Planning SOP for Canyon Search and Rescue

V1.0, June 2018

Purpose and scope of this document

This purpose of this document is to **help an Incident Management Team (IMT) plan a canyon Search and Rescue (SAR) operation**. It focuses on gathering the right intelligence, in large part through discussions with a Canyon SAR Team Leader (i.e. canyoning expert).

This document does *not* describe how to carry out the technical aspects of a canyoning SAR operation, for example the specific rope rescue techniques to be used. This may be added to the document later.

The procedures described in this document are not intended to be prescriptive, but to provide a general guide for rescuers to improve the efficiency and efficacy of the search. Where these procedures conflict with any NZ Police procedures, the NZ Police procedures clearly take precedent.

Using this document

If time affords it, work through all the sections in this document and note answers/observations to each of the questions. If time is of the essence, then the overview can be used.

Overview

1. The alarm has been raised. Start gathering intelligence (Sit Rep part 1)
    1.1. Alarm raised by PLB Activation; or
    1.2. Alarm raised by member of the party; or
    1.3. Alarm raised by informant/contact person/family member when party is overdue/missing.
2. Interview the informant/next of kin to understand the canyoners' intentions and capabilities (Sit Rep part 2)
    2.1. How long are the canyoners overdue? (if applicable)
    2.2. How experienced are the canyoners?
    2.3. How equipped are the canyoners?
3. Interview the Canyon SAR Team Leader to understand the nature of the canyon SAR operation (Sit Rep part 3)
    3.1. What is the nature of the canyon?
    3.2. What are current conditions in the canyon?
    3.3. What are the most likely reasons for the canyoners being overdue? (if applicable)
    3.4. Are conditions in the canyon likely to change?
    3.5. How long is a SAR operation in the canyon likely to take?
4. Decide what type of SAR operation is appropriate. And when to initiate it. Based on discussions with the Canyon SAR Team Leader
    4.1. Is a rescue helicopter a useful option?
    4.2. How long will it take to mobilise a ground team?
    4.3. What are the likely implications of delaying starting a search?
    4.4. When should the SAR operation start?
    4.5. Can anything be done in the interim?
5. Decide how to mobilise ground teams. Based on discussions with the Canyon SAR Team Leader
    5.1. Technical team(s) for in the canyon
    5.2. Technical team composition
    5.3. Recce team(s) for searching access routes
    5.4. IMT support team at forward base
    5.5. Communications team
6. Provide action list to Canyon SAR Team Leader
    6.1. Put technical team members on standby
    6.2. Collect information from IMT and discuss
    6.3. Prepare maps/topos
    6.4. Assemble equipment
    6.5. Organise transport
    6.6. Receive tasking from IMT
7. Provide equipment checklist for technical team(s) to Canyon SAR Team Leader
    7.1. Personal gear
    7.2. Rescue / group gear
    7.3. Emergency gear for the missing party
    7.4. Comms

1. THE ALARM HAS BEEN RAISED. START GATHERING INTELLIGENCE (SIT REP PART 1)

1.1. Alarm raised by PLB Activation; or

1.1.a. Record the GPS location. Note that the GPS location of any PLB in a canyon environment is likely to be inaccurate.

1.1.b. Contact the next of kin (as on the PLB registration form) and interview them based on Section 2 below.

1.1.c. Confirm the party were intending to go canyoning.

1.1.d. If the party were intending to go canyoning, or the GPS location is very close to known or likely canyoning terrain, contact the Canyon SAR Team leader, get them to put technical team members on standby and work through Sections 3 to 7 below.

1.2. Alarm raised by member of the party; or

1.2.a. Attempt to establish and maintain 2-way communication with the party member.

1.2.b. Determine the reason for raising an alarm (injury, rising waters, stuck ropes, damaged anchors, etc).

1.2.c. Determine the nature of the injuries (if any).

1.2.d. Determine the location of the members of the party. Specifically, where in the canyon – i.e. between which pitches/features? Reference the Topo diagram for known canyons from the Canyoning in NZ guidebook or at www.kiwicanyons.org. If you do not have the guidebook and need the topo urgently, contact Daniel Clearwater at chucky@kiwicanyons.org, 0212157059

1.2.e. Determine the intentions of the rest of the party.

1.2.f. Interview the party members based on Section 2 below.

1.2.g. Contact the Canyon SAR Team leader, get them to put technical team members on standby and work through Sections 3 to 7 below.

1.3. Alarm raised by informant/contact person/family member when party is overdue/missing.

1.3.a. Determine the intentions of the missing party. What canyon were they doing? How long are they overdue?

1.3.b. Conduct an idiot check – are they really missing?

1.3.c. Attempt to contact the missing party.

1.3.d. Attempt to contact family/known associates of the missing party to see if they know their whereabouts. They may have forgotten to call their contact person, phones may be damaged etc.

1.3.e. Check whether the missing party's car is still at the road-end.

1.3.f. Interview the informant based on Section 2 below.

1.3.g. Contact the Canyon SAR Team leader, get them to put technical team members on standby and work through Sections 3 to 7 below.

2. INTERVIEW THE INFORMANT/NEXT OF KIN TO UNDERSTAND THE CANYONERS' INTENTIONS AND CAPABILITIES (SIT REP PART 2)

2.1. How long are the canyoners overdue? (if applicable)

2.1.a. Do we know what time they started and expected to finish canyoning?

2.1.b. Did they provide a callout time to a callout person?

2.1.c. Does the nominated callout time seem appropriate given what we know about the canyon and the canyoners? Or, in the absence of nominated callout time, what would an appropriate callout time be?

2.1.d. Do they have a means of communication at the road end? Or do they have some way to travel before being able to communicate?

2.1.e. Have any other canyoners or trampers etc seen them (or not)?

2.1.f. Is it possible they changed their plans? Are there other canyons nearby that they might have considered? Were they considering other recreational activities?

2.2. How experienced are the canyoners?

2.2.a. Do the missing canyoners have similar experience levels? Is there clearly a group leader? Or less experienced canyoner?

2.2.b. Approximately how many canyons have they done?

2.2.c. Is their experience mostly in NZ or overseas?

2.2.d. Have they done many canyons of similar difficult to this one?

2.2.e. Do they have any first descent or remote canyoning experience?

2.2.f. Have they done any formal training?

2.2.g. Do they have first aid or medical qualifications?

2.2.h. Do they have general NZ backcountry experience?

2.2.i. Do they have other sporting experience that is relevant (e.g. climbing, kayaking)?

2.2.j. What is their general fitness?

2.2.k. Any known medical conditions?

2.3. How equipped are the canyoners?

2.3.a. Do they have a PLB with them? This is particularly important, because if they have a PLB and have not set it off, then it is less likely that their situation is critical, and it is more likely that they are able to self-rescue. Although also bear in mind that canyoners don't tend to carry their PLB in their pack rather than on their body, so if they lost their pack then they won't be able to activate their PLB..

2.3.b. Do they have any other means of communication that is likely to work in or around the canyon? E.g. Garmin InReach, SPOT, mobile phone, VHF radio?

2.3.c. What other emergency gear do they have with them? First aid kit? Emergency blankets? Bothy bag? Warm clothes? Spare food?

2.3.d. Do they have headlamps with them? How good are they and how long are they likely to last? This is obviously important if they have been benighted.

2.3.e. What canyoning gear do they have? Spare ropes? Spare anchor materials? Ascending gear? How good are their wetsuits/clothing?

3. INTERVIEW THE CANYON SAR TEAM LEADER TO UNDERSTAND THE NATURE OF THE CANYON SAR OPERATION (SIT REP PART 3)

3.1. What is the nature of the canyon?

3.1.a. What grade is the canyon? Is it vertically challenging or aquatically challenging or both? What is the commitment grading?

3.1.b. What is the terrain around the canyon? Open tussock? Scrub? Mature forest? Steep in the greater gorge, or relatively gentle?

3.1.c. Is the canyon difficult to access? What is the likelihood that they are delayed when entering or exiting the canyon? Are their bluffs/significant fall hazards near the access route?

3.1.d. Do we know for sure what canyon they are/were in?

3.1.e. Is there a possibility they changed plans?

3.1.f. Is there a possibility they got lost and entered a different canyon/watershed?

3.1.g. What is the risk of flooding? How quickly are water levels likely to rise and drop? Can they find a safe/dry place to wait it out?

3.1.h. Are there regular escapes? Are there any sections that are completely inescapable? If they did choose to escape, what implications does that have for their location or other possible scenarios?

3.1.i. Where is the 'crux' of the canyon? Are there any other parts of the canyon that are known to cause people issues? E.g. stuck or cut ropes, a difficult climb, hazardous jump, entrapment risk etc?

3.2. What are current conditions in the canyon?

3.2.a. What are flow levels likely to be in the canyon? Has it been raining in the last few days? What are water saturation levels like more generally (winter/spring/summer)? Is the canyon fed by a glacier or snow melt?

3.2.b. How cold is it in the canyon? If they are stuck or immobilised, are they likely to become hypothermic?

3.2.c. Are there any known rockfalls, slips etc?

3.3. What are the most likely reasons for the canyoners being overdue? (if applicable)

3.3.a. Injured? Stuck rope? Stumped by technical feature? Escaped the canyon? Lost on way in/out? Taking longer than expected? Medical condition? etc.

3.4. Are conditions in the canyon likely to change?

3.4.a. What is the weather forecast? How might that change flow levels and what are the implications?

3.4.b. Is it likely to get significant colder overnight or tomorrow?

3.4.c. Are any other recreational parties known to be entering the canyon very soon?

3.5. How long is a SAR operation in the canyon likely to take?

3.5.a. Once at the road end, how long will it take to access the canyon? Bear in mind the time of day, conditions, and capabilities of likely rescuers.

3.5.b. How long will it take the technical team(s) to move through the canyon (assuming no rescue required)?

3.5.c. How long might an actual rescue potentially take? This is obviously difficult to estimate, but worth bearing in mind if the conditions mean there is a limited time window.

4. DECIDE WHAT TYPE OF SAR OPERATION IS APPROPRIATE. AND WHEN TO INITIATE IT. BASED ON DISCUSSIONS WITH THE CANYON SAR TEAM LEADER

4.1. Is a rescue helicopter a useful option?

4.1.a. Is a helicopter likely to be available? (Weather conditions, helicopter range, daylight available, etc)

4.1.b. Is the helicopter likely to be able to sight stuck canyoners? Either in the canyon itself or on the access or surrounding terrain (if escaped)?

4.1.c. Is a helicopter likely to be able to winch/strop at many points in the canyon?

4.1.d. If the canyoners have exited the canyon (or are moved to outside the canyon rim by rescuers), are there likely to be any winch/strop spots?

4.1.e. What constraints are there on when a helicopter can be mobilised (e.g. night time)?

4.1.f. Is a helicopter useful/necessary for supporting a ground team? E.g. to establish comms, drop of the technical team, etc.

4.1.g. Are there useful areas to land for the helicopter in and around the area of operations (i.e. is a non winch/strop capable helicopter worthwhile if a dedicated rescue helo is unavailable)?

4.2. How long will it take to mobilise a ground team?

4.2.a. What teams would be required? (see next section)

4.2.b. Are appropriately skilled rescuers likely to be available locally? Or will they need to be brought in from further afield?

4.2.c. How many rescuers are likely to be available?

4.2.d. What is their travel time to the canyon?

4.2.e. Any difficult transport logistics?

4.2.f. Will it take long to assemble both personal gear and rescue gear (potentially from the SAR gear store)?

4.2.g. How long will it take to assemble support teams?

4.2.h. How long will it take to establish comms etc?

4.2.i. What is the overall best guess at time to get the rescue team(s) ready-to-roll at the forward base/road end?

4.3. What are the likely implications of delaying starting a search?

4.3.a. What are the likely implications for the missing party?

4.3.b. What are the likely implications for the rescuers?

4.4. When should the SAR operation start?

4.4.a. Based on all the intelligence collected thus far, when should the SAR operation be launched?

4.5. Can anything be done in the interim?

4.5.a. Has someone checked whether their car is still at the road-end?

4.5.b. Has someone tried repeatedly to contact the missing party?

4.5.c. Can friends or members of the canyoning community be contacted to find out more about the missing canyoners' experience, equipment and intentions?

4.5.d. Should potential rescuers be identified and asked to be ready?

4.5.e. Can someone be mobilised to contain the search?

4.5.f. Can the search be mobilised in phases, rather than all at once? E.g. someone walk the access in/out.

5. DECIDE HOW TO MOBILISE GROUND TEAMS. BASED ON DISCUSSIONS WITH THE CANYON SAR TEAM LEADER

5.1. Technical team(s) for in the canyon

5.1.a. In the case of a missing/overdue party, the priority action will usually be to send one technical team ('hasty team') that will enter the canyon from the top and make their way down the canyon.

5.1.b. If enough rescuers are available, then it may be appropriate to send additional technical teams in. This might include sending a technical team in from the bottom, walking and climbing upstream in wetsuits until they cannot safely go any further. Even though they're just walking up from the bottom, that team should still take some technical gear in case they find the missing person and ropes are needed to assist them down the canyon (for example a lower down what would otherwise be a downclimb). A technical team could also be dispatched to part way down the canyon, assuming that there is an easy access point.

5.1.c. When IMT is dispatching technical teams for a search, it should be wary of dispatching all technical rescuers into the canyon at the outset. It is possible that the first team will find the missing/overdue party and request additional equipment or support, for example a stretcher.

5.1.d. IMT should also try and retain at least one technical canyoner to advise on the operation from police HQ or forward base.

5.1.e. If it is known from the outset that a member of the party is seriously injured, it is likely necessary that multiple technical teams need to be dispatched, with larger team sizes, more equipment, and as many rescue riggers as available. A medical professional is also likely to be required.

5.2. Technical team composition

5.2.a. Three to five canyoners is usually a good technical team size for a search operation.

5.2.b. All team members should obviously be self-sufficient and very confident moving through the canyon, in the conditions at hand.

5.2.c. At least one of the team, the team leader, should be an experienced 'rescue rigger', i.e. capable to rigging a rescue system to lower an injured person or haul them up out of the canyon.

5.2.d. At least one of the canyoners should be first aid trained, ideally PHEC or higher.

5.2.e. At least one of the canyoners should know the canyon.

5.2.f. The required skills of the canyoners will be dictated by the nature of the canyon and the current conditions. For example, are swift water skills likely to be required? Or vertical / rigging skills?

5.3. Recce team(s) for searching access routes

5.3.a. Non-technical recce teams can be used to search the access routes, if those routes are not already being covered by the technical team(s). A likely example of this is to walk the route from the exit of the creek/river to the road end. This may require skills in off-track navigation.

5.3.b. If a technical team is not available to search the bottom of the canyon, a non-technical recce team could be asked to walk up the canyon as far as they are comfortable, e.g. up to the last technical feature or deep pool. This will likely require basic river skills and confidence moving in difficult creek beds

5.3.c. If the terrain allows it, a recce team could be asked to search the rim of the canyon to check whether the missing canyoners have exited or can be seen from the canyon rim. This would likely require skills moving/navigating/staying safe in steep terrain.

5.3.d. Recce team size should be at least two.

5.3.e. Ideally it should include someone training in tracking / search and clue awareness.

5.3.f. Ideally it should include someone with first aid training.

5.4. IMT support team at forward base

5.4.a. It will usually be appropriate for IMT to dispatch a support team to a forward base location to help coordinate the search, usually from the road end or main canyon exit point.

5.4.b. The support team can establish comms with the other teams and back to police HQ and can help with containment.

5.5. Communications team

5.5.a. It may be necessary to establish communication between the various technical, recce, and support teams. For example, to setup a repeater at a high point. This will be canyon / terrain specific.

5.5.b. In some cases, the communications team may be able to assist the technical team(s) carry gear up the hill.

6. PROVIDE ACTION LIST TO CANYON SAR TEAM LEADER

6.1. Put technical team members on standby

6.1.a. Receive call from IMT (after section 1 above), get essential information

6.1.b. Contact possible technical team members and gauge their availability.

6.1.c. Ask them to be ready, for example pack gear, don't drink, get to bed early, remain contactable, etc.

6.2. Collect information from IMT and discuss

6.2.a. Discuss the missing canyoners intentions and capabilities (section 2 above)

6.2.b. Discuss the nature of the canyon and the canyon SAR operation (section 3 above)

6.2.c. Discuss the likely type of operation being launched (section 4 above)

6.2.d. Discuss how ground teams are to be mobilised (section 5 above)

6.3. Prepare maps/topos

6.3.a. Download offline maps on your phone/GPS

6.3.b. Print a copy of the relevant topographical map and the canyon topo, waterproofed if possible

6.3.c. Take a photo of the maps and topo on your waterproof camera as a backup

6.4. Assemble equipment

6.4.a. Discuss required equipment with other team members (section 7 below)

6.4.b. Organise pick up of equipment from SAR base if required

6.4.c. Before team members depart, do a final gear check among everyone

6.5. Organise transport

6.5.a. Sort out logistics of transport to the SAR base/canyon road end with other team members

6.5.b. Bear in mind the possibility of being out of reception once at the road end, so consider meeting at the base or on route

6.6. Receive tasking from IMT

6.6.a. Once the operation is initiated, receive tasking from IMT.

6.6.b. Go get em! Be safe!

7. PROVIDE EQUIPMENT CHECKLIST FOR TECHNICAL TEAM(S) TO CANYON SAR TEAM LEADER

7.1. Personal gear

7.1.a. Harness + descender, cowstails, carabiners, ascenders etc
7.1.b. Helmet
7.1.c. Warm wetsuit (consider taking an extra layer/dry top/wind breaker)
7.1.d. Mask (for checking pools)
7.1.e. Knife + whistle
7.1.f. Canyoning bag + flotation (good dry bag or drum)
7.1.g. Warm clothes (in case stationary for a while)
7.1.h. Emergency blanket (or similar)
7.1.i. Headlamp (and spare batteries)
7.1.j. Food (for a long trip)
7.1.k. Pen & paper (for note taking)

7.2. Rescue / group gear

7.2.a. Topo map & canyon topo
7.2.b. GPS (or reliable phone with topo map)
7.2.c. PLB
7.2.d. Large first aid kit (good pain killers, splint, etc)
7.2.e. Power drill, hammer, bolts, blow tube etc (if appropriate, i.e. likely requirement to add/replace anchors)
7.2.f. Other rigging gear (webbing, mallions, hand-bolting bolting kit, etc)
7.2.g. Rope rescue gear (extra rope, pulleys, hands-free belay, etc)
7.2.h. Stretcher and bridle (if appropriate, i.e. is it realistic that the first team carry and use it?)
7.2.i. Floatation (PFD for injured person, stretcher float, etc)

7.3. Emergency gear for the missing party

7.3.a. Warm clothes when canyoning (spray jacket, extra neoprene layer, etc)
7.3.b. Warm clothes if stationary (warm jacket, sleeping bag, beanie, gloves, etc)
7.3.c. Shelter (bothy bag/bivy bag/emergency blankets/fly, etc)
7.3.d. Warmth (long-life candles, heat packs, etc)
7.3.e. Food (energy bars, freeze-dry meals, etc)
7.3.f. Cooker
7.3.g. Extra headlamp(s)

7.4. Comms

7.4.a. Radio(s) (VHF, simplex, etc)
7.4.b. Satellite comms (sat phone, InReach, etc)
7.4.c. Mobile phone (if it'll work)

Key information resources

Lists of canyoning experts and local groups

- NZ Canyoning Association SAR national database of specialist canyoning experts
- List of commercial canyoning companies, whose guides may be able to assist

Canyon topos

- NZ Canyoning Guidebook (hard copy only)
- NZ Canyoning Guidebook updates (online)
- NZ Canyoning Guidebook – Top of the South Supplement (pdf of new canyons)
- Kiwicanyons.org (for information on other new canyons not in the guidebook, also for background on the sport)

General information

- Kiwicanyons on Facebook (community forum)
- NZ Canyoning Association (for background on the sport)
- NZ Canyoning Association Bolting Code of Practice