

Search and Rescue (SAR), Palmer Station

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Purpose

To describe Search and Rescue (SAR) planning and response activities at Palmer Station.

Scope/Applicability

This procedure applies to all USAP personnel at Palmer Station.

Terms and Definitions

Abseil(ing)

A mountaineering technique in which a person ascends with the assistance of a pre-placed rope. In practice, a mechanical device (ascender, prussik knot, etc.) is normally installed on the rope to provide a moveable anchor point.

All Call

Station public address system

Back Yard

Area between Palmer's main station and the glacier

BioLab

Building #2: Palmer Station's main building.

Boat House

Building #1; muster point for OSAR team

C-Spine

Medical contraction for "Cervical Spine" the 7 uppermost vertebrae in the human body

CPR

Cardio-Pulmonary Resuscitation

Crampon(s)

A set of steel spikes designed to be strapped onto the bottom of mountaineering boots, used to improve traction when climbing on snow and ice.

Deadman

A temporary anchor point, created by attaching a rope perpendicularly to a buried object

ELT

Emergency Locator Transmitter

EMT

Emergency Medical Technician

ETD

Estimated Time of Departure

ETR

Estimated Time of Return

Fluke

A type of mountaineering anchor, used on snow-covered surfaces, and designed to dig deeper into the snow when the load increases

GPS

Global Positioning System

GSAR

Glacier Search and Rescue

GWR (Garage, Warehouse, and Recreation)

Building #10: Palmer Station's secondary building, where GSAR equipment is stored

Ice Screw

A type of mountaineering anchor designed to bore into solid ice

Jiffy Drill

Ice auger used for drilling holes for marker flags

MILVAN

Military cargo Van: shipping containers used by USAP personnel

NSF/OPP

National Science Foundation Office of Polar Programs

OSAR

Ocean Search and Rescue

Picket

A type of beam-shaped, mountaineering anchor, used on snow-covered surfaces, and designed to be driven into the snow

Prussik

A type of high-friction sliding knot, used in mountaineering to position a load on a haul or climbing rope

Rapel(ling)

A mountaineering technique in which a person descends with the assistance of a pre-placed rope. In practice, a mechanical device (figure-eight, prussik knot, etc.) is normally installed on the rope to control the rate of descent.

RPSC

Raytheon Polar Services Company

SAR

Search and Rescue

Station Manager

On-site manager, typically the senior on-site RPSC representative

Triage

A process of sorting out patients according to priority and service needs. **USAP**
United States Antarctic Program: umbrella agency responsible for all NSF research and support in Antarctica

C-Z Pulley

A configuration of ropes and multiple pulleys used to provide a mechanical advantage when lifting a load such as a litter.

Zodiac

Brand name of inflatable boats used at Palmer Station

Responsibilities

GSAR Team Leader

Provides training for GSAR team and orientation for community; maintains GSAR equipment and orders replacements as necessary.

OSAR Team Leader

Provides training for OSAR team and orientation for community; maintains OSAR equipment and orders replacements as necessary. Normally this is the Boating Coordinator.

SAR Teams/Community

Participate in SAR activities as required by the Team Leader(s) and the Station Manager.

Radio Watch-stander (typically the Communications Technician)

Monitors locations of off-site personnel. Informs the Station Manager and SAR Team Leader(s) if SAR response is indicated.

Station Manager

Ensures community gets appropriate training. Reviews this procedure (at least) annually and provides updates as necessary. Becomes Incident Commander and coordinates additional resources during SAR evolutions. May handle communications if Communications Technician is actively involved with the SAR team(s).

Station Physician

Ensures the clinic is prepared for trauma and other SAR-related emergencies. Provides ongoing medical/first aid training to the SAR teams and the Trauma Team.

Discussion

The Station Manager and the Search and Rescue (SAR) Team Leaders initiate all SAR missions. The GSAR (Glacier Search and Rescue) Team Leader coordinates all search and rescue operations relating to glacier and climbing activities. The OSAR (Ocean Search and Rescue) Team Leader coordinates all search and rescue operations relating to ocean travel. Some SAR scenarios may require expertise from both teams.

Search and Rescue

SAR team members are drawn from the Palmer community. Most OSAR team members are trained in the U.S. before deploying to Palmer Station. If needed, the GSAR leader may receive training in the U.S. prior to deployment. If the station population changes or additional SAR team members are needed, the SAR Team Leaders coordinate with the Station Manager to recruit and train new members.

SAR Team Leaders

SAR Team Leaders are responsible for the following tasks:

1. Design and execute SAR exercises at least once per month. GSAR and OSAR teams alternate training every two weeks to limit impacts to the station and work centers as much as possible.
2. Issue SAR equipment to SAR team members.
3. Maintain SAR equipment and lockers.
4. Review equipment inventory at least twice each season (an initial inventory review upon assuming the SAR leader position and an inventory review prior to turnover.)
5. GSAR: Maintain flagged glacier routes, including the following:
 - Lower route: flag crevassed area
 - Main route past antenna
 - Bonaparte route

NOTE: There is one small "Jiffy Drill" (model 50T) that turns the proper direction for use with the bits and flights from the Kovak ice augers (all the larger ones turn the wrong direction). This is the best setup for flagging the glacier routes. Be sure to use

the proper fuel/oil mix in this engine. This unit is equipment #TO40380 and is usually kept in MILVAN #711.

6. OSAR: Establish and maintain island equipment caches.
7. GSAR Recreational activities: schedule instruction and training for interested station personnel. Assign ice-climbing leaders and ensure they follow safe ice climbing procedures. These recreational activities are only undertaken when there are sufficient numbers of people skilled in glacier travel and mountaineering available to instruct and lead others.
8. When sufficient sea ice forms, safe travel routes are established according to the Sea Ice Travel policy. These routes must be regularly checked and changes must be clearly communicated to the rest of the Palmer Station community.
9. Maintain copies of correspondence, training records, equipment logs, and procedures.

SAR Team Members

SAR team members are selected according to their experience in search and rescue techniques, mountaineering-type skills, boating skills, and/or for their knowledge of the area around Palmer Station. Ocean Search and Rescue team members receive initial training in the U.S. prior to deployment.

There is one team for Glacier SAR (GSAR) and another for Ocean SAR (OSAR). In some cases, an individual may be on both SAR teams. However, to ensure a sufficient number of properly trained responders in a worst-case scenario (for example, simultaneous land and sea rescues,) most members should be assigned to only one team.

SAR Team responsibilities include the following.

1. Respond to SAR incidents.
2. Assist with and participate in SAR exercises, equipment management, medical training, and recreational activities.
3. Assist with maintenance of flagged routes (GSAR) and island caches (OSAR).

Two alternate (optional) GSAR team members may be chosen and trained. Their responsibilities are the same as the regular team members. Gear is not normally issued to

alternate SAR members, as hardware is limited in quantity. Alternates function primarily as backup resources during emergency situations.

Summer and Winter SAR Teams

The summer Glacier and Ocean SAR teams are fully staffed and have separate leaders. During the austral winter, when the population is smaller and there is limited travel in the area, the two SAR teams may have one leader and shared members.

Initiating a SAR Response

Whoever has the Radio Watch (typically the Communications Technician) will likely be the first to recognize the potential need for a SAR response.

Radio Watch Guidelines

1. Monitor the station blackboard for party locations and estimated times of return (ETRs).
2. If the wind speed reaches 20 knots, call all boats and let them know that if the wind speed reaches 25 knots all boats will be recalled to the station. If a recall becomes necessary, notify the Station Manager and the Boating Coordinator/OSAR Team Leader.
3. If personnel are overdue, or if you think there might be a problem, attempt to contact them via radio.

Note Personnel are considered "overdue" under the following circumstances:

- 15 minutes past ETR for glacier/back yard operations
 - 30 minutes past ETR/scheduled check-in for boating operations
4. If you get a distress call, or if personnel are overdue and they don't respond to your attempts to contact them, report the situation to the Station Manager and the appropriate SAR Team Leader/Boating Coordinator.
 5. If a SAR team is called out, they will relay information for the station blackboard (names, destination, and plan) during their radio check (before they leave the station). Write the information on the blackboard.

All Call

If activation of a SAR team is required, the Station Manager or the appropriate SAR Team Leader will use the station All Call to announce for appropriate SAR team members to muster at a designated location (usually the Garage for GSAR or the Boat House for OSAR).

SAR Team Leader(s)

During SAR responses, the appropriate (GSAR/OSAR) Team Leader directs all on-scene activities and relays updates to the Station Manager.

Station Manager

During SAR responses, the Station Manager takes on the role of Incident Commander, directing station activities, resources, and communications in support of the mission.

Physician

During SAR responses, the Physician maintains radio contact with the SAR Team Leader(s) and waits for initial medical assessments from the first responders. In some cases, the Physician may be required to report to the scene to provide medical assistance.

Glacier SAR (GSAR)

The Glacier SAR team usually consists of four to five active members plus a SAR Team Leader. One team member is designated as the snowmobile operator. It is preferred that at least one SAR team member has a current Emergency Medical Technician (EMT) certification. Up to two alternates may be trained to augment the team.

GSAR Team Members

Team Leader

The GSAR Team Leader provides overall direction for GSAR response and maintains radio contact with the Comms Center and the Station Manager during a GSAR mission.

Snowmobile Operator

The person selected as the snowmobile operator is responsible for all activities involved with getting the SAR team to the rescue site, including hooking up a sled and transporting the team to the rescue site, then shuttling extra equipment and personnel as required. The SAR Team Leader should dispatch this individual to collect the snowmobile(s) as early as possible.

Note There may be times in late summer when the use of snowmobiles is impractical due to prevalent icy surfaces.

The snowmobile operator carries a radio and maintains contact with the SAR Team Leader and the Comms Center at Palmer Station.

Active Members

Active GSAR team members maintain their own SAR gear in their dorm rooms or workspaces. When a GSAR mission is launched, team members dress out, gather their gear and muster as directed by the GSAR Team Leader (usually in the Garage). The GSAR leader issues instructions and directs team members to the next muster point (typically the GSAR cache at the glacier edge in the back yard).

GSAR Response

Injuries on the glacier usually consist of skiing, climbing, or hiking accidents, which usually will not demand the same response level as crevasse extractions. However, crevasse rescues have occurred at Palmer Station, and the teams should train to this possibility.

Notification

In the event of an incident requiring the GSAR team, the Station Manager or GSAR Team Leader announces the need over the station All Call system. GSAR team members dress out and report to the muster point (usually the Garage) with their response gear and radios. The snowmobile operator procures a radio and prepares the snowmobile and sled for glacier use.

Note During the latter half of the austral summer, the snowmobiles are stored at the top of the glacier. The GSAR team will have to use alternative means to transport equipment and people to the glacier, once the surface has become pitted and icy.

The Station Manager instructs all station personnel who are not directly involved with the response to stay away from the incident scene unless instructed to lend assistance.

Radio

The GSAR Team Leader reports "blackboard information" to the radio watch-stander, who writes the information on the blackboard. All other standard radio procedures are followed.

The standard frequency for use is channel 27. However, for long-duration operations, another frequency should be chosen and agreed upon by all involved parties.

Deployment

After initial preparations, deployment will depend on the nature of the incident. There are generally three types of GSAR deployment:

1. Crevasse extraction
2. Stabilization and transport of injured personnel
3. Search for personnel who are overdue (no radio response)

In the case of types (1) and (2) the procedure evolves as follows:

The GSAR team proceeds from the cache to the incident site via snowmobile unless otherwise directed by the GSAR Team Leader. In the event the operation involves a crevassed area, the team is transported as close to the scene as safely possible. The nature of the crevasse field and location of the incident may not always allow access by snowmobile.

Once the GSAR team has reached the incident site, the team leader evaluates the situation, deploys personnel and equipment as required, and reports to the Station Manager. If known, the medical situation should be reported at this time to properly alert the Physician.

If the situation involves unconscious personnel in a crevasse, a GSAR member with medical training descends into the crevasse to evaluate the patient's status and attempt to correct any immediately life-threatening medical conditions. In some cases (e.g., if it is evident that medical attention beyond the SAR team's ability is necessary) the Team Leader may request that the Physician respond to the scene.

The third class of incident involves a search resulting from individuals losing their way on the glacier due to storm, whiteout, fog, etc. The GSAR Team Leader decides which search techniques are most appropriate for the situation and requests assistance from the community if required. In those instances, GSAR team members lead each of the smaller search parties.

GSAR Training

Approximately twice per month, some type of GSAR team training is performed. One session includes a full-day exercise outdoors, usually involving some sort of accident scenario. The other is a half-day exercise held on or near station, usually involving specific skill training, such as first aid, triage, prussik techniques, etc. The GSAR Team Leader maintains training records, including a list of attendees and topics covered.

Training sessions are designed by the current GSAR leader to fit the skills needs of the current GSAR personnel. Below is a list of suggested topics:

- **Glacier Travel:** Proper techniques for traveling in crevassed areas, including self-rescue.
- **Anchoring:** Use of ice screws, flukes, pickets, and deadmen.
- **Rope Skills:** Rappelling, abseiling, knots.
- **Z-C Pulley:** Roping up, working over an edge, and recovering people.
- **First aid:** Proper C-spine stabilization technique and awareness; bandaging, splinting, cold injuries, etc. Basic life support.
- **Rescue Sled:** Sled contents and use, proper techniques for loading victims onto the sled and providing first aid (esp. CPR) while on the sled.
- **Crevasse Extraction:** Continuation of Z-C Pulley training, but in realistic crevasse scenario, perhaps including First Aid and high angle litter raises as well.
- **Low angle litter lowers and raises:** Reserved mainly for moving a litter up or down tricky (e.g., icy or rocky) slopes.
- **ELT and GPS Navigation:** Use of electronic navigation systems.
- **Standard Search Patterns:** How to find someone whose location is not known, especially in a whiteout or in the dark.

GSAR Equipment

Each GSAR team member is issued and maintains a personal kit of specialized climbing gear. The Station Operations Manager maintains the current gear list and is responsible for ensuring that new team members receive the full kit.

Additionally, GSAR team members are required to keep the following personal gear packed with SAR gear, or readily available:

- Pile jacket
- Shell jacket
- Warm gloves
- Hat
- Neck gaiter (optional)
- Polypro shirt
- Polypro pants
- Wool socks
- Sunglasses
- Gortex pants
- Visor cap
- Chemical hand and boot warmers

Gear lockers

All GSAR team members should be familiar with the location and contents of the three equipment lockers in GWR.

One locker contains ropes, anchors, carabiners, headlamps, harnesses, axes, webbing, and assorted climbing hardware.

The second locker contains hard shell ice climbing boots and crampons. All crampons and boots are matched, i.e., boot number to specific crampon number. The boots and crampons should remain in pairs unless either piece of equipment is damaged and needs to be replaced.

The third locker contains boot gaiters, backpacks, overmitts, helmets, goggles, hats, ski skins, water bottles, and other related gear.

GSAR response cache

The cache is located on a high point near the glacier edge. All GSAR team members should be familiar with the location and contents of this cache. The cache is to remain closed at all times and is off limits for general community use. The cache should be inventoried every 3-4 months. An electronic inventory of gear and equipment in the GSAR cache is maintained by the Station Operations Manager. The Operations Manager will provide a hard copy of the current gear list to the GSAR team prior to each periodic inventory.

Additional Response Equipment Inventory

Additional response equipment is packed with the GSAR sled. The Station Operations Manager maintains an electronic copy of the Additional Response Equipment Inventory and ensures that a hard copy of the inventory is kept readily available for use by GSAR team members. Team members should check the inventory immediately prior to deploying the sled, to confirm that they have a full set of rescue equipment.

Ocean SAR (OSAR)

The OSAR team is available for SAR missions anywhere around the Palmer Station area that is accessible by sea. Most team members will have attended the stateside OSAR course before deploying to Palmer Station. This course covers Zodiac use, hypothermia treatment, search techniques, and exposes students to boating safety on the open water.

The OSAR team consists of four to eight active members and an OSAR Team Leader. It is preferred that at least one SAR team member has a current Emergency Medical Technician (EMT) certification.

OSAR Team Members

Team Leader

The OSAR Team Leader provides overall direction for OSAR response and maintains radio contact with the Comms Center and the Station Manager during an OSAR mission.

Active Members

Active OSAR team members maintain their own SAR gear in their dorm rooms or workspaces. When an OSAR mission is launched, team members dress out, gather their gear and meet at the muster point (usually the Boat House). The OSAR Team Leader issues instructions and directs team members to the next muster point.

OSAR Response

Notification

In the event of an incident requiring OSAR response, the Station Manager, OSAR Team Leader, or Boating Coordinator will use the All Call to activate the OSAR team. Team members report to the muster point (usually the Boat House) with their response gear and radios.

The Station Manager instructs all station personnel who are not directly involved with the response to stay away from the muster point/incident scene unless instructed to lend assistance.

Radio

The OSAR Team Leader reports "blackboard information" to the radio watch-stander, who writes the information on the blackboard. All other standard radio procedures are followed.

The standard frequency for use is channel 27. However, for long-duration operations, another frequency should be chosen and agreed upon by all involved parties.

Deployment

After initial preparations, deployment depends on the nature of the incident. The OSAR Team Leader determines and directs the appropriate response.

OSAR Training

Approximately twice per month, some type of OSAR team training is performed. One session includes a full-day exercise outdoors, usually involving some sort of accident scenario. The other is a half-day exercise held on or near station, usually involving specific skill training, such as first aid, triage, etc. This can be in coordination with the GSAR medical training. The OSAR Team Leader maintains training records, including a list of attendees and topics covered.

Training sessions are designed by the current OSAR leader to fit the needs of the current OSAR personnel. Below is a list of suggested topics:

- Zodiac Operations
- Island Familiarity: Landings, Caches, Shoals
- Equipment Review: Litter, Backboard, Medical Kit, OSAR Bag, Towing Bridle, etc.
- Search Techniques/Use of GPS
- Man overboard/Zodiac capsize
- Hypothermia
- Patient Packaging/Litter Transport
- Zodiac recovery/Towing
- Boating Video Review (for use on days with poor weather).

OSAR Equipment

OSAR Team clothing is kept in the front of the BioLab Building vestibule (“Float Coat Room”) and is not used by non-SAR personnel. The following OSAR equipment is maintained in the northwest corner of the Boathouse:

- Zodiac Towing Bridle
- Backboard with Spider Strap and Head Blocks
- Throw Rope
- OSAR First Aid Kit

The Station Operations Manager maintains an electronic copy of the current OSAR First Aid Kit inventory and ensures that a current hard copy of the inventory is kept readily available for OSAR team use. The contents of the kit bag should be inventoried periodically, and immediately prior to deploying the OSAR team.

Island Caches

Survival caches are in place at the following locations:

- Torgersen Island

- Humble Island
- Janus Island
- Shortcut Island
- Hermit Island
- Cormorant Island
- Stepping Stones Island
- Old Palmer (Norsel Island)
- Christine Island
- Outcast Island
- Dream Island

Tie point locations are marked with painted orange dots and the caches are marked with flags. The cache barrels are blue. For an updated list of survival cache contents, refer to the current Boating Standard Operating Procedures.

References

The Alaska Marine Safety Education Association (AMSEA): (907) 747-3287; Sitka, Alaska

<http://amsea.org/>

American Alpine Institute (360) 671-1505; Bellingham, Washington

<http://www.mtnguide.com/>

RPSC Procedures:

SC-P-3003: *Palmer Area Boating Safety and Training*

Books:

- *Glacier Travel & Crevasse Rescue*, The Mountaineers, Andy Selters.
- *Wilderness Search and Rescue*, Tim Setnicka.
- *Mountaineering, The Freedom of the Hills*, Peters.
- *Beating the Odds on the North Pacific. A Guide to Fishing Safety*. Alaska Sea Grant College Program, Main Advisory Bulletin No. 41, 1992.
- *Field Manual for the United States Antarctic Program*, RPSC, NSF Publication 92-87.
- *Survival In Antarctica*, NSF Publication 90-91.

Records

Record Identification, Format, & Owner	Active Location Storage, Protection, & Retrieval	Facility Storage, Protection & Retrieval	Retention Time	Ultimate Disposition
Equipment Lists; MSEXcel files; SAR Team Leaders	SAR Folder I:\drive	N/A	Active: 1 year Storage: N/A	Delete files
Training reports & attendee lists; MSWord files; SAR Team Leaders	SAR Folder I:\drive	N/A	Active: 1 year Storage: N/A	Delete files

Attachments, Appendices

Appendix 1 of 1: SAR Operations Checklist

Appendix 1 of 1: SAR Operations Checklist

During a Search and Rescue mission, the Station Manager ensures the following tasks are performed:

1. ___ Announce (over the All Call and radio) for GSAR team members to report to muster location (usually the Garage for GSAR and the Boat House for OSAR).
2. ___ Announce (over the All Call and radio) for station personnel to stay away from the muster point and incident scene unless requested to provide assistance
3. ___ Announce (over the radio) for all parties to limit radio transmissions to essential radio traffic only.
4. ___ Inform Physician of the situation.
5. ___ Take on the role of Incident Commander. Monitor radio traffic and provide resources as appropriate.
6. ___ Notify the Palmer Area Director and/or NSF Representative(s) as necessary.
7. ___ Include a summary statement in the weekly station situation report.