

# Research Needs for ELMAO

05/03/2011

## A. Ecosystem Management

1. Comprehensive resource inventory, monitoring, and research plan
2. Effects of Type conversion (specifically grasslands to woodlands) on parks biodiversity (ELMO)
3. Identify historic Pinyon-Juniper capacity at El Morro prior to type conversion in order to help fuel treatment options.
4. Historical differences in vegetative cover and the effects on park biodiversity, hydrology or on animal use patterns
5. Variations in floral and faunal populations due to fire frequency variations within local wilderness areas
6. Natural resource studies of unique volcanic geologies and associated biology's along the western continental divide and the Jemez Liniment
7. Resource inventory databases
8. Natural resource museum collection
9. Natural resource inventory and monitoring
10. Air quality:
  - Lichens, mosses and ferns as air quality indicators
  - Air quality tracers: where are our pollutants coming from and what are they?

## B. Fire Ecology

1. Effects of fire on cryptobiotic soils
2. ELMAO's fire history in comparison to an undisturbed natural fire regime
3. Fire effect variations using prescribed fire vs. natural fire management
4. Effects of re-seeding post fire

## C. Social and Recreation Science, Visitor Use

1. Visitor characteristics and use patterns surveys
2. Importance of parks water resources to the history and use patterns of the area

## D. Administrative and Legal Topics

1. Legal boundary studies
2. Prepare administrative history of natural resources management and research
3. The effects of centralization on personal management of federal employees
4. NPS water rights?

## E. Floral and Faunal specific

1. Temporal and spatial uses of both monuments by large game (elk, deer, sheep, pronghorn, bear)
2. Prairie dog dispersal and mortality
3. Remote sensing for suitable habitat: cinder phacelia, Mexican spotted owls, Pecos Sunflower....
4. Study population status and trends for Federally-listed, rare or declining native species
5. Use and population patterns of amphibians as indicators of watershed or ground water health
6. Bat caves and the associated troglobitic communities
7. Floral and faunal variations within differing cave zones ( 5 zones, using deep dark)
8. Model the effects of grassland restoration on wildlife populations
9. Effects of fire suppression on grasslands at El Morro

## **F. Hydrology**

1. Effects of upstream restoration of the Agua Fria watershed on downstream park resources
2. Effects of exotics on NPS watersheds
3. Surface water flows

## **G. Geology, Volcanology and Lava Tubes**

1. Comprehensive cave resource inventory and assessment
2. Bat population surveys identifying hibernacula, paternal and maternity sites
3. Geomorphology of lava tube systems and effects on associated floral and faunal species
4. Ice cave resources as indicators for climate change, surface vegetation or air quality
5. Remote sensing for cave resources and unique volcanic geomorphology
6. Geologic compositions and types of El Malpais eruptions in comparison to all volcanic activity in New Mexico and along the Jemez Liniment
7. Volcanic activity along Jemez liniment as a lagging indicator to earths polarity changes
8. Remote sensing of cave openings

## **H. Cultural Resource-Related Research needs:**

1. Traditional Use Studies for both monuments
2. Ethnobotany of El Morro (El Malpais could use one, too)
3. Comprehensive archaeological inventory for El Malpais
4. Effects of Climate Change to the cultural resources of El Morro and El Malpais
5. Data Recovery (a term often used for archaeological excavations) on sites affected by soil erosion at El Malpais and El Morro
6. Geophysical Remote Sensing of El Morro (to identify buried cultural resources)
7. Clay sourcing studies of the ceramic artifacts of El Malpais and El Morro (partnerships with Acoma and Zuni would make this even more significant research)
8. Oral Histories for both monuments
9. Archaeology of the Lava Tubes of El Malpais
10. Archaeology of the Cinder Cones of El Malpais
11. Kipuka Archaeology in El Malpais
12. GIS-based predictive modeling of archaeological site locations in the lava flows of El Malpais (particularly so for trails)
13. Land Use Histories
14. Determine native uses of fire and its effect on systems and/or perceptions
15. Age, location, and use of culturally modified trees