



Summary Briefing for the Desert Managers Group

May 19, 2010

Death Valley, California



Objectives

- Increase understanding of climate change processes and their effects on the physical systems and biota of the Great Basin and Mojave Desert
- Provide the “best available” scientific information for adapting to change. Examine research and management needs
- Evaluate management constraints and determine potential solutions
- Develop effective research and management collaborations for addressing climate change into the future



U.S. Department of the Interior

DOI's Climate Change Science, Adaptation & Mitigation Strategy

Thomas R. Armstrong, Ph.D.
Senior Advisor for Climate Change
Office of the Secretary
U.S. Department of the Interior



Adaptation: Invasive Species and Fire



The Problem:

Annual grasses are increasing throughout the western U.S. Drought and climate change may shift distributions, but drought-tolerant species continue to spread, increasing fire frequency and intensity, and eliminating wildlife, livestock forage and habitat

The Science:

- Mapping annual plant invasions
- Understanding factors controlling invasion
- Documenting ecological effects of invasion
- Investigating soil additives to enhance restoration
- Mapping historic fires to understand causes

Management Options:

Prevent invasion by:

- Mapping vulnerable soils, avoid soil disturbance
- Fostering biological crusts
- Controlling fires as much as possible
- Restoring native plant species





Western Regional
Climate Center



Climate Variability and Change in the Great Basin: Observations and Projections



Kelly Redmond

Western Regional Climate Center

Desert Research Institute

Reno NV



**Natural Resource Needs Related to Climate Change
in the Great Basin and Mojave Desert:**

Research, Adaptation, Mitigation

Las Vegas, Nevada, 2010 April 20-22



Research needs (1/1)

Thorough elucidation of temperature effects of climate change
Because of much greater confidence in temperature projections

Effects of climate change on fine spatial scales

For hydrology

“Fine” is on the order of 1-4 km

For ecology

“Fine” is on the order of a few meters to a few km

Mountains and complex terrain issues

Snow hydrology and temperature issues

Particular interest in recharge

Effects of rising temperatures

What is the “equivalence” between precipitation and temperature effects ?

Appears to be that about +1 C is ~ “like” 2-4 % less precipitation

Mountain block recharge – how does it work, in detail ?

Downscaling

Dynamical. To how small scales can this be pushed?

Statistical. Will eventually be needed at some small scale.

Climate change uncertainty. Quantification and depiction.



Global Climate Change: Potential Effects on Ecosystems in the Great Basin and Mojave

Stanley D. Smith

**University of Nevada,
Las Vegas**

(stan.smith@unlv.edu)



Adaptation: Managing Ecosystems to Withstand Climate Change Impacts (ESA 2010)

- Because freshwater resources are of particular risk, take additional steps to protect water quality and quantity
- Enable natural species migrations across human dominated landscapes (corridors)
- Improve capacity to predict extreme events and their ecosystem impacts
- Manage collaboratively at the ecosystem level

America's Conservation Landscape in the Face of Changing Land Use and Climate Change.

J. Michael Scott

USGS, Idaho Cooperative Fish & Wildlife Research

Two Classes of Adaptation

- Maintain or enhance resilience
 - Reduce or eliminate non-climate challenges
 - Support the capacity of species/systems to adapt
- Prepare for regime shifts
 - Develop the capacity to
 - Modify management actions
 - Anticipate regime shifts
 - Identify alternate ecosystem services
 - Shift targets to new areas or agencies
 - Manage transitions to new states

Maintain & Enhance Resilience - I

- Minimize non-climate challenges
- Increase connectivity among existing units
- Increase conservation footprint by all means (**BCOR²**)
 - spatially **B**alanced
 - functionally **C**onnected
 - directionally **O**ptimized
 - **R**epresentative (one of each target)
 - **R**edundant (replicates of each target)

Maintain & Enhance Resilience - II

- Communicate and Educate
 - Reintegrate refuges into the American mindset
 - Build support for climate adaptation and mitigation
- Attempt to conserve refugia
 - Only for threatened or endangered species or habitat
 - ~ one-third of T&E refuges highly vulnerable
- Relocate
 - Only as a last resort

Prepare for Regime Shifts - I

- Project possible futures
 - Multiple scenarios to address uncertainty
 - Multiple scales
 - Identify mechanisms of response
 - Acknowledge potential “surprises”
- Develop scenario specific policy responses
 - Scale specific
 - State objective criteria for choosing among policy options
- Prioritize research agenda
- Increase collaboration with everyone

Prepare for Regime Shifts - II

- Increase length of planning/budgeting horizons
 - 1-yr operational and 3-yr research funding > inadequate
- Develop and implement monitoring programs
 - To assess status and trends of targets
- Use adaptive monitoring/management to
 - Inform the planning process regarding:
 - Required frequency and intensity of monitoring
 - Additive or compensatory nature of seasonal effects

Immediate Need

- Act now
 - Do not wait for perfect models
 - Use expert opinion
 - Lost opportunities cannot be regained
 - Mistakes will be made
 - Reward innovative risk taking
 - Capitalize on existing management experience
 - recent rapid warming encompasses entire history of NWRS



Changing Gradients: Effects on Species Invasions & Migrations

What will we manage for?

**Julio Betancourt USGS &
Rita Beard, NPS**

***Natural Resource Needs
Related to Climate Change in
the Great Basin & Mojave
Deserts: Research,
Adaptation, Mitigation***

April 21, 2010

Las Vegas, NV

Gotta Prioritize and Fund the Right Science

- Mapping, monitoring, and remote sensing
- Decision support/adaptive management
- Control methods- Life cycle of treatments
- Habitat suitability models & sensitivity simulations
- Fuel load & fire spread models
- Post-fire restoration
- Long-term effects of invasion & forecasting of environmental consequences should mitigation fail
- Cost-benefit analysis and long-term (20+ yrs) under alternate climatic and social scenarios

Climate change and plant invasions in the Great Basin and Mojave Deserts

Bethany Bradley

*Dept. of Natural Resources Conservation
University of Massachusetts, Amherst*

Priorities?

Use model projections where they're available

Reduce disturbance, target corridors

Expand extent and frequency of monitoring

Expand data sharing across jurisdictions

Use flexible protocols to enable fast response

Consider restoration opportunities

Great Basin & Mojave Desert Climate Change Workshop

Las Vegas, Nevada

April 21, 2010



Tony Willardson, Executive Director
Western States Water Council

Climate Change Adaptation

- Focus on vulnerabilities and building increased resiliency to climatic extremes.

1st Data Collection

- Expand Funding for snow surveys, streamgaging, and remote sensing of evapotranspiration (ET), ground water, water use

2nd Improved Climate Prediction & Modeling

- Urge Congress to fund more research
- Need for scaling models to regional and local level

3rd Impact Assessment

- Water supplies and demands



MANAGEMENT ACROSS BOUNDARIES

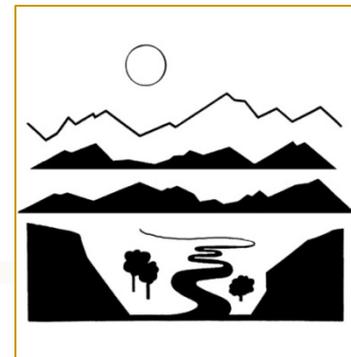
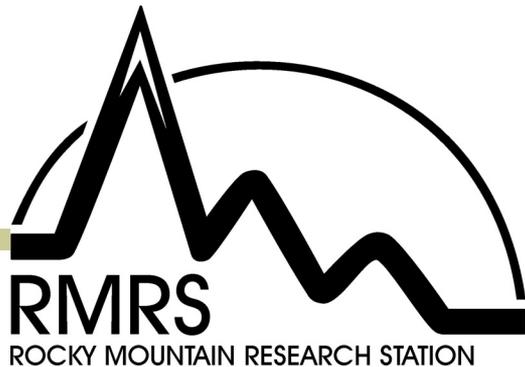
OBSTACLES AND OPPORTUNITIES

Dennis Schramm, Superintendent
Mojave National Preserve
A unit of the National Park System



So what works?

- ❑ Groups like DMG and SNAP are model forums for collaboration and cooperation
- ❑ Land managers need to meet regularly, get to know each other, exchange information about current activities, set goals, and form targeted groups to focus on specific cross boundary issues
- ❑ Ad hoc groups need to be formed to tackle short term issues, while standing groups can focus on long term concerns
- ❑ We need coordinators to reach across the many groups and interact with each working group; they need to keep the records of the organization and do the logistics
- ❑ We have to respect each others missions and strive to learn more about them
- ❑ By doing these things it causes us to think outside our own boundaries and focus on desert-wide conservation issues



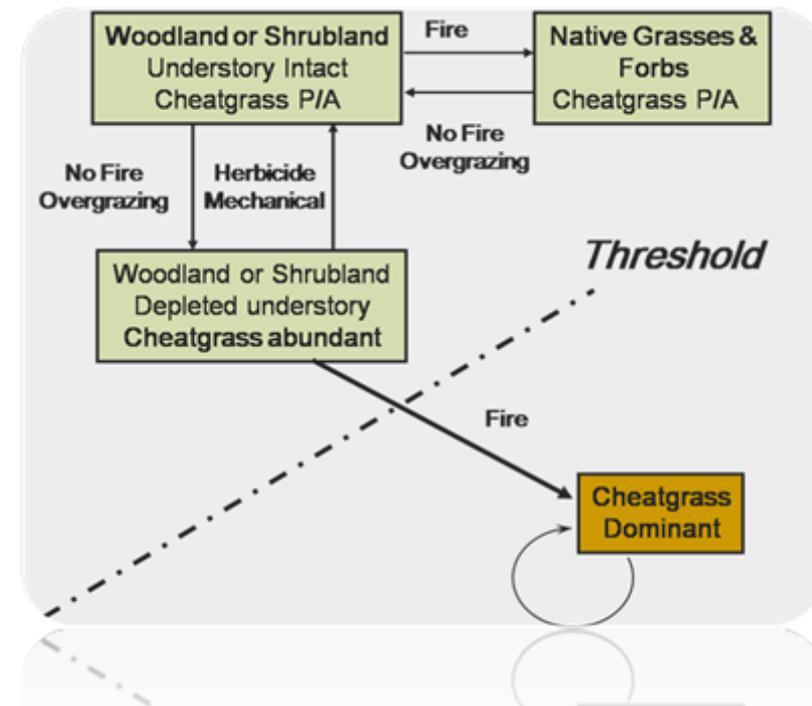
Cross-boundary Management in a Changing Environment - A New Era of Collaboration

Jeanne Chambers
US Forest Service, RMRS
Reno, NV



Science & Management Needs

- Mechanisms for prioritizing management across agencies at landscape scales
- Basic ecological understanding of several critical factors
 - Landscape connectivity
 - Ecological resilience
 - Ecological thresholds
- Adaptation strategies to reduce risk of adverse environmental outcomes



The Road Forward

- Climate change necessitates collaborative research & management that effectively crosses administrative boundaries
- Increase understanding of connectivity, resilience, thresholds
- Develop adaptation strategies
- Obtain consensus on priorities
- Conduct cross-boundary strategic planning
- Leverage resources to implement activities & monitor outcomes
- Collectively determine if adjustments are needed

