

National Park Service
Inventory and Monitoring Division



Safety—Version 1.0

Carlson, J. E., W. Finney, and M. Segura. 2018. Safety—Version 1.0. Gulf Coast Network Standard Operating Procedure NPS/GULN/SOP—AM01. Gulf Coast Network. Lafayette, Louisiana.

This standard operating procedure (SOP) provides description and guidance on safety for amphibian monitoring on three National Park Service units, as conducted by the Gulf Coast Network (GULN). Throughout this protocol's implementation, the GULN places a high priority on the occupational health and safety of its employees, cooperators, and volunteers. In this SOP, instructions are provided for crew safety roles, risk identification and abatement, and emergency response procedures for the GULN and the National Park Service (NPS). Two Job Hazard Analyses (JHA) are included in the appendices of this SOP.

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Introduction

Amphibian monitoring in Gulf Coast Network (GULN) parks can be physically challenging, with exposure to high heat, high humidity, hidden hazards under water or mud, venomous snakes, stinging insects, and harmful vegetation. Prior to field sampling, several hours of driving may be required to reach the park. Crew members must remain vigilant to the safety risks they face as they drive to and from the field site and as they complete the required field tasks. Occasionally, members of the field crew will need to handle amphibians to photograph them from standardized views for identification and quality control purposes. Amphibian handling must be completed with utmost care and respect for the organism's well-being, and the handler should clean their hands afterward to prevent skin secretions from contacting their eyes or mouth.

This SOP establishes safety parameters and guidelines for personnel involved in the GULN Amphibian Monitoring Project. The topics covered include: sampling crew roles and responsibilities, safety training needs, Job Hazard Analyses (JHA), and how to respond to a medical emergency. All personnel participating in amphibian monitoring must be familiar with these procedures and sign the acknowledgment form (see "Job Hazard Analysis" later in this document and JHA forms in the appendices of this document). When non-NPS personnel work with GULN staff during field work, the GULN crew leader is responsible for ensuring these individuals possess the skills necessary for successful and safe participation. To maintain a safe working environment, the network provides training, procedural guidance, and safety equipment. The crew members are expected to make personal safety a priority at all times while engaged in the sampling project.

Involvement of Cooperators

This SOP is written from the perspective of GULN staff conducting the field work for amphibian monitoring. In some parks or years, however, the necessary field work is completed by non-NPS contractors or cooperators. In these instances, the non-GULN organization is responsible for establishing and adhering to its own safety protocols and guidelines, in addition to following the policies and expectations of the network and the park.

Safety Roles & Responsibilities

Crew Leader

The GULN crew leader serves as the crew safety officer before and during sampling visits. Their duties start several weeks before the visit and involve relaying trip- and safety-related information to and from the park person of contact (POC), typically the park resource manager. This check-in not only establishes the field work schedule and timing, but also allows for updates regarding park safety and fieldwork regulations, policies and current advisories. Before departure to the park, the crew leader completes the trip plan (see In-Office Safety Preparations later in this document) and gathers safety equipment along with the other sampling supplies (e.g., first aid kit, insect repellent, sunscreen, and snake sticks). Once at the park, the crew leader has two additional safety-related duties. First, the crew leader conducts a short safety briefing just before sampling begins, which

ensures that all members are informed of safety concerns, network safety policies and requirements. Second, the crew leader is responsible for safety-related check-ins with the GULN point of contact at the start and end of each field day.

All Crew Members

All participants are responsible for being aware of safety information and following guidance relevant to sampling visits. They must remain cognizant of the hazards associated with the sampling activities and associated travel and act in a safe manner during the performance of activities. All members of a sampling crew (typically two people, but occasionally more) are expected to stay together throughout the sampling visit, and they all must carry cell phones with park and local emergency numbers on hand. All crew members, NPS employees, and other personnel are required to follow safety guidelines provided through training and on-site briefing and must subscribe to all regulations and policies regarding field work posted by the park they are working in.

Required Safety Trainings and Materials

General Safety Training

Safety is a Gulf Coast Network and NPS priority. Network policies require that all network NPS staff maintain certification in First Aid, complete Defensive Driving and Operational Leadership courses per the network schedule, and maintain a valid state motor-vehicle operator's license. Network staff is provided network-sponsored Red Cross First Aid training in CPR, AED and First Aid every two years. Outside of the network, the Gulf Coast Network expects all participants to meet their organization's specific safety training requirements. This includes personnel from other federal (i.e., participating U.S. Fish and Wildlife Service [USFWS] staff), state and academic or non-government agencies and organizations.

In-Office Safety Preparations

In the weeks prior to the sampling event, the crew leader contacts the park POC to schedule the visit and to learn of any changes to park policy, safety requirements and local conditions. The crew leader will inform all other participants with the relevant information and complete the GULN park visit Trip Plan. Additional details and a template for the Trip Plan are provided in GULN SOP AM02 *Preparation for Sampling and Equipment List—Version 2.0* (Carlson 2018a).

On-Site Crew Safety Briefing

An on-site crew orientation and safety meeting directly precedes all sampling. The crew leader conducts this meeting to ensure all crew members are aware of the sampling procedures and the potential hazards. If the same field crew is working together across many sampling events, the briefing can be a simple check-in about: (1) sunscreen and insect repellent application, including precautions to prevent these substances from contacting amphibians; (2) hydration needs; (3) the possible safety risks during sampling, such as venomous snakes, heat exhaustion, stinging insects, amphibian skin secretions, and harmful plants; and (4) cell phones being on-hand with important numbers already saved on them. If new crew members are present, the key points of the field-work JHA are also reviewed and the acknowledgement form is signed. This signed form is kept on file in the GULN office.

Job Hazard Analysis

An important tool used to promote safe conduct is the job hazard analysis (JHA; formerly called a job safety analysis). This approach is consistent with NPS Directors Order 50 and Reference Manual 50B for Occupational Health and Safety (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.

Two JHAs have been developed for use with the amphibian monitoring protocol, one for driving safety and one for field sampling (Appendices A and B in this document). Once per year, all GULN personnel involved must review and sign both JHAs. This acknowledges the participant's agreement to follow all safety guidelines during sampling.

Responding to a Life-Threatening Medical Emergency

- 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. Directions to the nearest hospital and emergency numbers will be updated and printed every January, prior to field sampling, by the protocol lead or designated field crew leader. Copies of the hospital directions and emergency numbers are included on the supplies and equipment checklists used before each field event.
- As soon as it is practical to do so, inform the park's emergency contact and the GULN office of the incident.
- For injured NPS employees and NPS volunteers, complete workers' compensation paperwork within 48 hours of incident. Non-NPS crew members (i.e., contractors and cooperators) must follow their organization's procedures for documenting accidents.

Responding to Non-Emergency Incidents

- For a non-emergency incident that may require medical attention, injured monitoring staff must contact the GULN supervisor immediately after incident. If the supervisor cannot be reached, inform the park's emergency contact.
- For injured NPS staff and NPS volunteers, complete workers' compensation paperwork within 48 hours of incident. Non-NPS crew members (i.e., contractors and cooperators) must follow their organization's procedures for documenting accidents.
- Injured crew members 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).

Safety Considerations for Field Work

The Gulf Coast Network monitors amphibians in three National Park Units: Jean Lafitte National Historical Park and Preserve (JELA), San Antonio Missions National Historical Park (SAAN) and Gulf Island National Seashore (GUIS) at the Naval Live Oaks Area. Many of the safety considerations are shared across the three parks, but some are specific to a given park, as detailed later in this document.

Excessive Heat and Sun

Overexposure 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.

Rainstorms and Lightning

Thunderstorms and rain can happen at any time of year. If a thunderstorm is approaching, the crew should cease sampling until thunder can no longer be heard and the rain stops.

Ticks

Several species of ticks can be encountered in the GULN parks where amphibians are monitored. 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 that there is often no rash around the tick bite. Note that the presence or absence of a rash is not a diagnostic feature to distinguish any of the tick-borne diseases (CDC 2017).

The blacklegged tick, which transmits Lyme disease, could also be in any of the three targeted GULN parks. There are, however, few incidences of Lyme disease reported for those areas, relative to the northeast and upper midwestern United States (CDC 2017). Bexar County for San Antonio Missions NHP had seven cases in 2015 and twenty-seven cases since 2000; Jefferson Parish for Jean Lafitte NHP&P has had no cases since 2000; Santa Rosa for Gulf Islands NS-Naval Live Oaks had one case in 2015 and ten cases since 2000. Symptoms of Lyme disease are similar to Ehrlichiosis (2 above), except that a ‘bulls eye’ rash forms at the site of the bite in 70–80% of cases (CDC 2017).

Mosquitos

The main mosquito-borne diseases that are possible in the three focal GULN parks are West Nile virus and several forms of encephalitis, such as St. Louis encephalitis or eastern equine encephalitis. These diseases are caused by the same family of viruses and can produce similar, flu-like symptoms. Another mosquito-borne disease of concern is Zika virus, which is transmitted by *Aedes aegypti* or *Aedes albopictus*. Most people infected with Zika are asymptomatic, but infection may pose particular risks for pregnant women. Refer to the [CDC web page](#) for current advisories and distributions of these and other mosquito-borne diseases.

Chiggers

Chiggers are the parasitic larvae 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 by inserting their mouthparts into the skin and injecting enzymes that dissolve skin cells. Their bites leave itchy spots that sometimes take weeks to heal. Bites are often in dense patches where clothes are constricted. Washing the skin with warm soapy water immediately after field work will remove most chiggers and reduce the number of bites. 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

The risks of arthropod bites can be reduced with a few basic precautions. Clothes treated with tick and insect repellents have been found to be fairly effective at preventing bites. Crew members are provided with DEET and other insect repellent options at the start of the sampling visit. However, during amphibian monitoring in particular, they must ensure that no repellent or other personal care product (e.g., sunscreen or lotion) is on their hands once sampling begins, cleaning with alcohol-based hand sanitizer or soap and water if necessary, so that amphibians are not put into contact with these substances. 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.

Potentially Harmful Plants

Rash-causing plants in the genus *Toxicodendron* are present in all three of the focal GULN parks. The three relevant species are poison ivy (*Toxicodendron radicans*), Atlantic poison oak (*Toxicodendron pubescens*), and poison sumac (*Toxicodendron vernix*). Each can cause itchy rashes or, occasionally, severe allergic reactions following skin contact. If anyone in the field crew is susceptible to extreme allergic reactions to these plants, that person should avoid working in infested areas and inform the crew leader in advance.

The field crew may also encounter thorny, spiny, or sharp-leaved plants during field work, which can rip clothing and puncture the skin. Wearing sturdy clothing and exercising caution while in the field can minimize these risks.

Precautions for Poison Ivy Encounters

- Avoid skin contact with any part of the poison ivy, poison oak, or poison 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, poison oak, or poison 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 the field day, wash potentially contaminated equipment with soap (e.g., boots, clothes, field pack, and snake sticks).
- 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 a NPS employee or NPS volunteer, he or she should also file a workers' compensation claim, even if the injury or allergic reaction seems minor at the time.

Considerations When Handling Amphibians

Most amphibians in GULN parks are harmless when handled. A few amphibian species produce skin secretions that could cause irritation if eyes are touched immediately after handling the animal. Amphibians known produce irritating secretions are members of the family Bufonidae and *Gastrophyrne carolinensis*. By immediately cleaning hands with hand sanitizer, these risks are minimized. The only amphibian species that could deliver painful bites are amphiumas or sirens, which are unlikely, but not impossible coverboard occupants.

Venomous and Non-venomous Snakes

The following species of venomous snakes may occur in the three focal GULN parks: copperheads (*Agkistrodon contortrix* or *A. c. laticinctus*), cottonmouths (*A. piscivorus* or *A. p. conanti*), diamondback or timber rattlesnakes (*Crotalus adamanteus* or *C. horridus*), pygmy rattlesnakes or massasauga (*Sistrurus miliarius*), and coral snakes (*Micrurus fulvius* or *M. tener*; nomenclature for all snakes following Powell et al. 2016). In addition to these species, each park has several non-venomous snake species that could also deliver a painful bite. Venomous and non-venomous snakes may be found under coverboards or elsewhere in the environment during field work.

To avoid snake bites, 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 by venomous snakes 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 its instructions to use constricting bands, incisions and suction are out of date. As described further below, the bite area should basically be left alone, and the primary objective should be getting the victim to a hospital immediately, calling ahead with information on the snake species and bite location.

Copperhead snakes may be found in diverse habitats including rocky outcrops, floodplains, and the edges of swamps or other waterbodies. *Agkistrodon contortrix* in particular has frequently been detected under coverboards at Jean Lafitte NHP&P. 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 three focal GULN parks. 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 scrublands, grasslands, woodlands, forests and even wetland habitats in the south. The diamondback and timber rattlesnakes are broadly distributed throughout the GULN region, and collectively, their ranges cover these three GULN parks. Rattlesnakes are capable of delivering a lethal dose of venom and can be aggressive. **Pygmy rattlesnakes** are also in a variety of habitats from arid to wet, but within a given habitat, they are often associated with water. 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. Coral snakes may be found in San Antonio Missions NHP or Gulf Islands NS, but not in Jean Lafitte NHP&P. Of the venomous snakes in GULN 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 Snake bite

- 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 with antivenom 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 snake-bite 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 that 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 GULN 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. Additionally, wasps have occasionally built nests in network PVC pipes. When this happens, the crew leader should wait for the wasp to leave, scrape out the nest, and rehang the pipe. The types of wasps that build nests in network PVC pipes are not known to act aggressively toward humans.

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 of 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, following the instructions below will reduce the potential for serious 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.

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Appendix S01A: Job Hazard Analysis for Driving Safety

Job Hazard Analysis Introduction

- **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 and/or Recommended Personal Protective Equipment:**
 - Two or more high-visibility safety road vests
 - Functioning seatbelts for all passengers

Table S01A-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 at 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.

Sequence of Basic Job Steps	Potential Hazards	Recommended Action or Procedure
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.
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 and back-up camera (if present) or look over your shoulder. If no backer is available, look behind the vehicle before backing.
Driving—physical and mental fatigue	Accidents result from falling asleep at the wheel	Get needed rest. Avoid driving when tired 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 more than a combined 10 hours of field work and driving.

Acknowledgment

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

Appendix S01B: Job Hazard Analysis for Amphibian Monitoring

Job Hazard Analysis Introduction

- **Job Title (and number if applicable):** Amphibian Monitoring
- **Date Written:** 19 July 2014
- **Date Revised:** 27 July 2017
- **Title of Person Who Does the Job:** GULN and NPS staff, contractors, cooperators
- **Analysis By:** Robert Woodman, edited by Jane Carlson
- **Supervisor:** Martha Segura
- **Park:** Jean Lafitte National Historical Park and Preserve, Gulf Islands National Seashore and San Antonio Missions National Historical Park
- **Division:** GULN Inventory and Monitoring
- **Approved By:** Martha Segura
- **Required and/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. After sunblock or repellent has been applied, hands must be washed so that these substances do not come into contact with amphibians.
 - First-Aid kit.
 - Individuals with known allergies to bees must carry an epinephrine injector.
- **Required Standards and General Notes:**
 - Read the amphibian monitoring protocol narrative and SOPs AM01–AM03.
 - Drive and hike carefully.
 - Bring all necessary equipment into the field.
- **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 if the crew is relatively new to the site.

Table S01B-1. Work Safety Job Hazard Analysis datasheet.

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
Driving to/from site	1a. 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.
	1b. 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.
	1c. Fatigue	Do not drive if fatigued. Pull over to rest or have another member of the crew drive.
2. Hiking or use of off-road vehicle to access sampling sites	2a. 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 thorn scrub habitat. Walking sticks may help to increase stability and push vegetation out of the way.
	2b. 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.
	2c. Encounters with venomous snakes	Venomous snake encounters are possible at amphibian monitoring sites. 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, coverboards, rock ledges or other likely snake hideouts, without looking first. 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 this document. Get medical help immediately—inform assisting personnel of the type of snake involved. Know locations in advance of nearest emergency room/hospital.

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
3. Trail and off-trail field work	3a. 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.
	3b. 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.
	3d. Hazards due to walking in water with boots or waders	Step slowly and carefully in the water. Test the ground for stable substrate, avoiding deep mud or holes. When you stop, make sure your feet are firmly planted. Avoid walking in water that is within inches of the top of your boot. Do not attempt to sample PVC pipes when there is a risk of stepping into waist-deep water. If you fall in, do not panic; your waders will not cause you to be pulled under. Stand up slowly and walk carefully back to dry land. If air temperatures feel uncomfortably cold while you get out of the water, return to the vehicle to dry off. If an alligator approaches while sampling pipes in the water (most likely out of curiosity), use the snake stick to ward it off.
	3d. 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 as listed in this document. 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.

JHA Instructions (general instructions from worksheet)

- Identify the location of the work project or activity, the name(s) of people involved in the process, the date(s) of acknowledgment, and the name of the appropriate supervisor approving the JHA. The supervisor acknowledges that all participants 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/procedure listed. For example:

- Research past accidents/incidents.
- Research the Health and Safety Code, or other appropriate literature.
- Discuss the work project/activity with participants.
- Observe the work project/activity.
- A combination of the above.

Emergency Evacuation Instructions

- Work supervisors and personnel are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a participant becomes seriously ill or injured at the worksite. This discussion should also cover situations where a civilian in distress is encountered on NPS lands or while driving to and from sites.
- 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/number), Identifiable ground/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/water evacuation.
- The items listed above serve only as guidelines for the development of emergency evacuation procedures.

Acknowledgment

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

The topics we have covered include (crew leader check-off)

- ☐ General safety information (POC, cellphone communications, allergies, procedures for an emergency).
- ☐ Specific hazards at the site (e.g., lightning, heat and fatigue, ticks, chiggers, mosquitos, harmful plants, venomous snakes, bees).
- ☐ Issue safety equipment (sunscreen, insect repellent, snake stick, rubber boots/waders).

PRINT NAME

SIGNATURE

CELL NUMBER

DATE

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