

National Park Service
Inventory and Monitoring Division



Safety—Version 1.0

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The Gulf Coast Network (GULN) I&M Program considers the occupational health and safety of its employees, cooperators, and volunteers to be of utmost importance. Network leadership is committed to ensuring that prior to fieldwork, all monitoring staff receive adequate training on National Park Service (NPS) safety procedures, incident reporting, and emergency response. This standard operating procedure (SOP) describes how the network and collaborators will prepare for and maintain safe working practices under the terrestrial vegetation monitoring protocol.

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Overview

The Gulf Coast Network (GULN) I&M Program considers the occupational health and safety of its employees, cooperators, and volunteers to be of utmost importance. Network leadership is committed to ensuring that prior to fieldwork, all monitoring staff receive adequate training on National Park Service (NPS) safety procedures, incident reporting, and emergency response. This SOP describes how the network and collaborators will prepare for and maintain safe working practices under the terrestrial vegetation monitoring protocol implementation plan. Focal topics include safety and emergency preparedness prior to fieldwork, safety considerations and incident reporting during fieldwork, and vehicle safety instructions for travel to and from fieldwork. This SOP also describes the Gulf Coast Network's field safety packet, which is distributed to the crew at the start of each field season. It includes laminated cards for field use that summarize key safety information and emergency contact numbers. It also includes a binder for the field vehicle, containing directions to hospitals, forms for workers compensation, forms for vehicle accident reporting, and the two job hazard analyses (JHA; Appendices S01.A and S01.B in this document). The JHAs supplement the GULN safety SOP by listing the primary hazards associated with this protocol and recommending steps to mitigate them. The SOP, field safety packet and JHAs serve as an outline for materials covered during the pre-season training and also serve as a first reference in case of an incident in the field. All protocol users are required to be familiar with this SOP, its JHA appendices (requiring signatures) and the field safety packet prior to the start of the summer field season in April or May. This SOP does not cover first aid.

SOP Source and How It Was Modified

This SOP is an adaptation of SOP—1: *Safety* (version 1.07) of the *Northeast Temperate Network Long-term Forest Monitoring Protocol* (Tierney et al. 2016). For a general explanation of how the Gulf Coast Network (GULN) modified the Northeast Temperate Network (NETN) protocol and its SOPs, see the protocol implementation plan document (Carlson et al. 2018). In the context of this SOP, the Gulf Coast Network made several substantial modifications to NETN SOP—1, as well as making minor editorial adjustments. Notable changes were made to align the NETN SOP with the Gulf Coast Network's (1) internal terminology preferences: person of contact (POC) instead of designated office staff (DOS) and job hazard analysis (JHA) instead of job safety analysis (JSA); (2) differing field work hazards: less concern about Lyme disease, poor air quality and black bears, but more concern about other tick-borne diseases, mosquito-borne diseases, venomous snakes and harmful plants; (3) use of one field crew per season, rather than two field crews per season; and (4) removal of all appendices except the JHAs from the safety SOP and their placement into a field safety packet. The field safety packet is independent of the SOP, and thus can be updated without changing the SOP itself. Likely updates include personnel changes in the networks and parks, current operational leadership guidance, and revisions to the network's own safety documents.

Definitions

Person of Contact (POC): Refers to the Inventory and Monitoring (I&M) staff member who is designated to remain in the office and be available for daily check-ins. The POC provides emergency response services for the field crew. The default POC is the protocol lead (when not in the field) or the network program manager.

Field team: Refers to the group of people (typically two or three) who are working together at a sampling plot.

Field crew leader: Refers to the leader of the field team. This person is responsible for planning and making changes to the daily field work plans, communicating those changes to the POC, following daily check-in procedures, and acting as alternative POC when appropriate (see Daily Communication and Planning).

Monitoring staff: Refers to all personnel engaged in field activities related to this protocol. This includes National Park Service (NPS) employees, contractors, and volunteers either actively participating in or observing monitoring activities. Volunteers are required to have read and signed a volunteer agreement. All monitoring staff must read and sign the job hazard analysis form before participating in any field work.

Protocol lead: Refers to the individual responsible for coordinating implementation of the terrestrial vegetation protocol (the ecologist in the Gulf Coast Network). The protocol lead will act as field crew leader when in the field or as POC when in the office. The protocol lead is also responsible for ensuring the field crew is properly trained in NPS safety procedures.

Prior to Fieldwork: Safety Preparation and Planning

All members of the monitoring staff are responsible for maintaining a safe work environment for themselves and their coworkers. To help promote safe conduct, staff members are advised to use the job hazard analysis approach (JHA; sometimes called a job safety analysis or JSA), as directed by the National Park Service Occupational Health and Safety Program Reference Manual 50B (NPS 2008). The JHA process is to (1) identify hazards associated with field and laboratory settings, as appropriate, and (2) develop approaches to mitigate those hazards. All monitoring staff who conduct field work for this protocol must read and sign the JHAs that are included as Appendices to this document. Appendix S01.A is the JHA for driving safety, and Appendix S01.B is the JHA for general field work. In addition to the JHAs, members of the field crew must be familiar with the entire contents of the safety SOP (this document) and the field safety packet, which is described in the final section of this SOP.

First Aid Kits and Training

Every network vehicle must have a first aid kit that remains with the vehicle at all times. In addition to the vehicle first aid kit, a backpacking first aid kit should be with the field team at all times while in the field. An inventory of first aid kits must be performed prior to each field season by the field crew leader to ensure all medical supplies are in sufficient quantity and have not expired. Each first

aid kit has an inventory list of the supplies it must contain. Items in first aid kits that are used must be promptly replaced.

At the beginning of every field season the field team receives basic first aid and CPR training, if they do not already have current certifications.

Daily Communication and Planning

Field teams are expected to carry two modes of communication at all times while in the field, which can be two cell phones or a cell phone and a park radio. All modes of communication must be fully charged and tested at the beginning of each day. Cell phones are the primary mode of communication in all parks except for at Padre Island National Seashore, where park radios may be required for communication at remote sites.

The field crew leader must check in with the person of contact (POC) at the start and end of each field day, and field crew members cannot leave the field site until everyone is accounted for at the end of the day. In the event that the usual field crew leader is absent from work, another member of the crew must be assigned check-in responsibilities for each day. The default POC is the protocol lead, unless they are in the field or otherwise unavailable, in which case the network program manager is the POC. When neither of these staff members is available, the protocol lead appoints another GULN staff person to serve as POC, who is notified at least 24 hours in advance of when they are needed. Additional contact information for potential POCs is provided to the crew during the first week of training. All potential POCs are provided with plot GPS coordinates, cell phone numbers, and vehicle information prior to the start of the field season.

Note: If the field crew leader does not contact the POC by 7:00 p.m. at the end of a field day, the POC should attempt to contact field crew members using all possible modes of communication (e.g., field crew and personal cell phones). If no contact is made by 7:30 p.m., the POC should contact park or local emergency response personnel to inform them of the situation and provide emergency response with the unaccounted for field team's last known location, a vehicle description, and names of monitoring staff involved.

Personal Gear

Monitoring staff are responsible for ensuring they are wearing field appropriate clothing and footwear such as long pants, a hat, and hiking boots. Depending on the weather, rain gear or warm clothing should be taken into the field, and it is recommended an extra set of clothing be kept in the vehicle. The use of sunscreen and protective clothing are recommended to avoid over exposure to the sun. Monitoring staff are expected to carrying ample water (2–3 liters or 0.5–0.8 gallons) and food when working in the field to avoid dehydration and energy shortfalls. Dehydration is a serious condition that can lead to more serious conditions if untreated. It is important to drink liquid frequently to maintain hydration on a warm day, even if you don't feel thirsty.

During Fieldwork: Responding to an Incident

Life-Threatening Medical Emergency

1. Call 9-1-1 or the park emergency number. Administer first aid to the best of your knowledge, ability, and training. If appropriate, transport to emergency room. Addresses for and directions to the nearest hospital are in the field safety packet.
2. As soon as it is practical to do so, inform the POC and the park's emergency contact of the incident. Phone numbers are listed in the field safety packet.
3. For injured NPS employees and NPS volunteers, complete workers' compensation paperwork within 48 hours of incident (copies are included in the field safety packet). For other, non-NPS monitoring staff (i.e., contractors and cooperators), follow your organization's procedures for documenting accidents.

Non-Emergency Incidents

1. For a non-emergency incident that may require medical attention, injured monitoring staff must contact the protocol lead immediately after incident.
2. For injured NPS staff and NPS volunteers, complete workers' compensation paperwork within 48 hours of incident (copies are included in the field safety packet). For contractors and cooperators, follow your organization's procedures for documenting accidents.
3. Injured monitoring staff should seek medical attention, if needed.

NOTE: Never discard original paperwork related to workers' compensation claims (including information from doctor's visits, CA-1, CA-2, CA-16 or CA-17 forms).

During Fieldwork: Safety Considerations for Parks

Slip, Trip, and Fall Prevention

As the crew hikes and walks for field work, the most likely accident is that of a slip, trip or fall. Risks are higher when crew members are fatigued, the terrain is uneven, the brush is dense, or substrates are slippery, muddy, saturated or submerged. The following guidelines must be obeyed by monitoring staff to avoid injury from slips, trips, or falls:

- Always wear appropriate footwear such as sturdy hiking boots.
- Pay attention to where you are going, and remain alert for potential hazards.
- Walk at an appropriate pace and adjust pace for changes in terrain (e.g., slow down and take smaller steps on slippery surfaces).
- When hiking long distances, take breaks to avoid fatigue.
- When navigating to a location off trail, choose the safest route (this may not be the shortest route).
- Avoid river crossings, excessively steep terrain, and sudden drop-offs.

Proper Use of Backpacks

Field crew members are expected to carry packs of up to 18.1 kilograms (40 pounds) over uneven terrain on a daily basis. It is important for everyone to understand how to pack, lift, and carry a heavy backpack to avoid serious back, neck and shoulder injuries. Monitoring staff must follow these guidelines:

- Use a sturdy field pack with padded and adjustable hip and shoulder straps. Packs are provided for field crew members.
- Pack heavy items in the center of the pack and close to your back.
- Make sure weight is evenly distributed from side to side.
- Once equipment is packed, tighten the compression straps to minimize movement inside the pack during travel.
- When picking up a heavy pack, use your legs to do the lifting, and use slow, smooth movements. Keep your back straight, and keep the pack close to your body. Do not twist or bend at the waist, and do not swing the pack quickly over one shoulder.
- Always carry a pack with both shoulder straps and with the hip belt and chest straps secured.
- The pack should be positioned near the center of the back, and most of the weight should rest on your hips.
- Keep your pack organized, and only carry the necessary equipment, food, and water to reduce weight.

Weather

Weather conditions can be hazardous and can change quickly. The field crew leader is responsible for planning their day according to the local weather forecast and updating plans accordingly. Individual team members are responsible for being aware of their surroundings and changing conditions and for consulting with the crew leader if plans need to change.

Thunderstorms

Storms that produce strong winds and lightning are dangerous and should be avoided in the field. If caught in a lightning storm, seek shelter in a building or car as soon as possible. If no shelter is available, spread out and move to an open space. Squat low to the ground on the balls of your feet, with your hands on your knees. Do not lie flat on the ground. Avoid high elevations, conductive materials, and tall structures such as trees or telephone poles. If you are in the open and feel your hair stand on end (indicating lightning is about to strike), immediately make yourself the smallest target possible and minimize contact with the ground.

NOTE: A person struck by lightning can often be revived by prompt administration of CPR and oxygen.

Excessive Heat and Sun

Over exposure to heat and sun can cause dehydration, heat exhaustion, or heat stroke. All are serious conditions that can be life threatening and must be avoided. When working in hot weather, be sure to drink plenty of water and eat foods that can replace electrolytes. Wear loose and light colored clothing, including a hat to block the sun's rays. It may help to shift the field schedule to avoid outdoor work during the hottest part of the day or hottest times of the year.

Note: Signs of heat stroke include hot, red or spotted (usually dry) skin, and the sufferer may be mentally confused, delirious, having convulsions, or unconscious. If heat stroke is suspected, seek immediate medical attention.

Ticks, Mosquitos, and Chiggers

Ticks

Several species of ticks can be encountered while working in Gulf Coast Network parks. Of primary concern are ticks that carry the following diseases: (1) Rocky Mountain spotted fever, with symptoms that include sudden onset of fever, headache, and muscle pain, followed by development of spotted rash at wrists or ankles; and (2) Ehrlichiosis, with similar symptoms except there is often no rash around the tick bite. Note the presence or absence of a rash is not a diagnostic feature to distinguish any of the tick-borne diseases (CDC 2017a).

The deer tick or blacklegged tick (*Ixodes scapularis*), which transmits Lyme disease, could also be in any of the seven targeted GULN parks. There are, however, few incidents of Lyme disease reported for those areas, relative to the northeast and upper midwestern United States. Symptoms of Lyme disease are similar to Ehrlichiosis, except that a “bull's eye” rash forms at the site of the bite in 70–80% of cases (CDC 2017a).

Mosquitos

The main mosquito-borne diseases that are possible in Gulf Coast Network parks are dengue fever, West Nile virus and several forms of encephalitis, such as St. Louis encephalitis or eastern equine encephalitis. The latter three diseases are caused by the same family of viruses and can produce similar, flu-like symptoms. Only about twenty percent of humans who get West Nile show any symptoms at all, and the most severe, potentially fatal cases are generally restricted to the elderly. Dengue fever also has mild to unnoticeable symptoms in most cases, but sometimes can cause excruciating pain or hemorrhaging. The only network park where dengue fever is considered a risk is Palo Alto Battlefield National Historical Park. Another mosquito-borne disease of concern is Zika virus, which is transmitted by *Aedes aegypti* or *Aedes albopictus*. These two mosquito species both have geographic distributions that span all network parks, but the risk is highest at Palo Alto Battlefield NHP. In late November 2016, mosquito-transmitted Zika had been recorded in Brownsville, resulting in a CDC travel warning to that area (CDC 2017b). In late August 2017, however, the Zika-related travel warning to Brownsville was lifted. Most people infected with Zika are asymptomatic, but some may exhibit flu-like symptoms. Once infected, a person can spread the disease through blood transfusion or sexual transmission. The spread of Zika virus is of particular concern for pregnant women because of the potential for birth defects. Refer to the [CDC webpage](#) for current advisories and distributions of these and other mosquito-borne diseases.

Chiggers

Chiggers are the parasitic larva of several species of mites in the family Trombiculidae. They are common throughout the Southeast and are typically too small to see with the naked eye. They feed on humans and other animals by inserting their mouthparts into the skin and injecting enzymes that dissolve skin cells. Their bites leave itchy spots that are often in dense patches where clothes are constricted. Washing the skin with warm soapy water immediately after fieldwork will remove most chiggers and minimize the impacts of their bites, which sometimes take weeks to heal. To prevent multiple attacks following a single field excursion, any clothes that were worn in the field should be washed before wearing again. Chiggers are not known to be vectors of diseases in the United States.

Precautions to Minimize Risks of Ticks, Mosquitos or Chiggers

- Clothes treated with tick and insect repellents have been found to be fairly effective. Monitoring staff are provided with DEET and permethrin and encouraged to treat their clothing with permethrin periodically throughout the summer. Monitoring staff must carefully follow the application instructions on the spray bottles to ensure their safety. A single permethrin treatment remains active for several weeks and through several washings.
- Monitoring staff should take additional precautions to protect themselves from mosquitos, ticks and chiggers, including tucking pants in socks and tucking in shirts. Long sleeves and gaiters (especially when treated with permethrin) have been found to help. Monitoring staff may consider other barrier devices such as RynoSkin™, Under Armor®, elastic bands, and duct tape, when they are an option.
- While in the field, crew members should check clothes and skin for ticks regularly throughout the day and then inspect their entire bodies at the end of the day. Ticks typically need to be embedded for at least 24 hours for disease transmission to occur, so the earlier ticks are found and removed, the lower the chances are of acquiring a tick-borne illness.
- If a tick is found that is already embedded, it should be removed with fine-tipped tweezers or a spoon-shaped tick remover (not heat or harsh fluids), grasping the tick firmly and close to the skin. The tick's body should be pulled slowly and steadily away from the skin. Twisting or jerking should be avoided, as this may break off the head and leave it embedded. Once the tick is removed, the attachment site should be cleaned with soap and water.

Considerations for Using Repellents Containing DEET

- DEET products have been widely used for many years; these products have occasionally been associated with some adverse reactions. Frequently reported reactions involve skin or eye irritation. There have been reports of central nervous system problems.
- By using products with lower concentrations of DEET and by applying as little of the product as needed for your outdoor work, you can reduce your exposure to DEET.
- Products with about 20–30% DEET are considered effective for most insects, but do not seem to be effective against some species of ticks (e.g., *Ixodes scapularis*).

- Generally, products with about 20–30% DEET are considered safe for adults (except for those with allergies to DEET products) when applied as directed.

Considerations for Using Repellents Containing Permethrin

- Products containing permethrin are for use on clothing only—not for use on skin. If permethrin is used improperly (e.g., sprayed directly on the skin), it can have negative health effects.
- Permethrin kills ticks that come in contact with treated clothing and one application lasts two weeks or more. Do not treat the clothing more than once every two weeks.
- Carefully read and follow manufacturer’s instructions for application, and refer to the Material Safety Data Sheet (MSDS) if you have questions.
- Do not apply while clothing is being worn.
- Apply to clothing item in a well-ventilated outdoor area, protected from wind. Take care to avoid spraying permethrin around domestic cats, as permethrin is highly toxic to them.
- Moisten the fabric with permethrin until the fabric darkens in color—do not over saturate the fabric.
- Allow clothing item to dry outdoors for at least two hours before wearing (four hours in humid conditions).
- Keep treated clothes in a separate bag for storage and transport.
- Launder treated clothing separately from other clothing.

For more information on permethrin, see the [EPA page on repellent-treated clothing](#).

Poisonous or Otherwise Harmful Plants

Poison Ivy and Its Relatives

Poison ivy (*Toxicodendron radicans*), Atlantic Poison Oak (*Toxicodendron pubescens*), and Poison Sumac (*Toxicodendron vernix*) are three closely related plant species of the Gulf Coast region that can cause itchy rashes or, occasionally, severe allergic reactions following skin contact. For most network parks, one or more of these species is present and can be very abundant in localized areas. Abundance of poison ivy, poison oak, or poison sumac is not a justification for excluding a plot. However, if anyone of the monitoring staff is susceptible to extreme allergic reactions to these plants, that person should avoid working in infested areas and inform the crew leader prior to field work.

Precautions to Minimize Poison Ivy Risks

- Avoid skin contact with any part of the poison ivy/oak/sumac plant. If the plant’s density is such that complete avoidance is impossible, use a pre-exposure cream and wear long sleeves, long pants, hats, and work gloves.

- After working in an area with abundant poison ivy/oak/sumac, gently wash exposed skin in cool water with poison ivy soap (e.g., Tecnu) and change into fresh field clothes. Clothes that have been in contact with the plants should be washed thoroughly before reuse.
- At the end of a field day, wash potentially contaminated equipment (e.g., quadrat, DBH tape).
- If anyone has a minor allergic reaction, use an itch-relief cream such as cortisone cream, Benadryl cream, or calamine lotion. If a severe allergic reaction occurs, seek medical attention and notify the protocol lead as soon as possible. If the individual is an NPS employee or NPS volunteer, he or she should also file a workers' compensation claim.

Other Plants That Are Potentially Harmful If Carelessly Touched or Ingested

All Gulf Coast Network parks have some plants with thorns, spines or prickles. If members of the field crew exercise caution while outdoors, the risks associated with these plants are minimal (e.g., scratches, torn clothing). At Palo Alto Battlefield NHP, however, the thorn-scrub habitat is dominated by thorny shrubs, cacti, and yuccas. Many of the park's plant species present their spines at or near eye-level, such that all crew members should use protective glasses. Most other plants in network parks are safe to touch, but some are potentially toxic if ingested. Both for safety and protection of park resources, it is never advisable for monitoring staff to eat wild plants while working in a national park, regardless of their confidence in plant identification.

Venomous Snakes

The following species of venomous snakes may occur in network parks: copperheads (*Agkistrodon contortrix contortrix* or *A. c. laticinctus*), cottonmouths (*A. piscivorus piscivorus* or *A.p. conanti*), diamondback or timber rattlesnakes (*Crotalus adamanteus*, *C. atrox*, or *C. horridus*), pygmy rattlesnakes or massasauga (*Sistrurus catenatus tergeminus*, *S. c. edwardsii* or *S. miliarius*), and coral snakes (*Micrurus fulvius* or *M. tener*). To avoid snakebites, pay attention to where you put your hands and feet, and remain at a safe distance from any snakes you see (at least one full length of its body). If you hear the rattle of a rattlesnake, freeze, locate the snake visually and back away slowly. Note that many snake bites are purely defensive and contain no venom. Bites from immature snakes are much more likely to contain a dangerous amount of venom than bites from adult snakes. Texas Parks and Wildlife has provided useful resources online about identifying a range of venomous snakes and dealing with their bites (Texas Parks and Wildlife 2018a,b). The free ebook *Poisonous Snakes of Texas and First Aid Treatment of their Bites* (Werler 1970) is also helpful for species identification and natural history, although it wrongly instructs the use of constricting bands, incisions and suction when bitten. As described further below, the current wisdom is to basically leave the bite area alone, with the primary objective being to get the victim to a hospital immediately and call ahead with information on the snake species and bite location.

Copperhead snakes may be found in a range of habitats including rocky outcrops, floodplains, and the edges of swamps or other waterbodies. These species may occur in the San Antonio Missions National Historical Park, Natchez Trace Parkway, Big Thicket National Preserve, Jean Lafitte

National Historical Park and Preserve, and Vicksburg National Military Park. Copperhead bites are not typically considered life threatening, and in most cases antivenin is not administered.

Cottonmouths are typically associated with wetland habitats and may be found in all network parks except Padre Island NS and Palo Alto Battlefield NHP. Cottonmouth bites that are defensive typically do not contain venom. However, cottonmouth bites are capable of delivering a lethal dose, and even if non-lethal, can result in the loss of fingers or toes.

Rattlesnakes may be encountered in a diversity of habitats from scrublands, grasslands, woodlands, forests and even wetland habitats in the south. The three species of diamondback or timber rattlesnakes occur in the Gulf Coast region, and collectively, their ranges cover all network parks. Western diamondback rattlesnakes (*Crotalus atrox*) are almost certain to be encountered on visits to Palo Alto Battlefield NHP. Rattlesnakes are capable of delivering a lethal dose of venom and can be aggressive. The western diamondback, in particular, is responsible for more fatal snake bites than any other North American snake (Powell et al. 2016).

Pygmy rattlesnakes are also in a variety of habitats from arid to wet, but within a given habitat, they are often associated with water. The combined range of the two species intersects all GULN parks except San Antonio Missions NHP and Vicksburg NMP. Their bites are low in venom and rarely cause fatalities.

Coral snakes may be encountered in habitats including pinewoods, open areas that are dry or sandy, and moist, lowland areas. Collectively for the two species, their ranges intersect all network parks except Jean Lafitte NHP&P, Natchez Trace Parkway and Vicksburg NMP. Of the venomous snakes in network parks, coral snakes may be the least likely to bite, but bites are still possible if snakes are handled or harassed. Their venom is a dangerous neurotoxin.

Procedures Following a Potentially Venomous Snakebite

- Treat all bites as if envenomation has occurred, which means field crew members must respond rapidly, and the victim must reach the nearest medical facility as quickly as possible, travelling either by ambulance or, if quicker, being driven in a vehicle from the park.
- One person on the field team is assigned to use the radio or cell phone to call 9-1-1 for assistance. This person should identify the call as a venomous snakebite incident and identify the victim's location and the closest possible point of access for responders. If driving the victim is a quick and safe option, ensure the target hospital has the appropriate antivenom in stock and call ahead so the antivenom will be ready upon arrival. The 9-1-1 operator or the poison control network (1-800-222-1222) will know which medical centers have the necessary antivenom.
- Prior to departure from the field site, quickly remove the victim's rings, watches, shoes etc., before swelling begins. If the bite is on the arm, bind it loosely to the body to restrict motion. Reassure the victim they will be OK and maintain calm. Do not use thin

circulation restrictive cords, do not pack with ice, and do not attempt to cut open or otherwise enlarge the fang punctures.

- Depart the site by leading the victim toward proper medical treatment facilities. Move as slow as necessary to maintain a normal heart rate for the victim. Waiting for assistance will only prolong the process of getting proper medical treatment.

Bees and Wasps

Bees and wasps are present in all network parks, and in most cases, the risk of getting stung during field work is similar to the risk of getting stung when outdoors for other reasons. Extra vigilance is required, however, around large palmetto leaves at Jean Lafitte NHP&P, because wasps can build nests on the leaf undersides.

If someone is stung by a bee or wasp, they should ensure the insect is no longer on them (most bee and wasp species can sting more than once) and inspect the injury. Benadryl and a cold compress may bring relief. If the stinger is left behind, it should be scraped off the skin. Tweezers should not be used, as this squeezes the venom sack and worsens the injury. If the victim develops hives, asthmatic breathing, tissue swelling, or a drop in blood pressure, the crew should seek medical help immediately. If any monitoring staff members know they are allergic to bee or wasp stings, they should inform the field crew leader before field work begins. They should also make sure to carry appropriate medications. If they carry an epinephrine injector (EpiPen), they should make sure all members of their field team know where it is carried and how to administer it.

If a swarm of aggressive bees is encountered, follow these instructions to reduce potential harm:

- Run away quickly and in as straight a line as possible.
- Protect your head, face and airways as you run; avoid flailing your arms and do not jump in water for protection.
- Seek shelter in a vehicle or building only if bees can be kept out.
- If a person is stung numerous times, seek medical attention even if no signs of allergy are observed.

To and from Fieldwork: Vehicle Safety

Responsibilities of NPS Vehicle Operators

Field teams are responsible for inspecting their vehicles before every use to ensure the vehicles are in safe working condition. This includes visually checking tire pressure, adjusting mirrors, and making sure equipment is secure. Field teams must perform preventative maintenance in a timely manner (e.g., having oil changed by a qualified mechanic) and report any potential hazards or needed repairs to the protocol lead.

Rules That Must Be Followed When Operating an NPS Vehicle

- Everyone in a government vehicle is required to wear a seat belt.
- Use of a cell phone for either talking or texting is prohibited while driving, unless the driver is using a hands-free device. With a hands-free device, talking is discouraged but allowed.
- Only NPS employees or authorized volunteers, cooperators and contractors are allowed to operate a government vehicle.
- Passengers who are not NPS employees or authorized volunteers, cooperators, or contractors are forbidden from riding in a government vehicle.
- Drivers must adhere to all federal and state vehicle regulations, including all posted speed limits.
- A copy of this SOP and the field safety packet must be in every NPS vehicle at all times.

Procedures for Reporting a Motor Vehicle Accident

In the event of an automobile accident in an NPS-owned vehicle, respond to the accident following procedures outlined in the GULN field safety packet which come directly from the GULN safety plan. Note that this SOP and the field safety packet address federal guidelines and requirements for accident reporting only. Cooperators and contractors may have additional reporting requirements. Because government vehicles are self-insured, damage resulting from government vehicle accidents are generally paid by the Gulf Coast Network. However, in cases of severe negligence, the driver found at fault for the accident may be personally liable.

Field Safety Packet and Pamphlet

All field crews are issued a copy of, and receive training from, GULN's field safety packet. This packet will include:

- An abridged version of the safety hazards described in this SOP.
- The daily check-in procedure (with POC) and the procedure for incident response during fieldwork.
- Up-to-date information on park, network and emergency contacts.
- Hospital locations and directions to the nearest hospital from each park.
- Workers' compensation forms.
- Vehicle accident reporting forms.
- One laminated card per crew member (for carrying in the field) that summarizes safety information, POC check-in procedures and emergency contact information.

A copy of this packet must be kept in the field vehicle and is also available as an online document. Separately, each crew member will be issued and briefed on the laminated safety card that they will carry in their field packs. This card will include basic, essential safety instructions for immediate reference in the field.

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Appendix S01.A: Job Hazard Analysis for Driving Safety

Job Hazard Analysis Header: Participants and Required Materials

- Job Title (and number if applicable): Driving Safety
- Date Written: 21 August 2012
- Date Revised: 27 July 2017
- Title of Person Who Does the Job: All Gulf Coast Network employees
- Analysis By: Robert Woodman, edited by Jane Carlson
- Supervisor: Martha Segura
- Park: Gulf Coast Network Parks
- Division: Inventory and Monitoring
- Approved By: Martha Segura
- Required or Recommended Personal Protective Equipment:
 - Two or more high-visibility safety road vests
 - Functioning seatbelts for all passengers

Table A-1. Driving Safety Job Hazard Analysis datasheet.

Sequence of Basic Job Steps	Potential Hazards	Recommended Action or Procedure
Vehicle Maintenance including pre-driving inspections	Vehicle malfunctions leading to breakdown, injury or accident In the event of a breakdown, lack of crucial equipment that might be needed Accidents or injuries caused from unsecured items	Take the vehicle in for regular scheduled maintenance or when any problem arises with vehicle performance. Familiarize yourself with the tire jack, spare tire, tools and other vehicle equipment. Ensure that there is an unused accident reporting form in the vehicle, including several witness statement forms. Check that the vehicle has appropriate equipment such as a first-aid kit, safety vests, flares, cones, and an ice scraper. Do a walk around of vehicle. Inspecting for damage and potential hazards. Secure all items that might become projectiles in the event of a crash.
Driving to and from destination on paved roads	Accidents from following a vehicle too closely or driving too fast for conditions Collisions with other vehicles or animals and/or driving off road surface due to inattention Head-on collisions due to driving when visibility is impaired due to elements (rain, fog, smoke, snow)	Obey speed limits and slow down if road conditions become slick or congested with traffic Pay attention at all times. Do not talk on a cell phone or text while driving. Choose the safest route such as a road with a divider stripe and passing lanes. Be especially careful on curves and stay within your lane. If you must drive a road without a lane divider, reduce speed and allow at least 4 seconds between you and the vehicle ahead of you.
Driving to and from destination on unpaved or damaged roads	Accidents (collisions, driving off road)	Reduce speed. On very bad roads, scout ahead if in doubt. Report hazards such as fallen trees to park dispatch.
Driving to and from destination on slippery roads (rain, ice, snow)	Accidents (collisions, driving off road)	Reduce speed. Engage proper equipment such as 4-wheel drive. Be prepared to stop in a safe location.
Driving to and from destination in the night	Potential for collisions with pedestrians, animals and other obstacles that are not visible Accidents due to fatigue	Turn headlights on; keep windshield clean. Schedule trip to ensure driver is well rested. Pull over and rest if sleepy.
Towing trailer	Collisions due to extra weight of load, extra length and greater stopping distances Back-up problems	Reduce speed. Allow four or more seconds between you and the vehicle ahead of you to allow stopping time. Practice backing up with a trailer in a safe environment such as an empty parking lot.
Emergency or breakdown	Exposure due to being stranded Being hit by passing vehicles	If possible, pull off road. If there is risk of being hit by passing traffic, turn on four-way flashers. Use cones or flares to provide a buffer around your vehicle. If you need to stand on or near roadway, wear a safety road vest.

Sequence of Basic Job Steps	Potential Hazards	Recommended Action or Procedure
Parking	Collision with rocks, pedestrian or other hazard while backing into or out of a parking site Exhaust system igniting a grass fire Parked vehicle moving on its own.	Park off of the road or in a designated parking area. Find a safe location to park that will provide safe exiting. Put transmission in Park. If parking on a slope, set parking break. Ensure that fuels are clear beneath vehicle so as not to start a fire. Use a backer to guide you into a safe place that will be easy to pull forward out of later. Use mirrors or look over your shoulder. If no backer is available, look behind the vehicle before backing.
Driving—physical and mental fatigue	Accidents results from falling asleep at the wheel	Get needed rest. Avoid driving when tire and take breaks as needed. Be particularly cautious when driving late at night. If a replacement driver is available, trade off driving when you start to feel tired. If no replacement driver is available, pull off the road and take a break or a nap. Plan the trip so that no person will be driving more than 10 hours. Plan the trip so that no person will be driving after working 10 hours in the field.

Acknowledgment and Signature Form for Driving Safety JHA

We, the undersigned crew leader and crew members acknowledge reviewing and discussing this JHA and being given the opportunity to propose revisions to improve safety. We understand the provisions of this JHA and will fully adhere to all recommended actions and procedures.

PRINT NAME

SIGNATURE

DATE

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Appendix S01.B: General Field Work Job Hazard Analysis

Job Hazard Analysis Header: Participants and Required Materials

- Job Title (and number if applicable): General fieldwork JHA
- Date Written: 19 July 2014
- Date Revised: 17 November 2017
- Title of Person Who Does the Job: GULN and NPS staff, contractors, cooperators
- Analysis By: Robert Woodman, edited by Martha Segura and Jane Carlson
- Supervisor: Martha Segura
- Park: all GULN parks
- Division: GULN Inventory and Monitoring
- Approved By: Martha Segura
- Required or Recommended Personal Protective Equipment:
 - Field clothing appropriate to the weather and sampling activities. This includes long pants, long-sleeve shirts, wide-brimmed hats, appropriate foot-gear (leather or similar hiking boots if dry conditions and rubber boots/wader if wet), sun-block and bug-repellent.
 - First-Aid kit.
 - Individuals with known allergies to bees must carry an epinephrine injector.
 - Snake chaps are recommended when working in habitats where venomous snakes are common (namely Palo Alto Battlefield NHP).
 - Protective eye-wear are recommended when working in tangled and higher – profile spiny and thorny vegetation (namely Palo Alto Battlefield NHP).
- Required Standards and General Notes:
 - Refer to each protocol's Safety SOP for additional information and GULN field work guidance on a particular project.
 - Refer to park-specific safety policies, alerts, and notices.
 - Drive and hike carefully.
 - Bring all necessary equipment into the field.

- Drivers must have current state-issued driver's license to operate government vehicles on public roads.
- GULN coordinates or provides access to Defensive Driving training for GULN NPS staff.
- Specific other standards for park locations may include Department of the Interior (DOI)/NPS small – boat operation, US-DOI-NPS chain-saw operation, operation of off-road vehicles (4x4 quad UTV, etc.) training and certification
- All GULN-conducted field sampling activities are performed by teams of 2 or more people.
- Required Tools and Equipment:
 - Equipment and supplies for planned sampling tasks in the field.
 - Communications equipment including cell-phones.
 - Park maps, compass and hand-held GPS units.
- Required Training and Preparation:
 - (GULN NPS staff) Participation in ongoing team mentoring and training on field work procedures and safety in the field.
 - Reading of GULN safety procedures in Safety SOP and review of park-specific emergency contact list and procedures.
 - Participation in on-site safety briefing about park-specific risks, understanding of how make emergency contact calls using available communications equipment, understanding of how to use supplied GPS units, understanding of how to reach and leave field site using maps and route plans.
 - Current certification in GULN-mandated general First Aid training.

Table B-1. Work Safety Job Hazard Analysis datasheet.

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
1. Prior to departing from the office, file a trip plan	1a. No specific hazards associated	Records team trip destination(s), schedule, and Point-of-Contact at GULN / on park with contact schedule and chain
2. Driving to/from site	2a. Car Accident	Wear seatbelt at all times. Drive only on established roads, follow all driving laws and park in a safe location that will not obstruct traffic. Do not use cell phone or other device while driving. Avoid traveling during inclement weather. Drive slowly during icy/snowy conditions, especially around curves. Use 4WD when necessary. Slow down where large animals may be present to allow for reaction time.
	2b. Unimproved roads	Maintain a safe speed for the road condition. Use 4WD when necessary. Move sharp rocks out of road. Ensure that tires are properly inflated and check for tire damage regularly. Always have a fully inflated spare tire and all equipment necessary for changing a tire.
	2c. Fatigue	Do not drive if fatigued. Pull over to rest or have another member of the crew drive.
3. On-park safety briefing	3a. No specific hazards associated	The briefing establishes member roles and responsibilities, team tasks and task sequence, and anticipated location-specific faunal, plant and environmental hazards, communications & contact procedures.
4. Hiking or use of off-road vehicle to access sampling sites	4a. Steep, rugged and/or slippery terrain.	Wear sturdy, well-fitting boots with good traction. When walking off-trails, take care to assess terrain conditions in order to determine the safest route. Move slowly and deliberately through the habitat. Walking sticks may help to increase stability and push vegetation out of the way.
	4b. Loss of orientation	Ensure all crew members are knowledgeable with map, compass, and GPS. Keep track of current position, vehicle location, and pay attention to landmarks along your way. Use established trails when possible.
	4c. Encounters with venomous snakes	Venomous snake encounters are possible at all network parks. Prior to the sampling event, put on appropriate boots. Know and review snakebite First-Aid procedures before sampling. During the sampling event, look and listen for snakes as you move through vegetation and around objects. Never reach into holes or cavities in or under trees, ground objects, rock ledges or other likely snake hideouts. Avoid disturbing venomous snakes and do not handle them for any reason. If bitten by a venomous snake, follow appropriate snakebite First-Aid procedures as listed in in Protocol SOP for Safety. Get medical help immediately—inform assisting personnel of the type of snake involved.

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
5. Trail and off-trail field work	5a. Hazards due to walking and load-carrying on and off-trails include risks imposed by rough terrain, treacherous footing, obstacles in path, sliding down slopes and on rough surfaces	Wear clothing appropriate to the task(s) being performed. Use caution and look before you step. Exercise special care when stepping over obstructions and on sloped, slippery, muddy and loose terrain. Use teamwork to carry heavy and bulky items and carry heavy objects on your down-slope side when possible. Use additional protective gloves and clothing where appropriate.
	5b. Hazards due to exposure to weather	Be aware and informed of expected weather conditions. Dress appropriately for prevailing weather and temperature conditions. Avoid prolonged exposure to extreme sun and wear sun block greater than SPF-30. Keep hydrated and be alert for heat exhaustion and heat stroke in hot, humid conditions. Be alert for hypothermia in cold or wet conditions. Take a break in the shade when feeling over-heated.
	5c. Hazards due to site flora and fauna include biting and stinging insects, contact with poisonous / toxic plants, encounter with venomous and other biting animals.	Know the park-specific hazardous plants, animals and arthropods (See protocol SOP: Safety). Wear insect repellent and long-sleeve shirts and long pants. Avoid undue contact with spiders, centipedes, and other hazardous arthropods. Frequently check body for ticks during work and after leaving the field site. Treat bites with antiseptic ointment or alcohol, wash bites with soap and water.

A safely and effectively performed GULN field-work event consists of the GULN field team:

- Getting completely organized and fully-oriented to the planned tasks. The team knows the anticipated task sequence, locations, timelines, travel responsibilities, major anticipated conditions and potential hazards. Team members know what their roles are in the effort and what to prepare for.
- Properly establishing emergency notification and communications procedures, event routes, and POC for both GULN and the park.
- Driving to and from the park in a safe and successful manner without injuries or loss or damage to property.
- Holding the pre-work field safety briefing such that all members are properly informed on local hazards and applicable park procedures.
- Traveling within parks to the sampling location, successfully collecting data, and returning to the team vehicle without injury or incident.

- If adverse weather develops, successfully addressing these factors while completing field tasks.
- Completing post-event activities (off-loading, cleaning and storing equipment, attending to personal clean-up and treatment, where desired, for contact with insects and plants) at the GULN offices without injury or incident.

General Instructions for Completing a JHA Worksheet

- Identify the location of the work project or activity, the name of volunteer(s) involved in the process, the date(s) of acknowledgment, and the name of the appropriate supervisor approving the JHA. The supervisor acknowledges that volunteers have read and understand the contents, have received the required training, and are qualified to perform the work project or activity.
- Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include emergency evacuation procedures (EEP).
- Identify all known or suspect hazards associated with each respective task or procedure listed. For example:
 - Research past accidents and incidents.
 - Research the Health and Safety Code, or other appropriate literature.
 - Discuss the work project or activity with participants.
 - Observe the work project or activity.
 - A combination of the above.

Emergency Evacuation Instructions

- Work supervisors and volunteers are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a volunteer(s) becomes seriously ill or injured at the worksite.
- Be prepared to provide the following information:
 - Nature of the accident or injury (avoid using victim's name).
 - Type of assistance needed, if any (ground, air, or water evacuation).
 - Location of accident or injury, best access route into the worksite (road name or number), Identifiable ground or air landmarks.
 - Radio frequencies.

- Contact person.
 - Local hazards to ground vehicles or aviation.
 - Weather conditions (wind speed and direction, visibility, temperature).
 - Topography.
 - Number of individuals to be transported.
 - Estimated weight of individuals for air or water evacuation.
- The items listed above serve only as guidelines for the development of emergency evacuation procedures.

Acknowledgment and Signature Form for General Field Work JHA

We, the undersigned crew leader and crew members, acknowledge reviewing and discussing GULN safety practices for vegetation monitoring, as also outlined in the JHA. In signing below, we agree to fully adhere to all recommended actions and procedures for safe sampling.

PRINT NAME

SIGNATURE

DATE

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