



# BACKCOUNTRY ACCIDENTS

By Johnny Mulheron and Nick Plimmer

## What to do in a backcountry emergency

**1. Personal Locator Beacons (PLB)** activation in remote wilderness areas has resulted in rescue in as little time as one hour, but more often several hours. Modern PLBs transmit data such as GPS location and serial numbers. Many clubs or outdoor stores hire PLBs, and most clubs now require leaders to carry one on official trips. PLBs transmit on the 406 Hz frequency although older ones (pre 2009) operate on 121.5 Hz. Older ones are still worth activating if that's all you've got, because a passing aircraft could pick it up.

**2. Satellite phones** may allow you to contact rescuers directly, depending on coverage limitations. They are far superior to cellphones but very expensive. Note: satellite phones will not work under tin roofs. To activate emergency help from a satellite or cellphone:

- Dial 111.
- Some satellite phones cannot call 111 so you should check with your provider before you leave. If not, programme into the phone the following Police Communication Centre numbers: North Comms (covers New Zealand north of Turangi): +64 9 571 2800; Central Comms (covers North Island south of Turangi): +64 4 381 2000; South Comms (whole of the South Island): +64 3 363 7400.
- For a medical/accident situation ask for Ambulance.

- For a rescue situation with a medical/accident component ask for Police SAR and say it is a medical/accident emergency too.
- Don't sweat it; police communications will contact ambulance communications and vice versa.
- Get the name, title and direct number of the emergency person (Police or Ambulance) with whom you are dealing to save precious time and battery life.
- Minimise phone use to conserve batteries.
- You may need to arrange a further sked/listening time, say in 15 minutes. Be clear about who is to phone whom.
- Give an accurate location (latitude-longitude, map series, grid reference, physical reference) and the phone number that you are calling from.
- If you contact a helicopter company directly, they may not send the appropriate personnel and you may be billed for the cost.

**3. Mountain radios** generally have fairly good coverage and are monitored by radio hams. They require an aerial.

**4. GPS tracking devices** use a commercial satellite system that is not as extensive or reliable as that of PLBs.

**5. Cellphones** are activating more and more rescues in the mountains. However, cellphones

The ridgeline above Old Man Hut, Mt Richmond Forest Park; St Arnaud Range, Nelson lakes National Park; Porters Creek Hut, Mt Richmond Forest Park; Photos: Carl Babe, Nelson Marlborough Rescue Helicopter

work well in only 10% of mountain areas, usually from high tops and peaks, which are just the places you may need to avoid in bad weather. PLBs, satellite phones and mountain radios have no such coverage limitations.

**6. Send for help.** Leave a person with the patient, and send two people for help with a clear written description of the incident.

### Personal Locator Beacons

Personal Locator Beacons (PLBs) have been available to the public since the late 1990s. Over time they have become smaller, lighter, faster and more accurate. Not carrying a PLB is regarded by many as risky and there are cases where people would have survived had they been carrying one.

### COSPAS – SARSAT System

The COSPAS–SARSAT program is an international search and rescue network of satellites, ground-based stations and an information distribution system established in 1979. New Zealanders utilise this system with PLBs, which transmit their signal via the satellites and ground stations to Rescue Coordination Centre New Zealand (RCCNZ) in the Hutt Valley. This is funded by the New Zealand government.

### How PLBs work

When a trumper, climber, hunter, sailor, or anyone else sets off a PLB, a signal is transmitted to satellites, onto ground based stations and forwarded to RCCNZ. The signal transmitted at 404MHz provides the location of the unit (down to an accuracy of a few meters for GPS imbedded units), and a unique identifier that can be matched up with the RCCNZ database. When the signal is received, RCCNZ initiate a search and rescue.

If the PLB has been registered, RCCNZ match the unique signal to their database and get in contact with the registered emergency contact person to gather more information. The PLB also transmits a second signal on 121.5 MHz which allows aircraft to finely search for the beacon. Typically, trampers see a rescue helicopter approaching within one to three hours of activation, depending on the location and weather conditions.

### What to look for when buying a PLB

A variety of PLBs are available in New Zealand, costing from \$300 to \$700. Models come in a variety of sizes, shapes, weights and battery life. Before purchasing one, the most important things to consider are: that it transmits on both the 406MHz and 121.5MHz frequencies; it is GPS imbedded for faster response times; it has a long battery life and is fully waterproof.

Check the expiry date, much as like you would check the expiry on a bottle of milk. Typically a PLB battery expires after five to seven years, depending on the model and may be replaceable. PLBs sold in New Zealand must conform to minimum standards. A good comparison of four leading brands can be found at [www.mapworld.co.nz/beacons.pdf](http://www.mapworld.co.nz/beacons.pdf)

### How many PLBs should a party have?

PLBs are light, small, relatively inexpensive and save lives, so take as many as you think you need. If there is a high likelihood of the party splitting up during your trip, each separate group should have one. Even if you plan to stay together as one party, there is no harm having more than one PLB, aside from carrying minimal extra weight. Consider the scenario where the person carrying the PLB falls into a crevasse, or off a cliff, or is swept downstream by a river, and cannot set off the PLB themselves.

### Registration

After purchasing a PLB, register it with RCCNZ at [beacons.org.nz](http://beacons.org.nz) by providing your contact details and emergency contacts. It is important to keep these details up to date. Some outdoor clubs own beacons for members to use, which are registered to the club. Clubs should have an internal intentions system so the three registered people have quick and easy access to the intentions.

### GPS tracking devices

SPOT beacons and InReach beacons are two brands that do not use the COSPAS–SARSAT system and are therefore technically not 'Personal Locator Beacons'. These are satellite-tracking devices that use a subscription-

based service. These provide a one-way emergency signal similar to a PLB, along with non-emergency tracking. Some devices provide basic two-way communication. In critical emergency situations, it may be unwise to rely on these devices. Based on anecdotal evidence, they have limited reliability in New Zealand's rough terrain. This is because their satellite network coverage is limited, especially in deep valleys. These do not communicate directly with RCCNZ through the COSPAS-SARSAT system, but through commercial satellites which rely on a subscription-based service contacting RCCNZ.

### Practical use of PLBs

Make the PLB and your intentions part of your pre-departure checklist. At the start of your trip, tell other party members that you have the PLB, and where it is located in your pack and explain how to use it. Give your registered contact people your trip intentions. If the PLB is activated, RCCNZ can contact them and will have a much better idea of what sort of situation the rescuers may be going into.

Take a PLB even if you expect to have cellphone coverage, as cell coverage can be dubious even in areas relatively close to urban areas, especially behind ridges. Conversely, carry your cellphone also, and attempt to use it before activating a PLB. If you have to activate your PLB, do so according to instructions. Make sure you are outside (it won't transmit through a metal hut roof). Be prepared to wait. It will take some time to muster SAR resources, and get them through prevailing weather conditions to your location.

When the battery expires, deregister the beacon with RCCNZ and dispose of it according to the instructions. There are numerous rescue helicopter deployments to rubbish dumps because of accidental activation of incorrectly disposed beacons.

### When should I activate a PLB?

Outdoors people are generally self-reliant and will often try self-rescue before reluctantly activating a search and rescue. There are cases of injured people stoically attempting self-rescue and suffering significant pain and distress because they do not want to incur costs to the

taxpayer, or otherwise be a burden. This is incorrect thinking and ironically often costs the taxpayer more in the long term by prolonging a search or complicating your injuries when they are not treated quickly.

It does not have to be a life-threatening emergency for you to set off your PLB. The basic rule is 'If in doubt, get them out'. You should push the button in these situations:

**Immobilised patients** in significant pain with traumatic injuries clearly need rescue.

**Fractured limbs** such as arms or legs. If getting out under your own steam creates more pain and distress, medical evacuation is needed. If the fracture results in reduced distal perfusion (i.e. less blood circulation to for instance the fingers or toes) then this is a threat to the limb and a true medical emergency.

**Consider the risk of infection** of more minor injuries in the wilderness, such as eyes, especially if self-rescue will take a long time.

**Many relatively minor injuries** result in helivacs because of the distance from a road, the increased risk to the rest of the group, or the difficulty of terrain ahead.

**Traumatic brain injuries** can be a difficult call. If someone has been knocked out or concussed, even though they seem fine now, they can develop a life-threatening brain bleed over the next 24 hours. Observe them carefully for subtle changes to their consciousness such as anxiety or repetitive questioning and if these are present, get them out.

**Post hypothermic/hyperthermic** patients have little reserve and can deteriorate rapidly if exposed to the same conditions. Numerous people have tried to self-rescue after supposedly recovering from hypothermia, only to succumb.

**Medical emergencies** such as anaphylaxis, suspected heart attack, severe asthma, prolonged diarrhoea and vomiting all need rescue.

**People in sustained pain** not easily reduced by pain relief are in need of evacuation. Think of the pain as an alarm system alerting you to the need for extra help. In an outdoor setting, sick people lack their normal reserves against the elements and can consequently deteriorate rapidly. Attempting self-rescue can put them

and the group at risk. Appropriate medical evacuations have occurred for conditions such as chicken pox and measles. If you think a medical or traumatic condition will warrant evacuation, set off your PLB early and prepare a helicopter landing zone (LZ).

### What can we do to assist rescue?

**No more accidents!** Make yourself, your group and the patient safe.

**Leadership** – take control. Cool analysis and implementation of a plan are vital.

**Good, clear communication** is crucial.

**Attend to the physical** (food, fluid, warmth and rest) and emotional well-being of everyone.

**As memory often becomes unreliable in times of stress, write everything down**, including: location – map series, grid reference/GPS coordinates and physical description; accident details – what happened?; personal details of the patient including next-of-kin contacts, medical conditions, allergies, medications; weather and terrain conditions; patient details including injuries, illness, treatments and observations. Give these written observations to your rescuers.

### What do we need to prepare for a helicopter rescue?

The helicopter needs to find you, which can be the most difficult part of the operation. Accurate location information is vital. In daylight, make yourself visible with smoke, flares, reflectors, or by shaking trees. At night, if the helicopter has night vision capability they will see lights from a long way off: people have been rescued at night from the light of their cellphone screen.

A landing site needs to be tennis court size, relatively flat, free of obstacles (such as wires) on the approach, and free of loose objects. After circling the site, a helicopter will generally land into the wind. Position someone at the far upwind boundary of the landing site with their back to the wind and arms horizontal from their sides. Have only the minimum number of people absolutely necessary at the site.

Even without a landing site, the helicopter can still rescue you. Numerous winch rescues occur every year in difficult terrain or dense heavy bush. Make sure the patient is completely

packaged, with all their personal gear and a written handover for the rescue crew. The helicopter may allow additional passengers, so prepare for this.

For operations after dark most dedicated rescue helicopters now have night vision capability. This is very sensitive technology: lights shone at the helicopter from the ground may blind the pilot, so keep torches shining downwards when the machine approaches.

Don't be surprised if the helicopter does not elect to use your well-prepared landing site. The pilot may have seen something better or decide on a winch rescue instead.

### Safety around helicopters

**Always approach** from the front (10 o'clock to 2 o'clock arc).

**Never go near the rear** of the helicopter (to avoid the tail rotor).

**Always obtain approval** (thumbs up or positive nod of head) from the pilot or crew before approaching the helicopter.

**If the helicopter has landed** on a hillside slope, the rotor on the uphill side may be very close to ground level. Always approach from below the level of the helicopter after getting pilot/crew approval.

**Rotor downwash** is very powerful. Secure loose articles of clothing including hats, caps or other equipment before approaching the helicopter. If an item blows away, don't chase it.

**If you are carrying long pieces** of equipment such as skis, carry them horizontally, below the waist, to prevent contact with the main rotor.

**If rotor wash or dust** impairs your vision, crouch down and stay where you are until you can see again.

**If a winch line is lowered** to you, stay still with your arm out and do not chase it; they will position the helicopter and bring the line right to you.

**Take your time.** The noise, wind and stress of the incident create a sense of urgency which can cause undue haste.

**Think before you act.**

Visit [beacons.org.nz](http://beacons.org.nz) for more information.

[accidents@fmc.org.nz](mailto:accidents@fmc.org.nz)

