

Standard Operating Procedure 2: Personal Safety (Version 1.0)

Summary

This Standard Operating Procedure (SOP) describes procedures for conducting field and laboratory aspects of benthic macroinvertebrate monitoring in a safe manner. This is done by (1) identifying hazards associated with field and laboratory settings and (2) using approaches to mitigate those hazards. The primary tool used to promote safe conduct is the Job Hazard Analysis. This approach is consistent with NPS Directors Order 50 and Reference Manual 50B for Occupational Health and Safety.

Revision Log

Original Version #	Date of Revision	Revised By	Changes	Justification	New Version #
NA	4/27/2016	C. Tzilkowski	NA	Protocol Implementation Plan publication	1.0

ERMN Benthic Macroinvertebrate Monitoring Protocol Implementation Plan

Introduction and Objectives

The Eastern Rivers and Mountains Network (ERMN) considers the occupational health and safety of their employees to be of utmost importance and is committed to ensuring that all employees receive adequate training on safety procedures, accident reporting, and emergency response prior to field work.

Encountering hazardous situations is inherent to all field monitoring activities; consequently, all personnel who participate in a field-based monitoring protocol are always, to some extent, exposed to the risk of accident, injury, or illness. In recognizing this, the ERMN is committed to conduct monitoring activities in a manner that hazardous conditions are recognized and measures are taken to minimize these risks.

Consistent with NPS Directors Order 50 and Reference Manual 50B for Occupational Health and Safety (NPS 1999), the ERMN will:

- Promote and enforce safe work practices and integrate safety and health into all operations.
- Evaluate occupational safety and health management programs annually, and revise as appropriate.
- Provide employees with the supervision, knowledge, equipment, and skills necessary to safely perform their assigned tasks.
- Make safe behavior a condition of employment, and require that employees and supervisors work together to identify and mitigate unsafe conditions, activities, and behaviors.
- Incorporate and enforce appropriate safety and health performance clauses in contracts, licenses, and permits, and establish a system of accountability for safety performance for all employees.
- Promote and enforce the safe operation of motor vehicles and equipment.

This protocol implementation plan requires the following (potentially hazardous) activities:

1. Accessing monitoring sites and making field measurements
2. Collecting, processing and analyzing benthic macroinvertebrate samples

Some hazardous conditions are inherent in most ERMN monitoring activities, whereas others are specific to particular sites. Examples include exposure to extreme weather, highway driving, use of hazardous chemicals, and specific hazards associated with accessing individual sites. The ERMN recognizes these hazards and strives to minimize the risk of personnel injury.

Risks Inherent in Benthic Macroinvertebrate Monitoring

Risks inherent in wadeable streams (e.g., benthic macroinvertebrates) and/or river monitoring include:

- Long road trips – Travel between parks will require long road trips in varied weather and road conditions.
- Remote roads and trails – Accessing sampling sites may require travel on secondary roads that are gravel or dirt, and some sites require considerable hiking. Unsurfaced roads can become impassible during wet weather, and may remain muddy for several days after precipitation. Hiking is often done on unestablished trails that vary in difficulty and condition.
- Activities in streams - Sample collection requires entering the main current in streams. Extra care is necessary when wading because many streams are steep, swift, and stream substrate can be loose or slippery; moreover, water and air temperatures can be near or below freezing while sampling. Precautions are needed to (1) recognize and avoid risks, (2) use proper techniques to avoid accidents, and (3) be properly equipped for self-rescue. It is recognized that some sites will not be accessible during periods of bad weather. If there is any doubt, the correct decision is to forgo sampling until another day.
- Varied weather conditions – The ERMN region is characterized by weather conditions that vary considerably among seasons, on a daily basis, and even hour-by-hour. Snow, wind and temperatures below 0°F can occur in the winter, and summer temperatures may be above 100°F. As a result, field work requires preparation for this range of conditions. Hypothermia and heat-related injury are possible and occasional discomfort is certain.
- Use of hazardous materials – Some of the chemicals used are hazardous and require proper storage, handling, disposal and personal safety gear including eye and skin protection.
- Potentially dangerous animals and plants – Being able to identify and avoid the risks associated with wild animals and plants (e.g., poison ivy) is essential to maintaining a healthy and efficient stream monitoring crew.

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Job Hazard Analysis

The AE will update the Job Hazard Analysis (JHA) associated with this PIP (Appendix A) when necessary. Personnel will review the appropriate JHA at the beginning of each sampling season and suggest modifications as necessary. The procedure to be used for writing a JHA is presented in NPS Reference Manual #50B, Occupational Safety and Health Program. (NPS 1999). A list of suggested hazards to be included and expanded upon is presented in Table 1 and the most current full JHA is provided in Appendix A.

Table 1. Suggested topics to be addressed in a Job Hazard Analysis

Job Activity	Job Step	Potential Hazards
All Field Activities	Environmental Conditions	Temperature and Sun Exposure Adverse Weather (rain, snow, lightning and wind) Hazardous Animals, Plants, People
Accessing Sites	Highway Driving	Varied Road Conditions Fatigue Behavior of other Drivers Animals and other Obstructions
	Driving on Unimproved Roads	Rough and Rutted Roads Muddy Roads Narrow Roads with Poor Visibility
	Winter Driving	Slippery Roads and Poor Visibility
	Hiking	Steep/Slippery Terrain, Undergrowth, Rocky Slopes
Sample Collection	Wading	Swift Currents and Deep Water Flood Flows Cold Water and Ice Contaminated Water
	Walking on Stream Banks	Slick Footing Adjacent Swift Currents and Deep Water Streambanks are Sometimes Unstable
Sample Processing	Preserving Samples	Exposure to ethanol

Personal Protective Equipment

Each crew member is responsible for ensuring he/she is wearing field appropriate clothing and footwear while in the field. General personal protective equipment includes: Appropriate clothing for prolonged cold (insulated material) or heat exposure (e.g., wicking material), sunscreen, ample supplies of water or hydrating beverage, stocked first aid kits, park radio, Technu, polarized sunglasses, emergency shovel, wood saw/shears, nylon rope, breathable waders, studded wading boots, wading belt, rain jacket and hat, survival kit, compass/GPS unit, maps, shoulder-length PVC gloves, insect repellent, flashlight/headlamp.

Cell phone and park radio.-See Routine and Emergency Communication section below.

Water and food.-Crew members should always carry ample water (2-3 liters) and food when working in the field. Dehydration is a serious condition that can lead to more serious conditions if untreated, and should be avoided. It is important to drink liquid frequently to maintain hydration on a warm day, even if you do not feel thirsty.

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First-Aid Training

Permanent ERMN employees are required to have advanced first aid training because they all participate in field-based activities. Relevant trainings and certifications include: Wilderness First Aid, Outdoor Emergency Care, and/or Wilderness First Responder. These levels of training also include CPR certification. All permanent ERMN employees are also required to take NPS Occupational Leadership Training.

First aid kits.-The monitoring crew should carry a stocked first aid kit with them in the field. Field vehicles also have a more substantial first aid kit. The contents of the kit(s) include:

Bandage Materials

- 5 Bandage, Adhesive, Fabric, 1" x 3"
- 2 Dressing, Gauze, Sterile, 2" x 2", Pkg./2
- 2 Dressing, Gauze, Sterile, 4" x 4", Pkg./2
- 2 Dressing, Non-Adherent, Sterile, 3" x 4"
- 2 Bandage, Conforming Gauze, 3"
- 5 Bandage, Adhesive, Fabric, Knuckle

Bleeding

- 1 Trauma Pad, 5" x 9"
- 1 Instructions, Easy Care Bleeding
- 1 Gloves, Nitrile (Pair), Hand Wipe

Blister / Burn

- 1 GlacierGel (Large Oval)
- 11 Moleskin, Pre-Cut & Shaped (11 pieces)

CPR

- 1 CPR Face Shield, Laerdal

Duct Tape

- 1 Duct Tape, 2" x 5 Yards

Fracture / Sprain

- 1 Instructions, Easy Care Fracture & Sprain
- 1 Bandage, Elastic with Velcro, 3"
- 1 Bandage, Triangular

Instruments

- 1 EMT Shears, 4"
- 1 Splinter Picker/Tick Remover Forceps
- 3 Safety Pins
- 1 Pencil
- 3 Thermometer, Disposable

Medical Information

- 1 Comp. Guide to Wilderness & Travel Medicine
- 1 Patient Assessment Form

Medication

- 2 Ibuprofen (200 mg), Pkg./2
- 2 Acetaminophen (500 mg), Pkg./2
- 1 Instructions, Easy Care Medications
- 2 Antihistamine (Diphenhydramine 25 mg)
- 1 Aspirin (325 mg), Pkg./2

Wound Care

- 2 Tincture of Benzoin Topical Adhesive
- 6 After Cuts & Scrapes Antiseptic Wipe
- 1 Instructions, Easy Care Wound
- 1 Tape, 1" x 10 Yards
- 1 Syringe, Irrigation, 20 cc, 18 Gauge Tip
- 1 Povidone Iodine, 3/4 oz
- 1 Wound Closure Strips, 1/4" x 4", Pkg./10
- 1 Cotton Tip Applicator, Pkg./2

Motor Vehicles

Crew members are responsible for inspecting their vehicles before every use to ensure that the vehicles are in safe working condition. This includes visually checking tire pressure, adjusting mirrors, and making sure equipment is secure. Report any potential hazards or needed repairs to the AE immediately. Strategies to avoid motor vehicle accidents are outlined in the job hazard analysis (Appendix A). Rules that must be followed when operating an NPS vehicle include:

- Everyone in a government vehicle is required to wear a seat belt.
- All use of cell phones (including talking and texting) are strictly prohibited while driving.
- Only NPS employees or authorized cooperators and contractors are allowed to operate a government vehicle.
- Passengers who are not NPS employees or authorized cooperators and contractors are forbidden from riding in a government vehicle.
- Drivers must adhere to all federal and state vehicle regulations, including all posted speed limits.

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Vehicle accident reporting. – Necessary forms are updated and shared locally among ERMN staff via Bison Connect Drive. They are checked annually for updates and copies are printed in kept in the glove compartment of each ERMN vehicle.

Field Site Description

A record of site locations and specific hazards that might be present will be developed and continually updated in the site descriptions that are part of Macroinvertebrate Sample Datasheets.

Routine and Emergency Communication

Having established lines of communication between ERMN staff and member parks (i.e., natural resource specialists, rangers, and communications/dispatch) is essential for safe operations. It is also essential that each crew have appropriate communications equipment and clearly understand how to use it in case of emergency. Guidance for maintenance and use of park radios and Personal Locator Beacons is updated and shared locally among ERMN staff via Bison Connect Drive.

Cell/mobile phones.-Each field crew is required to carry a fully charged cell/mobile phone with them while in the field. Cell phones are the primary means of emergency communication in ALPO, JOFL, FONE, and FRHI. Park radios are not required in these parks.

Park radios.-Each field crew in DEWA, UPDE, NERI, GARI, or BLUE is required to carry an ERMN-owned and programmed Motorola XTS 2500 radio. Radio use is primarily reserved for emergency situations (medical or logistical). However, radios can be used for more routine communication while in the field. It is important that you understand which radio channel and zone to be using in each situation.

Personal Locator Beacon.-Each field crew is required to carry a Personal Locator Beacon (PLB).

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Routine Communication

Park Notification

Network parks are contacted each year regarding staffing changes and an updated contacts list is shared locally among ERMN staff via Bison Connect Drive. The AE or HT will notify park contacts via email prior to each field season that a monitoring crew will be in the park. Information provided includes arrival date, departure date, crew (e.g., BMI Crew), names of crew members, housing accommodations, vehicle make, model, color, and license plate.

Table 2. Park staff to be contacted prior to conducting field work in the respective parks (March 2016). This list is updated annually and shared locally among ERMN staff via Bison Connect Drive.

Park	Contact	Contact information	
ALPO, JOFL	Kathy Penrod	kathy_penrod@nps.gov	814-886-6128
	Liz Blair (ALPO)	elizabeth_blair@nps.gov	814-505-6388
	Adam Dreese (JOFL)	adam_dreese@nps.gov	814-931-2095
	Chip Nelson	chip_nelson@nps.gov	724-322-2394
GARI, NERI, BLUE	Mark Graham	mark_graham@nps.gov	304-465-6542
	John Perez	john_perez@nps.gov	304-465-6537
	Duane Michael	ronald_michael@nps.gov	304-640-8802
DEWA	Rich Evans	richard_evans@nps.gov	570-296-6952x26
	Amanda Stein	amanda_stein@nps.gov	570-296-6352x28
	Kara Deutsch	kara_deutsch@nps.gov	570-296-6352x30
	Dispatch	DEWA Communications Center@nps.gov	570-426-2457
FONE, FRHI	Chip Nelson	chip_nelson@nps.gov	724 329-5812
UPDE	Don Hamilton	don_hamilton@nps.gov	570-729-7842
	Dispatch	DEWA Communications Center@nps.gov	570-426-2457

Check-out/Check-in

A daily check-out/check-in procedure is required for each monitoring crew and each crew member to help ensure timely assistance can be provided in case of a mishap or delay. A routine is established where each crew (including 1-person crews) is provided a contact person (i.e., a “check contact”) and is required to “check-out” before heading into the field each day and then “check-in” upon safely returning from the field with that contact person. The Program Manager is typically the check contact when the AE and HT are sampling BMI.

Check-out information includes the sampling site(s) to be visited and the estimated return/check-in time. Communication is in the form of a phone call or text message. The check contact person should confirm (i.e., reply) that they received both the check-out and check-in messages. **Do not deviate** from the daily plan without clearly discussing and confirming it with all crew members and check contacts. If a crew member does not “check-in” within two hours of the agreed upon time, the check contact person in conjunction with other crew members should begin to contact/locate the missing crew member(s) using all appropriate means. This includes cell phones, park radios, revisiting the scheduled sampling site, and notifying 9-1-1 and/or Park Dispatch to initiate a search and rescue.

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No crew member is allowed to conduct field work without fully understanding who their check contact is and “checking out” with that person. **The work day for the entire crew, including check contacts, does not end until each crew member has safely returned from the field and checked-in with the appropriate contact.**

Emergency Communications

Emergency contact information for 9-1-1, each park, ERMN personnel, hospitals, and individual crew members is posted in each field house and in the glove compartment of each field vehicle. This information is updated annually and shared locally among ERMN staff via Bison Connect Drive.

Responding to a medical emergency:

- a. Administer first aid to the best of your knowledge, ability, and training and contact 9-1-1 or park emergency number via phone or park radio as soon as possible. If unable to contact emergency services by cell phone or radio and unable to move, activate Personal Locator Beacon (PLB). If appropriate, transport victim to emergency room. Directions to the nearest hospital from each park are in the glove compartment of each field vehicle.
- b. As soon as it is practical to do so, contact the Program Manager and the park’s emergency contact.
- c. Complete Worker’s Compensation paperwork.

Responding to a non-medical incident (e.g., stuck or broken vehicles):

- a. Contact park ranger via phone or park radio.
- b. As soon as it is practical to do so, contact the AE (if applicable) and the Program Manager.

Chemical Storage and Use

Because the ERMN is housed at the Pennsylvania State University (PSU), all PSU Environmental Health and Safety regulations must be followed; these regulations are rigorous and satisfy NPS policies (NPS 1999). A PSU Laboratory Safety Plan and Chemical Use and Disposal Record are maintained in the ERMN laboratory. Chemicals must be stored according to their Material Safety Data Sheet (MSDS) information. The MSDS sheets for all of the chemicals are in the ERMN laboratory.

Appendix A. Benthic Macroinvertebrate Monitoring Job Hazard Analysis

JOB SAFETY ANALYSIS: General Field Work Travel to, from, and within parks Working in streams	JOB TITLE: Field Crew Members DEPARTMENT: Eastern Rivers and Mountains Network ANALYSIS BY: Caleb Tzilkowski and Andrew Weber	☒ NEW ☐ REVISED ☐ REVIEWED
Required and/or Recommended Personal Protective Equipment: Required: Park radio, cellular phone, Personal Locator Beacon, first aid kit, driver's license, first aid kit. Recommended as appropriate: rain gear, condition-appropriate footwear and clothing, hat, safety vests during hunting seasons, sufficient food and water, polarized sunglasses.		
Tasks	Potential Hazard(s)	Recommended Action or Procedure
Planning and Communication	Not being prepared and following plan/itinerary.	- Plan ahead. Know where you will be going, particular hazards associated with travel routes, and sites to be visited that day. Check expected weather and stream conditions for day and sites to be visited. - Understand itinerary of planned trip and follow it carefully. Always carry a NPS radio. - Keep other ERMN staff apprised of your travel/sampling itinerary which includes following check in/check out procedures - Carry a charged park radio at all times.
General foot travel	Falling or tripping due to wading, poor footing, uneven terrain, snow and ice, loose/rolling rocks and heavy pack.	- Use caution at all times. Walk carefully and watch footing. - Wear appropriate boots for conditions, especially stream wading. Stay aware of your feet. Address blisters and hot spots promptly. - Avoid carrying excessive weight or unbalanced loads. - When walking on a steep slope, lean upslope. Ensure that stems and vines are alive and can support your weight before relying on them. - Use extreme caution traversing wet rocks, streams, steep slopes or blowdown areas.
Working outdoors during storms	Being struck by falling trees or branches Being struck by lightning	- Listen to the weather forecast each morning (park radio and/or internet). - Plan or adjust field work to avoid being out in severe thunderstorms. - Postpone work if safety will be compromised by storm conditions. If you see or hear a thunderstorm coming, retreat from water, high ground, and exposed areas. Go inside a sturdy building or vehicle if possible. - If you can't get inside and if you feel your hair stand on end, lightning is about to

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Tasks	Potential Hazard(s)	Recommended Action or Procedure	
		strike. - Make yourself the smallest target possible and minimize contact with the ground. - 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. - Members of the crew should stay separated by at least ten feet.	
Poisonous plants, especially poison ivy	Contamination/toxicity from contact with poisonous plants	- Learn to identify poison ivy in its many growth forms. - Wear long sleeves and pants. - Be aware of poison ivy and avoid coming in direct contact with it. - Thoroughly wash hands, equipment, and clothes with Tecnu or similar specialized soap after working in areas with poison ivy.	
Working in bear territory	Bear encounter	- Avoid working alone if possible. - Be especially alert near dawn or dusk. - Be especially aware of mother bears with cubs. Never approach cubs or come between a mother bear and her cubs. - Maintain eye contact, face the animal, continually make noise -- do not freeze or remain silent. - Appear larger by standing tall, waving arms or jacket over your head. - Slowly back away -- don't approach a bear. - Never run from a bear. - Throw things and shout loudly. - Fight back aggressively.	
Bee, wasp, or yellow-jacket stings	Multiple stings from disturbing or stepping into nest areas	- Be alert to hives in brush, ground holes, or hollow logs. Watch for insects traveling in and out of one location. - If you or anyone you are working with is known to have allergic reactions to bee stings, tell your supervisor. Make sure you carry emergency medication with you at all times. - Wear long sleeve shirts and pants, tuck in shirt. Bright colors and metal objects may	

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Tasks	Potential Hazard(s)	Recommended Action or Procedure	
		attract bees or wasps. ▪ If you are stung, a cold compress may bring relief. ▪ If stinger is left behind, scrape it off of skin. Do not use tweezer as this squeezes the venom sack, worsening the injury. ▪ If the victim develops hives, asthmatic breathing, tissue swelling or a drop in blood pressure, seek medical help immediately.	
Bites from mosquitoes, no-see-ums, and chiggers	Itchy reactions to multiple bites	▪ Wear long sleeves and pants. ▪ Avoid sitting on the ground or on logs, especially in dry, sunny, grassy areas. ▪ Use insect repellants. Do not apply Permethrin, Permanone, or greater than 30% DEET directly to skin, only to clothing. ▪ Carry after-bite medication to reduce skin irritation.	
Venomous snakes	Being bitten by a venomous snake	▪ Wear snake gaiters when in known snake territories. ▪ Be alert for snakes in thick vegetation and rocky habitats. ▪ Look before putting hands or feet in places out of immediate view. ▪ Treat all bites as if evenomation has occurred. ▪ Immobilize the bitten area and keep it lower than the heart. ▪ Apply a bandage, wrapped two to four inches above the bite, to help slow the venom. This should not cut off the flow of blood from a vein or artery - the bandage should be loose enough to slip a finger under it. ▪ Remove rings, watches, shoes, etc. before swelling begins in earnest. ▪ Seek medical attention immediately and/or call for help. Remain calm. ▪ Rattlesnake bites are more likely to be life-threatening.	
Ticks	Contracting diseases transmitted from ticks	▪ Use tick avoidance precautions, including tucking pants into socks and shirt into pants. ▪ Wear light colored clothing and check for	

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Tasks	Potential Hazard(s)	Recommended Action or Procedure	
		ticks on clothing periodically throughout the day. - Conduct a thorough tick check every evening after completing field work. - Know how to identify tick life forms, and the signs & symptoms of tick-borne diseases. - Use insect repellants. Do not apply Permethrin, Permanone, or greater than 30% DEET directly to skin, only to clothing	
Walking through thick vegetation	Cut, scratched, or bruised by vegetation; Eye or ear injuries	- Shield your eyes and face with your hands, glasses, or hat when moving through tall thick brush. Keep your head and eyes pointed somewhat downward so your head hits obstacles before your eyes. - Wear long clothes to protect bare skin. - Look before you grab vegetation to avoid grasping thorny stems. - Carry a well-stocked first aid kit.	
Working in heat, humidity, or cold	Heat exhaustion, sunburn, dehydration, hypothermia	- Listen to the weather forecast on the park radio each morning and plan field work accordingly. - Carry and drink plenty of water. - Wear a hat and sunscreen. - Take extra breaks. Adjust the work routine to minimize exposure to extreme heat and humidity. - Take adequate garments for all possible weather conditions. Choose clothing (e.g., wool) that will keep you warm even if it gets wet.	
Hazard trees	Being struck by falling trees or branches.	- Look up. Be alert for widow-makers, storm damaged trees with large broken limbs, and unstable standing dead trees. - Do not spend extended time in an area with hazard trees.	
Preparation for stream wading	Blisters and Hypothermia	- Make sure waders and boots fit properly and do not leak. - Make sure waders are dry. - Use neoprene waders during cold weather. - Bring a change of dry clothes.	
Wading fast or deep	Injuries from falling and/or	Wear appropriate foot gear (i.e., studded	

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Tasks	Potential Hazard(s)	Recommended Action or Procedure	
water	drowning	boots with treaded soles made of rubber designed for aquatic environments). - Wear wading belt - Be sure that one foot is always firmly in place before taking another step - Avoid walking sideways, cross streams at an angle, facing upstream - Take care to not step into crevices in bedrock or between rocks where you may become stuck or cause injury (e.g., ankle or knee). - Avoid deep mud/depositional areas that can be deceptively deep. These areas can lead to potential injury or unnecessary fatigue if you become stuck. - Avoid sampling during periods of high water flow. - If you fall, keep your face up with your feet downstream and attempt to move toward stream bank.	
Driving on highways and paved park roads	Collision with another vehicle, pedestrian, bicyclist, or wildlife	- Wear seat belts with shoulder harnesses whenever vehicle is in motion. - Drive defensively; be alert to potential hazards. - Obey all traffic laws and speed limits. - Adjust speed to changing weather or traffic conditions - Be alert for pedestrians or bicyclists using roadways. - Be watchful for wildlife crossing roads, especially at early morning, dusk, and after dark.	
Driving on gravel, dirt, or un-maintained roads	Injuries from vehicle accident; Damage to vehicle	- Wear seat belts with shoulder harnesses whenever vehicle is in motion. - Maintain a slow and safe speed for changing road conditions, such as loose gravel, large potholes, washed out road, fallen trees or rocks, etc. - Be alert on narrow roads for oncoming vehicles and log trucks. Be prepared to slow down, pull over, or stop with little notice. - Many roads require 4-wheel drive and/or	

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Tasks	Potential Hazard(s)	Recommended Action or Procedure	
		high-clearance vehicles for safe passage. Use the appropriate vehicle for the terrain. - Do not exceed the capacity of your vehicle or driving ability. When in doubt, turn around or back out. - Use spotters to assist in navigating obstacles and assessing water depth.	
General vehicle operation	Injuries from vehicle accident; damage to vehicle	- Be watchful for wildlife, especially at early morning, dusk, and after dark. - Carry a charged park radio at all times. - Perform pre-operational check of vehicle (oil, tire pressure, fluids, gas). Report all needed repairs to the crew leader promptly. - Do not use the vehicle if it is unsafe. - Wear seat belts with shoulder harnesses whenever vehicle is in motion. - Clean windshield regularly. Keep all windows and mirrors clear of condensation and dirt. - All personnel shall ride inside the vehicles. - Properly store and secure all tools, equipment, and cargo so that they will not shift during sudden starts or stops.	