



Standard Operating Procedure (SOP) 1:

Staff Training and Job Hazard Analysis V2.0

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Revision History Log

Prev. Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
1.0	July 2025	J. L. Bailard	Updated trainings	New agency guidance	2.0

This Standard Operating Procedure is available in digital format from [Mojave Desert Network](#) and the [NPS Data Store](#).

1. Introduction

The current staffing structure includes a Protocol Lead, one Field Technician Crew Lead, one additional Field Technician, and one or more interns or volunteers. It is the responsibility of the Protocol Lead to ensure that all personnel conducting monitoring for the protocol are properly trained. This Standard Operating Procedure (SOP) describes the training in safety procedures and data collection methods that all field crew members must receive prior to the field season.

2. Safety Training

The Safety Officer or delegated network staff will provide safety training during the first week of employment. Training topics include facility and vehicle orientation, field hazards and mitigations, communications devices, radio etiquette, emergency procedures, backcountry travel planning and preparedness, and personnel roles and responsibilities.

Permanent employees are required within their first year to complete a 12- to 14-hour [Operational Leadership](#) course administered by the NPS, which covers situational awareness and decision-making skills. Operational Leadership training can be completed online through DOI Talent or in-person if a training is available and timely at LAKE. Temporary employees, interns, and volunteers may view the [Trail Safe!](#) series of online videos developed by Ice Age National Scenic Trail, which condense Operation Leadership concepts into 3 hours and are tailored to trail volunteers.

Employees and interns are also required to complete a 16-hour Wilderness First Aid (WFA) course, either through a certified organization (e.g., Red Cross, NOLS) or a team of LAKE first responders. Permanent employees may instead opt to complete a more intensive 70 to 80-hour Wilderness First Responder (WFR) course if funding is available.

Anyone who drives a government vehicle is required to complete a 4-hour [Aware Driver](#) online defensive driving course, which is administered through GSA by Improv Learning. The website requires a GSA leased vehicle tag number to log in for the first time. Any MOJN vehicle tag number can be used to register. Network staff will provide additional on-the-job training in GPS navigation and off-road driving in 4WD vehicles as necessary.

Depending on availability, employees and interns may attend optional safety trainings, such as snake handling or fire extinguisher trainings.

The Job Hazard Analysis (JHA) for the Desert Springs protocol can be found at the end of this SOP. Field crew members should review the JHA before participating in field work.

For more information about safety procedures and training, refer to the most recent version of the *Mojave Desert Network Inventory & Monitoring Field Safety Plan* (unpublished but can be found in the Safety Plan channel of the NPS-MOJN-Safety team).

3. Water Quality Training

Inventory and Monitoring Division (IMD) guidance requires at least one employee per network to complete an approved water quality field methods training course. Training must be kept current with at least one employee having completed approved training within the last three years. IMD has developed a course in collaboration with the USGS that is designed to promote basic knowledge and core competencies in the skills required to implement water quality monitoring protocols as well as to foster consistency in field methods among networks. The Protocol Lead will complete and maintain this training requirement.

4. Data Collection Training

4.1. Protocol Methods

The Protocol Lead and Field Tech Crew Lead or other experienced Field Tech will together provide training to new field crew members prior to the start of the field season. Training topics include field mobilization, equipment disinfection, and data collection methods. There will also be hands-on practice with field tablets, data collection apps, water quality instruments, and water detection sensors. If all field crew members are returning from previous seasons, the Protocol Lead will provide a refresher prior to the start of the field season.

The Protocol Lead will accompany the field crew members to the first three or four springs sampled during the field season, and together they will walk through the methods and complete a field form at each spring. The springs should be diverse enough that the field crew members are exposed to a variety of spring types and vegetation communities. Field crew members are encouraged to ask questions that may arise.

The Protocol Lead will make sure that at least one of these springs has a HOBO TidbiT water detection sensor. The Protocol Lead will walk through the site assessment and decision-making steps and demonstrate proper sensor placement and installation. Field crew members must be trained to understand where and how to deploy the sensors appropriately at a spring. If they incorrectly place a sensor outside of the spring source area, then the sensor will not be able to record the actual presence or absence of surface water, and the data will be inaccurate. If they improperly secure a sensor to the ground or nearby vegetation, then the sensor may be washed away by flash flooding or removed by animal activity, and the data will be lost.

4.2. Spring Vegetation

The Ecologist or designated biological Field Tech will train field crew members to identify the plant life form categories ranked in this protocol as well as common riparian and invasive plant species found at desert springs. Some of this training should occur in the office and include a fundamental explanation of plant life form categories with many examples of plants that fall into each of the categories. If time and staff are available, field crew members may take a field trip to the Clark County Wetlands Park or other riparian area to practice plant identification.

Depending on their level of botanical expertise, the Protocol Lead may also train field crew members to identify common riparian plant species while they are learning about data collection methods in the field. While this protocol does not require field crews to identify many plants to species, understanding the basics of botany is required to collect vegetation data for this protocol.

5. Data Management Training

The Data Manager will train field crew members in the login and use of assigned laptops, field tablets, data collection and navigation apps, and folder and file structures and naming conventions, along with data quality standards. For more information on data quality standards, refer to [Data quality standards for springs in the Mojave Desert Network—surface water monitoring at desert springs](#).

The Protocol Lead will train field crew members in the use of water detection sensor download apps and the entering and appending of data to the Aquarius database.

6. Literature Cited

Lehman, M., S. Wright, and J. Bailard. 2018. Data Quality Standards for Desert Springs Monitoring in the Mojave Desert Inventory & Monitoring Network. National Park Service, Fort Collins, Colorado. Accessed here: <https://irma.nps.gov/DataStore/Reference/Profile/2257548>.

JOB HAZARD ANALYSIS (JHA)		Date: July 25, 2025	☐ New JHA ☒ Revised JHA
Park Unit: MOJN I&M	Location of Park Unit: Boulder City, NV	Location(s) of Job Duties: CAMO, DEVA, JOTR, LAKE, MOJA, PARA	
Job Title: Physical Scientist		JHA Number:	Page: 1 of 8
Job Performed By: Desert Springs Field Crews	Analysis By: Jennifer Bailard	Supervisor: Allen Calvert	Approved By:
Required Standards and General Notes:	Refer to the <i>Mojave Desert Network Inventory & Monitoring Field Safety Plan</i>		
Required Personal Protective Equipment:	Clothing: hiking boots, long pants, hat, sunglasses, sunscreen; rain jacket and warm clothing if necessary Equipment: first aid kit, map and GPS, flashlight / headlamp, radio, satellite phone, inReach Food and water: 1 gallon of water per person per day, extra food and water		
Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure	
Driving in the backcountry	Poor road conditions and unmaintained dirt roads	• Turn around, find alternate routes, or postpone travel if the road is washed out or impassible or if the driver is fatigued or feels uncomfortable with the difficulty level of 4-wheel drive. • Be alert and drive slowly when driving on roads known to be frequented by deer, sheep, elk or other large animals.	
	Low or no visibility (e.g., dust storms, downpours)	• Pull your vehicle off the roadway as far as possible, stop, turn off lights, set the emergency brake, and take your foot off the brake pedal to be sure the taillights are not illuminated. • If you cannot pull off the roadway, proceed at a speed suitable for visibility, turn on lights, and sound horn occasionally. Use the painted center line to help guide you. Never stop on the traveled portion of the roadway. • Do not drive on unmaintained dirt roads at night, when obstacles or unsafe conditions may be impossible to see.	

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Driving in the backcountry (continued)	Difficult navigation	• Familiarize yourself with the park and the route before you start driving. • Bring a backcountry road map and GPS with road layer. • Stay on approved roads.
	Vehicle problems	• Complete a vehicle inspection (e.g. fluid levels, tire pressure, full gas tank) before driving in the backcountry. • Ensure vehicle is properly and regularly maintained (e.g. schedule oil changes, replace tires if they become too worn). • Ensure vehicle is equipped with traction board, shovel, and jack. • Bring at least two spare tires into the backcountry, and know how to change them for every vehicle.
Hiking and camping in the backcountry	Rugged and remote terrain: <i>Slips, trips, falls</i>	• Wear sturdy hiking boots with good ankle support. Make sure the tread is not too worn. • Turn around if terrain becomes too difficult or dangerous to continue (e.g. large boulders, steep cliffs). If one field crew member feels uncomfortable, then the whole team should turn around. No spring is worth the health and safety of a field crew member. • Do not hike in the dark, especially if the terrain is difficult. Return to the vehicle by sunset. Carry a headlamp or flashlight just in case.
	Rugged and remote terrain: <i>Patchy communications</i>	• Every team should have multiple forms of communication with spare batteries and charging equipment. At a minimum: truck radio, handheld radio, satphone, inReach, cellphone.
	Rugged and remote terrain: <i>Long rescue times</i>	• All field crew members must maintain current certification in CPR / AED and wilderness first aid. • Keep a larger first aid kit in the vehicle and a smaller first aid kit in your backpack. Replace used or expired materials regularly. • Stock the vehicle with enough food and water for the team to camp at least one additional night beyond the anticipated plan.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Rugged and remote terrain: <i>Difficult navigation and getting lost</i>	• Familiarize yourself with the terrain and the route before you start hiking. Hiking cross-country over desert terrain can be disorienting. • Bring a map, compass, and GPS along with spare batteries or a charging pack. Ensure that the map and GPS have topo lines and sufficient resolution to bypass steep terrain and find the most accessible routes to springs. • If you park at a different location than suggested on GPS, collect a waypoint where you park. • Hike on trails and closed roads when possible. • Maintain line-of-sight with your fellow field crew members during hikes.
	Rugged and remote terrain: <i>Hunger and dehydration</i>	• Carry at least one gallon of water per person per day. • Rest and take water and snack breaks to keep up energy and stay hydrated. • Bring extra food in case the hike is longer or more strenuous than expected.
	Rugged and remote terrain: <i>Heavy backpacks</i>	• As there is often no water in the desert even at springs, you must carry all of the water you need on your back. For overnight backpacking trips, tents and other camp gear add to the load. Do not plan trips longer than you have the ability to carry supplies. Generally, field crew members can only carry enough water for a two-day trip before they must return to a water source. • Do not overload yourself and risk back injury with unnecessary gear. Bring what you need to stay safe; you can forgo luxuries for a night or two. • Hike with trekking poles to stabilize yourself and distribute weight.
	Abandoned mines	• Do not enter abandoned mines. They are vulnerable to cave-in and may contain unstable explosives, deadly gas, or lack of oxygen.
	Weather: <i>Extreme heat</i>	• Wear a wide-brimmed hat, sunglasses, long pants, and long sleeves to protect against sun exposure to skin and eyes. Ultralight sun umbrellas are a good option for hiking if you have a free hand. Cooling neck wraps can also provide some relief on hot days. • Apply sunscreen to exposed skin regularly. • If possible, conduct field work from fall to spring, when temperatures tend to be more moderate. If you must work outside in the summer, begin hiking at daybreak and finish by noon to avoid the hottest part of the day.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Weather: <i>Extreme heat (continued)</i>	• Drink plenty of water. Supplement your water with electrolytes or salty snacks to avoid hyponatremia. • Take rests in the shade if you are beginning to feel overheated. • Refer to NPS heat illness website for more information.
	Weather: <i>Cold and inclement conditions</i>	• Check the weather forecast before leaving for every trip, bring a rain jacket or warm clothes accordingly. Continue to check weather updates throughout your trip, especially if a storm system is predicted to develop. • Bring a spare set of clothes (especially socks) in case you get wet. • Bring a sleeping bag with a sufficient temperature rating for your trip, or bring more than one sleeping bag if overnight lows are going to be very cold. • Use chemical hand, foot, or body warmers as necessary to help stay warm. • Postpone travel during severe weather. • Refer to NPS winter weather website for more information.
	Weather: <i>High and sustained wind</i>	• Avoid hiking in exposed areas (e.g., alluvial fans, above tree line) when wind gusts are greater than 30 miles per hour. • High wind may exacerbate the feeling of cold or wind chill. Bring additional warm layers when it is windy.
	Weather: <i>Flash floods</i>	• Do not camp in washes or canyons. • Do not hike in canyons during heavy or prolonged rain, or if there is heavy or prolonged rain in the mountains above you. It does not have to be raining where you are in the canyon for a flash flood to descend upon you from higher elevations. • If you see flooding heading toward you, quickly climb to higher ground. • Do not attempt to wade across flowing water. • Refer to NWS flood safety website for more information.
	Weather: <i>Lightning</i>	• If you see or hear a thunderstorm developing around you, immediately return to the vehicle. • If you cannot get to your vehicle, move away from high mountain passes and open meadows. Retreat to a forested area. Do not stand next to running water or tall objects like trees, telephone poles, or power lines.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Weather: <i>Lightning (continued)</i>	• Crouch down on your pack on the balls of your feet, and keep your feet close together. Place your hands on your knees and lower your head. Minimize contact with the ground, and make yourself as small a target as possible. • Refer to NPS lightning safety website for more information.
	Weather: <i>Wildfire smoke</i>	• Check the air quality index (AQI) before leaving for a trip if there are actively burning wildfires in the western U.S. or Canada. • Wear an N-95 respirator in smoky conditions. • Postpone travel and do not work outside where the AQI is greater than 150. • People with chronic conditions (e.g., asthma) may need to reduce their smoke exposure even when the AQI is less than 150. • Refer to NPS air quality health website for more information.
	Vegetation: <i>Thorny or spiny plants</i>	• Be careful when hiking around sharp plants, like cacti, yuccas, mesquite, catclaw, and wild rose, especially on steep or loose terrain where you have a higher risk of falling into them. • Check the ground for cholla balls, stinging nettle, and thorny /spiny twigs before sitting or putting down gear. • Wear long sleeves and pants made of thicker fabric to prevent cuts and provide a barrier. Some spines are barbed and may be painful to remove, while other plants have irritating properties if they puncture or touch the skin.
	Vegetation: <i>Dead trees and snags</i>	• Be alert for falling trees and limbs when hiking, working, and setting up camp in recently burned areas and in areas where trees have been treated with herbicide for removal. • Wear a hardhat in recently burned areas if advised by park staff.
	Wildlife: <i>Mountain lions</i>	• Stay close to other field crew members as much as possible. Mountain lions are less likely to attack groups of people. • If you see a mountain lion or encounter a fresh mountain lion kill, leave the area immediately. • If a mountain lion becomes aggressive toward you, move together, stand tall, raise your arms in the air, and yell loudly to be intimidating. Do not run, crouch down, or bend over.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Wildlife: <i>Mountain lions (continued)</i>	• Fight back if attacked. Since mountain lions usually try to bite the head or neck, try to remain standing and face the attacking animal.
	Wildlife: <i>Venomous snakes</i>	• If you see a snake, leave it alone. • If you hear rattling, look for the snake and move away from it quickly. • Be careful when reaching into handholds or rock crevasses into which you cannot see. Also be careful when bushwhacking through vegetation where the ground may be obscured. • Wear snake gaiters if you are going to be working in a location and time of year where snakes are expected. • If you receive a snake bite, evacuate immediately and go to a hospital.
	Wildlife: <i>Bees and wasps</i>	• Avoid antagonizing bees and wasps. • If you see bees “bumping into you,” they may be marking you with a pheromone and preparing to swarm. Leave the area immediately, and return to the vehicle.
	Wildlife: <i>Spiders</i>	• If you receive a spider bite from a black widow or other venomous spider, seek medical attention as soon as possible.
	Wildlife: <i>Scorpions</i>	• Avoid walking barefoot, especially in the dark. • Check the inside of your boots before putting them on.
	Disease transmission: <i>Hantavirus from rodents</i>	• Do not enter abandoned or unventilated structures where rodent droppings are present. Do not sweep, vacuum or dust in areas with rodent activity. • Refer to NPS hantavirus website for more information.
	Disease transmission: <i>Lyme disease from ticks and other tickborne illness</i>	• Wear long sleeves and pants, and check clothing and skin for ticks. Treat clothing and gear with permethrin. • Remove an embedded tick by grasping it with tweezers at its head and pulling it straight out. Clean the area thoroughly. • Be alert for fever, rash, or other symptoms of concern. Seek medical attention if you observe any symptoms, since providers may recommend prophylactic antibiotics or other treatment options. • Refer to NPS tickborne disease website for more information.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Disease transmission: <i>Rabies from mammals</i>	• All staff who handle mammals (e.g., bats) as part of their duties are required to have a full series of rabies vaccinations. • If any crew member is bitten or scratched by a mammal, seek medical attention as soon as possible. Healthcare providers will recommend the appropriate course of action, such as postexposure prophylaxis (PEP). • Bat bites can be very small so a person might not always know when they have been bitten by a bat. PEP should also be considered when direct contact between a person and a bat might have occurred, and a bite or scratch cannot be confidently ruled out. • Refer to NPS rabies website for more information.
	Disease transmission: <i>Mosquito infections</i>	• Wear long sleeves and long pants, and use bug spray if necessary. • Stay vigilant for signs of illness, and see a doctor if you become sick. • Refer to NPS mosquito-borne disease website for more information.
	Disease transmission: <i>Aquatic organism infections</i>	• Desert springs may contain pathogenic organisms, like the protozoan giardia. Never drink untreated spring water. If you must drink spring water, use a filter or purification tablet. • Warm springs may harbor potentially deadly organisms, like the protozoan <i>Naegleria fowleri</i>, which can enter through the nose and cause lethal brain infection. Never submerge your head in spring water. • Refer to NPS water-borne disease website and NPS Naegleria fowleri website for more information.
	Disease transmission: <i>Valley fever</i>	• Valley fever is an infection caused by the fungus <i>Coccidioides</i>, which is found in soil throughout the southwestern states. • Try to avoid activities that require you to breathe in large amounts of dust. • Refer to NPS valley fever website for more information.
	Disease transmission: <i>Pandemics and public health emergencies</i>	• In the event of pandemic or other public health emergency (e.g., Covid-19), follow all CDC and other federal mandates and guidance. • Mitigations may include wearing masks or respirators, driving in separate vehicles, disinfecting shared surfaces, closing office doors, and working from home when necessary.

Sequence of Job Steps	Potential Hazards / Injury sources	Safe Action or Procedure
Hiking and camping in the backcountry (continued)	Disease transmission: <i>Pandemics and public health emergencies (continued)</i>	• Postpone your trip or find a replacement field crew member if you are too sick to work. Do not expose your colleagues to infection. • Refer to NPS Covid-19 website for more information.
	Prior medical conditions	• Inform other crew members about health conditions that may affect you in the backcountry (e.g., asthma, severe allergy, migraines, heart condition, recent cold or flu). Let them know where you keep your medications or EpiPen in case you need assistance. • Stay in shape for field work. Monitor your personal fitness level and that of others in your group. Adjust plans accordingly.
	Illegal activity	• If you see evidence of illegal activity (e.g. marijuana grows, poaching), leave the area immediately. Take a quick photo if you can do so discreetly, but do not linger to investigate. • Do not confront strangers in the backcountry, even (especially) if they are breaking the law. • Report illegal activity or suspicious persons to dispatch or law enforcement when you have reached a safe distance.