

3-31-2008

Lake Mead National Recreation Area Vegetation Monitoring and Analysis: Quarterly Progress Report, January 1– March 31, 2008

Margaret N. Rees

University of Nevada, Las Vegas, peg.rees@unlv.edu

Follow this and additional works at: https://digitalscholarship.unlv.edu/pli_lake_mead_vegetation



Part of the [Desert Ecology Commons](#), [Environmental Monitoring Commons](#), [Natural Resources and Conservation Commons](#), [Natural Resources Management and Policy Commons](#), [Systems Biology Commons](#), and the [Weed Science Commons](#)

Repository Citation

Rees, M. N. (2008). Lake Mead National Recreation Area Vegetation Monitoring and Analysis: Quarterly Progress Report, January 1– March 31, 2008. 1-10.

Available at: https://digitalscholarship.unlv.edu/pli_lake_mead_vegetation/8

This Report is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Report in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Report has been accepted for inclusion in Vegetation Monitoring by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact digitalscholarship@unlv.edu.



QUARTERLY PROGRESS REPORT

University of Nevada, Las Vegas

Time Period: January 1— March 31, 2008

Cooperative Agreement Number H8R07060001

Task Agreement Number J8R07060011

Lake Mead National Recreation Area

Vegetation Monitoring and Analysis

Executive Summary

- The Weed Sentry program surveyed 104 miles of transportation corridors on federal land in Clark County for incipient populations of exotic plants.
- Seven manuscripts attained in-press or published status and two manuscripts were submitted for review this quarter. Among other in-press manuscripts, are one documenting Sahara mustard germination patterns (Western North American Naturalist), one assessing exotic species distributions in Clark County (Environmental Monitoring and Assessment), and another is a synthesis of burro effects on Mojave Desert vegetation (Environmental Management).
- Staff delivered four presentations this quarter at conferences or at agency meetings.
- Twenty-six Las Vegas bearpoppy sites were assessed as part of rare plant monitoring efforts through the MSHCP program.
- A total of 14 fires have been sampled to date as part of a county-wide survey effort of burn succession and exotic grass distributions.
- UNLV M.S. candidate Chris Roberts has sampled approximately 100 plots as part of a major effort remeasuring plots established in 1979 in the Newberry Mountains.

Program Activities

The task agreement was awarded to UNLV on October 1, 2006. This report covers the period January 1, 2008 to March 31, 2008. The following activities have been conducted toward meeting or exceeding deliverables in the statement of work.

Invasive Plant Monitoring and Treatment (Weed Sentry Program)

Research assistants in the Weed Sentry Program are tasked with mapping and treating incipient populations of exotic species on targeted federal lands throughout Clark County. Surveying activities for invasive species that took place from January 1, 2008, to March 31, 2008, are divided into sections by federal agency, and are summarized in Table 1. One hundred and four miles and 833 acres were surveyed for exotic, invasive species during this period. Weed Sentry is continuing to work through technical difficulties with the GPS units. Weed Sentry staff has worked with data managers to redesign a more efficient database and new data dictionaries for the new GPS units. The new database should be up and running within the next couple weeks. Due to the many technical difficulties we have experienced with various GPS units, new protocols are being designed to maximize survey efforts in the field even when GPS units malfunction. Another meeting is set up with NPS data managers for March 28th to outline the new protocols for data collection. In spite of all the time and effort it has taken to overcome the many technical difficulties, Weed Sentry has still been able to survey a respectable number of miles. In the future, with the new protocols in place, we anticipate being able to survey a much greater area.

Table 1. Summary of miles and acres surveyed, Weed Sentry Program, January 1, 2008-March 31, 2008, by federal agency.

| Agency | Miles | Acres |
|----------------------------------|--------------|--------------|
| Bureau of Land Management | 9 | 71 |
| National Park Service | 95 | 762 |
| Total | 104 | 833 |

A. Locations surveyed: Bureau of Land Management

Surveys on land managed by the BLM occurred in the following locations: Jean Railroad and Jean Correctional Center Road. These locations are near rare plant habitat (*Penstemon albomarginatus*).

B. Locations surveyed: National Park Service

The following approved roads were surveyed: 1, 1A, 2A, 8, 9, 13, 20, 23, 24, 25, 30, 37, 55, 55A, 55B, 56, 80, 86, 90, 91 106, 109, 136, Lake Mead Boulevard, Overton Beach Road and Willow Beach Access Road. Also surveyed were developed areas at Boulder Beach, Cottonwood Cove and Katherine's Landing (including parking lots, campgrounds, swim beaches and trails). Grapevine & Sacatone Springs were surveyed on foot; portions of Lake Mead shoreline and Lake Mohave shoreline were also surveyed.

C. Small Incipient Population Treatment

In addition to surveying, the Weed Sentry staff is tasked with treating upon discovery (often hand pulling) small, incipient populations of invasive plants. This represents a pro-active effort to remove invasive species before they become larger infestations and, therefore, increasingly

costly and difficult to eradicate. During this quarter, a total of 529 individual invasive plants were removed by Weed Sentry staff from federal lands in Clark County. These removals are summarized by agency lands in Tables 2 and 3 below.

Table 2. Number of individual invasive plants removed, Weed Sentry Program, January 1—March 31, 2008, Bureau of Land Management land.

| Species | Number of Plants Treated |
|------------------------------|---------------------------------|
| <i>Brassica tournefortii</i> | 26 |
| Total | 26 |

Table 3. Number of individual invasive plants removed, Weed Sentry Program, January 1—March 31, 2008, National Park Service lands.

| Species | Number of Plants Treated |
|------------------------------|---------------------------------|
| <i>Brassica tournefortii</i> | 464 |
| <i>Pennisetum setaceum</i> | 15 |
| <i>Sisymbrium irio</i> | 14 |
| <i>Sisymbrium orientale</i> | 1 |
| <i>Sorghum halepense</i> | 3 |
| <i>Tamarix ramosissima</i> | 6 |
| Total | 503 |

Sahara Mustard Research

A manuscript written by Research Assistant Dianne Bangle received official acceptance from the journal *Western North American Naturalist*. The manuscript: “Seed germination in the Mojave Desert invasive plant *Brassica tournefortii* (Sahara mustard),” details several seed experiments that Dianne performed on this species. The article is in press.

Research Assistant Alex Suazo designed an experiment to evaluate control methods for Sahara Mustard. Methods involve hand pulling and herbicide treatments. The experiment will be carried out over multiple seasons, and Sahara Mustard plant abundance and above ground biomass will be used to evaluate control methods. In addition, soil samples were collected to elucidate seed bank dynamics of the local plant community.

Research Assistant Suazo designed an experiment to evaluate the role of granivorous nocturnal rodents on Sahara Mustard seed consumption. Nocturnal rodents were offered a specified amount of Sahara Mustard seed, and the rate of consumption will be determined by subtraction.

Research Assistants Alex Suazo and Jessica Spencer submitted an abstract for the upcoming Ecological Society of America annual meeting in Milwaukee, WI:

Response of Sahara mustard (*Brassica tournefortii*) to soil disturbance,
and water addition in the southern Mojave Desert

ABSTRACT

Sahara mustard (*Brassica tournefortii*) is one of the top exotic invasive plants spreading through the southwestern deserts of North America. In the Mojave Desert, it is common on road sides, large washes, sand dunes, and disturbed areas. Sahara mustard germinates before many of the native annuals and as a result it has a competitive advantage over soil nutrients and moisture. As a winter annual, Sahara mustard seeds germinate after winter rainfall and population densities fluctuate as a function of available soil moisture and soil type. To elucidate patterns of Sahara mustard population densities in Mojave Desert habitats, we established 5 replicate field sites in Lake Mead National Recreation Area, Nevada USA, each containing water addition, experimentally disturbed soil, and control plots. Our objectives were to document whether experimental treatments had an effect on seedling emergence, phenology, and plant density. We used a generalized randomized block design and replicated each treatment 12 times. We performed the soil disturbance treatment once, and water additions (7 liters / plot) were applied from November 2007 through January 2008 at a two week interval. In addition, we performed a soil seedbank study to make comparisons between species emerging from the soil seedbank and the above ground community. We collected 60 soil samples of the top 5 cm and placed 120 cm³ of soil for each plot in separate 1-gal plastic pots filled with 300 cm³ of soil mix. Pots were randomly placed on a bench in a temperature-controlled greenhouse, watered daily and monitored for emergence for 6 months. We repeated the seedbank experiment in a germination chamber. At the field sites, seedling emergence was patchy. We recorded low densities in large washes and high densities in disturbed road sides. Experimental manipulations were significant

in highly disturbed sites. Seedling density was higher in soil disturbed plots than in other treatments. We found a significant association between phenology and treatment. Sahara mustard did not germinate in the greenhouse or germination chamber. These data suggest that depth of Sahara mustard seed in the soil seed bank may be greater than 5 cm and soil disturbance events may aid germination by bringing seeds to the soil surface where seeds have a better chance of emergence.

Rare Plant Monitoring and Research

Surveying and monitoring

Research Assistant Dianne Bangle conducted surveys of known poppy locations located across Clark County in order to assess their status and evaluate them for inclusion in upcoming monitoring. A total of 26 sites were visited on NPS, BLM, and State lands. One new Las Vegas bearpoppy site was discovered in the Gale Hills region of Clark County. This new site occurs on BLM land about 1.5 miles from the NPS border. GPS coordinates and tracklogs were recorded when poppy populations were located. If the site met the requirements for monitoring (suitable terrain, enough poppy individuals), it was added to a list of sub-populations for random selection to be included in monitoring. By late February, 10 Las Vegas bearpoppy sub-populations were selected for monitoring. In March, D. Bangle began setting up plots for April-May data collection.

In March, Research Assistant Bangle began surveys of known threecorner milkvetch locations to re-evaluate and update the status of this species. Many historic threecorner milkvetch populations have not been visited since the mid 1990's and a modern assessment was necessary. To date, four known locations have been visited and partially or thoroughly surveyed. Threecorner milkvetch was relocated at three of these sites. A new site was located west of Middle Point, which supported 1,000-2,000 individuals. The area was diverse in native annuals and would be ideal for inclusion in the rare plant monitoring. The re-located population near Ebony Cove supported 200-500 threecorner milkvetch individuals (the highest recorded at this location) and would be suitable for monitoring as well. One of these sites will be randomly selected and included in the 2008 monitoring schedule. Monitoring for threecorner milkvetch will begin at the end of March.

Ms. Bangle also relocated sticky buckwheat at the above mentioned Ebony Cove site. It was flowering already (earlier than usual). An estimate was not recorded as there were many rosettes not yet flowering that may have been a similar species. A second visit will occur next quarter.

A new population of sticky buckwheat was also discovered near the new threecorner milkvetch location. This new area was diverse in native annuals and supported thousands of sticky buckwheat. It was suitable for monitoring and will likely be included in the 2008 monitoring schedule.

Research Assistant Cayenne Engel assisted Research Assistant Bangle in reassessing the size and location of *Arctomecon californica* populations in the Gold Butte region February 11-12, 2008.

Weather station monitoring at 4 Las Vegas bearpoppy sites continued this quarter. New rain, temperature, and relative humidity gauges were ordered for all upcoming covered species monitoring sites (21 sites total).

In January, Ms Bangle co-led the LMNRA winter staff retreat at Nevada Telephone Cove. Field work included re-assessing and collecting modern data from a 2005 Smoketree monitoring project. The results showed 5 new trees and 14 dead or missing trees with a total of 139 trees remaining. Several of the missing trees are suspected to have been removed by visitors.

Sticky ringstem research

Research Assistants Bangle and Engel finished data collection for ringstem phenology and replaced pin flags with permanent nails and aluminum tags for relocation next season. Data have been entered into an Excel database.

Herbarium

This quarter, plant identifications occurred consistently. Plants were keyed as necessary for all vegetation programs including Exotic Plant Management Team, Weed Sentry, Nursery, and Botany plus wildlife division. Ms. Bangle also is drafting a letter of support, at the request of Kent Turner, on behalf of LAME for keeping the UNLV herbarium functioning.

Ms. Bangle and Lake Mead nursery staff members visited all locations of existing and future Lake Mead entrance station fee booth locations to survey and record plant species diversity. Ms Bangle is preparing plant species checklists for the Fees Manager of LMNRA of both exotic and native species. Ms. Bangle and the nursery staff are gathering photos of as many of the species in flower as possible for inclusion in the Fee Stations species checklist.

Technical Assistance/Synergistic Work

Community Invasibility Assessments

A study of the distance weed species are found from roads and relationships between the frequencies and abundances to native shrubs was designed and proposed to the NPS Vegetation Manager Alice Newton and Weed Manager Carrie Nazarchyk. Sampling was initiated. To date, seven sites located at LAME and two sites on BLM land have been sampled.

Springs Rana onca Habitat Restoration Project (Jef Jaeger, PI)

Vegetative cover assessments were conducted at Blue Point and Lower Rogers Springs February 27-28, 2008. Cayenne Engel, Jill Craig, Donovan Craig, and Dianne Bangle participated as data collectors. Dr. Jaeger and Ms. Engel will be working on data compilation and analysis for a SNWA riparian revegetation workshop that will take place May 7-9. In mid-January 2008 staff

initiated biomass drying and weighing from the November vegetation treatments from new vegetation cuts and plots, which were given a burn treatment. The effort is ongoing.

North Shore Road Realignment Project Visits and Mapping

Research Assistant Alex Suazo installed pitfall traps to sample darkling beetle species composition and distribution in sections of road that are scheduled to be demolished. Trapping is expected to begin in April 2008.

Cacti Poaching

Research Assistant Jill Craig worked with Joseph Hutcheson, Vanessa Truitt and Mark Sappington to set up automated data collection geodatabases for on-going cactus PIT-tag follow-up and demography study initiation. Dr. Abella also assisted ATR Alice Newton in recovering a poached barrel cactus (~ 100 lbs).

Remeasurement of Holland Plots in the Newberry Mountains

This is a major effort led by UNLV M.S. candidate Chris Roberts. Jim Holland established more than 110 transects in 1979 in the Newberry Mountains. Mr. Holland collected data on perennial species density and cover in large 600 m² plots scattered throughout the Newberry Mountain area from the Colorado River to the higher elevations. Mr. Roberts is relocating and resampling the 110 transects this winter. He has sampled approximately 100 transects to date.

Clark County Desert Burn Succession

At the suggestion of NPS Resource Chief Kent Turner and BLM botanist Christina Lund, and because of our interest in plant succession, Dr. Abella and Research Assistant Cayenne Engel have initiated a broad field assessment of plant succession on desert burns throughout Clark County using a BLM GIS database. Five more fires with associated control sites were assessed during this quarter. They are the Scenic, Tramp, Fork, Miracle, and Arden fires. Also conducted were a scouting trip for the Spirit mountain fire, and two overnight visits to the Gold Butte to assess suitable sites for the Tramp and Fork fires.

Las Vegas Valley Vegetation

Research Assistants Jill Craig and Dianne Bangle sampled an additional (4th) site in February, to add information regarding a uniquely grassy site located within a mile of sites that were sampled last year. The site is located near the corner of W. Warm Springs and Decatur Avenue. Data were analyzed and a manuscript was prepared and submitted to Desert Plants.

Other

- On January 7, Research Assistants Dianne Bangle, Jill Craig, and Cayenne Engel assisted with the Nationwide Eagle Survey on Lake Mead.

- Ms. Craig worked with the NPS media specialist, Leslie Page to have a poster designed to discourage damaging native trees at the end of 9-mile road.
- Dr. Scott R. Abella and Ms. Craig provided an article review of “Effects of Fire Intensity, Time Since Fire, and Repeated Burning on Woody Vegetation of an Eastern Sand Savanna” for *Forest Ecology and Management*.
- In March, Ms. Bangle assisted UNLV professor (Dr. Lois Alexander) with a biology class field trip to Willow Beach. Ms. Bangle located, identified, and discussed the plant species present along the road including weedy species and their impact on NPS resources.
- Ms. Craig compiled and produced Issue 1(1) of a regional newsletter to communicate to collaborating agencies about research we are conducting. Research Assistants Jessica Spencer, Craig, and Engel contributed articles.

Papers Published/Submitted

The following manuscripts were submitted for review this quarter:

Craig, J.E., and S.R. Abella. Vegetation of grassy remnants in the Las Vegas Valley, Southern Nevada. *Desert Plants* (in review).

Abella, S.R. Plant recruitment in a northern Arizona ponderosa pine forest: testing seed- and leaf litter-limitation hypotheses. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Proceedings paper, August 2008. (in review).

The following papers attained in-press status or were officially published this quarter:

Bangle, D.N. L.R. Walker, and L. Powell. 2008. Seed germination in the Mojave Desert invasive plant *Brassica tournefortii* (Sahara mustard). *Western North American Naturalist* (in press).

Abella, S.R. 2008. A systematic review of wild burro grazing effects on Mojave Desert vegetation, USA. *Environmental Management* (in press).

Abella, S.R., J.E. Spencer, J. Hoines, and C. Nazarchyk. 2008. Assessing an exotic plant surveying program in the Mojave Desert, Clark County, Nevada, USA. *Environmental Monitoring and Assessment* (in press).

Abella, S.R., and J.D. Springer. 2008. Canopy-tree influences along a soil parent material gradient in *Pinus ponderosa-Quercus gambelii* forests, northern Arizona. *Journal of the Torrey Botanical Society* (in press).

Abella, S.R. 2008. A unique old-growth ponderosa pine forest in northern Arizona. *Journal of the Arizona-Nevada Academy of Science* (in press).

Abella, S.R., A.C. Newton, and D.N. Bangle. 2007. Plant succession in the eastern Mojave Desert: an example from Lake Mead National Recreation Area, southern Nevada. *Crossosoma* 33:45-55. [note: paper officially published this quarter in 2008]

Abella, S.R., and P.Z. Fulé. 2008. Fire effects on Gambel oak in southwestern ponderosa pine-oak forests. Research Note RMRS-RN-34. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO. 6 pp.

Presentations

Dr. Abella gave the presentation “Smoke-cued emergence in plant species of a ponderosa pine forest: contrasting greenhouse and field results” at the 2008 Association for Fire Ecology conference in February in Tucson, Arizona.

Dr. Abella and collaborators with the Ecological Restoration Institute also presented to the U.S. Forest Service and Fish and Wildlife Service about the need for forest restoration and a proposed project to accomplish these objectives. The presentation was given March 6 at the Las Vegas interagency office.

Dr. Abella was invited by the Mojave Restoration Initiative on behalf of the Bureau of Land Management to present a 30-minute update on fire research and monitoring on March 26 at the Las Vegas interagency office.

Research Assistant Bangle gave a presentation to all LMNRA Fees division staff members regarding rare and native plants. The title of the presentation was ‘Native and Rare Plant Species at Lake Mead National Recreation Area (January 24, 2008).

Agency Meetings/Training Attended/Professional Development

- Jill Craig and Dr. Abella renewed red card fire certification training at the Clark County Fire Training Facility on February 23.
- PLI staff consistently attended National Park Service monthly staff meetings. Dr. Abella also attended the sub-branch chief meetings led by ATR Alice Newton after each meeting.
- Dr. Abella met with ATR Alice Newton and BLM grazing representatives at Gold Butte on February 14 to assess BLM’s grazing monitoring strategy.
- Dr. Abella met with Kent Turner and NPS ATRs on March 14 to prepare two vegetation NPS MSHCP concept proposals.
- January 14, Jessica Spencer met with Mark Sappington and Vanessa Truitt to redesign the Weed Sentry database and data dictionaries.
- On January 15, Dianne Bangle, Donovan Craig, Jill Craig, Cayenne Engel, and Jessica Spencer attended the NPS Resource Management Winter Retreat at Nevada Telephone Cove.
- On January 17, Jessica Spencer attended the SNRT meeting.
- Jessica Spencer attended the Climate Change Workshop held at Lake Mead NRA on January 31.
- February 4, Dianne Bangle, Jessica Spencer, Cayenne Engel, Jill Craig, and Alex Suazo attended the NPS Staff meeting and received training in Hazard Communications.
- February 5, Cayenne Engel and Alice Newton met with NPS liaisons from the Denver Service Center and FHA officials to discuss plans for construction related monitoring and research.

- February 6, Jill Craig met with A. Sprunger to discuss research synthesis of springs vegetation surveys.
- February 7, Jessica Spencer and Scott Abella met with Nick Bechtold, Allison Manwarring and Amy Sprunger to discuss palm tree research at Moapa and other areas.
- February 12-15, Jessica Spencer attended the Intermediate ArcGIS training held at UNLV.
- March 17 – 21, Cayenne Engel participated in the Motorboat Operator Certification Course offered at Lake Mead NRA.
- March 19, Jill Craig met with Doug Merkler to discuss vegetation and spring location information to assist with upcoming soil surveys he will be conducting. D. Merkler requested vegetation survey information and shapefiles of the springs to supplement information he has to plan and carry out upcoming soil mapping. He will aim to conduct soil surveys of some of the spring areas Jessica Spencer and Jill Craig sampled.
- Dianne Bangle attended the Lower Colorado River Terrestrial and Riparian Biology Meeting on January 30, 2008. The meeting focused on past, present, and future research concerning biota that occur along the Lower Colorado River.
- Dianne Bangle attended the Mojave Desert Ecosystem Modeling Workshop held January 29-31, 2008. Ms. Bangle attended two days (29th and 31st).

Submitted by:



Margaret N. Rees, Principal Investigator

3/31/2008

Date