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Progress in strategic research areas

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Mojave Applied Ecology Notes

Progress in Strategic Research Areas

Scott Abella, Program Manager

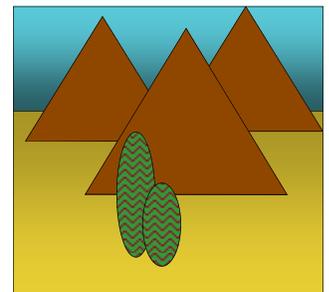
Three years ago through conversations with resource managers, assessing the status of knowledge of the scientific literature, and our own interests, we set forth several strategic research areas that we believed would be timely for advancing Mojave Desert conservation and management. Below is a partial list of these initiatives with a summary of progress made and thoughts on future directions:

Fire Ecology and Management. We sought and are seeking to understand natural recovery patterns after desert wildfires and how burns may be actively managed to accelerate revegetation. To date, we have published a literature synthesis of natural post-fire recovery patterns in the Mojave and Sonoran Deserts [1], a case study of recovery on the Loop Fire in southern Nevada's Red Rock Canyon [2], and a monitoring assessment of post-fire seeding effectiveness in the Sonoran Desert [3]. Further, we have completed fieldwork for a Clark County-wide (southern Nevada) assessment of recovery on a temporal chronosequence of 32 fires differing in age, are continuing monitoring with the BLM-Las Vegas on fire effects and post-fire seeding, and brought a nationally competitive Joint Fire Science grant to the Mojave Desert in 2007 to examine species traits for identifying candidate revegetation species. These efforts help provide a foundation of knowledge, but have only scratched the surface on this important topic; we are interested in a variety of future studies.

Revegetation and Ecological Restoration. Our first step in this initiative was to quantitatively synthesize the scattered literature on revegetation methods and effectiveness in the Mojave Desert, which illuminated examples of both successful and failed projects [4]. Simultaneously, we sought to identify a concept of reference conditions (e.g., ecosystem conditions before burro and livestock grazing) for the Mojave Desert to assist in setting management goals by reconstructing the species composition of past desert ecosystems. This effort has been slow to gain momentum, although we have published a status of knowledge on how burros may have affected current vegetation [5]. We also have ongoing projects with Joshua Tree National Park and Lake Mead NRA to assess techniques for revegetating disturbed roadsides. The purpose of the next generation of revegetation experiments should be to compare a variety of candidate prescriptions and species while controlling for as many external factors as possible.

Invasibility/Exotic Species. We adopted a two-faceted approach involving understanding what makes communities invulnerable by exotic plants (and how invulnerability could be manipulated positively) and developing specific treatment prescriptions for killing targeted species. We have completed and are working on a variety of projects to meet these objectives, such as evaluating invasion patterns of exotic annuals in the eastern Mojave [6], comparing community condition among springs in the Sheep Mountains, examining the exotic Sahara mustard's seed banks and establish-

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ment requirements, a graduate project by Adria DeCorte on soil effects on invasibility, and a graduate project by Sara McPherson on invasibility and an overall project on the status of exotic species threats in Mojave Desert parks. We are not satisfied with progress on habitat requirements and control prescriptions for exotic annual grasses, and look forward to future projects to advance this critical area of research.

Climate Change Management. We have been working with Stan Smith to assist efforts in understanding effects of elevated CO₂ on desert ecosystems. We also have an ongoing graduate student project by Chris Roberts to assess 30-year dynamics of desert vegetation in southern Nevada by re-measuring a landscape network of plots established in 1979. We believe that a serious shortcoming in current research and management on the ground is that there are few examples of **specific** management plans and implementation of prescriptions for conserving resources in a changing climate. We are hopeful that some of the several funding proposals we have written to try to provide science support for specific climate change management are funded, because we believe that some specific examples could help stimulate progress in this emerging area of conservation and land management. The Mojave Desert could be at the forefront of some of these efforts.

We have worked to advance these initiatives through literature syntheses and new monitoring and research field studies. We appreciate the financial support we have received from the National Park Service, Bureau of Land Management, Joint Fire Science Program, and the Ecological Restoration Institute at Northern Arizona University. We welcome feedback on opportunities to advance these objectives and possibilities for future attention.

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