



Resource Management and Research Division: Vegetation Management Program, 2014

Introduction

The Resource Management and Research Division oversees both natural and cultural resources in Zion National Park, Cedar Breaks National Monument, and Pipe Spring National Monument. The division includes seven programs: Wildlife Management, Vegetation Management, Physical Sciences, Cultural Resource Management, Environmental Planning, Geographic Information Systems, and the Museum program. The resource programs administer numerous research activities that are conducted by outside universities and other agencies. Additionally, we receive support for long-term monitoring by the Northern Colorado Plateau Network. (Visit <http://science.nature.nps.gov/im/units/ncpn/> for more information about what this program is doing in each park.) The resource programs are involved with various outreach projects, including Zion Canyon Field Institute courses. This handout describes the Vegetation Management Program and many of the on-going projects for the 2014 field season.

Non-Native Plant Species

Of the 1,086 known plant species in Zion, 162 are non-native. The Vegetation Program staff and volunteers control invasive, non-native plants over a 1,500 acre area each year through Integrated Pest Management (IPM) techniques. IPM uses the least environmentally disturbing methods to achieve desired results. Methods may include preventative measures as well as mechanical and chemical techniques. Non-native plant populations and their effects on native plant communities are carefully documented. Control work in any given area can take many years to reach eradication or containment of target species. Priority areas include wetland and riparian corridors, developed areas, areas of high visitor use, and rare plant habitats.

Priority Species Include:

- Tamarisk, *Tamarix ramosissima*
- Russian olive, *Eleagnus angustifolia*
- Tree of heaven, *Ailanthus altissima*
- White top, *Cardaria draba*
- Scotch thistle, *Onopordum acanthium*
- Bull thistle, *Cirsium vulgare*
- Knapweeds, *Centaurea sp.*
- Yellow Star thistle, *Centaurea solstitialis*
- Mullein, *Verbascum thapsus*
- Field bindweed, *Convolvulus arvensis*
- Puncture vine, *Tribulus terrestris*
- Russian thistle, *Salsola kali*
- Kochia, *Kochia scoparia*
- Horehound, *Marrubium vulgare*
- Cheatgrass, *Bromus tectorum*
- Ripgut brome, *Bromus diandrus*
- Red brome, *Bromus rubrum*
- Smooth brome, *Bromus inermis*
- Annual mustards, *Descurainia spp.*, *Chorispora spp.*, *Sisymbrium spp.*



Tamarisk



Native Plant Management

Each year, park staff and volunteers collect dozens of pounds of native seed and propagate native plants for revegetation projects throughout the park. Seed is cleaned, sorted, and stored according to species and zone of collection for later use in restoration projects.

In the park, staff and volunteers broadcast the locally-gathered seed, plant the young plants raised in the nursery, and transplant native plants salvaged from nearby areas. Because the new plantings and the emerging seedlings are fragile, each newly restored area must be protected from human trampling—usually achieved through fencing and education. Due to the abundance of competitive exotic species and low annual rainfall in Zion combined with several drought years, restoration sites must be watered and weeded for a minimum of one year after planting. Each restoration site is documented and monitored, and the growth and survival of newly planted and seeded natives are evaluated.

Some recent construction projects have resulted in large areas of ground disturbance along the Pa'rus Trail and at the Visitor Center. Restoration of those areas will start in the fall of 2014 with broadcast seeding and planting of native vegetation.



Cleaned seeds, ready for storage



Research in Cheatgrass Control

The spread of cheatgrass (*Bromus tectorum*) is a concern at Zion, as it is throughout the west, not only because of its ability to compete with native vegetation but also due to the impact on the fire cycle. Vegetation program staff, scientists with the US Geologic Survey, and university cooperators have been working on developing a successful strategy to reduce cheatgrass and convert these areas to native and more fire-resistant vegetation. A study is underway to determine the success of various native plant species when seeded following cheatgrass treatments. In addition, different seed application methods are being evaluated. The goal is to develop a seed mix and application techniques that will be the most effective in helping to establish native vegetation following cheatgrass treatments.

Demographic Monitoring of Shivwits Milkvetch

Shivwits milkvetch is a federally listed endangered plant found only in southwest Utah, with the largest population located in Zion. Staff collects an abundance of data annually for the largest populations to track population trends. In 2013 monitoring was expanded with the addition of demographic monitoring. Demographic studies involve following individual plants to gain a better understanding of their life cycle. This monitoring will help answer questions about mortality rates and timing of transitions between life stages.

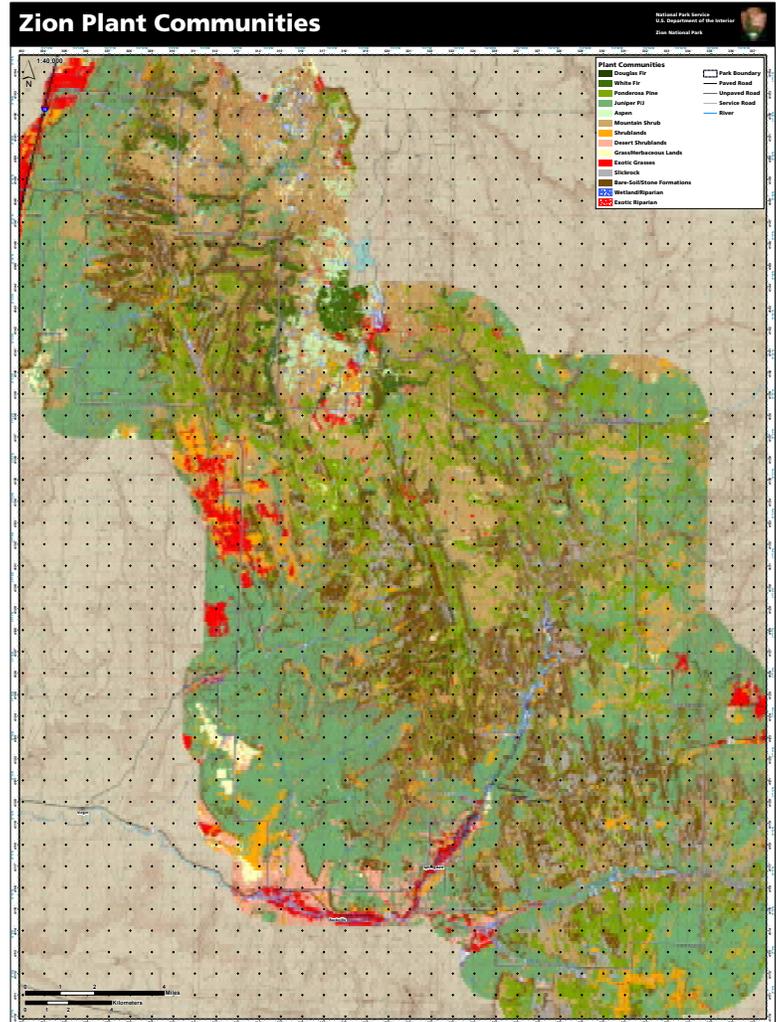


Monitoring & Modeling of Rare Plants

Of the over 1,000 plant species found in Zion, many are considered rare including the federally listed endangered Shivwits milkvetch (*Astragalus ampullarioides*). For many of these rare plant species we do not know the extent of their distribution within the park. The use of GIS modeling has provided a means to identify potential suitable habitat within the park for these rare and endangered plants. A model has been developed for suitable habitat for Shivwits milkvetch and each year some of areas identified as potential habitat are surveyed. This has led to the discovery of new populations of Shivwits milkvetch. Models of suitable habitat have been completed for a few other rare plant species.

Zion Seed Increase Fields

Genetic integrity is maintained at Zion by not introducing seed or propagules from different zones based on elevation, watershed, and human impact. Through the Challenge Cost Share Program, Zion was able to secure funding in 2007 to install fields where we can grow native plants to harvest seed, allowing us to further maintain genetic integrity and protect plants from competition. With weed control and extra water from drip irrigation, individual plants are able to produce far more seed than wild plants. After successfully growing three species of native grasses over the last five growing seasons (producing over 800 pounds of cleaned seed), Zion staff are now replacing decadent plants with several new native species, including two grasses and three forbs. A secondary aspect of this project is the processing and storage of native seed and learning the skills necessary to maintain the highest quality seed for long-term and large-scale projects. This has resulted in the acquisition of two essential seed cleaning machines to efficiently and accurately clean the seed, allowing us to use the purest form of the seed, as well as reducing the volume of material that requires storage. This grant also enabled the native plant nursery to acquire a new seed cooler, which is critical for maintaining the long-term viability of collected seed.



Mature Plants in the Increase Field