



Environmental Analysis Program

Pomona College
Biogeochemistry Laboratory

SOP-F001

Field Safety

Standard Operating Procedure

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1. Purpose

This SOP covers field-based research activities and class field trips, addressing transportation, weather-based, and biotic hazards. Although we cannot predict all risks and hazards, it is everyone's responsibility to identify and mitigate potential risks associated with field work (Occupational Safety and Health Administration, 2012).

2. Scope

- **Applies to:** All field-based research activities, class field trips, and off-campus data collection
- **Does not apply to:** Laboratory-only procedures (see relevant Lab SOPs)
- **Location:** All field sites used by the EA Program

3. Responsibilities

Role	Responsibility
Instructor / PI	Approve field plans, ensure training compliance
Trained Personnel	Follow this SOP, report deviations and hazards
New Students	Complete training and document review before field work

Anyone conducting research in the field is required to have documented training before commencing field work. Learning about risks and taking the precautions described here is the first step to reducing the risks associated with field work. Anyone working in the field should identify potential risks and attempt to mitigate them.

4. Definitions

- **Field lead:** The trained, designated person responsible for safety decisions during a field outing; authorizes resumption of work after a stop-work condition, maintains communication with the PI, and is the first point of contact in an emergency.

- **Heat illness:** A spectrum of conditions caused by overheating, ranging from heat cramps and heat exhaustion to heat stroke; heat stroke (core temperature above 40 °C, altered mental status) is a life-threatening emergency requiring immediate 911 activation (Occupational Safety and Health Administration, 2012).
- **Incident report:** A written record of any injury, illness, near-miss, or property damage occurring during field work; submitted to the PI and the college risk management office within 24 hours of the event (Pomona College, 2024).
- **Minimum crew size:** Two persons at all times during field work; one person must be capable of summoning help if the other is incapacitated. Solo field work is prohibited unless explicitly waived in writing by the PI for low-hazard, high-visibility situations.
- **PPE (personal protective equipment):** Equipment worn to minimize exposure to field hazards, including closed-toed shoes, long pants, safety glasses, sun protection, and task-specific items such as hard hats and cut-resistant gloves (National Research Council, 2011).
- **Risk assessment:** A structured evaluation of the hazards at a field site and the probability and severity of resulting harm; used to select appropriate control measures and documented on the Field Work Planning Form (Appendix A).
- **Stop-work authority:** The right – and duty – of any crew member to stop field operations without prior approval when they observe an imminent safety hazard. No crew member may be penalized for exercising stop-work authority in good faith (Occupational Safety and Health Administration, 2012).
- **Two-person rule:** See “Minimum crew size” above.
- **Widow-maker:** A dead branch, dead tree, or tree with structural defects that may fall without warning; a leading cause of fatalities in forest work; avoid working beneath or near hazard trees, especially in high wind.

5. Safety and Hazards

General Field Hazards

Reducing risks is one of our main priorities. Like many endeavors in life, field work has certain risks. We can reduce these risks dramatically by understanding our physical limits and how these can be tested by uncontrolled environmental factors.

We rely on each individual to be mindful of their own limitations and to advocate for themselves and others to reduce risk exposure.

5.1. Required Materials

- First Aid Kit (kits are located in EA vehicles; see EA vehicle checklist to document their presence)
- Cell phone(s) with emergency contacts programmed
- Walkie-talkies (optional but recommended for sites with poor cell service)
- Personal Protective Equipment (PPE) appropriate for the site and task

6. Estimated Time

Preparing to go in the field can take a few minutes to several hours of planning and gathering resources. A good rule of thumb is to double the time you think it will take to get ready.

7. Field Preparation Checklist

7.1. Before Departure

- ☐ Check weather report and air quality index
- ☐ Read and understand emergency procedures for the specific site
- ☐ Know locations of emergency equipment (first aid kit, fire extinguisher if applicable)
- ☐ Be aware of any special medical conditions of team members
- ☐ Report departure time and expected return to supervisor
- ☐ Identify the hospital or urgent care facility closest to the field site
- ☐ Develop a transportation plan with a designated driver
- ☐ Complete a risk assessment and safety plan (Appendix A)

7.2. Supply Checklist

- ☐ PPE appropriate for the task (see §8 for task-specific items)
- ☐ Rain gear (if precipitation is forecast)
- ☐ Closed-toed shoes or field boots (no sandals or open-toed shoes)
- ☐ Additional clothing/gear for site conditions (e.g., long sleeves and gaiters for poison oak areas)
- ☐ Sunscreen and sun hat
- ☐ Adequate water (minimum 1 L per person per 2 hours in warm conditions)
- ☐ Rite in the Rain field notebook and waterproof pen
- ☐ Watch or phone for time-stamping field records
- ☐ First aid kit
- ☐ Cell phone with the following numbers programmed:
 - 911 (emergency)
 - Campus safety: (909) 621-8170 (Pomona College)
 - Lab supervisor and/or instructor
 - Field team members

7.3. On Site

- Identify a meeting time and departure plan if the team splits up
- Leave no trace: ensure the environment remains undisturbed
- Field lead ensures that safety procedures are followed
- Report any potential field hazards to the field lead immediately

8. Hazard-Specific Procedures

8.1. Transportation

- All passengers must wear seatbelts at all times
- Designated driver is identified before departure; no impaired driving
- Allow extra time on unpaved or unfamiliar access roads
- Do not drive into flooded washes or roads

8.2. Weather Hazards

8.2.1. Lightning

Follow the 30-30 rule: if the time between a lightning flash and thunder is 30 seconds or less, the storm is within 10 miles – seek shelter immediately. Remain sheltered for 30 minutes after the last flash or thunder (Occupational Safety and Health Administration, 2012).

When lightning threatens:

1. Move away from tall isolated objects (trees, towers, open hilltops)
2. Avoid open fields and water bodies
3. Seek a low-lying area away from individual trees
4. Do not hold metal equipment
5. If no shelter is available, spread the team out (at least 30 m apart) to reduce the risk of multiple casualties

8.2.2. Heat

Southern California field sites can exceed 40 °C. Carry adequate water, take shade breaks, and monitor for heat-related illness. Symptoms of heat exhaustion include heavy sweating, weakness, cold or clammy skin, weak pulse, nausea, and fainting. Heat stroke (hot/dry/red skin, rapid strong pulse, unconsciousness) is a medical emergency: call 911 immediately and cool the person rapidly (Occupational Safety and Health Administration, 2012).

8.2.3. High Wind

Sustained winds above 25 mph (above 20 mph when working near trees or overhead hazards) require stopping work. High winds increase the risk of widow-makers and can topple equipment.

8.3. Overhead Hazards (Widow-Makers)

Before working under or near any tree:

1. Look up and assess the crown for dead branches, leaning limbs, or structural failure
2. Do not work beneath or near hazard trees in high wind

3. Wear a hard hat when working in forested areas with overhead hazard potential
4. If a hazard tree is identified, flag it and report it to the field lead; do not attempt to remove it

8.4. Sharp Tools

When using hand saws, loppers, pruners, or other cutting tools:

- Keep blades sheathed while walking
- Pass tools handle-first; never toss tools
- Never carry open blades through brush
- Wear cut-resistant gloves when operating cutting tools

8.5. Biotic Hazards

8.5.1. Poison Oak

Wear long sleeves, long pants, and gloves when working in potential poison oak habitat. Learn to identify the plant. Wash exposed skin with soap and water as soon as possible after potential contact. Do not burn plant material that may contain poison oak.

8.5.2. Ticks

Wear long pants tucked into socks and long sleeves. Use permethrin- treated clothing or DEET-based repellent in tick habitat. Perform a full-body tick check at the end of every field day. Remove attached ticks promptly with fine-tipped tweezers.

8.5.3. Stinging Insects

Know whether any team member has a history of anaphylaxis. Ensure that at least one team member knows the location of any prescribed epinephrine auto-injectors (EpiPens) in the group. Call 911 immediately if anaphylaxis is suspected.

8.5.4. Wildlife

Do not approach, feed, or attempt to handle wildlife. Report unusual wildlife behavior (particularly in mammals that could indicate rabies) to the field lead.

9. Emergency Response Procedure

9.1. Responding to a Medical Emergency

1. Survey the scene; identify any risks to other team members
2. Do not move the injured person unless they are in immediate danger

3. Call 911; provide the following information:
 - Suspected type of injury or illness
 - Location (GPS coordinates if known; nearest landmark otherwise)
 - Type of assistance required
 - Number of persons injured
4. Identify a location for emergency vehicle access and send someone to meet the vehicle
5. Notify the PI or instructor as soon as possible (Pomona College, 2024)

9.2. Chronic Conditions

Personnel with chronic conditions (epilepsy, diabetes, heart conditions, severe allergies) must inform the field lead before each field outing. The field lead will ensure the team knows relevant first aid steps and the location of any required medications.

9.3. Injury from Equipment

Handle all equipment with caution. Read operating procedures before use. Do not use any equipment you are unsure of how to handle – ask a trained team member first.

9.4. Documenting the Incident

- Record what happened and how the injury or illness occurred in the field notebook
- Complete a formal incident report and submit it to the PI and the college risk management office within 24 hours
- This information is used to eliminate hazards and prevent future incidents (Pomona College, 2024)

10. Stop-Work Conditions

Stop all field operations immediately if any of the following occur:

- Lightning is detected within about 10 miles, or thunder is audible
- Wind is sustained above 25 mph (above 20 mph when working near trees or other overhead hazards)
- A crew member shows signs of heat illness, injury, or allergic reaction
- An unexpected utility or buried line is found within the work zone
- Crew size drops below the two-person minimum

Resume only when the field lead confirms conditions are safe (Occupational Safety and Health Administration, 2012).

11. References

- Occupational Safety and Health Administration (2012)
- National Research Council (2011)
- Pomona College (2024)

National Research Council. (2011). *Prudent practices in the laboratory: Handling and management of chemical hazards* (Updated). National Academies Press. <https://doi.org/10.17226/12654>

Occupational Safety and Health Administration. (2012). *Laboratory safety guidance* (OSHA 3404-11R). US Department of Labor.

Pomona College. (2024). *Emergency instructions*. <http://www.pomona.edu/sites/default/files/emergency-instructions.pdf>

12. Related SOPs

SOP	Title	Relationship
F002	Field Equipment Checklist	Supplies required for safe field work
F003	Field Notebook Protocols	Incident documentation
F004	Site Access and Permits	Site-specific hazard requirements
F100	EA Program Vehicle Use	Transportation safety

13. Training Record

Training is documented in EA Program files. Before conducting independent field work, personnel must:

1. Read this SOP in full
2. Attend a field safety orientation with the PI or field lead
3. Demonstrate understanding of the stop-work conditions and emergency response procedure
4. Be signed off by the instructor or designated trainer

14. Appendix A: Field Work Planning Form

Complete this form before each field outing and retain it in the project file.

Project / Site Name: _____

Date: _____ **Departure time:** _____ **Expected return:** _____

Field Lead: _____

Team Members: _____

Emergency Contacts:

Name	Role	Phone
911	Emergency	911
Campus Safety	Pomona College	(909) 621-8170
PI / Instructor		

Nearest Hospital / Urgent Care:

Name: _____ Address: _____ Phone: _____

Location / GPS of field site: _____

Hazards identified at this site:

- ☐ Lightning / thunderstorm risk
- ☐ Extreme heat
- ☐ High wind / overhead hazard trees
- ☐ Poison oak
- ☐ Ticks
- ☐ Stinging insects / known anaphylaxis in team
- ☐ Swift water / drowning risk
- ☐ Wildlife
- ☐ Other: _____

Risk Mitigation Plan: _____

PI / Supervisor Approval: _____ **Date:** _____