

Standard Operation Procedure (SOP) #1

Safety Protocol

Version 1.01 (January 8, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	1/8/2021	Kim Weisenborn, Amanda McCutcheon, Anne Farahi	Updated SOP references and external links. Updated content.	References, external links, and content were outdated.	1.0

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP explains the safety protocol for the operations using the Pacific Islands Stream Monitoring Protocol: Fish, Shrimp, Snails, and Habitat Characterization protocol and associated SOPs for the Pacific Island Network. This document outlines safety considerations for conducting any aspect of the protocol. All observers should be familiar with this SOP in order to identify and use the most current procedures and ensure optimum safety.

A master equipment list for the entire Freshwater Animal Communities: Stream Vital Sign Monitoring Protocol can be found in SOP #2 Before the Field Season. The master equipment list should be updated simultaneously if any SOP requiring an equipment list is revised.

General Preparation and Review

Prior to conducting fieldwork, observers are required to review this entire freshwater stream monitoring protocol, including all SOPs listed in this protocol. In particular, all participants should be thoroughly familiar with the NPS Occupational Safety and Health Policies, watercraft manuals (if applicable), various environmental and chemical safety guidelines, procedures outlined in SOP #7 Training Observers, as well as in SOP #2 Before the Field Season.

The USGS National Field Manual¹ is another recommended reference for safety procedures.

Federal employees, volunteers, partners, or cooperators are required to know and follow safety policies and requirements documented in Reference Manual 50 B Occupational Safety and Health Program². Boat operators should refer to Reference Manual 9 Watercraft Safety³ for safety guidelines. In addition, individual parks also have park specific safety procedures, and operational protocols.

Safety Policies, Regulations and Requirements

Ensure that all field personnel obtain First Aid and CPR training when available. It is recommended that at least one staff member be trained as a Wilderness First Responder or in Wilderness First Aid. Supervisory staff should ensure that all field staff are well trained in the safety guidelines and policies outlined below.

Weather

Sampling during inclement weather is of particular concern in the aquatic environments. Streams can swell drastically without warning and weather can change rapidly on the ocean, creating hazardous conditions in a relatively short time period. Prior to departure, it is the responsibility of all personnel to be aware of the appropriate local weather, tide, and current forecast for the day and to decide whether sampling should commence.

Sampling should be conducted during periods of little rain, mild wind, and small ocean swell. If thunder is heard or lightning seen, sampling will be suspended, and personnel should return to shore or vehicle for at least 30 minutes. Do not stay in the field during a lightning storm. During intense rainfall events, visibility may drop, and appropriate precautions should be taken. At any point during sampling, any personnel involved have the right and responsibility to abort a sampling trip if hazardous conditions develop.

Environmental Conditions

Individual parks have occupant emergency plans which cover safety procedures for medical emergencies, earthquakes, floods, fires, and tsunamis. Be familiar with the procedures and emergency contact numbers of your duty station park as well as other parks you may visit during field sampling activities.

Rough, steep, and slippery terrain will be encountered when conducting field work necessary for this protocol. Appropriate footwear should be worn to protect field personnel from injuries. Felt soled shoes should be worn in around streams. Sturdy hiking shoes should be worn while accessing field

¹ USGS National Field Manual, https://www.usgs.gov/mission-areas/water-resources/science/national-field-manual-collection-water-quality-data-nfm?qt-science_center_objects=0#qt-science_center_objects (accessed 8 January 2021).

² Reference Manual 50 B Occupational Safety and Health Program, <https://www.nps.gov/policy/RM50Bdoclist.htm> (accessed 8 January 2021).

³ Reference Manual 9 Watercraft Safety, <https://www.nps.gov/policy/RM50Bsection9.pdf> (accessed 8 January 2021).

sites. Field conditions in the region are likely to expose crews to intense tropical sunlight, wind, and rain. Flash flooding should always be a concern when working near streams. High topographical relief in the region combined with the episodic nature of rainfall in the tropics leads to extreme flood events with little or no warning. Signs of flash flood include the sound of rushing water, change in color of the water to a muddy brown, and large debris (such as sticks, logs, and leaves) coming down the stream suddenly. If any signs of a flash flood are present staff must immediately gather gear and leave the stream for higher ground. If necessary, leave gear and seek higher ground.

Collecting freshwater stream data will require hiking over very rough and unstable terrain in hot and arid conditions. Appropriate precautions should be taken to protect field personnel from injuries as well as dehydration and exposure in these environments. Personnel should be prepared with adequate sun protection equipment (hats, sunscreen, etc.) and plenty of drinking water. Access to certain field sites may require hiking long distances (up to 8 miles) over uneven terrain carrying heavy equipment (up to 50lbs). Camping in potentially inclement weather in backcountry sites may be required. Appropriate preparations and safety precautions should be taken.

Contaminated Water

Aquatic areas being sampled may be contaminated with pathogens or harmful chemicals although this situation is rare in the PACN. Consuming or exposing open wounds to untreated or unfiltered freshwater may result in the contraction of bacterial diseases or parasites (e.g., *Leptospirosis*, *Giardia*.) Personnel should not work in water with open wounds to minimize exposure to parasites. *Leptospirosis* infection can present with flu like symptoms up to 14 days after exposure to untreated water. Staff who have these symptoms after working in streams should seek medical attention and treatment for *Leptospirosis* immediately.

Animal Hazards and Disease Vectors

Any open cut has a high likelihood of becoming infected and all cuts should be carefully tended and monitored. It is the responsibility of all personnel to be familiar with the local hazardous flora and fauna and to understand the appropriate treatment methods.

Field Trip Preparations and Emergency Contacts

Table SOP 1.1 contains information a list of basic field survival equipment. No sampling activities will be conducted without all necessary safety equipment present and in proper working condition.

Table SOP 1.1 List of basic field survival equipment for the freshwater stream protocol.

Equipment (#/quantity)	Preparation & Maintenance
Water	Ensure that the proper quantities are available.
Water Filter	Ensure this equipment is available if necessary
First Aid Kit	Keep stocked
Sunscreen (reef safe)	Ensure that the proper quantities are available.
Insect repellant	Ensure that the proper quantities are available.
Sunglasses (polarized)	Ensure that this equipment is available.
Headlamp	Ensure this equipment is available.
Headlamp batteries (usually AAA) (6)	Label and charge.
Appropriate raingear, clothing and footwear (including stream shoes)	Ensure this equipment is available.

Equipment (#/quantity)	Preparation & Maintenance
Tent, sleeping bag (1/staff)	Ensure this equipment is available if necessary
Personal items	Ensure this equipment is available.

Emergency Procedure

In the event of an emergency, the first action is ALWAYS to take care of the injured person and seek help. Once help is on the way and the situation is under control, the team leader or crew member should contact, or have someone else contact, the supervisor to inform them of the incident.