EFROYMSON COACHES NETWORK

Genies in the Bottle: Tools to Assess Landscape Health & Predict Benefits of Conservation Strategies

LANDFIRE Tools, Remote Sensing, Predictive Models & Cost-Benefit Assessment

Bodie Hills & Mono Basin, California

"If you had a dollar to spend on conserving your public lands, where would you invest it first?"

TNC staff are posing this question to public land managers in the Great Basin and Mojave Desert. Land managers at the Bureau of Land Management's Bishop Field Office wanted the answers for a 200,000 acre project area in California's Bodie Hills and Mono Lake basin.

To answer the question, CAP Coaches Greg Low and Susan Abele, working with Dr. Louis Provencher, TNC-Nevada's Director of Conservation Ecology, deploy their "Enhanced Conservation Action Planning" toolbox. A case study of their work with BLM and local partners is described on the back side.

Susan, Greg and Louis report that the National Park Service is now contracting with TNC to apply the Enhanced CAP tools for Great Basin National Park, which encompasses desert floor to alpine habitats... as are the U.S. Forest Service and BLM for 200,000 acres of "basin and range" lands in eastern Nevada. The U.S. Fish & Wildlife Service has also expressed interest for the 1.5 million acre Desert National Wildlife Refuge, the largest wildlife refuge in the lower 48 states.

Enhanced Conservation Action Planning

- **Identify Conservation Targets**: Map ecological systems across the landscape, using *satellite imagery and remote sensing*
- **Assess Viability**: Use *landscape level measures of ecological condition* – to evaluate ecological condition:
  - Departure of each ecosystem from its natural range of variability
  - "High risk" vegetation classes
- **Assess Future Threats**: Use *predictive ecological models* to assess potential future impairment
- **Develop Conservation Strategies**:
  - Develop *alternative management strategies* to improve ecological condition and abate future threats
  - Run *computer simulations* to test if strategies achieve desired results
  - Evaluate which scenarios achieve the *highest return on investment*

Benefits & Constraints

- Works for large, relatively unfragmented landscapes ~100,000 to 1,000,000+ acres
- Only as good as the data; often requires investment in remote sensing to interpret LANDSAT or other satellite imagery
- Works for terrestrial and wetland ecosystems; aquatic systems require supplementary assessment
- Complements existing public agency land management plans
- Provides solid science foundation for federal agency NEPA assessments and funding requests

CASE STUDY: Bodie Hills Conservation Action Plan

- **The current condition of the ecological systems varies widely in terms of their departure from their natural range of variability.**

Ecological System	Ecological Condition: Departure from NRV	Relative % of High Risk Vegetation Classes
Alpine	Very Slight	*n/a*
Tobacco Brush	Very Slight	*n/a*
Montane-Subalpine Riparian	Slight	Very Low
Mountain Mahogany	Slight	Very Lowt
Pinyon-Juniper Woodland	Slight	Moderate
Juniper Savanna	Moderate	*n/a*
Low Sagebrush	Moderate	Very Low
Mountain Shrub	Moderate	Very Low
Stable Aspen	Moderate	High
Wet Meadow	Moderate	Very Low
Basin Wildrye-Big Sagebrush	High	High
Montane Sagebrush Steppe	High	Moderate
Seral Aspen	High	Low
Wyoming Big Sagebrush-Loamy	High	High
Wyoming Big Sagebrush-Sandy	High	High

Condition of Bodie Hills-Mono Lake Basin ecological systems as measured by departure from natural range of variability -- using LANDFIRE methodology and ecological models, and % cover in high risk vegetation classes (e.g. invasive species).

- **Several ecological systems are predicted to become further impaired over the next 20 years without good management.**

  Predictive ecological models indicate that about half of the ecological systems will become further departed from their natural range of variability, and several systems will have substantial increases in "high risk" vegetation classes, such as cheatgrass and invasive weeds.

- **Alternative strategies were tested using state-and-transition models to predict future outcomes.**

  Shown below is a Strategy Worksheet with actions, acres and costs for restoring the Montane sagebrush steppe, the matrix ecosystem in the Bodie Hills landscape

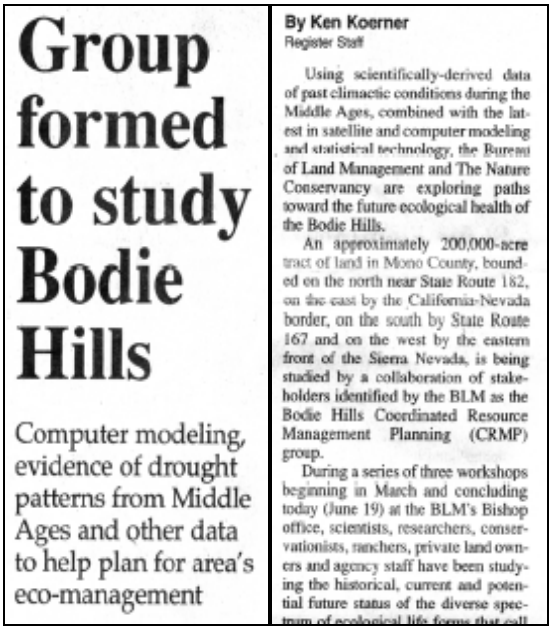
Project	**Bodie Hills**				
Conservation Target	**Montane Sagebrush Steppe**				
Objective	Improve ecological condition of ~120,000 acres of Bodie Hills montane sagebrush steppe from 72% departure (FRCC 3) from NRV to ~55% departure (FRCC 2), prevent increase in highest-risk classes to 30% or less… over 20 years, and establish fuel break around Bodie State Park providing ecological benefits by increasing Classes A & B				
Acres Treated/Year					975
Total Ecosystem Acres					119,836
Strategy	Treat ~1000 acres/yr of montane sagebrush steppe -- with prescribed fire, mowing/burning/ drilling/seeding, lopping & canopy thinning.				
Actions		*One Time Costs*	*Acres/Year*	*Cost/Acre*	*Cost/Year*
	Lop Class D & DPL & ShAP to prevent conversion to Tree Encroached Class; make available for firewood; explain fire risk		50	$ 300	$ 15,000
	Conduct early spring burns of Shrub/Annual/Perennial Grass Class (ShAP) to Class A		500	$ 40	$ 20,000
	DPL restoration & 300 ft. fuel break around 7 miles of State Park (280 acres over 3 years @$207/acre)	$ 112,000	-	$ 400	$ -
	Regular prescribed fire in Classes C & D		400	$ 50	$ 20,000
	Canopy thinning of Class C as needed for WUI objectives		25	$ 400	$ 10,000
	Archeological & plant surveys	$ 9,800	900	$ 35	$ 31,500
Total Cost/Year	*excluding one time costs*	**$ 121,800**			**$ 96,500**
Number of Years					20

- **Somewhat surprisingly, the predicted climate change impacts generally had nominal effects.**

  The key factor explaining these results was that increased adverse effects of CO_2 enrichment (e.g. "fertilizer" for cheatgrass) were cancelled out by decreased soil moisture due to predicted increased droughts.

- **Using a combination of ecological benefits and acres impacted, the basin wildrye, aspen, montane sagebrush, wet meadows and riparian ecological systems accrued the highest "return on investment."**

  To help prioritize resource allocation, metrics were used to show which management scenarios achieved the greatest ecological benefits per dollar invested, as compared to minimal management.



Group formed to study Bodie Hills

Computer modeling, evidence of drought patterns from Middle Ages and other data to help plan for area's eco-management

By Ken Koerner
Register Staff

Using scientifically-derived data of past climactic conditions during the Middle Ages, combined with the latest in satellite and computer modeling and statistical technology, the Bureau of Land Management and The Nature Conservancy are exploring paths toward the future ecological health of the Bodie Hills.

An approximately 200,000-acre tract of land in Mono County, bounded on the north near State Route 182, on the east by the California-Nevada border, on the south by State Route 167 and on the west by the eastern front of the Sierra Nevada, is being studied by a collaboration of stakeholders identified by the BLM as the Bodie Hills Coordinated Resource Management Planning (CRMP) group.

During a series of three workshops beginning in March and concluding today (June 19) at the BLM's Bishop office, scientists, researchers, conservationists, ranchers, private land owners and agency staff have been studying the historical, current and potential future status of the diverse spec-

Inyo Register, July 19, 2008

"People appreciate the opportunity to come and participate in an open dialogue on such projects. It increases the public's comprehension of the variety of land management issues our agency must consider."

Dale Johnson,
Vegetation Management Planner
BLM, Bishop Field Office