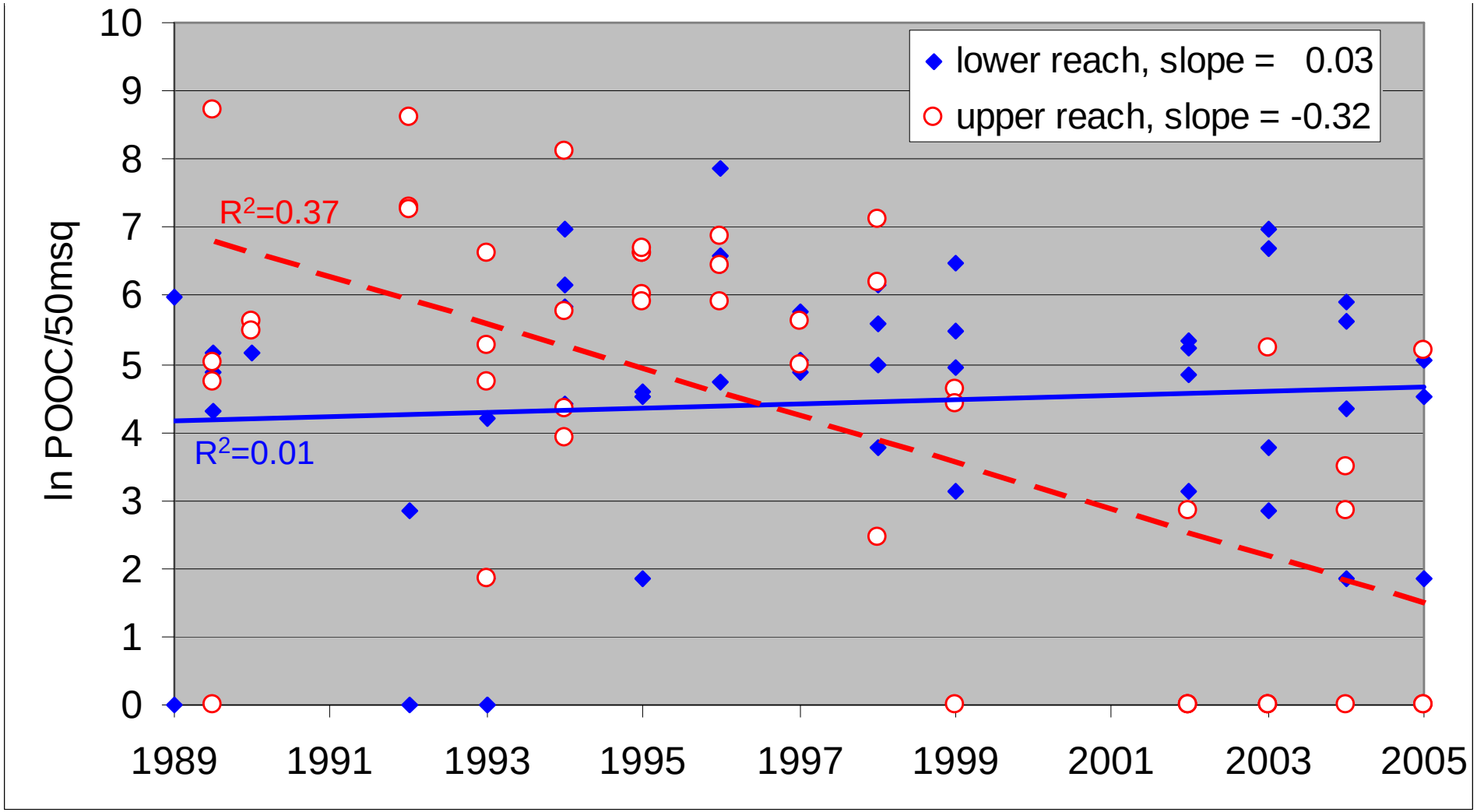


Confidence boosters

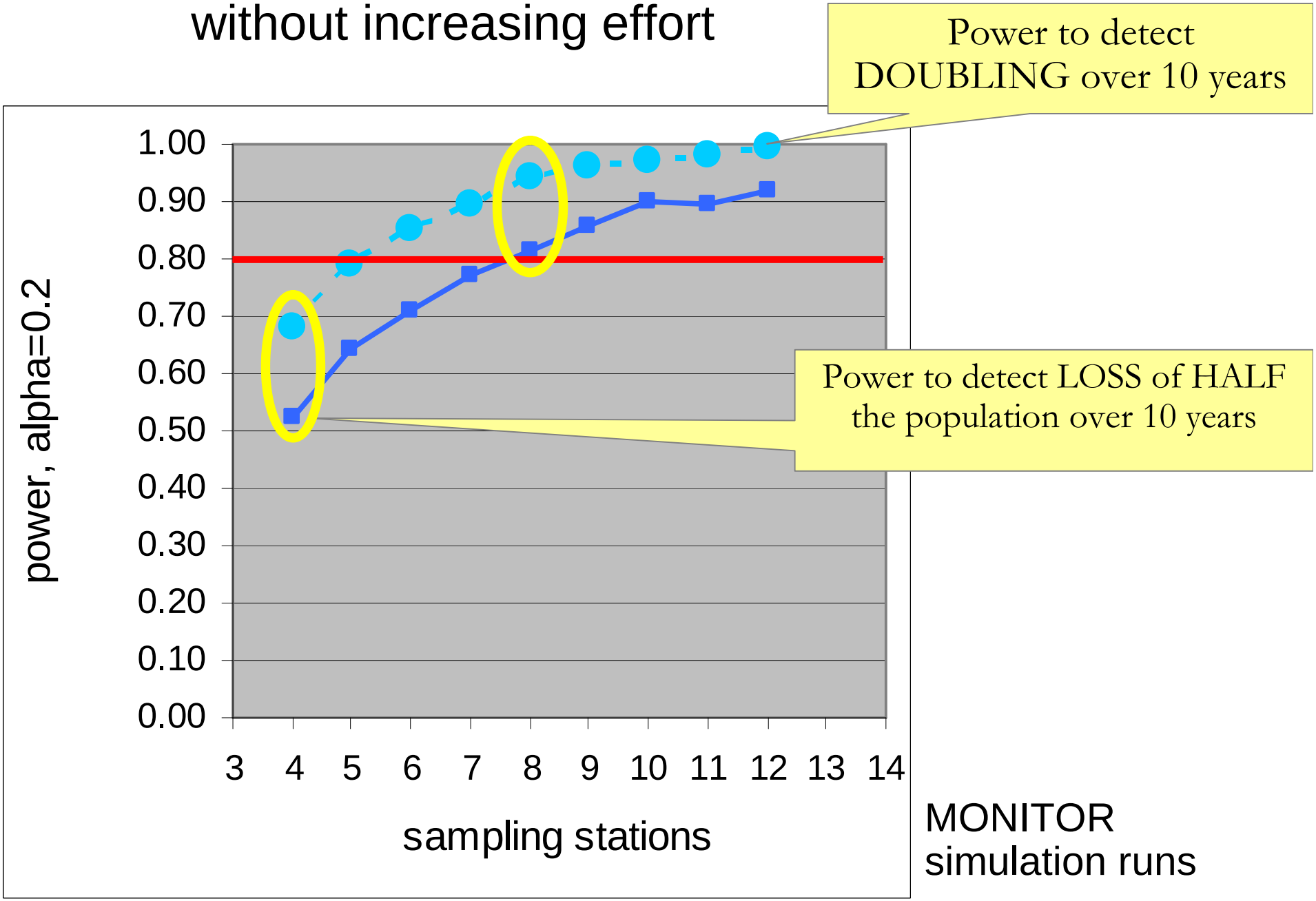
- Ecologically-based objectives with broad buy-in
- Explicit ecological models: basis for thresholds are clear, hypothesized drivers can be visualized
- Statistical power: larger sample size boosts power to detect important changes, reduces variability of estimates
- Teasing apart causality with paired exclosures, shrub measurements
- Transparency: process is open, concerns get vetted, results reports posted online at www.azconservation.org
- Time builds trust: stakeholders saw that monitoring data can be used to document recovery as well as declines, can help permittee protect bottomline

Gila Topminnow Population Trend 1989-2005

Regression of each site's log-density vs. year



Can make monitoring more powerful without increasing effort



MONITOR simulation runs