VOLUNTEER WETLANDS MONITORING PROGRAM

Field Safety Guide

Written in coordination with:
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Project Introduction and Summary

Carolina Wetlands Association is partnering with North Carolina State University and RTI International through an EPA-funded grant to employ a new strategy for wetland monitoring in North Carolina through the Volunteer Wetlands Monitoring Program (VWMP). It is a volunteer-based monitoring program to collect data at 6 monitoring stations across 3 minimally disturbed, protected wetland sites in central North Carolina.

Project Goals

- To provide wetland monitoring data that will contribute to state water quality programs and watershed planning
- To provide data for further analysis such as trends over time, comparisons to past data collected on impacted sites, climate change implications, etc.
- To create an increase in wetland quality and quantity as more easily accessible and standardized wetland data can be used to improve reference-based success criteria for future wetland mitigation
- To develop a web-based data portal for uploading, storing, and sharing monitoring results and to provide a central location for volunteers to access the data and to use visualization tools to display data
- To create a foundation for the program such that it may develop into a self-sustaining wetland monitoring network across North Carolina and beyond

Volunteer Involvement

- Collect reliable and accurate wetland information (e.g., water level, water quality, plants, amphibians, soil descriptions)
- Help collect wetland data that will contribute to North Carolina’s water quality and watershed planning programs and provide data for further analysis such as trends over time, comparisons to data from impacted wetlands, and detect climate change effects
- Provide new data which can be used by wetland partners (e.g., regulators, resource managers, environmental consultants, state agencies, and researchers) to improve statewide wetland resource management, wetland restoration, and other environmental decision making
- Learn how wetland condition relates to ecosystem integrity, functions, and services, and how stressors can negatively impact wetlands
- Visualize data through a data portal and create a database compatible with NC DEQ’s wetland program data repository
Contact Information for Volunteer Wetland Monitoring Program Personnel

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Pre-Fieldwork Briefing

Prior to starting fieldwork, a pre-fieldwork safety briefing will be conducted to identify potential safety hazards that may be encountered and how they should be handled.
Emergency Information for VWMP Wetland Sites

**Hemlock Bluffs Nature Preserve**  
2616 Kildaire Farm Rd, Cary, NC 27518

**Meeting Spot:** Harold D. Ritter Park, 301 W Lochmere Dr, Cary, NC 27518  
(First parking lot on LEFT - Swift Creek Greenway Trailhead)

**Closest ER:** WakeMed Cary Hospital  
1900 Kildaire Farm Rd, Cary NC 27518  
919-350-8000

**Urgent Care:** UNC Urgent Care at  
115 Kildaire Park Dr Suite 101, Cary NC 27518  
919-387-3180

**Mason Farm Biological Reserve**  
Chapel Hill, NC 27517

**Meeting Spot:** NC Botanical Garden, 100 Old Mason Farm Rd, Chapel Hill, NC 27517  
(Park in lot closest to exit gate)

**Closest ER:** UNC Hospitals Emergency Department  
101 Manning Dr, Chapel Hill, NC 27514  
984-974-4721

**Urgent Care:** UNC Urgent Care at The Family Medicine Center  
590 Manning Dr, Chapel Hill, NC 27514  
984-974-0210

**Robertson Millpond Preserve**  
6333 Robertson Pond Rd, Wendell, NC 27591

**Meeting Spot:** Robertson Millpond Preserve, 6333 Robertson Pond Rd, Wendell, NC 27591

**Closest ER:** WakeMed Raleigh Campus Adult ER  
3000 New Bern Ave, Raleigh, NC 27610  
919-350-8000

**Urgent Care:** Community Family Medicine and Acute Care  
2469 Wendell, NC 27591  
919-365-9045
Safety Considerations for the Pilot Volunteer Wetlands Monitoring Program

This document represents a survey of several hazards we can face in the field, how to avoid them, and how to deal with them if they do occur. A few general rules of thumb for all field activities are listed below:

Some of the potential hazards:

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General Practices (some of these are expanded in the sections following this introduction)

1. Always work with a partner. If others have to leave, go back to the meeting location and check in with the site coordinator.

2. Park in designated areas and make sure to lock your vehicle.

3. Be careful walking through wet areas and areas with high vegetation that may hide sinkholes, ditches, rocks, etc.

4. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves, and high-top boots.

5. Use insect repellent. Wear long sleeves, light clothing, and tuck pant legs in socks when traversing through tick infested areas. Seek immediate help in case of snake or spider bites. Make note of attached ticks and watch the bite site for signs of infection. Keep an eye out for wasp, hornet, ground bee, or yellow jacket nests.

6. Carefully observe ditches, swamps, and open water. Use caution crossing ditches and streams. Try to avoid jumping over ditches or streams.

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 Modified From NCDENR http://www.enr.state.nc.us/safety/WSM%202003/Chapter%2026B/Wetlands%20Assessments.html)
7. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures. (i.e., frequent breaks and increased intake of hydrating fluids in hot weather). Know signs, symptoms, preventive measures, and treatment of heat exhaustion, dehydration, and heat stroke.

8. Use sunblock to prevent sunburn. Protect eyes from UV exposure with sunglasses.

9. Insects, spiders, snakes and small mammals are frequently found in underneath items left in the field, or in field sampling equipment housings. Always use caution when picking up or opening anything in the field. When picking up things off the ground (like logs, rocks, PVC pipe, pieces of lumber) it is best to turn them over first with preferably with a shovel or safely positioned GLOVED hand. When opening sampler housings, carefully position the housing between you and the opening in case something decides to fly, run, or crawl out. Be sure to check if wasp or ant nests have been built underneath sampler housing platforms since you last visited.

10. Proper lifting techniques should be used. Get help or use mechanical equipment if necessary.

11. Review Safe Operating Practices for equipment used in the field and perform pre-operational checks before leaving for the field.

Let the Volunteer Coordinator know if you have any allergic reactions to insects, plants, foods, etc., or conditions that would make it difficult to perform work in the field (like asthma). Please make a note of the address and phone number of the closest hospital or urgent care to your research site.

I have carefully read and understand the contents of this safety document and will do my best to adhere to the warnings and recommendations discussed.

Name (printed)  Signature  Date
Dealing with Extreme Heat and Cold

Heat and cold are two safety concerns that you will likely encounter while working in the field. With a few precautions, their affect can be reduced and field work can safely proceed.

**Reactions and Symptoms**

**Heat:**
- **Heat Stress** - can occur with various degrees of severity.
- **Heat Cramps** – After excessive sweating, the body has depleted its moisture and salt levels which can cause painful muscle cramps.

**Symptoms:** Muscle pain or spasms in the legs, arms, or abdomen.
- **Heat Syncope** – Fainting or dizziness, usually after prolonged standing or sitting and rising to a different position

**Symptoms:** Fainting, dizziness, or light-headedness
- **Heat Exhaustion** – After excessive sweating, the body has depleted needed moisture and salts.

**Symptoms:** Heavy sweating; Extreme weakness or fatigue; Dizziness; confusion; Nausea; Clammy, moist skin; Pale or flushed Complexion; Muscle cramps; Elevated body temperature; Fast and shallow breathing
- **Heat Stroke** – The body is no longer able to control its temperature and is unable to cool down. Can cause death or permanent disability if emergency treatment is not given.

**Symptoms:** Hot, Dry Skin (no longer sweating); Hallucinations; Chills; Throbbing Headache; Very High Body Temperature; Confusion; Dizziness; Slurred Speech
- **Sunburn** – occurs after excessive exposure to the sun. It takes as little as 15 minutes for skin to be burnt but may take 2-4 hours for symptoms to begin to occur.

**Symptoms:** Painful, reddened skin

**Cold:**
- **Hypothermia** – occurs when the body is no longer able to maintain its temperature in cold weather. Can cause death or permanent disability in severe cases.

**Early Symptoms:** Shivering, Fatigue, Loss of coordination, Confusion and disorientation

**Late Symptoms:** No shivering, Blue Skin, Dilated Pupils, Slowed Pulse and Breathing, Loss of consciousness
- **Frostbite** – Occurs when part of the body or skin freeze, usually occurring on the nose, cheeks, chin, fingers, and toes.

**Symptoms:** Reduced blood flow to the hands and feet, Numbness, Tingling or stinging, Aching, Bluish or pale, waxy skin
Weather Protection

Following a few simple recommendations can reduce the effect of heat and cold while working in the field:

Heat

• Wear light-colored, loose fitting, breathable clothing
• Schedule heavy physical work during the cooler parts of the day
• Take frequent breaks in the shade, especially in extreme heat and humidity
• Drink water frequently. By the time you are thirsty you are already beginning to dehydrate.
• Avoid drinks with caffeine, alcohol, and large amounts of sugar
• During extreme heat, consider rescheduling your field day for a cooler day

Sunburn

• Use sunscreen, especially on the neck, ears, and nose/face. The higher the SPF, the better protection
• Wear a hat that shades your face and possibly neck
• If especially sensitive to sunburn consider, long sleeves and a collared shirt (to protect the back of the neck).
• Avoid the sun if you have already been burned.

Cold

• Wear appropriate clothing, wear several layers of warm clothing, and bring a layer that also blocks wind.
• Be sure to wear a warm hat, gloves, and warm socks (They are often overlooked in importance). If out in wet conditions, make sure these items are waterproof or resistant.
• Try to stay dry while in the field, consider bringing changes of socks and gloves just in case you get wet.
• During extreme cold, consider rescheduling your trip or limit time out in the cold by taking frequent breaks to warm up.
• Be sure to eat and drink enough, this will give your body energy to regulate its temperature
• Don’t forget lip balm for the wind!!!

First Aid for Heat and Cold

Heat

For most heat related stress, do the following:

• Stop your activity; get out of the sun and into the shade or an air-conditioned area
• Begin to sip water slowly
• You may want to pour some water on yourself to aid in cooling, or place cold items on pressure points (inside wrists and neck/chin)
• Consider taking the rest of the day off until you recover, going back to your activity could lead to more severe heat stress.

For more severe heat related stress, such as a heat stroke, do the following:
• Get the victim into the shade and cool them down (if victim feels steady enough to move, otherwise, create shade), soak his/her clothes with water.
• If conscious, have the victim sip water.
• Monitor conditions, don’t leave the person.
• Call 911 for emergency treatment

*Sunburn*
• Sunburn creams (Aloe Vera and others) are available over the counter
• If sunburn is severe (blisters form, etc.) then consider seeking medical treatment

*Cold*

*Hypothermia*
• Move to a warm area (like in the truck with the heat on high).
• Remove any wet clothing.
• If available, sip a warm beverage.
• If the victim shows any of the Late Symptoms listed above or seems very confused and disoriented then call 911 for emergency treatment.

*Frostbite*
• Move to a warm area.
• Do not walk on frostbitten feet or use frostbitten hands (it can increase the damage).
• Immerse the affected area in lukewarm (not hot) water.
• Warm the affected area using body heat.
• Do not rub or massage the frostbitten area (can cause more damage).
• If frostbite is severe, seek medical treatment.
Wildlife

Arachnids

Black Widows and Brown Recluse

How to distinguish them from similar spiders: Black widows are typically small, but they can be up to 1.5 inches long and 0.5 inches wide. They are black and shiny on the bottom of their abdomen, they have a red dot in the shape of an hourglass, and they often have an orange or red dot on the top of their abdomen. Brown Recluses are brown, known for the violin shaped pattern on their bodies, hairy which makes a velvety look, long thin legs with a leg span the size of quarter. Brown Recluses form irregular webs that can look like disoriented threads or funnel-like.

Problems/Diseases: Can cause deterioration of skin, internal organ problems and death if treatment prolonged. Black widows release neurotoxin venom, meaning that the venom affects the nervous system and can cause paralysis and possibly death. Brown recluses release hemolytic venom, which attacks red blood cells and causes necrosis, therefore tissue and cells rapidly decay.

Avoidance: Black Widows and Brown Recluses prefer dark corners and crevices such as inside and underneath sampler boxes, under rocks, wood piles, and in well tops. Gloves should be worn to avoid contact. They only bite when disturbed.

Signs of Impact: Pain at the bite zone, swollen skin, severe itching, vomiting, fever, abdominal pain, weakness, tremors, nausea, vomiting, fainting, and chest pain are symptoms of a spider bite.

First Aid: Go immediately to the emergency room if bitten by one of these spiders. Some people may have allergic reactions to other spiders if bitten. A doctor should be seen immediately if bitten.

Figure 1: Left, black widow (notice red hourglass shape); Right, brown recluse
Insects

Ticks

Problems/Diseases: Ticks are dependent on mammal’s blood and will attach themselves to human skin to feed. They can cause diseases such as Rocky Mountain spotted fever and Lyme disease.

Avoidance: Ticks are found in high grassy areas and tree limbs. They are difficult to avoid in the field, but precautions can be taken to avoid direct contact. Cover work pants bottoms with socks and tuck shirt in to avoid additional entrances to the skin. Wear a hat to avoid direct accessibility to the head. Apply bug spray with high DEET to not allow ticks to touch your clothes. You can also pre-treat clothing with Permethrin. During your time in the field avoid areas with high grass and try to stay away from low tree branches. They usually reside in these locations to attach to clothing while passing through. After leaving the field, check your body for possible tick attachments. Ticks often attach behind the ears, back, under the arms, and in hair. Periodically have your field partners check your back and neck for ticks while in the field. Use a comb to check your hair thoroughly after getting home from the field.

Signs of Impact: Symptoms of Lyme disease includes fever, headache, fatigue, depression, and skin rash that looks like a bull’s-eye. Signs of Rocky Mountain Fever include fever, headache, nausea, and muscle pain. A rash will appear approximately 2 days later often around wrists, ankles, and forearms.

First Aid: In the case a tick is attached to the skin remove promptly using tweezers and pulling it straight out, pay particular attention that the head and mouth parts have also been removed. Antibiotics are available for both diseases. If you have been bitten by a tick be aware of how you are feeling and if any of these conditions begin to occur over a one to two week period see your doctor immediately to start antibiotics.

Figure 2: (from top left, clockwise) Male and female American dog tick, male and female brown dog tick, male and female lone star tick, male and female black-legged tick. (Pictures are taken from the website of the NC State University and NC Cooperative Extension).
Bees, Wasps, Yellow jackets, and Hornets

Problems/Diseases: Allergic reactions and pain at sting site

Avoidance: All can form nests in sampler boxes. When opening a sampler box during the summer, position yourself on the backside of the box to shield yourself in case bees fly out. Some bees are found on the ground, so always look where you step while in the field. Observe possible nests in trees and avoid those locations. Use wasp and hornet spray if needed in monitoring locations to remove pests from equipment.

Signs of Impact: In the event that you are stung pain will occur at the sting site immediately usually followed by some swelling, itching, and reddish colored rash.

First Aid: If stung, remove stinger immediately if visible with tweezers/credit card, wash area, apply ice wrapped in a towel to reduce swelling, and apply baking soda and water to reduce pain. If pain continues take an aspirin/acetaminophen/Advil. Know before entering field if you are allergic to bee, wasp, and hornet stings. If person has an allergic reaction take them to the emergency room immediately, have person lay in prone position and keep the affected area immobile and lower than the heart. Tie a strip of cloth, a belt, watch, or sleeve 2 to 4 inches above infected area to slow venom but loose enough to fit a finger underneath.

Figure 3: (from top left, clockwise) Honeybee, yellow jacket, hornet, wasp.
**Ants**

**Problems/Diseases:** Pain at bite site

**Avoidance:** Ants like to make their homes inside samplers and wells since they are dark and have access to water. Wear gloves when opening well caps and sampler boxes and be aware of the possibility of ants being present beneath caps. If ants are found remove gloves and get ants off body immediately. When walking, avoid large piles of sand that is often ant hills. If ants are found, use pesticides to kill ants in area if near monitoring equipment.

**Signs of Impact:** If bit, a burning, stinging sensation will follow.

**First Aid:** When bit do not scratch area to avoid scaring. Clean area with alcohol, apply ice, and use baking soda and water to reduce pain. Hydrocortisone ointment can be applied and Benadryl can be taken to reduce itching. If hives appear on skin or chest pains/shortness of breath occur go to the hospital immediately.

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**Mosquitoes**

**Problems/Diseases:** Causes itching areas on skin from being bitten.

**Avoidance:** Apply bug spray with DEET and cover as much area of the skin with clothing as possible. Tuck in shirt and pull socks over pants to avoid extra entrances to skin.

**Signs of Impact:** Red bumps appear that cause severe itching. In the case of a chigger bite, a red dot will be in the middle of the bump.

**First Aid:** Apply calamine or cortisone creams to ease itching and inflammation. If severe itching occurs, Benadryl can help.
Mites

Chiggers

**Problems/Diseases:** Causes itching areas on skin from being bitten.

**Avoidance:** Apply bug spray with DEET and cover as much area of the skin with clothing as possible. Tuck in shirt and pull socks over pants to avoid extra entrances to skin.

**Signs of Impact:** Red bumps appear that cause severe itching. In the case of a chigger bite, a red dot will be in the middle of the bump.

**First Aid:** Apply calamine or cortisone creams to ease itching and inflammation. If severe itching occurs, Benadryl can help.

![Chigger](image1)

**Figure 6:** Chigger

Centipedes

**Problems/Disease:** As a centipede bites, it releases a small dose of venom. Most people are not affected by it except slight pain. Some might have allergic reactions.

**Avoidance:** If an area (Isco boxes) is infested with centipedes, spray a residual insecticide spray around its perimeters and entry points. Habitats include damp areas, air out if needed.

**Signs of Impact:** pain, possible anxiety, dizziness, fever, nausea

**First Aid:** Wash area with water and soap, apply heat to reduce pain or ice pack if swelling exists, take an acetaminophen if pain, hydrocortisone cream if itching persists, and keep bite clean to avoid infection. If allergic reaction develops, see medical care immediately.

![Centipede](image2)

**Figure 7:** Centipede
Snakes

Typical snakes in North Carolina are few inches to more than 8 feet. Two types of snakes are non-venomous snakes and venomous snakes. Typically, there are more non-venomous snakes than venomous snakes. There are 37 species of snake found in North Carolina, and only 6 species are poisonous species. Three venomous species are found in the Piedmont and eastern regions of North Carolina: Copperheads, rattle snakes and cottonmouths.

Characteristics of Venomous Snake Bites:

- Cottonmouth bite: Release venom through fangs; venom is hemolytic; more dangerous than a copperhead; when scared, it opens its mouth.
- Copperhead snake bite: Release venom through fangs, venom is hemolytic, rarely lethal.
- Rattle snake bite: Release venom through fangs; able to release a large amount of venom, which makes it more dangerous; venom is hemolytic.

Note: Neurotoxic: Affects the nervous and respiratory system. Symptoms include nausea, drowsiness, vomiting, problems swallowing, and difficulty breathing. Hemolytic: Causes necrosis: decaying of cells and tissues; blood poisoning. Symptoms include muscle cramps and convulsions.

“If a confrontation is unavoidable, how can you tell the difference between a venomous copperhead and a harmless rat snake? The rattlesnakes, copperhead, and cottonmouth are pit vipers. They are characterized by a pit between and slightly below the eye and nostril, long movable fangs, a vertically elliptical "cat's eye" pupil, undivided scales on the underside of the tail, and a large triangular-shaped head that has a small, smooth, shiny cap over the nose. Non-venomous snakes have round pupils, a large smooth cap over the top of the head past the eyes, divided scales on the underside of the tail, no pits and no long fangs.”2

2 Stated directly from NC Cooperative Extension Service - http://www.ces.ncsu.edu/gaston/Pests/reptiles/venompix.htm
Avoiding snake bites: According to US Food and Drug Administration, there are about 8,000 people who receive snake bites and only 2 percent victims actually die. Most of victims die because they receive no medical aid or treatment. According to the experts the chances of snake biting can be decreased by taking following precautions:

- Leave snakes alone, many people are bitten when they try to get closer to snake.
- Stay out of tall grass and keep your hands and feet out of the areas you cannot see.
- What do you do when you encounter a snake? Maintain at least more than 6 feet distance and stay out of the its path, leave it alone do not throw a stone or try to poke it with stick, let it go its way.

Venomous snake bite first aid treatment: The following protocols should be observed following the snake bite.

- Always have contact number and address of the nearby local hospitals in case of emergency.
- Stay calm, get safely away from the snake and have someone call 911 (emergency in your area).
- Have the victim lie down on with affected limb lower than the heart and keep the limb immobilized. If practical splint the limb.
- Always have the first aid kit with you when you travel to monitoring sites.
- Treat for shock and preserve the body heat and remove any rings, bracelets or boots from the bitten extremity.
- Apply a light band about 2 inches above or below the wound; however, place the band either above or below the wound, not at both sides.
- The purpose of constricting bands is to restrict lymphatic flow, not blood, so they should not be too tight. Check pulses below the bands and readjust the bands as necessary when they tighten due to swelling.
- Wash the bite with soap and water.

Figure 9: Diagrams of how to distinguish venomous and non-venomous snakes (Pictures are taken from the website of the NC State University and NC Cooperative Extension)
• If the victim has to walk out, sit calmly for 20-30 minutes to let the venom localize at the site, then proceed calmly to the nearest source of help and try to avoid unnecessary exertion which will stimulate circulation of the venom.
• Get the victim to definitive medical care for antivenin, which will provide the greatest relief from the toxic effects of the bite.

**ACTIONS TO AVOID:**
• Do not cut the bite. The additional tissue damage may actually increase the diffusion of the toxins throughout the body.
• Do not apply a tourniquet. Such action can result in the loss of the limb.
• Never try to suck out the venom by mouth. You can try the suction cup in a snakebite kit if it doesn't delay other needed treatment.

Do not apply cold water, as recent studies indicate that application of cold water or ice makes the injury much worse.

**Non-venomous snake bite first aid:** North Carolina non-venomous snakes have tiny teeth and if they bite, they will make superficial cuts. If bitten by a non-venomous snake, clean the wound area and apply hydrogen peroxide, and if your skin is allergic to some foreign material, see a doctor as soon as possible (North Carolina Cooperative Extension Service).
Mammals/Rabies

Bears

- Talk loudly so you do not surprise bears.
- Work in a group if possible.
- If a black bear is visible, but not close, alter your route so that you will move away from its area. Remain calm and avoid sudden movements.
- Give the bear plenty of room, allowing it to continue its activities undisturbed. Every bear has a zone of danger or personal space -- that is, the distance within which a bear feels threatened. If it changes its natural behavior (feeding, foraging or movement) because of your presence, you are too close. If you stray within that comfort zone, a bear may react aggressively in the form of a bluff charge, bodily contact, or even an outright attack.
- If spotted by a bear, try to get its attention while it is a good distance away. Help the bear to recognize that you are human, by talking to it in a normal voice or waving your arms. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening.
- If a black bear approaches, do not run. Remain calm, continue facing the bear and slowly back away. If the bear continues to approach, try to group together. Try to scare the bear away by shouting and acting aggressively.
- Some bears will bluff their way out of a threatening situation by charging, then veering off or stopping abruptly at the last second. Bear experts generally recommend standing still until the bear stops and then slowly backing away.
- Never run from a bear. Running may elicit a chase from an otherwise non-aggressive bear, and since they can run faster than 30 mph, you have no chance of outrunning them.
- Never feed or toss food to a bear.
- Climbing a tree to avoid bears is popular advice but not very practical in many circumstances. All black bears can climb trees. Running to a tree may provoke an otherwise uncertain bear to chase you.
- Throw something onto the ground (like a camera) if the bear pursues you, as it may be distracted by this and allow you to escape.
- If a black bear attacks, it is suggested to fight back using everything in your power: fists, sticks, rocks, and bear pepper spray. Black bears rarely attack humans. Do not play dead if attacked by a black bear. Black bears often eat dead animals and they will view you as a source of food.
- Be aware of bear cubs. Female black bears are very aggressive when a human or another bear comes between them and their cubs. If you come between a mother bear and her cubs, do not act aggressively and slowly move away from her and the cubs. It is best to leave the area if bear cubs are spotted!

Mice/Rats
• Worldwide, rats and mice spread over 35 diseases. Rodent-borne diseases are spread directly to humans through bite wounds, consuming food or water that is contaminated with rodent feces, coming in contact with surface water contaminated with rodent urine, or through breathing in germs that may be present in rodent urine or droppings that have been stirred into the air (a process known as “aerosolization”).
• If bitten by a mouse, clean the wound immediately. If flu-like symptoms (fever, fatigue, muscle aches) develop then go to a doctor as soon as possible and tell them you were bitten by a mouse.
• Avoid mouse feces and urine if possible. Wash your hands immediately if you come into contact with mouse feces or urine. Go to a doctor if flu-like symptoms develop after being exposed to mouse feces and urine.
• Remove mouse feces from an area to prevent exposure.
• Wear rubber, latex, or vinyl gloves and clean up all rodent urine, droppings, nests, and dead rodents using disinfectant or mixture of bleach and water.

Other Mammals (Raccoons, Coyotes, Bobcats)

These safety tips are general for all mammals:
• Do not work alone.
• If you see the animal before it sees you, change your path to avoid the animal if possible.
• If you are confronted by an animal, do not run; that might stimulate the animal’s instinct to chase. Instead, stand and face the animal, make eye contact.
• Do not crouch down or bend over; you may appear like ordinary four-legged prey to the animal instead of a human.
• Do all you can to appear larger; raise your arms and/or open your jacket.
• Fight back if attacked. Animals have been repelled with rocks, sticks, garden tools, kicks, and bare hands.

Rabies

• Any mammal can get rabies with the most common being raccoons, foxes, and coyotes.
• Any mammal that attacks a human is likely to have rabies.
• The primary method that humans get rabies is through being bitten by a rabid animal, but rabies can be transmitted by coming in contact with the saliva of a rabid animal.
• If you have been bitten by a potentially rabid animal, immediately wash the wound with soap and water. Then go to a hospital for treatment.
Poisonous Plants

Common Myths about Poison Ivy, Oak, & Sumac

- Myth: Poison Ivy/Sumac rash is contagious.
  - Fact: The rash is a reaction to the urushiol. The rash cannot spread, but urushiol can if it is still present.
- Myth: I was immune to poison ivy as a child, so I still am.
  - Fact: Peoples allergies change over time. Your reaction to poison ivy can vary from different seasons to years.
- Myth: If I see a dead poison ivy vine, I can pick it up and move it out of the way.
  - Fact: NO! Urushiol can remain on dead plants to up to five years, so a dead vine is just as contagious as a live one.
- Myth: As long as I don’t touch the plant, I can’t get a rash.
  - Fact: No, indirect (touching clothing, gloves, equipment) and airborne (burning poison ivy/sumac) contact can transfer urushiol onto your skin.

Poison Ivy

Appearance and Habitat

“Leaves of three, beware of me.” Poison Ivy has clusters of leaves with three leaflets. The plant is usually light or dark green except for around the fall when the leaflets turn red. They have a smooth-like surface; the edges can possibly be notched; and sometimes they can have a glossy look. Poisonous ivy is commonly found in the Southeastern US. It is often found in wooded areas, particularly around the edges. Poison ivy vines can grow to be about a foot tall on the ground in clusters, bushes, and also up trees. Even in the winter, dormant poison ivy can still be contagious.

Figure 10: From left to right – poison ivy leaves, vine, low-growing vine, vine in the winter (can still cause skin irritation) (Pictures are taken from the website of the NC State University and NC Cooperative Extension).
**Why is it poisonous?** Poison Ivy contains an oil called urushiol, which makes the plant poisonous. If you come in contact with poison ivy, the urushiol is what remains on your skin causing a reaction. If the oil is left on your hands, it can spread to whatever you touch. Urushiol can stay active on surfaces for up to five years, so avoid dead poison ivy too.

**Signs of Contact:** Poison Ivy can be contacted several different ways:

*Direct contact* – directly touching the plant

*Indirect contact* – touching equipment or clothing that has urushiol from the poison ivy

*Airborne contact* – when poison ivy is burned, the urushiol is released into the air, and particles can land on the skin

Once urushiol makes contact with the skin, it can begin to react within minutes, but a rash will not appear until several hours (12-72) later. Highly allergic people can develop conditions much sooner (4-12 hours). After a couple of hours, a rash can develop and the skin will begin to redden, itch, swell, or possibly blister. A rash may appear to be spreading, but this can just be a delayed reaction. The rash isn’t contagious.

**Prevention:** When you know you can be around poisonous ivy, it is important to dress properly. One should wear long pants, a long shirt, closed toe shoes (no sandals!), and gloves. Over-the-counter products that contain bentoquatum can be applied to the skin to prevent urushiol from reacting with the skin. A common lotion is Ivy Block which is available at most drugstores. Most importantly, learn how to identify this plant to avoid it. If you know you came in contact with poison ivy, it is important to not spread the urushiol.

**Treatment:** Once the skin becomes in contact with poison ivy, it is crucial to begin treating the affected area. The area needs to be immediately flushed with water. Then, it can be washed with soap and cool water (warm water opens pores to more urushiol). If water isn’t available, apply rubbing alcohol to affected area. After the first ten minutes of exposure, only 50% of the urushiol can be removed and only 10% can be after thirty minutes. Any affected clothing and shoes should be laundered thoroughly (if heavily affected clothing might be better to throw away).

If a rash develops, it will remain for several days up to two to three weeks. Oatmeal baths and baking soda mixtures can soothe the rashes. Applying lotions like calamine can relieve itching and discomfort while drying up any oozing from the rash. Antihistamines like Benadryl can also provide relief. If conditions persist and worsen or if you are highly allergic, it is important that you seek professional medical care as soon as possible.

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**Poison Sumac**

**Appearance and Habitat**

Poison sumac is not as common as poison ivy, but it can be common in areas with wet soils (wetlands!). It is found in NC in forests by stream banks, along ponds, and in wetlands. It grows as a shrub or small
tree (~20ft). Poison sumac produces white/gray berries while non-poisonous sumacs have red berries. The bark and wood are light colored. Leaves alternate with leaflets in clusters of seven to thirteen. They are smooth, oblong, and are not toothed. In June and July, they bloom small greenish flowers followed by white fruit (drupe), and in the fall the leaves turn orange/scarlet. The stem is red and has no hair on it.

**Figure 11:** Clockwise from top left: sumac tree, distinct 12 leaves, blooming flowers/drupe, and sumac in the fall (pictures taken from http://www.duke.edu/~cwcook/trees/tove.html)

**Why is it poisonous?** Poison sumac also contains urushiol like poison ivy. See notes on poison ivy.

**Signs of Contact, Prevention, Treatment:** See notes on poison ivy. Same methods/symptoms apply.

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**Poison Oak**

**Appearance and Habitat**

In North Carolina, the Atlantic Poison Oak is often found in the Coastal Plain and Sandhills. Poison oak looks similar to poison ivy, but instead of growing as a vine, it grows as a shrub. It is found in forested woods, dry thickets, and sandy fields. The leaves alternate, and each leaf has three leaflets, which are slightly toothed. In the fall, the leaves turn a red/violet shade. When it flowers, it does so in clusters, and the fruit (drupe) is yellow and hairy. The underside of the leaves is covered in hair and is a lighter shade of green.

**Figure 12:** Atlantic Poison Oak (on right, notice drupes)

**Why is it poisonous?** Poison oak also contains urushiol like poison ivy. See notes on poison ivy.

**Signs of Contact, Prevention, and Treatment:** See notes on poison ivy. Same methods/symptoms apply.
Walking in the Field and Uneven Terrain

Fieldwork may involve hiking in areas of steep topography, where a real risk of injury caused by accidental falls may exist. Exercise caution when hiking in steep terrain (such as rock outcrops). Similar precautions should be exercised in other areas where falls could occur (crossing or walking in streams, stepping over vegetation and fallen logs). Even wet or mossy rocks on a path can be a serious slipping hazard.

Many of the surfaces will be uneven and pose tripping hazards. When working in the woods, near streams, or other uneven surfaces, take a minute to plan your walking path. If possible, take the extra time needed to walk around rocks, steep surfaces, areas with lots of exposed tree roots, etc. so that you avoid exposure to uneven surfaces. If practical to use, a walking stick or hiking pole can help prevent slips, trips or falls when walking on steep, uneven or wet terrain.

Some areas may be muddy or contain hidden depressions. Proceed slowing, testing the ground before applying your full weight.

Roads and Moving Vehicles

When working adjacent to an active roadway, including a paved or grassed shoulder:
• Be alert to vehicle traffic traveling in both directions and vehicles potentially pulling off onto the road shoulder.
• If possible, always face oncoming traffic.
• Be wary of surfaces adjacent to the roadway that are sloped so steeply that an employee could slip or fall into the roadway or down the slope.
• Before crossing a roadway, look both ways to ensure the road is clear of oncoming vehicles.
• Walk across the road, do not run.
Severe Weather and Electrical Safety

Volunteers should be aware of local weather forecasts and should seek appropriate shelter at the first signs of approaching storms, tornadoes, high winds, hail, and lightning. Volunteers are responsible for wearing appropriate clothing (for example, rain gear, hat, warm coat) for existing and anticipated weather conditions. Use your best judgment when preparing for field activity in inclement weather. Listen to local forecasts for warnings about specific weather hazards such as tornadoes, hurricanes and “flash” floods.

Electrical Safety

Electrical safety practices are often overlooked, ill-prepared for, and ignored despite the relative ease of incorporating such protocols. Electrical safety procedures (ESPs) are necessary due to several possible dangers, to include, but not limited to:

- Electric shock
- Electrocution
- Fires
- Explosions

The following list contains items that pose electrical safety hazards. You may typically use or come in contact with these items, so it is imperative to ensure that you recognize these items and know how to safely use, transport, store, repair, and/or dispose of this equipment.

- Batteries (3.5V, AAA, AAA, C, D, 6V, 12V, +)
- Battery Chargers, generators, and solar panels
- Electrical outlets, Extension cords, and electrical fittings
- Computers
- Vehicles

Several ESPs exist to help keep you safe around the above equipment, as well as many other pieces of electrical equipment:

- Turn off equipment when not in use
- Turn off equipment during periods of increased atmospheric electrical activity
- Turn off equipment during periods of atmospheric precipitation
- Turn off equipment when attempting to move or repair
- Turn off equipment if in contact with foreign objects/liquids
- Ensure only waterproof equipment is used outdoors where contact with water may occur
- Properly store, shield, and protect all equipment, including waterproof equipment
- Do not attempt to repair equipment beyond your expertise
- Disconnect power sources before transporting or attempting to repair equipment

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3 (OSHA, 2008)
4 (HSE, 2009)
As a volunteer you typically will have limited, yet still potentially serious, interactions with sources of electricity. Many of the items you may utilize each day can pose an electric safety risk, thus it is imperative that these sources, risks, and ESPs are identified, understood and practiced.

Lightning

Injuries and/or deaths are not always caused by direct strikes; as current travels through the ground or through water, those nearby can still be in harm’s way. The following list from the National Geographic News (2005) reveals a few facts about lightning. The following list reveals a few facts about lightning.

- The odds of being struck by lightning in the U.S. during any year are 1:700,000.
- The odds of being struck during your lifetime are 1:3,000.
- According to the NWS Storm Data, over the last 30 years (1989-2018) the U.S. has averaged 43 reported lightning fatalities per year. Only about 10% of people who are struck by lightning are killed, leaving 90% with various degrees of disability. More recently, in the last 10 years (2009-2018), the U.S. has averaged 27 lightning fatalities.
- If a strike doesn’t kill, it may cause cardiac arrest, severe burns, or permanent brain damage (from memory loss to personality change).
- Approximately 10% of strike victims die, 70% suffer serious long-term effects (about 400 people survive strikers each year in the U.S.
- Lightning is not confined to thunderstorms – it can occur during volcanic eruptions, intense forest fires, nuclear detonations, snowstorms, and in hurricanes.
- Rubber-soled shoes will not protect you from lightning
- Standing under a tall tree is one of the most dangerous places to take shelter
- If your hair stands up, it may indicate that you are about to be struck
- If you can hear thunder, you can be struck by lightning (typically up to 10 miles away)
- Lightning can, and does, strike in the same place twice
- A vehicle may shield you from a direct strike, but do not touch metal surfaces or electronic equipment
- An umbrella, soil auger, etc. will increase your chances of being struck

In order to avoid lightning dangers, follow the below guidelines during electrical events:

- Seek shelter if you hear thunder or see lightning.
- Do not stand under or near tall objects
- Stay away from windows
- Do not use phones, computers, electrical equipment, or cords
- Do not lie on a concrete garage floor, as it may contain a wire mesh
- Avoid being the tallest object anywhere
- Do not hold onto metal or other conductive material

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5 (National Geographic News, 2005)
6 (NWS Storm Data, 2019)
General First Aid Information

Healthline recommends the following actions to perform first aid:

**Three Steps for Emergency Situations:**
1. Check the scene for danger
2. Call for medical help, if needed
3. Provide care

**First aid bandage:**
1. Hold the injured area steady.
2. Gently but firmly wrap the bandage around the injured limb or body part, covering the wound.
3. Fasten the bandage with sticky tape or safety pins.
4. The bandage should be wrapped firmly enough to stay put, but not so tightly that it cuts off blood flow.

To check the circulation in a bandaged limb, pinch one of the person’s fingernails or toenails until the color drains from the nail. If color doesn’t return within two seconds of letting go, the bandage is too tight and needs to be adjusted.

**First aid CPR:**
If you see someone collapse or find someone unconscious, call 911. If the area around the unconscious person seems safe, approach them and begin CPR. Even if you don’t have formal training, you can use hands-only CPR to help keep someone alive until professional help arrives.

Here’s how to treat an adult with hands-only CPR:
1. Place both hands on the center of their chest, with one hand on top of the other.
2. Press straight down to compress their chest repeatedly, at a rate of about 100 to 120 compressions per minute.
3. Compressing the chest to the beat of “Staying Alive” by the Bee Gees or “Crazy in Love” by Beyoncé can help you count at the correct rate.
4. Continue performing chest compressions until professional help arrives.

**First aid for nosebleed:**
To treat someone with a nosebleed, ask them to:

1. Sit down and lean their head forward.
2. Using the thumb and index finger, firmly press or pinch the nostrils closed.
3. Continue to apply this pressure continuously for five minutes.
4. Check and repeat until the bleeding stops.

If you have nitrile of vinyl gloves, you can press or pinch their nostril closed for them. If the nosebleed continues for 20 minutes or longer, seek emergency medical care. The person should also receive follow-up care if an injury caused the nosebleed.
First aid for heart attack:
If you think someone might be experiencing a heart attack, call 911. If they’ve been prescribed nitroglycerin, help them locate and take this medication. Cover them with a blanket and comfort them until professional help arrives. If they have difficulty breathing, loosen any clothing around their chest and neck. Start CPR if they lose consciousness.

In the case of an emergency, CALL 911.
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http://www.duke.edu/~cwcook/trees/tove.html
http://www.medicinenet.com/poison_ivy/page3.htm#glance

Severe Weather:

General First-Aid Information:
https://www.healthline.com/health/first-aid#kit-list
Appendix 1: COVID-19 Volunteer Fieldwork Guidance

Covid-19 and its variants are a continued safety issue in North Carolina and across the US.

Carolina Wetlands Association requires that all volunteer be fully vaccinated for Covid-19.

Covid Vaccination Requirements:
Vaccine card verification is required upon arrival at site visits upon check in with the volunteer coordinator. A photo of the vaccine card is acceptable.

Mask Requirements:
- If carpooling from a meeting place to a site, masks in the vehicle are required. (This only applies to Mason Farm as meeting spot is not on site)
- Masks for outdoors are optional but ENcouraged where social distancing is not possible.

In order to maximize protection from the COVID-19 virus, volunteers and participants should follow these steps:
1. Conduct a self-check prior to leaving to site to confirm they are feeling well and are not symptomatic. Health-compromised should not attend monitoring events.
2. Thoroughly wash and sanitize hands, tablets, materials, and equipment.
3. If equipment used by others is handled, sanitize your hands immediately afterward.
4. Upon arriving at the site, the volunteer coordinator shall inquire with attendees to determine if anyone is symptomatic or generally not well. If anyone is unwell, they will be asked to not participate in fieldwork.
5. If at any point someone begins to feel ill, they must self-isolate and avoid any contact with other people.
6. Don’t shake hands and maintain at least six feet from other individuals. Wearing a mask is encouraged.
7. Masks that cover participants nose and mouth are optional for outdoor field work. If carpooling transportation is needed in the field, participants should wear masks inside of vehicles at all times.