



The Oasis

Spring 2014

Plant Responses to Climate Across Mojave Parks

National parks in the Mojave Desert Network Inventory & Monitoring (MOJN I&M) face tremendous management challenges in the future as climate alters the abundance, distribution, and interactions of plant species. These challenges will be daunting throughout the southwestern U.S., which is predicted to warm faster than many parts of the country and experience reduced precipitation. This will result in decreased soil moisture in an already water-limited environment.

Synthesis of climate and vegetation change data from MOJN parks is essential to provide resource managers with important insights to contemporary climate responses and a sound basis to forecast likely future changes at species, community and ecosystem scales. An understanding of climate-vegeta-

tion dynamics is important to both short-term park management decisions and to long-term planning for projected climate change.

A compilation of legacy vegetation datasets collected by researchers and park staff in Mojave parks has resulted in a database that includes

(continued on page 2)

Mojave Desert Network



Inventory & Monitoring

In 2012, the network began a partnership with the U.S. Geological Survey to integrate past local and regional patterns in climate with long-term vegetation datasets. This will determine which plant species and functional types in the Mojave Desert may be most sensitive to prolonged drought and elevated temperatures.

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nearly 1,000 repeatedly measured (1963-2012) vegetation plots in four MOJN parks (DEVA, LAKE, MOJA, JOTR) and adjacent areas. Many of the plots have repeat photographs associated with them (see photos below), which will be interpreted in tandem with the vegetation measurement results.

Historical climate data have been assembled from weather stations across the Mojave Desert to pair with the vegetation measurements. Soil and

landscape characteristics of the plots are being incorporated into the analysis to better understand their role in plant responses.

Ultimately, the results of this research can help park managers understand the vulnerability of vegetation to increased aridity across park landscapes, improve vegetation monitoring protocols and analyses, and help parks in the MOJN I&M mitigate and adapt to the effects of climate change.

Seth Munson, USGS



Colton Hills, Mojave National Preserve, 1985. Creosote bush (*Larrea tridentata*), White bursage (*Ambrosia dumosa*), and Big galleta grass (*Pleuraphis rigida*). The *Pleuraphis* (foreground) is very obvious and obscures the *Ambrosia*. Photo courtesy of USGS



Colton Hills, Mojave National Preserve, 2011. *Pleuraphis* is not as obvious in this view, but is still present. The individual *Larrea* (background) are much larger than they were in 1985. Photo by Helen Raichle

Welcome!

I am pleased to present the inaugural issue of the Mojave Desert Network (MOJN) Inventory & Monitoring (I&M) Program's biannual newsletter, *The Oasis!*

Twice a year we will be providing you with updates on our progress, field schedules and plans for the future.

Our goal is to provide you with the information you need to make sense of the MOJN I&M program and what it means to you and your park (see the last page to access the online survey). In this edition we can only focus on a few of the many projects that MOJN I&M has in the works.

We also invite you to submit specific questions about our monitoring efforts and projects, and will address these questions in future issues.

Only through the hard work and dedication of MOJN I&M park staff has this been possible - many thanks to all.

The MOJN I&M staff looks forward to continued collaboration with resource managers, interpreters, superintendents and all of our other partners.

Thanks!
Nita Tallent
MOJN I&M Program Manager

What is MOJN I&M?

Mojave Desert Network Inventory & Monitoring (I&M) Program is one of 32 networks of parks established under the National Park Service I&M Division to implement long-term ecological monitoring across multiple park units that share relatively similar ecological attributes. Data collected through this program will help inform resource management decisions. (click on hyperlinks)

Parks of the Mojave Desert Network I&M:

- DEVA: Death Valley National Park
- GRBA: Great Basin National Park
- JOTR: Joshua Tree National Park
- LAKE: Lake Mead National Recreation Area
- MANZ: Manzanar National Historic Site
- MOJA: Mojave National Preserve
- PARA: Grand Canyon-Parashant National Monument

2013 Field Activity



June

Streams and Lakes field season kickoff in GRBA. Staff gage installation at MC Spring in MOJA. Assist LAKE with bacteria collections.

July

Arid Land Springs monitoring at PARA. Quarterly Selected Large Springs monitoring at LAKE, PARA. Assist in GLORIA project at GRBA. GLOBal Observation Research Initiative in Alpine environments (GLORIA) establishes long-term monitoring plots around the world to detect trends in species diversity, temperature, and other climate change data within alpine environments.



January

Installed weather station at OX Ranch in MOJA. Took over monitoring of former USGS gage at Blue Point Spring in LAKE. Pressure transducer installed in MC spring in MOJA. Data Management Review held at MOJN I&M office.

February

Geoff Moret and Jean Pan attended LAKE Resource Stewardship Strategy Workshop.

March

Arid Land Springs monitoring at DEVA. Weather Stations installed at Saratoga Spring and Eureka Valley in DEVA.

April

Arid Land Springs monitoring at MOJA & LAKE. Quarterly Selected Large Springs monitoring at LAKE and PARA.

May

Arid Land Springs monitoring at JOTR. Weather Station installed at Wilson Canyon in JOTR. Assist LAKE with bacteria collections. Selected Large Springs pilot testing at 49 Palms Oasis in JOTR.

September

Lake monitoring at GRBA. Training of Integrated Uplands field crew for LAKE field season.

October

Integrated Uplands monitoring starting at LAKE. Arid Land Springs monitoring at DEVA. Quarterly Selected Large Springs monitoring at MOJA, LAKE, and PARA. Participated with JOTR in a solar panel bird mortality survey.

November

Continued Arid Land Springs monitoring at DEVA. Integrated Uplands monitoring at LAKE. Vegetation Map validation starting at LAKE. Selected Large Springs monitoring at JOTR.

December

Integrated Uplands monitoring at LAKE (continued through February 2014). Vegetation Map validation continuing at LAKE (continuing through February 2014). Weather station installation at PARA.

Weather and Climate Inventory National Park Service Mojave Desert Network
Natural Resource Technical Report NPS/MOJN/NRTR-2007/007

Climate Change and the Mojave Desert
National Park Service U.S. Department of the Interior
Natural Resource Stewardship and Science
Vegetation Inventory Project Great Basin National Park
Natural Resource Report NPS/MOJN/NRR-2012/568

Mojave Desert Network Inventory and Monitoring Streams and Lakes Protocol 2009 and 2010 Pilot Data
Natural Resource Data Series NPS/MOJN/NRDS-2013/448

Mojave Desert Network Climate Change Resource Brief
National Park Service U.S. Department of the Interior
Natural Resource Stewardship and Science
Climate Change and the Mojave Desert
Climate change is altering the Mojave Desert. Small changes in temperature and precipitation quantity, timing, frequency and distribution can have significant effects on physical resources and biological communities. Mojave Desert Network is currently developing protocols to monitor overall. Visit [http://www.nps.gov/mojn](#) for more information on climate change impacts in the Mojave Desert.

The importance of Joshua Tree National Park, the Mojave Desert, and the Mojave Desert Network. Climate change may affect water availability of streams and rivers, which in turn affects the availability of water for plants and animals.

Climate change may affect water availability of streams and rivers, which in turn affects the availability of water for plants and animals.

All increases in invasive grasses and shrubs could change the desert landscape by outcompeting native plants to which native plants are not adapted.

Program Updates

Project	Parks	Status
<i>Inventories</i>		
NPSpecies List Certification (birds and mammals)	DEVA	Data review by Boone and Wilson. Upload certified list to NPSpecies database.
	GRBA	Data review by Baker and Hamilton. Upload certified list to NPSpecies database.
NPSpecies List Certification (reptiles and amphibians)	DEVA	Data review by Boone. Upload certified list to NPSpecies database.
	GRBA	Data review by Hamilton. Upload certified list to NPSpecies database.
NPSpecies List Certification (fish)	DEVA	Data review by Wilson. Upload certified list to NPSpecies database.
	GRBA	Data review by Pepper. Upload certified list to NPSpecies database.
NPSpecies List Certification (vascular plant species) 	PARA	Contractor – Fertig complete review and MOJN I&M upload certified list to WASO.
	MOJA	Contractor – Schramm complete review and MOJN I&M upload certified list to WASO.
	DEVA	NPS staff - Kaiser to complete review and MOJN I&M upload certified list to WASO.
	JOTR	NPS staff - Harding to complete review and MOJN I&M upload certified list to WASO.
	GRBA	NPS staff - Holland to complete review and MOJN I&M upload certified list to WASO.
	LAKE	Contractor – Fertig complete review and MOJN I&M upload certified list to WASO.
Vegetation Mapping	GRBA, JOTR	Final reports published in IRMA (click links): GRBA JOTR
	MANZ, JOTR, PARA	Complete final review and revisions and publish final reports and deliverables.
	LAKE	Conduct accuracy assessment (CNHP), complete map (BOR).
	MOJA	Contractor – Cogan Technologies Inc. Commence mapping in FY14
	DEVA	Mapping to begin in FY15
<i>Monitoring</i>		
Streams and Lakes (S&L)	GRBA	Data collection to be carried out May 2014 to September 2013.
Selected Large Springs (SLS)	JOTR, LAKE, MOJA, PARA	Revision of protocol is ongoing. Quarterly monitoring to continue at Blue Point, Pakoon, 49 Palms and MC Springs.

Program Updates



Project	Parks	Status
Arid Land Springs (ALS)	DEVA	Complete collection of humidity sensors and basic vegetation and site condition data in FY14
	DEVA, JOTR, LAKE, MOJA, PARA	Analyze data and draft pilot reports.
Integrated Upland, Soils, Invasive Species Status & Trends (IU)	LAKE	Installation and data collection of ~20 macroplots October 2013 – February 2014.
Riparian Vegetation, Soils, Invasive Species Status and Trends-Arid Land Springs	DEVA, GRBA, JOTR, LAKE, MOJA, PARA	Solicitation/selection of cooperator to lead riparian ecosystem component in collaboration with water-related protocol lead in FY14
Riparian Vegetation, Soils, Invasive Species Status and Trends-Selected Large Springs	DEVA, JOTR, LAKE, MOJA, PARA	Solicitation/selection of cooperator to lead riparian ecosystem component in collaboration with water-related protocol lead in FY14
Invasive Plant Species Early Detection	DEVA, GRBA, JOTR, LAKE, MANZ, MOJA, PARA	Solicitation/selection of cooperator to lead invasive plant species early detection protocol in FY14
Invasive Plant Species Guide	DEVA, GRBA, JOTR, LAKE, MANZ, MOJA, PARA	Complete draft guide for LAKE review. Develop park specific guides using template developed for LAKE
Weather and Climate 	DEVA, GRBA	FY14 MOJN I&M in partnership with UI will begin writing weather and climate protocol and in partnership with UI and DRI will complete installation of weather stations (Dates of installation are contingent on site selection, weather and approval of permits). Installation of snow gauges to be determined.
<i>Program Management</i>		
Technical Committee Meeting	DEVA, GRBA, JOTR, LAKE, MANZ, MOJA, PARA	Spring and Fall 2014
<i>Science Communication</i>		
MOJN I&M Newsletter	DEVA, GRBA, JOTR, LAKE, MANZ, MOJA, PARA	March & September 2014 MOJN I&M Newsletter will be available to parks, region and I&M Division.
Science Communication Strategy	DEVA, GRBA, JOTR, LAKE, MANZ, MOJA, PARA	August 2014 MOJN I&M will submit the revised science communication strategy to parks for review.



The Spotlight is on...

JOTR Superintendent, Mark Butler! Mark has been the Superintendent of Joshua Tree National Park (JOTR) since 2011.

When asked what are some of the biggest challenges facing JOTR, Mark expressed concerns about the adverse effects from the urban and industrial developments occurring adjacent to the park, which can cause fragmentation between JOTR and surrounding lands; the occurrence of climate change, which has the potential to threaten the unique ecology of the park; and continued degradation of air quality, which can threaten and alter the park's native vegetation and thus potentially increase the frequency of wildfire.



Mark reports that because of these issues – and others – JOTR has been called “one of the most threatened national parks” by Lary Dilsaver, who is preparing the park’s administrative history.

Another of JOTR’s biggest challenges is the ability to assemble credible and accurate data and information in a cost effective, efficient, and timely manner, so that management decisions can be informed by high quality, thorough and adequate scientific analyses.

When asked what he believes is MOJN I&M’s greatest contribution to JOTR, Mark emphasized that the parks in the network have strong

ecological and operational connections and interdependencies, and that MOJN I&M through its consistent application of protocols, use of standard operating procedures, and commitment to a consistent approach for information management, provides a way for parks to observe conditions and understand resource changes over time, from both a regional and localized perspective.

“Without commitment to a long term program, we will lose the ability to understand how the ecosystem is adjusting and changing. It is a fundamental requirement to our ability to make good decisions, to have an understanding of the temporal and spatial changes occurring in the park, and to foresee how things are being impacted so that we can intervene in a constructive way.”

“Finally, long term inventory and monitoring efforts from MOJN I&M provide additional capacity to JOTR to accomplish ecological analyses that we would otherwise not be able to carry out on our own.”

MOJN I&M congratulates Mark on his retirement

The Oasis Recognizes...

David Gundlach, MOJN I&M GIS Specialist! David joined the Network almost a year ago and is looking forward to working more closely with the parks as he continues his career. He will be providing the network with valuable GIS assistance, in addition to training staff and cooperators on GIS related topics and projects. He will also aid in dataset management to support the detection of trends in the condition of park resources that the network monitors.

Before arriving at this point in his career path, David received his M.S. in Geography from University of Nevada, Reno in 2008. He feels most at home in the desert, as demonstrated by his position as GIS Specialist for

the Southern Nevada Water Authority, where he worked for five years. He then traveled to Washington, D.C. to work for the U.S. National Ice Center as a Physical Scientist before returning to Nevada.

When asked what he liked about working for the National Park Service, David said the national parks are an inspiring example of what the USA represents. His first national park visit was to Statue of Liberty National Monument in the second grade. He still has the souvenir statue he bought while there.

When David isn’t working, he enjoys golfing, sailing, hiking, and biking, as well as reading and movies.



David would like to extend a thank you to the park staff he has met thus far. He appreciates how helpful and welcoming everyone has been throughout his assimilation into the NPS.

Weather Station Installation Continues!



Announcing new additions to the Network Parks - Remote Automated Weather Stations (RAWS)! RAWS are in the process of being installed, with the locations chosen in consultation

with park Resource Management staffs. These stations measure temperature, precipitation, wind speed and direction, relative humidity and solar radiation once every hour. The data are then transmitted by satellite to the National Interagency Fire Center in Boise, Idaho, where they are used to support wildland fire fighting efforts. Five stations were installed this year (two in DEVA, and one each in JOTR, MOJA, and PARA). In addition to the five RAWS units, MOJN I&M has purchased three snow gauges that will be installed at DEVA, GRBA, and PARA. The project is being completed under two cooperative agreements: Geoff Moret of the University of Idaho is working with the parks on weather station siting and compli-

ance, while the stations are being installed by Greg McCurdy of the Desert Research Institute.

Data from the five installed stations can be accessed by clicking on these links:

[Eureka Valley in DEVA](#)

[Wilson Canyon in JOTR](#)

[Saratoga Springs in DEVA](#)

[OX Ranch in MOJA](#)

[Nevershine in PARA](#)



Shoutout to the MOJN I&M field crew of 2013

With the MOJN I&M monitoring season kicking off in September 2013, MOJN I&M welcomed two seasonal NPS Science Technicians, Mary Levandowski and David Merz (not pictured). Four new SCA Interns; Alex Whalen, Emma Bernard (not pictured), Kristin Koeper (not pictured), and Jennifer Bailard have also joined MOJN I&M as the Field Crew this season, as well as two international volunteers, Jan Kirchiem and Guillaume Oui (not pictured). This group of individuals has been essential to the successful outcome of the 2013 field season that wrapped up in mid-January this year.

Their efforts have included assisting Geoff Moret with water sampling at MOJA, PARA, LAKE, JOTR, and DEVA and the execution of our first official Integrated Uplands field season at LAKE.

MOJN I&M would also like to extend a special thank you to LAKE employees Carrie Norman (not pictured), Elizabeth Skinner, and Toshi Yoshida (not pictured) for their assistance in making the Integrated Uplands field season a success.

MOJN I&M thanks everyone for all of their hard work this past year!

MOJN I&M says farewell...

Ronald Budde, MOJN I&M Administrative Assistant, said goodbye to the National Park Service and the I&M at the beginning of May 2013. Ron says hello to the U.S. Forest Service and the comforts of being near family and friends in Oregon.

MOJN I&M would like to congratulate Bob Truitt, Network Data Manager, on his retirement this past February. Bob started his Park Service career in 1998, and served as Data Manager for the Klamath Network prior to becoming

MOJN I&M’s Data Manager. He has worked for the Mojave Desert Network since it’s infancy and will now enjoy spending his free time wood-working and spending time with his wife.

MOJN I&M: Paying it Forward

Life at MOJN I&M isn't all work, work, work! MOJN I&M has volunteered for several park projects and efforts—we enjoy lending a helping hand while having a bit of fun at the Network Parks.



For three consecutive years, the MOJN I&M team has participated in LAKE's Operation Zero (OZ) Cove Cleanups. Just one OZ Cleanup event can contribute to the removal of about 200 pounds of trash from the coves of Lake Mead – that's 200 pounds in just a couple of hours! In 2012 alone, the OZ events removed 2,540 pounds of litter from the shorelines of LAKE. Being part of the OZ C.R.E.W. (Citizens Removing and Eliminating Waste) is a wonderful way to enjoy the park scenery and the boat ride while also helping our fellow rangers keep the park clean. [More...](#)

In January 2011 and 2013, Nita Tallent (Program Manager) and Jean Pan (Ecologist) contributed to the Eagle Count efforts at LAKE. The Eagle Counts document the number of bald and golden eagles sighted at Lake Mead NRA.

In spring 2013, Ron Budde (Administrative Assistant) and Nita Tallent were involved in providing parking and traffic control assistance for the March opening of the newly renovated Lake Mead Visitor Center at LAKE.

Previous Student Conservation Association (SCA) Interns working with MOJN I&M have also contributed to network park projects. SCA Sara Violet contributed to GRBA's 2011 BioBlitz in search of Hymenoptera, an insect group that comprises the wasps, bees, and ants.

In 2012, SCA Craig Rowell volunteered his personal time to assist in excavation efforts taking place at MANZ during the 2012 IU field season.

Mary Levandowski, current Biological Science Technician, has assisted with LAKE bacterial collections, as well as the establishment of GLORIA plots at DEVA. The MOJN I&M International Volunteers In Parks, Guillaume and Jan, assisted JOTR with a solar panel bird mortality survey.

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Check out our website!
<http://science.nature.nps.gov/im/units/mojn/>

Please tell us what you think!

This is the premiere issue of The Oasis, so we'd like to know what you think!

How can we improve?

What would you like to see in the next issue?

Have suggestions for future articles?

Do you want to be featured in our "The Oasis Recognizes..." article, or do you know someone whom you would like to nominate?

Do you have more specific questions about what resources we monitor and how we contribute information to the parks?

[Click here!](#)

Please click on the hyperlink above and fill out The Oasis survey. We greatly appreciate your feedback. Thanks!