

Program Information

National Science Foundation Introduction

The purpose of the United States Antarctic Program (USAP) Field Manual is to provide an overview of USAP field logistics, operations, and safety. It contains information relevant to field deployments and living and working in an Antarctic field camp and is intended to enhance your success in the field. It is your responsibility to be familiar with the skills and techniques covered in this manual.

This is intended to be a reference manual and it should be taken into the field with you. Valuable knowledge is provided. Safety, environmental stewardship, and your health are of paramount importance. Continued vigilance and action in these areas are essential to maintain a safe and productive environment for work in Antarctica.

The harsh conditions encountered in the field setting, coupled with relatively short deployments and important scientific objectives, require effective leadership and constant risk management from all team members. Reducing the risk of injury and illness depends on a combination of systematic risk assessment, hazard elimination or control, appropriate use of personal protective equipment, and safe work practices.

This manual is designed to be used in conjunction with the USAP Field Practices Manual located on www.usap.gov. The Field Practices Manual provides pre-deployment, planning information that is useful during the Support Information Packet (SIP) process. Use of these manuals and adherence to the guidelines set forth will enhance both your safety and productivity while working in Antarctica.

We wish you a very safe and productive field season.

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Emergency Management

The Emergency Operations Center (EOC) is on call 24/7. The staff will collect the caller's name, phone number, and location; classify the situation (e.g., injury or illness, spill, aircraft mishap, vehicle accident, loss of shelter); and gather the information necessary to assess needs and risks and determine appropriate actions. If a search-and-rescue (SAR) is launched, it may involve the USAP SAR team and/or the Joint SAR Team (JSART), which is composed of both USAP and Antarctica New Zealand (ANZ) personnel.

First Aid Emergency Response Checklist

- o **Survey the scene.**

Is it safe? What happened? How many are injured? Who can help?

- o **Do a primary assessment of the victim.**

Do an ABC check: Airway, Breathing, Circulation

- o **Radio or call for help, if needed.**

Alert other field team members or people in the vicinity.

- o **Do a secondary assessment of the victim.**

Interview the victim, check vitals, conduct head-to-toe exam.

- o **Call MacOps.**

Inform MacOps of the incident and victim's condition, the condition of other camp members, and any plan. Request assistance or evacuation if needed. Request transfer to medical personnel, if necessary.

- o **Stabilize the patient until help arrives.**

Keep patient warm and dry, move to shelter if possible, be reassuring, and provide food and warm liquids if appropriate. Improvise toilet equipment, if necessary.

- o **Follow up.**

Notify appropriate manager and other involved parties about the incident. Complete and submit the required incident report as soon as possible.

Emergency Numbers for MacOps

Phone 2586

VHF Channel 3

HF

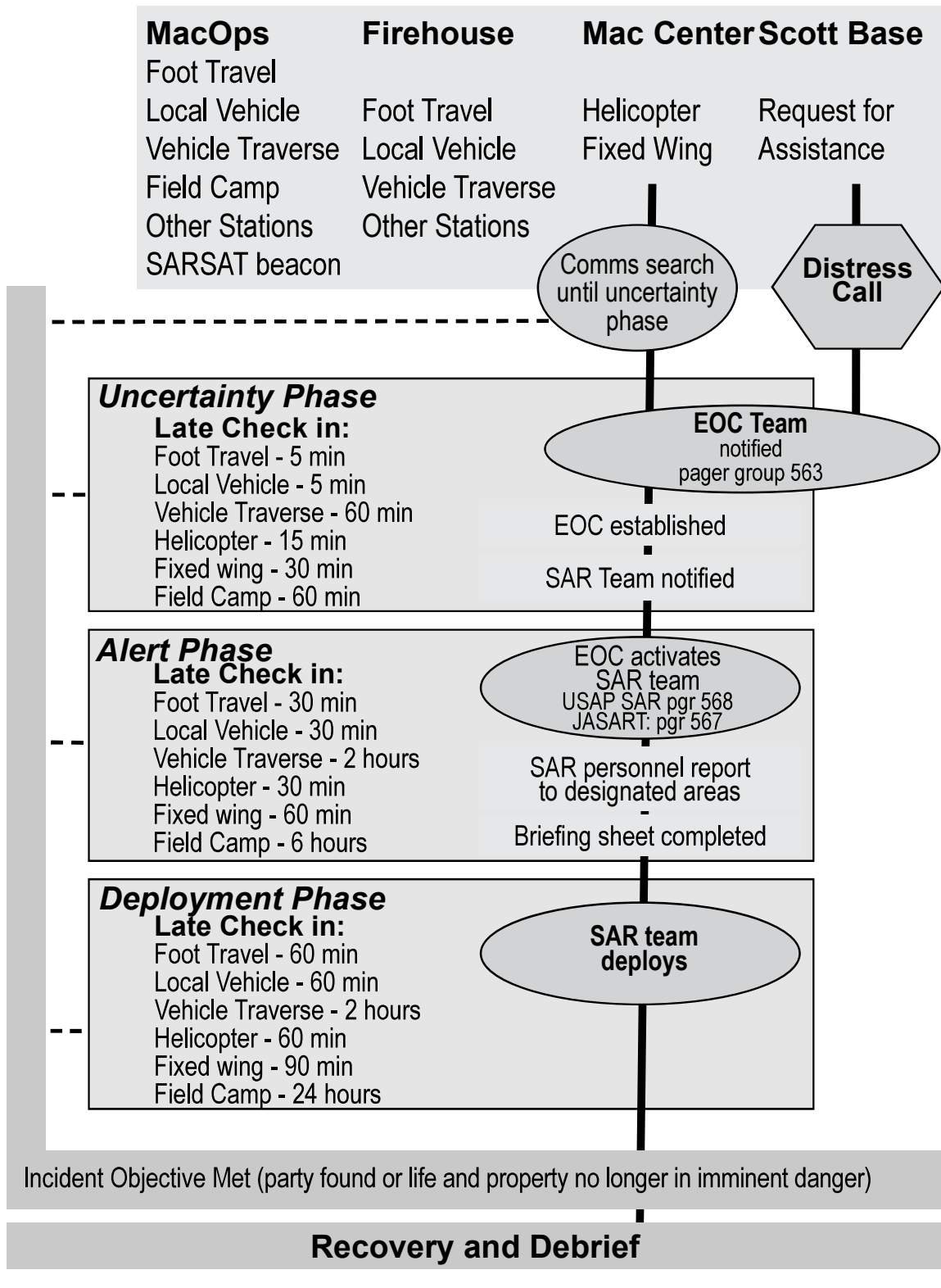
7.995 MHz

11.553 MHz

Iridium 00-8816-763-12464

Emergency Response Flow Chart

In response to a distress call or a failure to check in from foot travel, local vehicle, vehicle traverse, helicopter, fixed wing aircraft, or field camp.



USAP Operational Risk Management

Probability	Consequences				
	none (0)	Trivial (1)	Minor (2)	Major (4)	Death (8)
Certain (16)	0	16	32	64	128
Probable (8)	0	8	16	32	64
Even Chance (4)	0	4	8	16	32
Possible (2)	0	2	4	8	16
Unlikely (1)	0	1	2	4	8
No Chance 0%	0	0	0	0	0
None	No degree of possible harm				
Trivial	Incident may take place but injury or illness is not likely or it will be extremely minor				
Minor	Mild cuts and scrapes, mild contusion, minor burns, minor sprain/strain, etc.				
Major	Amputation, shock, broken bones, torn ligaments/tendons, severe burns, head trauma, etc.				
Death	Injuries result in death or could result in death if not treated in a reasonable time.				

USAP 6-Step Risk Assessment

USAP 6-Step Risk Assessment	
1) Goals	Define work activities and outcomes.
2) Hazards	Identify subjective and objective hazards.
3) Safety Measures	Mitigate risk exposure. Can the probability and consequences be decreased enough to proceed?
4) Plan	Develop a plan, establish roles, and use clear communication; be prepared with a backup plan.
5) Execute	Reassess throughout activity.
6) Debrief	What could be improved for the next time?

Field Camp Put-In Procedures

Upon arrival at the camp site, while aircraft is still on the ground

- o Assist the flight crew with unloading the aircraft, as directed.
- o If staying overnight, establish communication with MacOps using a satellite phone or radio; verify the camp name, the name of the camp leader, and the number of people in the camp. Confirm the time of daily check-in.
- o For fixed-wing supported camps:
 - Establish a shelter; set up a tent away from the landing area.
 - Establish a flame; light a camp stove.
 - Inform the pilot when these tasks are complete.
 - Obtain the following information from the pilot:
 - An altimeter reading for the site (to program the Kestrel®).
 - The direction of Grid North (to establish directional flags for weather observations).
 - Keep clear of the aircraft and any prop wash as it departs.
 - Test the VHF air-to-ground radio (if you have one) with the pilot once the aircraft has become airborne.

Immediately after the aircraft has departed

- o Identify the best location for the camp; look for a spot that offers easy access to research sites, avoids hazards, and provides protected areas for shelters. Consider storm wind direction (study the topography for clues) and helo pad and/or skiway location to create optimal camp orientation.
- o For helo-supported camps, it is recommended to keep camp elements a minimum of 25 meters away from the primary flight path. Be aware of rotor wash and keep a secure landing zone at all times in case of unexpected or last-minute helo landings.
- o Set up all tents with equal and appropriate spacing, taking whiteout scenarios and drifting into consideration.
- o Set up the HF radio, solar panel, and antenna. Test the radio by contacting MacOps.
- o Set up a camp toilet area. This may be a tent with a human waste container or a hole in the snow (in areas where accumulation is permitted).

As soon as practical

- o Place all fuel containers and equipment (e.g., generators) in containment.

- o Establish a site for trash. Be sure all trash is correctly packaged and labeled for return to McMurdo Station.
- o Erect flag lines between tents and/or cargo lines in case of whiteout.
- o Set-up a camp survival cache with spare fuel, food, and a personal locating beacon. The toilet tent is often a good candidate if it's a Scott Tent.
- o Establish GPS coordinates for cargo lines, tents, and the survival cache. Store this GPS in an easily accessible location for a whiteout situation.

Field Camp Daily Tasking Checklist

Communications

- o Complete daily check-in call before the appointed time. Inform MacOps of the number of people at the camp and whether or not all is well.
- o Helo-supported camps:
 - Monitor Channel 7 at all times and especially if a helo is in the area, in case the pilot is trying to reach you.
 - If expecting a flight that day, call Helo Ops between 0700 and 0730 with a weather update.
- o Fixed-wing supported camps: Make weather observations and call them into MacWeather at the pre-arranged times.
- o Call MacOps after 1900 for the next day's flight schedule, or call the fixed-wing or helicopter supervisor to confirm any upcoming flights.
- o Call work centers, as necessary, to request or confirm material for any impending resupply.
- o Inform Fixed-Wing Ops or Helo Ops of the amount and nature of items expected and the expected delivery date.
 - Fixed-wing supported camps: Follow the communications plan established with the Fixed-Wing Office to arrange resupply.
 - Helo-supported camps: Call Helo Ops three business days in advance of a requested flight with all flight details (e.g., passengers, cargo, mission).

Record Keeping

- o Record any pollutant spills using the "Field Spill Reporting Sheet."
- o Record any information each day that will be required in the camp report. For helo-supported groups, this includes all locations where team members were dropped off and picked up while in the field.

Housekeeping, Health and Safety

- o Sort waste and recyclables and keep them in proper containers.
- o Check for and clean up any pollutant spills.
- o Check and tighten all guy lines and anchor points.
- o Keep landing areas clear of debris.
- o For helo-supported groups, keep a secure camp at all times, with all items tied down, in case a helo needs to land unexpectedly.
- o Monitor surroundings and weather patterns for indications of coming storms.

Resupply

- o Check levels of commonly used items, such as propane, food, paper towels, toilet paper, and hand sanitizer. Make a list and call the BFC for resupply once a week, remembering that many items have a long lead time.

Field Camp Pull-Out Procedures

In the days leading up to pull-out:

- o Package equipment and cargo not being used. Record the weight, cube, and type of retrograde cargo for each box. For flight planning, this information must be passed to the Fixed-Wing or Helo Ops supervisor three days in advance of pull-out.
- o Package hazardous cargo in its original packaging and label it. Locate original hazardous cargo documentation, as the pilot may request it.
- o For helo-supported groups, have a passenger manifest available (passenger names and flight weights), as the pilot may request it.
- o Identify a staging area a convenient but safe distance from the helo pad or landing strip and stage cargo there when it is packaged and ready to go.
- o Communicate with the Fixed-Wing or Helo Ops supervisor to confirm pull-out flights and relay cargo details. For helo-supported groups, call the helo hangar at least three business days in advance to request the pull-out flight. Provide helo staff with all known flight details at that time. Call immediately if any details change over the next two days.
- o Notify MacOps of planned pull-out date.
- o Plan the take-out in stages. Cargo and passengers slated for the last flight should include essential gear, survival food for one week, and someone to provide weather observations, in case the takeout needs to be aborted for any reason.

- o Communicate with Lodging personnel at least two days before arriving in McMurdo to arrange or confirm room assignments.
- o Take GPS coordinates of all release sites for the end-of-season environmental report.

Day of pull-out:

- o In fixed-wing supported camps, begin hourly weather observations six hours before an LC-130 aircraft leaves McMurdo and three hours before a KBA aircraft (Twin Otter or Basler) leaves McMurdo.
- o If there are no known issues and your aircraft is on track to pick you up, take down tent(s).
- o Place all remaining camp items in the staging area and conduct a visual sweep of the camp site ensure all items have been removed.
- o Disassemble the radio(s) and antenna(s).
- o Before takeoff, take one last look to make sure everything and everyone is on the plane!

After return to McMurdo Station:

- o For helo-supported groups, work with the helitechs to ensure all items have been picked up from the cargo line.
- o Take the time necessary to clean and return all equipment to its proper storage area or department. See the “Camp Gear Return Procedure” for details.

Field Camp Hut Etiquette

Please complete the following before leaving the hut:

Trash

- o Sort and pack all trash and recycled materials and take them back to McMurdo Station for proper disposal.
- o No trash or recyclable items should be left in hut containers.

Floors, surfaces, and furniture

- o Sweep the floor.
- o Wipe all tabletops and chairs clean.
- o Arrange chairs and tables neatly.

Personal items

- o Conduct a thorough sweep of the hut in order to locate and remove all personal and project-specific items.

Food and dishes

- o Wash and put away any dishes, utensils, and cookware.
- o Non-perishable food should be neatly packaged, labeled, and stored in its proper area.
- o Take perishable food back to McMurdo Station.

Thank you for leaving the hut in a clean and tidy condition for the next field team.

Camp Gear Return Procedures

Allow sufficient time for returning equipment to the BFC. Field teams are responsible for cleaning the gear, sorting it, and ensuring it is checked in by BFC personnel. Gear return can take from an hour to two days, depending on the type of gear and its condition.

- o Call the BFC in advance (x2348) to make an appointment for gear return.
- o At the appointed time, bring all camp gear to the BFC and make piles of like items (e.g., sleeping bags, Thermarests®) on the floor downstairs.
- o Remove all flight tags, cargo stickers, and duct tape from the gear.
- o Report any damage to a BFC staff member, or tag it as such.
- o A BFC staff person will inspect the gear, inventory it, check it in, and print out an “Outstanding Returns” sheet for any missing items. Locate and return these missing items or make a note on the sheet explaining what happened to them.

BFC items needing extra attention:

- o Tents – All communal cook tents must be set up, swept out, and scrubbed. Make an appointment with the BFC personnel so they can assign a location and provide the proper cleaning tools.
- o Dishes, thermoses, food coolers, stoves, water coolers, and five-gallon buckets – Wash and dry these items, using the sinks at the BFC. Please repack the kitchen box and inform a BFC staff member of any missing content.
- o Climbing ropes and equipment – Inform BFC staff of any issues with the equipment or any falls on the rope. Also, please check ropes before returning them. BFC staff will check all equipment during the winter, but field-team knowledge and assistance is valued and appreciated.
- o Pee bottles and toilet seats – Clean and bleach these items. A system with directions is in place downstairs at the sink next to the washing machine. Please do not leave them for other people to clean.

- o Trash – Separate, clean, and dispose of all trash in the bins outside the BFC. Each category needs to be bagged. Extra bags are in the BFC bay.
- o Human waste – Please take it to the Waste Barn and place in the appropriate container.
- o Cage – Please clean out the cage completely! Throw out garbage, sweep floors, and wipe off shelves. **DO NOT LEAVE ANYTHING IN THE CAGE!** It will be inspected by a BFC staff member when this task is completed.
- o Jerry cans – Consolidate like fuel and empty all unknown or unmarked jerry cans in the waste barrel near the flammables van. Please tag and label any full or partially full cans with the contents. Place them under the appropriate sign outside the flammables van.
- o Food – Dry food that is in good condition and unopened can be returned to the BFC. Frozen food cannot be returned, as it may have thawed during transport.

Survival Bags Explained

Local Survival Bags - Red

Needed - When traveling off established roadways outside of McMurdo town limits (Examples: Cape Evans, Cape Royds, Windless Bight).

Not Needed - Within town limits or on established roadways, such as Phoenix Road or Williams Field Road.



from the BFC

Helo Survival Bags - Orange

Needed - When passengers disembark a helicopter at locations other than an established camp.

Not Needed - If passengers disembark at an established camp, at a location with a survival cache, or at a tent camp with all components of a survival bag.



from Helo Ops

Red and orange bags contain everything – including fuel. Bags should be opened only in an emergency.

Deep Field Survival Bags - Blue

Needed - When traveling away from any camp in the deep field.

Not Needed - If traveling via LC130, Twin Otter, or Basler to an established camp. The aircraft carries survival bags for all passengers.

Deep-field survival bags have no fuel! Fuel bottles must be obtained from a BFC staff member and then hazardous-certified separately by Science Cargo.



from the BFC

The fuel should be kept near or in the survival bag so the kit remains complete.

Local-Field Survival Bag Contents

Red, shiny, dry bags - Supports 2 people for 3 days

- o 2 ea sleeping bags
- o 2 ea bivy bag
- o 2 ea ensolite™ pad, 24"x48"
- o 1 ea mtn tent w/instructions & repair kit
- o 1 ea collapsible snow shovel
- o 1 ea snow saw
- o 1 ea first aid kit
- o 2 bt white gas, 22 or 33 oz
bt in ziplock™ bag and PVC

Tent stake bag:

- o 10 ea assorted stakes
- o 2 ea ice screws
- o 1 ea snow flukes
(ok if missing)
- o 1 ea hammer

Cook & Stove Set Bag:

- o 1 set cookset, 1-2 pots w/lid
- o 1 ea signal mirror
- o 1 ea MSF Whisperlite™ Stove w/
instructions, repair kit, & 4 bx.
matches (35/bx) wrapped in foil

Toilet Paper:

- o 1 roll toilet paper

Food Bag:

- o 6 ea dehy meals
- o 3 ea large chocolate bars
or 6 ea small
- o 12 ea tea bags, assorted
- o 12 ea hot chocolate
- o 2 pk Mainstay™ food bars,
9 bars/pk (2 per person per day)
or 10 Bumper™ Bars

Utensil set contains:

- o 1 ea pot handle
- o 2 ea mug, hard plastic
- o 2 ea spoon
- o 1 tube or bottle burning paste
wrapped in foil
- o 1 ea pocket knife

Clothing Bag:

- o 1 bag misc. clothing (hat,
mittens, gaiter, etc.)

Ziplock™ Bag:

- o may contain a book or game, not
essential
- o survival manual
- o 50 ft parachute cord
- o 1 ea contents list

Deep-Field Survival Bag Contents

Blue, shiny, dry bags - Supports 2 people for 3 days

Note: Full fuel bottles cannot be flown on LC-130 aircraft. They must be hazardous certified separately. This survival bag is intended for people traversing away from a fixed camp on a daily basis. Fuel should be added to this bag from camp stock.

- o 2 ea sleeping bags
- o 2 ea bivy bag
- o 2 ea ensolite™ pad, 24"x48"
- o 1 ea mtn tent w/instructions & repair kit
- o 1 ea collapsible snow shovel
- o 1 ea snow saw
- o 1 ea first aid kit

Tent stake bag:

- o 10 ea assorted stakes
- o 2 ea ice screws
- o 1 ea snow flukes (ok if missing)
- o 1 ea hammer

Cook & Stove Set Bag:

- o 1 set cookset, 1-2 pots w/lid
- o 1 ea signal mirror
- o 1 ea MSF Whisperlite™ Stove w/instructions, repair kit, & 4 bx. matches (35/bx) wrapped in foil

Toilet Paper:

- o 1 roll toilet paper

Food Bag:

- o 6 ea dehy meals
- o 3 ea large chocolate bars or 6 ea small
- o 12 ea tea bags, assorted
- o 12 ea hot chocolate
- o 2 pk Mainstay™ food bars, 9 bars/pk (2 per person per day) or 10 Bumper™ Bars

Utensil set contains:

- o 1 ea pot handle
- o 2 ea mug, hard plastic
- o 2 ea spoon
- o 1 tube or bottle burning paste wrapped in foil
- o 1 ea pocket knife

Clothing Bag:

- o 1 bag misc. clothing (hat, mittens, gaiter, etc.)

Ziplock™ Bag:

- o survival manual
- o 50 ft parachute cord
- o 1 ea contents list

Survival Cache Contents

Staged at fixed camps

Exact quantities and supplies may vary, depending on average population and specific camp criteria.

Supplies:

- o sleeping bags
- o ensolite™ pads, 24"x48"
- o collapsible snow shovel
- o snow saw, ice ax, sledge hammer
- o assorted tent stakes
- o ice screws
- o snow flukes
- o mountain tents (large camps do not have tents since there are several Jamesways or Rac-tents.)
- o parachute cord (100 ft)
- o signal mirror
- o pocket knife
- o pee bottles
- o human waste buckets
- o toilet paper rolls
- o sledge hammer

First Aid:

- o first aid kit, group
- o books - *Medicine for Mountaineering, Cold Injuries*

Cooking:

- o Coleman fuel
- o Coleman two burner stove
- o MSR Whisperlite™ stove
- o pot, 10 qt
- o pot, 5 qt
- o pot, 3 qt
- o plates
- o utensils (fork, knife, steak knife, spoon)
- o mug, hard plastic
- o pot grips
- o fry pan
- o matches
- o cleaning pads, scrubbies

Food:

- o dehydrated meals
- o oatmeal
- o meals-ready-to-eat (MREs)
- o hot chocolate
- o bars (granola, chocolate)

Environmental Guidelines

Environmental stewardship and protection in the Antarctic is essential. The United States is a signatory to the Antarctic Treaty (1959) and the Protocol on Environmental Protection to the Antarctic Treaty (Protocol, 1991). These agreements are implemented in the U.S. under the Antarctic Conservation Act of 1978, Public Law 95-541, as amended by the Antarctic Science, Tourism, and Conservation Act of 1996, Public Law 104-227.

The Antarctic Treaty sets Antarctica aside for peaceful purposes, primarily scientific research, cooperation, and the exchange of information. The Protocol commits to comprehensive protection of the Antarctic environment, including a ban on commercial mineral exploration, and through its six Annexes requires environmental impact assessment of all proposed actions and conservation of native fauna and flora (including management activities to limit introduction of non-native species). The Protocol also establishes protocols for waste disposal and waste management, prevents marine pollution, and establishes a process for area protection and management. Adherence to Protocol obligations by USAP participants relies on education programs for each of these areas.

United States Federal regulations implementing the ACA can be found in the Code of Federal Regulations (CFR) Title 45, sections 640, 641, and 670 through 674. For questions or to obtain additional information regarding the information presented below, contact ASC Environmental (Environmental@usap.gov).

Antarctic Specially Managed Areas (ASMAs)

ASMAs are areas in which careful planning and coordination are required to avoid activity conflicts, improve coordination among field parties, and reduce the risk of cumulative environmental impacts. The two ASMAs covered by this manual are the McMurdo Dry Valleys (ASMA 2) and Amundsen-Scott South Pole Station (ASMA 5).

Please note: Personnel intending to enter the McMurdo Dry Valley ASMA are required to attend specific Dry Valley ASMA training beforehand. The management plans for each ASMA contain information regarding Restricted Areas and/or Managed Areas with which the entrant should be familiar.

Antarctic Specially Protected Areas (ASPAs)

ASPAs are areas designated to protect outstanding environmental, scientific, historic, aesthetic, or wilderness values. This includes

protecting ongoing scientific research from inadvertent disruption or contamination. ASPAs require an ACA permit to enter. ASPAs located directly within the McMurdo Station area include Arrival Heights, ASPA 122, and Discovery Hut at Hut Point, ASPA 158.

There are several ASPAs located within the McMurdo Dry Valleys, ASMA 2. These include: Lower Taylor Glacier and Blood Falls, ASPA 172; Canada Glacier, Lake Fryxell, Taylor Valley, ASPA 131; Barwick and Balham Valleys, ASPA 123; Linnaeus Terrace, ASPA 138; and Botany Bay, Cape Geology, ASPA 154. Additional ASPA sites located on, or in the vicinity of, Ross Island include: Cape Royds, ASPA 121; Backdoor Bay, Cape Royds, ASPA 157; Cape Evans, ASPA 155; New College Valley, ASPA 116; High Altitude Geothermal Sites of the Ross Sea Region, ASPA 175; Cape Crozier, ASPA 124; Beaufort Island, ASPA 105; Lewis Bay, ASPA 156; and Northwest White Island, ASPA 137.

Additionally, there are 26 Historic Sites and Monuments (HSM) in the Ross Sea Region. Some HSMs are incorporated within ASPAs, such as the historic huts from early Antarctic Expeditions (e.g. HSM 15, Shackleton's Nimrod Hut in ASPA 157; HSM16, Scott's Terra Nova Hut in ASPA 155; HSM 18, Scott's Discovery Hut in ASPA 158;), and some are individual HSMs.

USAP participants who find something of historical significance (pre-1958) are asked to note the location, describe the artifact, and notify ASC Environmental or NSF Environmental of its presence.

For additional information regarding ASMAs, ASPAs, or HSMs, refer to <http://www.ats.aq> or query ASC Environmental via email at environmental@usap.gov.

ACA Permits

An ACA permit is required to: 1) enter and work in an ASPA; 2) take native mammals or birds, or remove or damage such quantities of native terrestrial or freshwater plants that their local distribution or abundance would be significantly affected; 3) engage in harmful interference of native mammals, birds, non-marine invertebrates and non-marine plants; 4) introduce non-native species into Antarctica; or 5) export native mammals or birds or parts thereof. The term "take" also applies to dead mammals or birds, bird eggs, mummified seal teeth, feathers, etc. Research with marine invertebrates, plants, and fish do not require an ACA permit.

An ACA permit is not needed for entry into an ASMA; however, personnel entering or working in an ASMA are required to know and

follow the code of conduct specified in the applicable ASMA Management Plan. For any questions regarding ACA permits contact the NSF ACA permit officer at acapermits@nsf.gov.

Spill Prevention, Clean-up, and Reporting

- All spills of designated pollutants (e.g., fuel, glycol, transmission fluid) need to be reported immediately upon their discovery, regardless of spilled volume.
- To reduce the occurrence of spills, appropriate secondary containment and spill kits must be available for any fueling operation.
- For camps with a camp manager, spills should be reported directly to the camp manager.
- For McMurdo-based camps without a camp manager, spills should be reported to the Firehouse (via MacOps).
- For Peninsula-based field camps without a camp manager, spills of any designated pollutants should be reported to the location of the daily check-in.
- All spilled, designated pollutants need to be cleaned up to the greatest extent practicable and disposed of through the hazardous waste system.

Waste Management

- Releases of human waste or gray water are only permitted in accumulation zones, i.e., areas where snow and ice are thickening relative to the surrounding area. Releases onto blue ice, into crevasses, or on ice-free land are not permitted. No releases to the environment are permitted in the McMurdo Dry Valley ASMA or within ASPAs.
- All hazardous waste (e.g., fuel-contaminated material, lab waste, chemical containers, aerosols, radioactive material) requires special handling and labeling. Questions regarding hazardous waste management should be directed to the Waste Department at each station or to the marine lab technician on the vessels.
- The ACA has strict guidelines on managing hazardous waste. Be sure to remove all hazardous waste from the field at the end of each field season.

Human Waste

- Human waste must not be discharged onto ice-free land, sea ice, or in blue-ice areas. Discharge can only occur in snow accumulation areas and only with permission to do so.

- Surface discharge of urine is not allowed anywhere on the continent. If urine discharge is specifically approved, it may only be discharged to the subsurface (into a pit or hole).
- Personnel must carry a pee-bottle when bathrooms or out-houses are not available. Used pee-bottles must be cleaned and emptied by personnel before they leave the station (McMurdo has dedicated pee-bottle cleaning stations at the Science Support Center (SSC) and the BFC).
- Human waste and gray water should be planned for retro-grade to McMurdo Station. For planning purposes, the table below provides estimates of volumes generated.

Usage Rates for Buckets and Containers

Human Waste Type	Container Type	Persons/Days
Human Solid Waste	5-gallon bucket (1)	5 people for 5 days (minimum)
Urine	5-gallon bucket (1)	1 person for 5 days
Gray Water	5-gallon bucket (1)	1 person for 5 days

Interactions with Animals

- Personnel should not interfere with wildlife unless they have an ACA permit and are specifically trained for the activity being conducted.
- Maintaining a distance of 15 to 20 feet from animals is generally sufficient, but if an animal's behavior is altered or disturbed, individuals should increase that distance.

Non-Native Species

- No non-native species of animal or plant may be introduced onto land, ice shelves, or into water in the Antarctic Treaty area, except in accordance with an ACA permit.
- To avoid introducing non-native species into Antarctica, personnel must clean all science gear and personal equipment before arriving on the continent.
- To avoid cross contamination, personnel must also clean gear and personal equipment before transiting between Antarctic field sites.
- If a suspected non-native species is observed in Antarctica, it should be reported immediately to the environmental representative.

End-of-Season Report

- At the conclusion of field activities, all Peninsula-based and McMurdo-based science groups must submit an Environmen-

tal End of Season Report (EOS) to Environmental@usap.gov. The forms are available on the station intranet, or science personnel can request one from the above email address.

- To make the process simpler and more accurate, the Environmental EOS should be populated with information throughout the season. Do not try to remember everything at the end.
- The next section provides a general summary of the information required when filling out the Environmental EOS.

Environmental End-of-Season (EOS) Report:

General Information Required

The following information must be tracked and quantified in the EOS (as a Microsoft Excel spreadsheet). Please refer directly to the EOS report form for specifics.

Section A – Field Camp Summary

Part 1: Camp or site information

Part 2: Fuel use

Part 3: Hazardous materials use (non-fuel)

Part 4: Waste disposition

4a: Containerized waste

4b: Discharged sanitary waste

Part 5: Items remaining at camp closeout (fuel, hazardous materials, waste)

Part 6: Fuel, waste handling, spill prevention and response suggestions

Section B – Summary of Field Activities

Part 1: Equipment deployed

Part 2: Materials released

Part 3: Environmental disturbances in the Dry Valleys

Part 4: Spills

EOS Report Form Instructions

- Please complete the EOS form thoroughly and send it electronically as a Microsoft Excel file to the Environmental Department. (Environmental@usap.gov).
- Completion of the form is a requirement for each science group and ASC work center. All end-of-season reports are submitted

to the NSF, and data in the reports are compiled in the USAP Master Permit.

- All principal investigators (PIs) or their designated environmental POC must complete the form. Field camp managers must complete a form separately.
- Please use the drop-down menus in the Microsoft Excel spreadsheet form for consistent reporting.
- For all field parties, please submit GPS coordinates of any science equipment installations, sampling or coring locations, temporary camps, releases (planned and unplanned), equipment left in the field over the winter, and/or disturbances of any kind (past or present). GPS data should be reported in decimal degrees to five decimal places.
- Specific to field parties operating in an ASMA or ASPA, please submit GPS coordinates for each of the following environmental disturbances (refer to the ASMA or ASPA management plan http://www.ats.aq/documents/ATCM38/WW/atcm38_ww005_e.pdf for additional details):
 - Sample sites
 - Soil pits
 - Non-established helicopter landing sites
 - Tent sites outside facility zones (remote camps) – please GPS the perimeter of the camp location
 - Fuel storage locations outside facility zones
 - Waste handling and storage location outside facility zones
 - Any releases of fuel (intentional or unintentional) or equipment
- Contact ASC Environmental (at the above email address) with any questions or comments you may have regarding the EOS form or any other environmental issue.
- Please save and send the form with the file name: Group number_PI_YearEOS.xls (e.g., B-001_Smith_2017_EOS.xls)