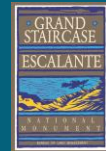


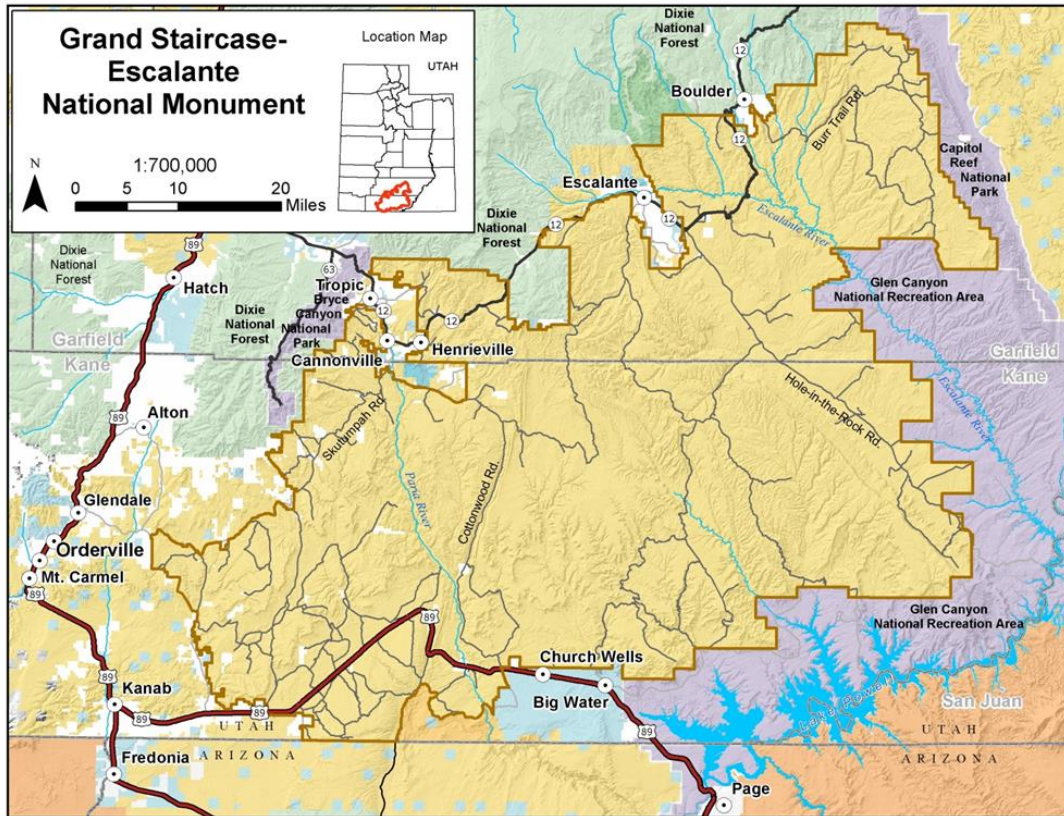
Implementing BLM's Assessment, Inventory and Monitoring (AIM) Strategy on Grand Staircase-Escalante National Monument

Sampling Design, Methods and Results
from Summer 2014

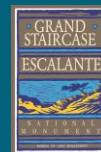
Society for Range Management
Sacramento, CA
February 5, 2015



Grand Staircase-Escalante National Monument

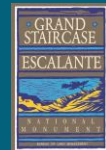


- Approx. 2 million ac (800,000 ha) land area
- Precip range 4-12 in (100-300 mm)
- Elevation 3,500-9,000 ft (1,050-2,700 m)
- desert shrub, sage steppe, semidesert grasslands, piñon-juniper woodlands



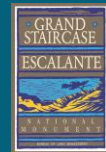
Objectives and Management Questions

- To assess plant community condition and land health
 - to provide data to support grazing management decisions
 - planning and implementation scales
 - planning (grazing EIS): estimate forage availability
 - to assess land health (evaluate effects of land uses)
- AIM strategy provides
 - probability-based sampling framework
 - consistent methods (terrestrial core indicators)
 - allows aggregation for inference at multiple scales
 - field office -> region -> state -> national



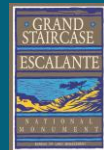
Sampling Design

- General strategy
 - Toevs et al, Aug 2011, “Assessment, Inventory, and Monitoring Strategy: For integrated renewable resources management”
- Stratified random sampling
 - stratification by lumped ecological sites
 - lumped by precipitation zone and potential vegetation
- Sample points distributed by potential production (lb)
 - area (ac) x potential production (lb/ac)
 - summed grass, forbs, shrubs (from ESD reference state)



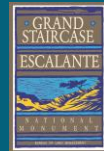
Sampling Design

Ecosystem Class	Total Plots
Upland pinyon-juniper woodland	64
Upland big sagebrush	57
Semidesert pinyon-juniper woodland	54
bottomlands/riparian	40
Semidesert fourwing saltbush	40
Semidesert big sagebrush	38
Other	30
Desert blackbrush	29
Desert fourwing saltbush	25
Desert shadscale	25
Semidesert shrubland	24
Alkali greasewood	19
Semidesert grassland	17
Semidesert shadscale	14
Upland cliffrose	10
Semidesert blackbrush	5
Mountain ponderosa-oak woodland	5
Grand Total	530

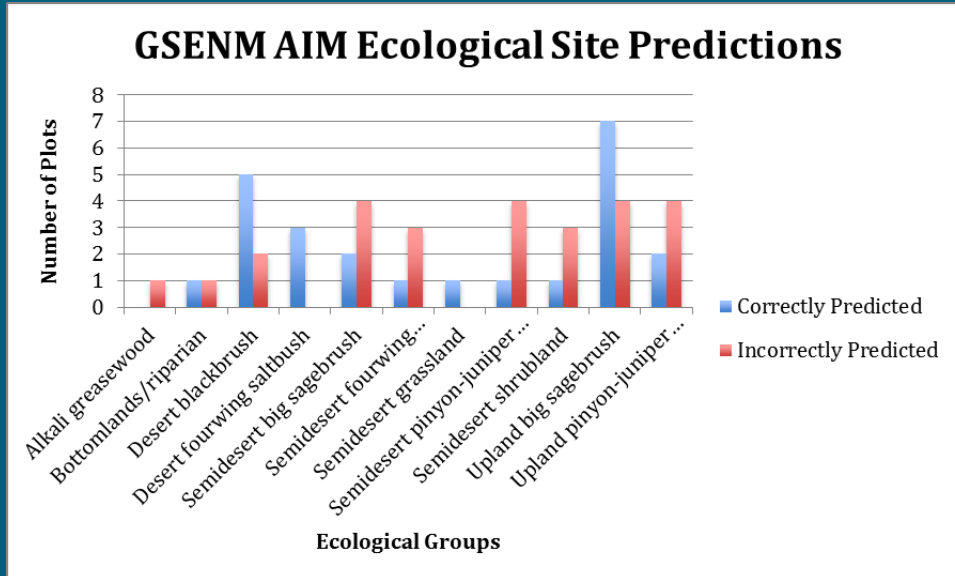


Field Methods

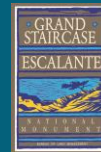
- Core indicators
 - MacKinnon et al, 2011, “BLM core terrestrial indicators and methods. Tech Note 440”
 - line point intercept
 - bare ground, vegetation composition, nonnative invasive plant species, plant species of management concern), vegetation height, canopy gap, plot-level species inventory
 - additional indicator (soil stability)
- Rangeland health indicators
 - Pellant et al, 2005, Interpreting indicators of rangeland health, ver 4. Tech Ref 1734-6.
- Rejection criteria
 - roads, slope, accessibility



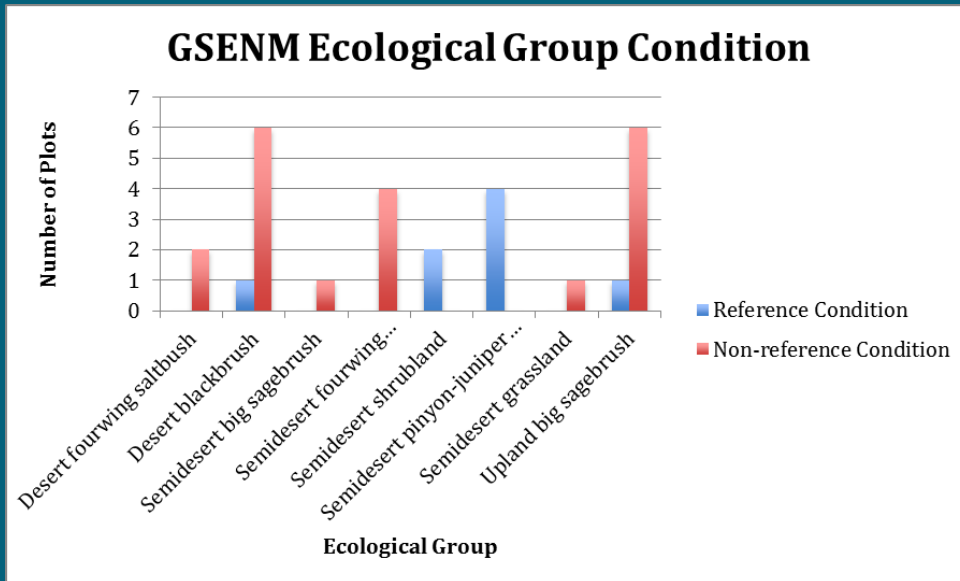
ESD Prediction Accuracy



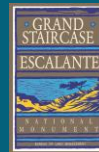
- Overall: 24/50 plots (48%) correct
- All correct: desert fourwing, semidesert grassland
- Mostly correct (>50%): bottomlands/riparian, semidesert big sagebrush/fourwing/piñon-juniper/shrubland, upland piñon-juniper
- Mostly incorrect (<50%): desert blackbrush, upland big sagebrush
- All incorrect: alkali greasewood



Community Type

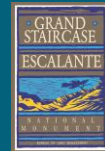


- Limited to ecological sites with state-and transition models (28/50 plots, 56%)
- Overall: 8/28 reference state (29%)
20/28 non-reference (71%)
- Reference state: semidesert shrubland, semidesert piñon-juniper
- Non-reference state: desert fourwing/blackbrush, semidesert big sagebrush/fourwing/grassland, upland big sagebrush



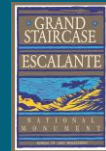
Challenges

- nature of soil survey (3rd order, complexes common)
 - error in predicting ecological site
 - possible improvements using existing data on topographic position/landform
 - possible improvements through remote sensing
- limited number of state-and-transition models
 - need to update ESDs



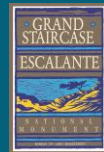
Conclusions

- Despite limitations, AIM data will help improve estimates of forage availability (based on site condition)
 - spatially explicit; allows alternatives analysis
- AIM data provides additional assessment data useful in allotment evaluations
- Compatibility of historic data sets (key areas) depends on spatial representativeness and method compatibility



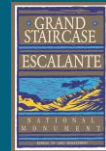
Next Steps

- Addition of aquatic indicators
- Vegetation mapping (remote sensing, state mapping)
- Apply AIM strategy to other resources
 - Cultural resources
 - Recreation?



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