

GPS DIVISION FIELD TRIP SAFETY PROTOCOLS

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The following recommended protocols (and the documents referenced therein) are the results of the Field Safety Committee charged by GPS Division Chairman John Grotzinger during the summer of 2022 to assess current field safety practices and suggest a set of recommended protocols for future field trips. These documents are meant to be “living documents” that are reviewed and modified annually by the Field Safety Committee to reflect the most current safety practices and needs of class- and research-related field trips. Input from all GPS members is encouraged, and the Field Safety Committee is committed to being responsive to input received.

The Field Safety Committee first developed and disseminated field safety protocols to the GPS community in fall 2022. These protocols were then trialed during the 2022-2023 academic year and 2023 summer by the GPS community. During summer 2023 the Field Safety Committee solicited feedback from the community on the efficacy and implementation of the safety protocols and subsequently reviewed and modified the safety documents. The updated protocols were then disseminated to the GPS Community at the beginning of the fall term 2023 for a final comment period. The protocols below (and associated safety plan) reflect the final formalized documents. Until fall term 2024, there will be a grace period so that field trip leaders and the division have time to implement safety protocols prior to the field trips. Moving forward, the Field Safety Committee remains open to input from the GPS community on the efficacy of the recommendations, will modify the documents annually as necessary, and will disseminate the updated protocols to the GPS division.

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The GPS Division recognizes that there are safety risks that are inherent to field trips away from campus, and that we should minimize risks to the maximum extent that is consistent with our mission. To this end, the GPS Division Chairman should establish a Field Safety Committee with rotating appointments of faculty and graduate students that will provide guidance on and continually assess field safety measures for the division. Tenure on the committee will be sufficiently long to ensure continuity and institutional memory. The Field Safety Committee will review Field Safety Plans for both class field trips and research-related field work and update the field trip safety protocols, risk assessment, and mitigation documents annually. The contents within the safety documents although crafted by the Field Safety Committee are approved and enacted by the Caltech Institute of Technology.

The following safety protocols are best practices for GPS field trips. *For each protocol it is indicated whether the protocol is required or recommended for both class and research field trips.* These guidelines notwithstanding, under some circumstances the requirements may not be possible to fulfill, and leaders and participants of field trips must use their judgement to take the safest course of action. Further, as field trips take place in uncontrolled environments, many risks may not be foreseeable, and it is up to the leader(s) and participants to use their judgement in the moment to anticipate and mitigate risks as they arise. Safety is everyone’s responsibility. Finally, there are certain risks inherent to many field trips that are deemed acceptable after proper mitigation measures are in place to achieve the educational and research goals of the division. Examples of these risks include car travel, work in areas with endemic pathogens, and weather-related hazards.

GPS FIELD SAFETY PROTOCOLS

Protocol	When is it required/recommended and other notes	Required/Recommended	Class/Research
Leadership/Participation			
1 designated trip leader	All trips.	Required	Class & Research
At least 1 faculty or instructor	All class-related trips.	Required	Class
>1 leaders (faculty/instructor + TA) when >10 participants or >2 vehicles	All class-related trips.	Required	Class
>1 leader (faculty, TA, or lead researcher) when >5 participants	Rugged/difficult/remote conditions or unique hazards	Required	Class
		Recommended	Research
Minimum 2 people	When any identified risk (other than driving) scores ≤ 3 on the RAC matrix <i>after</i> risk mitigation measures are in place (<i>see below</i>)	Required	Class & Research
Medical and first aid			
Completed health, insurance, and contact information forms (all participants).	<i>On GPS website</i> Class Field Trips Research Field Trips Forms must be carried in by trip leader on trips.	Required	Class & Research
Participants should provide trip leader with information regarding relevant health conditions	<i>Trip participants should alert the trip leader about relevant health conditions (allergies, chronic or acute conditions, etc.) so that the leader can make proper arrangements and be prepared for emergencies. Trip participants should also provide this information in a sealed envelope to the leader, along with relevant medications, which the leader will carry on the trip and return afterwards. This information may be shared with other group members and medical personnel in case of an emergency. Participants can consult their doctor or student wellness services to determine what health information is necessary to convey to the trip leader.</i>	Required	Class
		Required	Research
First aid kits should be accessible to all trip participants.	All trips. <i>For class trips, division will stock division vehicles with a first aid kit, plus provide the required number of portable first aid kits.</i>	Required	Class & Research
In person basic first aid training including CPR (all trip leaders)	All trips. <i>The GPS division will organize two basic first-aid courses each year that are specifically focused on common injuries/accidents in the field.</i> <i>[First aid training is also available through Caltech: https://safety.caltech.edu/root-pages/first-aed-cpr-training]</i>	Required	Class & Research
Up-to-date wilderness first aid (WFA) training (at least 1 leader)	>1 hour from medical help at any time <i>This course is 2 days long and is offered by various organizations including NOLS and the American Red Cross.</i> <i>More advanced training, including Wilderness Advanced First Aid (WAFA) and Wilderness First Responder (WFR) can be considered.</i>	Recommended	Class & Research
Medical evaluation of ability to participate	>8 hours from medical help, international travel to remote areas or requiring additional prophylaxis, boats at sea	Recommended	Class & Research
Driving			
Follow all local traffic laws and driving rules.	All trips.	Required	Class & Research
Approval to use division vehicles (required forms + division driver orientation)	All trips utilizing division vehicles <i>See: Field Vehicle Availability</i>	Required	Class & Research

<3 hours between breaks, <8 hours total per day per driver Fieldwork + driving in a single day should not exceed 14 hours	All trips.	Recommended	Class & Research
Online defensive driver training (all drivers)	All class-related trips. To be taken every 2 years. <i>Online class organized by division.</i>	Required	Class
		Recommended	Research
Off-road, 4WD training	Driving off maintained roads. To be taken once, with the option to take again after 4 years, if desired. <i>Division will organize an annual training for drivers on class field trips requiring driving on unpaved, unmaintained roads.</i>	Required	Class
		Recommended	Research
Up-to-date scheduled maintenance	Personal vehicles used	Recommended	Research
Equipment			
Individual specialized PPE provided to all participants as safety plan requires	All trips. <i>(For class trips, GPS Division will provide basic PPE, for example safety glasses, work gloves, ear plugs, and N95 masks as field activities require.)</i>	Recommended	Class & Research
Personal Flotation Devices and specific safety briefing	Work on boats	Required	Class & Research
Communications (see details below)			
Safety Plan, reviewed by field committee	All trips.	Required	Class
		Recommended	Research
Pre-trip meeting (all participants)	Trip itinerary, required gear, and safety protocols to be discussion.	Required	Class & Research
During-trip safety briefings (all participants)	At least daily, or when significantly changing location or activities.	Required	Class & Research
Ombudsperson for trip	All trips.	Required	Class & Research
Satellite phone or inReach communicator	Non-existent or spotty cell service. <i>Available to check out through division.</i>	Required	Class & Research
Check in once per day (call, text [cell or satellite], email) with campus contact	Overnight trips to remote locations.	Recommended	Class & Research
Accident or incident reporting post-trip	<i>See below.</i>	Required	Class & Research
Miscellaneous			
Camping experience (including shelter construction and cooking stove safety)	Trip leaders when camping	Required	Class
		Recommended	Research
Follow Caltech's substance abuse policy	All class trips.	Required	Class & Research
Participation on new graduate student camping trip emphasizing basic outdoors skills and cohort building	Organized by division annually at beginning of fall term to incoming graduate students.	Recommended (new graduate students)	n/a

Guidelines for planning and executing a safe field trip

In addition to the specific protocols outline in the table above, detail descriptions of recommended actions to be taken by trip leaders and participants prior to, during, and after a field trip are provided here.

TRIP PARTICIPANTS

Leader Responsibilities

Leaders of field trips or fieldwork (faculty members, teaching assistants, principal graduate student or postdocs investigators) are responsible for identifying and assessing hazards and developing an initial field safety plan with input from participants (see more details below). They should provide an explicit description of tasks to be done in the field, risks associated with the field trip, and training on how to mitigate the risks to the trip participants. This information should be conveyed to participants both during a pre-field trip meeting and in the field. During field trips, leaders should demonstrate and enforce safety practices on the field trip and brief participants on safety issues when the need arises (e.g., at the start of a new activity). When a participant raises a safety concern, the leader should acknowledge their concern and pause activities to assess the situation. In the case of an accident or incident, they should notify the Division and perform an accident follow-up (see below).

Participant Responsibilities

Participants on field trips must comply with all Caltech guidelines and policies. Prior to the field trip, participants should be aware of and identify risks involved with the field trip and contribute to the crafting of the field safety plan. They must attend the pre-trip meeting. By acknowledging the field safety plan, participants accept the risks inherent to the trip. Prior to the trip, participants must fill out a [contact information and health form](#) with their relevant health information and emergency contacts. Participants should alert leaders to any health conditions or medical information they wish to disclose before the trip so that the leaders can make proper arrangements and be prepared for emergencies. This information also should be provided to the leader in a sealed envelope. On the trip, participants should know and comply with safety guidelines and policies for required field tasks and obtain appropriate training and personal protective equipment for designated activities. In the field, participants should also maintain and use personal protective equipment and safety equipment appropriately, consistent with their training. By participating on a field trip, participants acknowledge that safety is everyone's responsibility. They have the right and responsibility to identify unsafe conditions and report accidents to the leader and trip ombudsperson.

PRE-TRIP

1) Develop a Trip Plan

The leader should develop a trip plan and itinerary that contains the information including what is the objective of the trip, who will be going, when will the trip happen, what locations will be visited on the trip, what activities will be done at each location.

2) Perform a risk assessment

The leader should complete a risk assessment must be completed prior to developing a safety plan. Each identified risk should be individually assessed via a risk assessment code (RAC) matrix and given a numeric score (Fig. 1). Examples of typical risks, mitigation measures, and how they should be coded are given in the Field Safety Plan.

Risk Assessment Code (RAC) Matrix					
		probability			
		Frequent	Likely	Occasional	Rarely
		severity			
		A	B	C	D
Catastrophic	I	1 CRITICAL	1	2	3
Critical	III	1	2 SERIOUS	3	4
Significant	III	2	3 MODERATE	4 MINOR	5
Minor	IV	3	4	5	5 NEGLIGIBLE

after: <https://www.bia.gov/sites/default/files/dup/assets/public/pdf/idc-017617.pdf>

Severity Code

- Catastrophic (I)** Imminent and immediate danger of death or permanent disability
- Critical (II)** Permanent partial disability, temporary total disability
- Significant (III)** Hospitalized minor injury, reversible illness
- Minor (IV)** First aid or minor medical treatment

Hazard Probability

- Frequent (A)** Immediate danger to health and safety of leader and participant
- Likely (B)** Probably will occur if not corrected, or probably will occur 1 of more times
- Occasional (C)** Possible to occur in time if not corrected
- Rarely (D)** Unlikely to occur; may assume exposure will not occur

Figure 1: Risk Assessment Code Matrix

3) **Develop a safety plan**

After completion of the risk assessment, the trip leaders will draft a safety plan using a [pre-existing template](#) to address the identified risks. Mitigation plans for the identified risks should be developed with the aid of the [Risk Mitigation Document](#), and risks should be reassessed using the RAC matrix (Fig. 1). Ideally, the RAC matrix score for each risk should increase, however in some instances it may not be possible to significantly mitigate risks and then the score will stay the same. The Field Safety Committee and other resources given in the Risk Mitigation document should be consulted as necessary during development of the risk assessment and field safety plans.

In addition to a list of risks and mitigation strategies, the field safety plan should include emergency procedures and contacts, document any trip participants who are trained in first aid or other medical training, and outline the physical demands required of the field trip. The plan should be explicit in outlining the personal protective equipment and/or field equipment needed and work protocols to ensure safety.

Safety plans should be reviewed by the Field Safety Committee. Sufficient time (1 week) prior to the pre-trip meeting should be given for review. In addition, the field safety plan should be distributed to all participants prior to the pre-trip meeting (see below). Prior to and during the pre-trip meeting, participants should contribute to and provide feedback on the safety plan. They should identify any other perceived risks not initially identified by the leader. It is important that everyone take personal responsibility for themselves and the group by researching possible risks online, contacting local experts as appropriate, and to craft the best possible safety plan.

4) **Lead a pre-trip meeting**

A pre-trip meeting should ideally be undertaken at least **1 week** in advance of a field trip (though in some instances this may not be possible, e.g., a field trip at the start of a term, and the timing will be left to the

discretion of the leaders). Attendance at this meeting by all trip participants is **required**. If a trip participant cannot attend, they must go over the safety plan and pre-trip information with a leader prior to the trip.

During the meeting, leaders should give participants detailed information regarding the field trip. This should involve reviewing the Safety Plan and explicit discussion of:

- a personal equipment list
- expected weather conditions
- travel logistics
- a description of activities
- security concerns
- information on permission/permits required to access field trip stops (if any)
- potential risks and mitigation plans
- a description of bathroom facilities available
- contact information of leaders

The leader should hold space for discussion of the contents of the Safety Plan and be open to modifying the documents according to the feedback that they are given. Leaders should encourage participants to get medical procedures (including dental procedures) taken care of before extended field excursions. In addition, field trip leaders should also consider identifying an individual to whom field trip participants can talk to about managing menstruation during field work, especially when regular facilities will not be available and longer, more-remote trips.

An ombudsperson should be identified by trip participants for confidential reporting of safety or other concerns.

Leaders should remind participant to fill out the Contact Information Form for field trips (link to [Class Field Trips](#) and [Research Field Trips](#)). **This form includes a statement attesting that field trip leaders and participants have read the Field Safety Plan and agree to comply with its requirements.**

A final Safety Plan should be sent to Aleen Boladian (aleenb@caltech.edu). A copy should be carried by the leader(s) during the trip.

DURING THE FIELD TRIP

The safety of all participants and success of the field experience is built upon good leadership, teamwork, and communication. Field trip participants are more likely to implement safety practices and engage in safety discussions when the field trip leader models safe behaviors and initiates frequent safety discussions. Field trip leaders should brief their team/group often, including at the start of the day, the beginning of an activity, or when plans change. Briefings should include answers to the following questions:

- What are we doing? (What are our goals?)
- How are we doing it? (What's the plan?)
- When are we doing it? (What's the timetable?)
- Who is doing it? (What are our roles?)
- What hazards can we anticipate?
- How will we manage those hazards?
- What gear do we need?
- How and when will we make decisions?
- How is everyone doing? What concerns do you have?
- What is our plan if someone becomes ill, injured, or lost?
- Have I been understood?

If conflicts arise, make sure to resolve them as they can lead to miscommunication and lack of cooperation. Conflicts often arise when expectations, roles, and responsibilities are unclear. The group leader should clarify

these. Conflicts can be resolved through listening to differing perspectives, reinforcing, or revising roles and expectations, and helping the group move forward productively.

POST FIELD TRIP

Reporting and reviewing field incidents benefits the entire GPS community. Although injuries when working outdoors in uncontrolled environments do occasionally happen, we want to strive towards being as prepared as possible, making safe decisions in the field, and mitigating negative consequences when incidents do occur. Learning from prior incidents is critical to this endeavor.

All field trips should include an opportunity for a leader-participant post-trip debriefing, even when no safety incidents occur. Discussion of project/class goals, challenges, and logistics can help identify where improvements can be made during future field work.

Field trip risk assessments and safety plans will be archived and catalogued by the division as a resource for future trips going to a similar location or undertaking similar tasks.

ACCIDENT, INJURY, NEAR-MISS, or UNSAFE CONDITIONS REPORTING

If there is a field-related safety incident or emergency, it needs to be reported so that it can be tracked and investigated so that future preventive measures can be implemented. Any field work-related injury or illness should be reported to the trip leader as soon as possible.

For any injury requiring more than basic first aid, the trip leader must contact the Caltech Security Office [(626) 395-5000] and the Division as soon as possible. The leader should also follow the Division's [injury reporting requirements](#).

In the event of a "near miss" or to report an unsafe condition, trip leaders or participants should fill out an [Incident Report](#) and send it to the GPS Field Safety Committee. This can be done anonymously if so desired. The Field Safety Committee will deliver an annual report to the division on safety accidents and "near misses" that occurred during field work or on field trips. This report will keep participants identities anonymous. The reports will be archive on the GPS Field Trip website so that members of the GPS community can use them as a tool when developing safety plans for future field trips.