



# Operation Wallacea

Conservation research through academic partnerships

Risk Assessment and Management  
In Indonesia 2012

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## TRANSFER BASED RISK ASSESSMENT AND MANAGEMENT

**2011 - KB01**     **Jakarta/Makassar/Bau Bau**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Being injured from traffic	L	H	Ensure all staff and volunteers are told of the dangers due to the lack of driver regulation and poor enforcement of the laws of the road.
Theft	M	L	Volunteers and staff told to look after their belongings at the start of their expedition and to be warned about pickpockets around the port areas.
Stomach problems	L	M	Ensure only bottled water is drunk. Food to be sourced from trusted suppliers.
Terrorists target Operation Wallacea sites or volunteers/staff get caught up in a general terrorist attack	L	VH	Operation Wallacea staff to monitor the political situation. The likelihood of a terrorist attack on the Operation Wallacea sites is extremely small. Volunteers to be advised to exercise caution if travelling to Bali or other tourist centres before or after their expedition.
Volunteers attacked in hotel	L	M	Volunteers will be booked into hotels in Jakarta or Makassar as required. The hotels used have English speaking staff and there are Losari Tours staff available at all times. There is no history of any problems of this nature in either of the hotels used.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site

**2011– KB10 Air travel**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
An aeroplane carrying Operation Wallacea volunteers or staff has a serious accident	L	VH	Losari Tours are only booking Operation Wallacea volunteers or staff on airlines rated 1 or 2 by the Indonesian Ministry of Transportation. The likelihood of this occurring is minimal.
Control measures not implemented	L	VH	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site

**2011 – KB11 Road travel in Jakarta, Makassar, Bau Bau or Ereke**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
RTA or other vehicle related incident	L	H	All drivers to be hired through the Losari Tours (Jakarta and Makassar) or Lawana Ecotone (Buton) who are responsible for ensuring that the vehicles are in good condition with regard to tyres, lights and brakes. Drivers are briefed prior to every journey to ensure that vehicles travel in convoy and at a safe speed. Losari and Lawana staff to travel in all vehicles with volunteers and to ensure moderate speeds are maintained at all times. All passengers to sit down inside the back of the vehicle and not sit in the doorway or stand whilst the vehicle is moving. Each vehicle to carry a mobile phone, to have the necessary equipment for changing the wheels and to carry a torch and sufficient water for the journey in case of breakdown. Volunteers and staff are forbidden to use the 'ojek' motorbike taxis.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site

**2012 – KB12 Boat transfers between Bau Bau and Hoga**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Accident at sea resulting in the vessel sinking or capsizing	L	VH	The Bau Bau to Wanci boat is a scheduled daily boat and receives weather information before setting sail. Opwall staff will check the forecast wind conditions prior to the boat sailing and if the conditions are not suitable will keep the volunteers an extra day in Bau Bau or Hoga. All crossings will be done with Opwall staff in attendance and they will ensure that the boat is not overloaded before departure. Operation Wallacea will supply lifejackets and a satellite telephone for all groups crossing and a full briefing will be conducted by the Opwall staff member prior to departure identifying the safety features and emergency exits on the boats. The Wanci to Hoga boat is smaller but the entire passage is protected from winds except for about 30 minutes crossing between the bottom of Wanci and the top of Kaledupa. All such crossings will be made with Opwall staff in attendance and they will determine in consultation with the captain.
Passengers suffering sunburn, dehydration or heat-stroke	H	M	Drinking water provided for all journeys. The Wanci to Bau Bau boat is covered so exposure to sun is not a problem. It can be an issue on the Wanci to Hoga boat but the crossing only takes 2 hours. The accompanying Opwall staff member to remind all volunteers to use sunblock and wear hats.
Slipping or falling on deck or falling overboard	L	M	Passengers to be fully briefed on the safe and out-of-bounds areas of the boats. The volunteers on the Wanci to Bau Bau boat will be sleeping on mattresses on covered decks with waist high walls around the edge of the boat. In heavy weather when the boat may roll a little the Opwall staff member to ensure any volunteers going to the bathroom at night go in pairs or are accompanied. On the Wanci to Hoga boat the volunteers to be told to sit down when crossing between the bottom of Wanci and the top of Kaledupa
Falling off a gangplank when boarding or alighting a boat	L	M	Passengers told to board or alight one person at a time. Passengers instructed not to carry more than they feel comfortable carrying when boarding or alighting via a gangplank.
Seasickness	M	L	Passengers that suffer from motion sickness advised to bring relevant medication.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site

**2012 – KB13 Boat transfers between Ereke and north Buton**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Accident at sea resulting in the vessel sinking or capsizing	L	VH	Opwall staff will check the forecast wind conditions prior to the boat sailing and if the conditions are not suitable will keep the volunteers an extra day in south Buton. All crossings will be done with Opwall staff in attendance and they will ensure that the boat is not overloaded before departure. Operation Wallacea will supply lifejackets and a satellite telephone for all groups crossing and a full briefing will be conducted by the Opwall staff member prior to departure identifying the safety features on the boats.
Passengers suffering sunburn, dehydration or heat-stroke	H	M	Drinking water provided for all journeys. The accompanying Opwall staff member to remind all volunteers to use sunblock and wear hats.
Slipping or falling on deck or falling overboard	L	M	Passengers to be fully briefed on the safe and out-of-bounds areas of the boats. All volunteers to be told to sit down when the boat is in motion and will only move from their seat when the boat has come to a stand still and is docked.
Falling off a gangplank when boarding or alighting a boat	L	M	Passengers told to board or alight one person at a time. Passengers instructed not to carry more than they feel comfortable carrying when boarding or alighting via a gangplank.
Seasickness	M	L	Passengers that suffer from motion sickness advised to bring relevant medication.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site

**FOREST BASED RISK ASSESSMENTS AND MANAGEMENT**

**2011 – LF01 Labundo**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Medical problem for	M	M	Medical staff to be present in Labundo at all times. Medical staff to interview all incoming

volunteer or staff member			volunteers and staff and record on standard medical record forms previous medical conditions and any treatment given on site. Separate First Aid room with bed for unwell patients to be isolated for recovery. Extensive medical supplies are available in the First Aid room.
Need for emergency evacuation	L	H	Vehicle permanently stationed in Labundo and ready for emergency evacuation of volunteers and staff by driving to the hospital in Bau Bau (2 hours). 24 hour radio contact with the Indonesian Co-ordinator and Losari Tours and telephone contact via this office to additional specialist medical advice.
Lack of hygiene increasing risk of disease	M	M	Ensure the kitchen is kept clean and that food categories (e.g. meats, vegetables etc) are prepared separately. Clean all tables with bleach at least once a day. Change the dishwashing bucket water frequently and ensure there are numerous buckets with disinfectant and water around the site for volunteers and staff to wash hands.
Fire	L	H	Ensure there are buckets with sand/water distributed available for all houses being used and that the volunteers know where the exit points are. Ensure that staff are trained in the fire and evacuation to a safe point procedure. No smoking to be allowed in any building
Volunteer becoming lost in the forest	L	H	No volunteer or staff member to leave Labundo without a guide, radio, sufficient water and First Aid kit. All groups leaving camp must sign out on a whiteboard system with details of where they are intending to go and estimated time of return. If the group does not return on time then the Labundo Manager to make contact with the group by radio and if this is not possible to organise a search and rescue team.
Attack from local people	L	H	Staff to patrol the site 24 hours a day.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site.

### 2011 – LF02 Node, Jungle Training camps and north Buton camp

Risk	Likelihood	Severity	Control measures
Volunteers poorly equipped or with a lack of fitness to cope	L	M	Staff to fully brief volunteers prior to the start of the walk to the node camp and check they have the appropriate equipment with them. Staff to watch the new volunteers carefully for signs of exhaustion and to adjust the distances covered according to the fitness levels.

adequately with the forest conditions			
Heavy rain causes river to rise, landslides or tree fall with consequent threat to volunteers and staff	L	H	Experienced expedition camp manager to select the site to minimise risk from flooding, landslides and tree fall. In exceptionally heavy rain conditions the Camp Manager to organise a 24 hour look out system. This is unlikely as camp operates in the dry season.
Medical problem for volunteer or staff member	M	M	Medical staff to be present at the node camps or with jungle training groups at all times. Medical staff to ensure that medical record forms completed in Labundo follow volunteers and staff going to the camp. The medical officer will ensure that there is a medical kit available in the node camps.
Need for emergency evacuation	L	H	A stretcher to be kept at the camp. The Camp Manager to have practised with other camp staff before the camp opens the evacuation of a patient who has to be immobilised and carried out on a stretcher back to Labundo. Radio contact to be maintained with Labundo throughout the evacuation and through them to the Indonesian Co-ordinator and Losari Tours and external additional medical advice throughout the evacuation. A vehicle should be on stand-by at the nearest accessible road.
Lack of hygiene increasing risk of disease	L	M	Ensure at the camp design stage that all river washing is done downstream of the kitchen and that the toilets are sufficiently far from the camp and the river that there is no possibility of effluent contaminating either. Ensure all toilet paper burnt three times daily and that each day soil is added to cover the faeces. Ensure the kitchen is kept clean. Change the dishwashing bucket water frequently and ensure there are numerous buckets with disinfectant and water around the site for volunteers and staff to wash hands.
Fire	L	M	Ensure there are buckets with sand/water distributed around the site. Ensure that staff are trained in the fire and evacuation to a safe point procedure. No smoking to be allowed in any tent.
Volunteer becoming lost in the forest and unable to find the camp	L	H	No volunteer or staff member to leave the camp or trek without a guide, radio, sufficient water and First Aid kit. All groups leaving camp must sign out in a diary with details of where they are intending to go and estimated time of return. If the group does not return on time then the Camp Manager to make contact with the group by radio and if this is not possible to organise a search and rescue team after informing Labundo by radio. Expedition members to be provided with training and SOPs on what to do if they do get lost and how to avoid separations.

			Adequate navigational aids to be used and carried at all times.
Falling down steep slopes or tripping on slippery surfaces	M	H	Regular trails with steep slopes to be fitted with ropes. Handrails to be installed around the river shower and washing area. All river crossings to be done with trained staff leading and where necessary the use of ropes.
Control measures not implemented	L	H	Camp Manager to be responsible for auditing the control measures and camp procedures on a fortnightly basis. These audit reports including details of non compliances and corrective measures to be available for inspection on site.

## 2011 – LF10 Trekking

Risk	Likelihood	Severity	Control measures
A fall resulting in serious bleeding or a bone fracture	L	H	Ensuring that all staff and volunteers have footwear with good grip and ankle support. Ensure volunteers are shown how to walk with stick as an aid when descending and ascending slopes. Ensuring that a Medical Officer with a mobile First Aid kit is available at each camp and can be summoned by radio or a runner if required. Ensuring that an evacuation plan is in position for each location in which the staff and volunteers will be working.
Dehydration	M	H	Ensuring that all staff and volunteers are informed that this is a significant risk and that they drink 3 litres of water per day. Ensuring that all trek members carry sufficient water supplies for the duration of the trek. Ensuring that the Trek Leader stops every 30 minutes for the group to rest and checks for signs of dehydration or exhaustion.
Bites and stings	M	M to VH	Ensuring that all staff and volunteers are informed not to taste or grab hold of any plants whilst trekking. Ensuring that all staff and volunteers are told not to approach any snakes or try to pick them up. Ensuring that the Medical officer is trained in the snake bite procedures. Ensuring that all traps and nets are emptied by experienced Opwall staff and that volunteers are not allowed to handle animals that are not anaesthetised. Ensuring that the Medical Officer carries antihistamines and that treatment is available for anaphylactic shock. In general trekking through the forest at night is not allowed to minimise the risk of accidental encounters with snakes. The only survey work at night will be around

			established camps and wading through rivers for amphibian surveys.
Drowning or being swept away	L	VH	The Trek Leader to lead any river crossings and to judge whether it is safe for the group to cross either separately or in the case of higher flows using ropes.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

### 2011 – LF11 Camp building and maintenance

Risk	Likelihood	Severity	Control measures
Inappropriate site selection and planning	L	H	Ensuring that only the Indonesia Operations Manager is allowed to approve site selection, which has to be free of the risk of flooding, becoming stranded on the far side of a swollen river and with a sufficiently rapid evacuation route available. Sites where radio or telephone contact cannot be maintained with base camps, may not be used. Toilet facilities to be placed at least 30m away from the river and cooking facilities. Waste disposal carried out according to the procedures. Biodegradable waste to be buried to a depth of not more than 0.3m and 30m away from the river and non biodegradable waste to be collected and removed from the forest. Ensure no dead trees in the vicinity of the base camp or any trees that look unstable and may fall on the camp during storm events.
Serious cuts from using a parang	L	H	Volunteers not allowed to use parang. Expedition medical kit maintained in Labundo and at the Node Camps and mobile kits carried with each group leader.
Burns from cooking or fires	L	M	Fuel stored away from fire. Care taken when moving pans of boiling oil or water. No fire left unattended.
Stomach problems from poor sanitation	M	M	Boil all water for at least 10 minutes. Use iodine or chlorine to purify river water Ensure all volunteers and staff adhere to strict personal hygiene.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances

			and corrective measures to be available for inspection on site.
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**2011 – LF12 Snake bite and other interactions with animals**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Anaphylactic shock resulting in death	M	VH	A bite or sting from any toxic animal, even those that would not normally be dangerous, can cause anaphylactic shock. Roughly 10% of the population is considered 'at risk' from anaphylactic shock. As many as one in a hundred cases of anaphylactic shock can result in death in cases where treatment is not administered quickly. On arrival in Labundo volunteers and staff are given a lecture on the dangerous organisms found in the area and are told not to handle or aggravate them. Medical staff are all fully briefed on how to identify anaphylactic shock and how to treat it if necessary. Supplies of adrenaline and oxygen are held in Labundo and the node camps. Although the likelihood of a life threatening anaphylactic shock occurring are very small we consider it to be the most serious risk posed by wildlife in the forest.
Snake bite	L	VH	Ensure that all volunteers and staff in the forest wear long baggy trousers and long sleeved shirts, and boots with ankle support. Ensure no volunteer or staff member approaches any snake unless they are an approved snake handler. Ensure only approved snake handlers are allowed to empty pit fall traps. Ensure that all night time trekking is confined to areas very close to the main camps. If a dangerous snake is seen it should be removed by an experienced snake handler. The two venomous snakes are the Wagler's pit viper ( <i>Tropidolaemus wagleri</i> ) and the king cobra ( <i>Ophiophagus hannah</i> ), and patients must be treated with anti-venom as soon as it is appropriate to do so.
Snake bite treatment	L	H	If bitten the patient should be immobilised and spread of the toxin slowed by bandaging. The main camp should be informed by radio and the patient carried out by stretcher. The Indonesian Co-ordinator and Losari Tours to be informed so they are aware of the patient's arrival so arrangements can be made in Bau Bau. Antivenin for the Wagler's pit viper to be held in the fridge at Bau Bau and the medical officer to travel with the patient to Bau Bau to administer the antivenin under hospital conditions. Anti-venin for the king cobra available at the hospitals – patient to be stabilised and evacuated.

Domestic dog bite	L	M	There are domestic dogs in the villages of Lawele and Labundo. Volunteers are instructed not to approach the dogs. Any volunteer or staff member bitten by a dog to be evacuated to Bau Bau where they will be given booster rabies injections.
Small mammal or bat bite	L	H	Only volunteers and staff who have received rabies injections to be allowed to handle bats and small mammals. Any volunteer or staff member bitten by a bat to be evacuated to Bau Bau where they will be given booster rabies injections.
Bees and ants	M	M	Trek leaders to identify any major hives and ensure trails avoid these areas
Scorpions	L	M	Ensure all volunteers and staff check their shoes before putting them on.
Stinging plants	M	M	Ensure all volunteers and staff are informed not to touch any plants
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 – LF13 Canopy work**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Equipment failure	L	H	Canopy Access Limited staff audit all equipment prior to shipping to country, and inspect each piece prior to initial setup and before assigning equipment to students.

Students poorly equipped to climb trees	L	M	Students are not able to climb until they have completed the training course, and only then under the supervision of the Canopy instructors. Students failing to complete the training course and achieve an acceptable level of proficiency with the equipment as determined by the Canopy instructors will not be allowed to climb.
Climbing line failure	L	H	Lines are only installed by Canopy Access Ltd. staff. Top anchors and lines are inspected weekly by canopy staff. All students climb on two lines, a primary and secondary line, and fall arrest devices are installed, and students taught how to use them, on the secondary line in the unlikely event of a primary line failure.
Panic attack	L	M	All trees are rigged with two complete sets of lines, and an instructor is able to ascend the same tree and assist a student returning to the ground. Canopy Instructors received extensive training in emergency recovery as part of their BCAP, ACAP and ICAP certifications.
Injury while hiking to climbing site	L	M	All students must have a heard torch, in addition to their regular trekking kit, as the canopy access overnight experience will involve a trek in the dark at least one way. Trees rigged for climbing are all along well defined/travelled paths to reduce risk of injury from roots, logs, holes, etc. Canopy Access instructors lead students and have had extensive first aid training and carry a special canopy access field med kit, in addition to a portable radio to communicate with camp and medical personnel.
Animal bite or attack while hiking to climbing site.	L	H	All students must have a heard torch, in addition to their regular trekking kit, as the canopy access overnight experience will involve a trek in the dark at least one way, and to ensure that they are able to avoid any animals that might be on or near the trail. Canopy Access instructors lead students and have had extensive first aid training and carry a special canopy access field med kit, in addition to a portable radio to communicate with camp and medical personnel.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 – LF14     Jungle Training**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
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Volunteers poorly equipped or with a lack of fitness to adequately cope with the forest conditions	L	M	Staff to fully brief volunteers prior to the start of the course and check they have the appropriate equipment with them. Staff to watch the new volunteers carefully for signs of exhaustion and to adjust the distances covered according to the fitness levels.
Heavy rain causes river to rise, landslides or tree fall with consequent threat to volunteers and staff	L	M	Experienced expedition camp manager to select the temporary camps to be used to minimise risk from flooding, landslides and treefall. In exceptionally heavy rain conditions Camp Manager to organise a 24 hour look out system.
Medical problem for volunteer or staff member	M	M	Medical staff to be present on the course at all times.
Need for emergency evacuation	L	H	Radio contact to be maintained with Labundo, so that a stretcher and evacuation can be arranged if required. The team also carry a satellite phone.
Volunteer becoming lost in the forest and unable to find the camp	L	H	No volunteer or staff member to leave the course and trek without a guide, radio, sufficient water and First Aid kit. Expedition members to be provided with training and SOPs on what to do if they do get lost and how to avoid separations. Adequate navigational aids to be used and carried at all times.
Falling down steep slopes or tripping on slippery surfaces	M	M	All river crossings to be done with trained staff leading and where necessary the use of ropes.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 – LF15 Night trekking and survey work**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Not being able to see	L	M	Ensuring all staff and volunteers on night walks have a head torch or hand torch. Ensuring

resulting in a fall			that staff members give a briefing including night-trekking techniques prior to the trek group's departure. Ensure that all safety precautions are taken in line with the control measures for falls and injuries.
Dehydration	L	H	Ensuring that all trek members carry sufficient water supplies for the duration of the trek. Ensuring that the Trek Leader stops every 30 minutes for the group to rest and checks for signs of dehydration or exhaustion.
Bites and stings	L	M	Ensuring that all staff and volunteers are informed not to taste or grab hold of any plants whilst trekking. Ensuring that all staff and volunteers are advised to use their torches to identify any branches or parts of plants which could cause a danger to themselves or others in the trek group. Ensuring that all staff and volunteers are told not to approach any snakes or try to pick them up. Ensuring that the Medical officer is trained in the snake bite procedures. Ensuring that all traps and nets are emptied by experienced Opwall staff and that volunteers are not allowed to handle animals that are not anaesthetised. Ensuring that the Medical Officer carries antihistamines and that treatment is available for anaphylactic shock.
Drowning or being swept away	L	VH	The Trek Leader to lead any river crossings and to judge whether it is safe for the group to cross either separately or in the case of higher flows using ropes. Ensuring that groups keep in close contact with each group member.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

## WAKATOBI BASED RISK ASSESSMENT AND MANAGEMENT

2011 - WT01 Hoga (general)

Risk	Likelihood	Severity	Control measures
Being hit by falling coconuts	M	H	All staff and volunteers are briefed about not sitting under coconut trees anywhere on Hoga Island. All coconut trees are regularly cleared of coconuts of all sizes.
Falling down Coral holes	M	H	Volunteers and staff are briefed on the dangers of coral holes and made aware of their proximity to the main paths and houses. All staff and volunteers told to use torches at night. All staff and volunteers told to keep to the main footpaths. Strict limit on the amounts of alcohol drunk by individuals are enforced.
Falling/Tripping over	M	M	All staff and volunteers instructed to walk sensibly around the site and wear shoes in the surrounding area. All staff and volunteers told to use torches at night. All staff and volunteers told to keep to the main footpaths. Strict limit on the amounts of alcohol drunk by individuals are enforced.
Fire on site	L	H	No Smoking policy observed in all buildings. Flammable materials, especially fuel, to be stored away from other buildings. Stringent electrical checks to be carried out pre-season and spot checks carried out through the season. Fire extinguishers and buckets of sand available in all communal buildings. All staff and volunteers are briefed on the location and use of fire extinguishers. Staff and volunteers are made aware of the fire alarm meeting point (spit on beach near old jetty). Have a sign pointing to the access route to this spit, which avoids the main lodge area in the event of a major fire.
Electric shock	M	VH	Stringent electrical checks to be carried out pre-season and spot checks carried out through the season. Volunteers and staff told to report any potential electrical hazard immediately.
Being bitten by wildlife	L	VH	Ensure that all staff and volunteers are advised to wear shoes and carry a torch at night in order to ensure that they don't tread on wildlife. All staff and volunteers to be advised not to touch or try to pick up/handle snakes or any other wildlife. There are few dangerous land-based animals on Hoga. The only venomous creatures are banded sea krates (see

			WT01.3) and the occasional scorpion. Monitor lizards can give a nasty bite or whip of the tail but this doesn't pose a significant danger, even if they do bite. Staff and volunteers to be advised to knock out shoes before putting them on and check for scorpions.
Injury or danger encountered when walking around the island.	L	M	Ensure that all staff and volunteers are advised of the dangers of coral holes, uneven terrain, exposure to biting insects, weather and reptiles in the centre of the island. Ensure that an experienced local member of staff with a large amount of local knowledge of the area leads the walk and carries a parang and a radio in contact with Hoga Base. Ensure that all staff and volunteers are advised to take a hat, mosquito repellent, adequate food, water, sunscreen and wear sturdy shoes. Ensure that all staff and volunteers are aware of the tidal movements prior to going on the walk. The walk should be undertaken 2 hours either side of low tide at a tide lower than 1.2 metres.
Theft	M	M	Security staff patrol the island 24 hours a day. Volunteers and staff warned to lock their cabins at all times and not to leave valuable items unattended. Secure lockers are provided in the Hoga lodge. It is worth noting that the majority of recorded thefts on Hoga have been perpetrated by other volunteers or staff and not by the local community.
Assault, mugging or other violent crime.	L	H	Security staff patrol the island 24 hours a day. This is highly unlikely as the local community have never shown any aggression towards to any of our volunteers or staff and no such instances have occurred in the past.
Natural disaster	L	VH	In the highly unlikely event of a tsunami warning all volunteers and staff to evacuate to the high ground on mainland Kaledupa.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

2011 - WT02 Hoga (medical)

Risk	Likelihood	Severity	Control measures
Dehydration	H	L to H	Volunteers and staff briefed on the importance of drinking plenty of water. A minimum of 3 litres a day. The way to monitor whether adequate fluid is being taken is to monitor the volume and colour of urine. Anyone suffering for stomach upsets to be instructed to double their water intake and take re-hydration salts. Extreme cases to be evacuated to Bau Bau to be kept in the clinic for observation.
Heat stroke and sunburn	H	L to H	Ensure that all volunteers and staff are aware of the need to drink 3 litres of water a day. The way to monitor whether adequate fluid is being taken is to monitor the volume and colour of urine. All volunteers and staff to be told of significant risk of sunburn particularly when travelling on boats and to wear hats, sit in the shade and use high factor sun block (30+) for the duration of their stay. All volunteers to be made aware of risk of heat stroke through long exposure in the sun before acclimatisation.
Stomach upsets	H	L to H	Ensure all staff and volunteers drink or wash their teeth in filtered water. Water filtration system to be cleaned and filters changed twice a week. Ensure that personal hygiene issues are emphasised in briefings to avoid spread of infectious diseases amongst a group of people living in close proximity. Hoga Operations Manager to regularly check the standard of hygiene in the areas used for cooking foods and reporting back to cooks on improvements required. No food to be reheated or consumed more than 6 hours after cooking. All food to be covered in the kitchen. No cats or other animals allowed in the kitchen or food preparation areas.
Infection of wounds	H	L to M	Ensure all cuts, however insignificant, are cleaned with clean water and betadine /antiseptic is applied. All volunteers and staff to be made aware that there is a greatly increased risk of secondary infections in this climate and with frequent immersion in the sea. Assess daily and if the wound appears to becoming infected then report it to the Medical Officer. Ensure that volunteers and staff are informed that scratched mosquito bites are a common source of secondary infection. Ensure staff and volunteers are informed of the dangers of walking around bare footed and that shoes should be worn when walking from their huts to the lodge and in the surrounding area.
Ear infections	H	L to M	Staff and volunteers to be made aware of greatly increased risk of ear infections with in

			water activities. All staff and volunteers to be advised to wash out ears at the end of each dive with freshwater. All instances of ear problems, however minor, should be reported promptly to the Medical Officer. All students should be made aware of the dangers of diving with ear infections and should stop in-water activities when symptoms first begin and not return until advised by the Medical Officer.
Malaria and Dengue Fever	L	VH	Ensure that all staff and volunteers are told in advance to bring adequate supplies of malaria medication and that they start taking them at least one week before joining the expedition. All staff and volunteers to be informed that anti malaria medication is only partially effective against malaria and totally ineffective against Dengue Fever and that the first line of defence should be to cover up from about 5pm onwards, wear insect repellent and sleep under a mosquito net. Mosquito nets are provided for all volunteers and staff. There is no history of malaria or dengue on Hoga.
Other tropical illnesses	L	VH	All volunteers and staff are advised to see their doctor prior to their departure and make sure that they have all the vaccinations as advised by the doctor. There is no history of any tropical illnesses on Hoga.
Recurrence of previous or existing medical condition leading to illness/death	L	VH	All staff and volunteers are required to complete a pre-expedition medical form and details of significant conditions are passed onto the site medical officer. Medical Officer to interview all volunteers and staff with prior medical conditions to clarify medical information or discuss previously undisclosed conditions. Confidential medical forms maintained by the Medical Officer. Provision to exclude staff or volunteers from specific activities that may pose a risk to their health as a result of their pre-existing medical condition to be included in the Operation Wallacea operating procedures.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site.

2011 - WT03 Hoga (dangerous marine animals)

Risk	Likelihood	Severity	Control measures
Anaphylactic shock resulting in death	M	VH	<p>A bite or sting from any toxic animal, even those that would not normally be dangerous, can cause anaphylactic shock. Roughly 10% of the population is considered 'at risk' from anaphylactic shock. As many as one in a hundred cases of anaphylactic shock can result in death in cases where treatment is not administered quickly. Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms found in the area and are told not to handle or aggravate them.</p> <p>All volunteers and staff are told to wear dive booties when in the water. When large numbers of stinging 'jelly-fish' are in the area all water based activities are stopped. All Staff are fully briefed on how to identify anaphylactic shock and how to treat it if necessary. Supplies of adrenaline and oxygen are carried on all boats and are held at the Hoga medical centre. Although the likelihood of a life threatening anaphylactic shock occurring are very small we consider it to be the most serious risk posed by marine animals.</p>
Being bitten by a Banded Sea Krait	L	VH	<p>Banded Sea Kraits are a general of sea snakes relatively common in the waters around Hoga and are capable of biting humans. They could bite a student whilst diving, snorkelling or walking on paths when the snakes are on land causing death or serious injury. Sea snakes are present in every ocean except the Atlantic. Sea snakes are generally very docile, especially in the water unless they are provoked, however on land, where they generally come to nest, they have been seen to be a lot more aggressive. Fatality rates worldwide currently stand at 3% averaging at 150 deaths a year worldwide. However most bites are 'dry', less than 10% of snake bites inject any venom. Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms present on the island in which the Banded Sea Krait is one. Photographs are included in this presentation, so that students are aware of what they look like and they are also discussed in the mandatory coral reef ecology lectures and pointed out to students if seen on the reef.</p> <p>Laminated instructions of how to deal with a bite are displayed in the lodge, dive shed and medical centre.</p> <p>All volunteers and staff are told to wear dive booties when in the water. Volunteers and staff are instructed not to approach them either on land or in the water and to always wear</p>

			shoes and carry torches when walking around the site at night.
Being bitten by a blue ringed octopus	L	VH	Blue ringed octopus are commonly found within the intertidal zone of Hoga, especially at low tide at night. A blue ringed octopus could bite a student if they handle or aggravate the animal whilst walking in the shallows at low tide causing death or serious injury. They are generally not aggressive but possess a beak on the underside of their body that will bite if disturbed or aggravated, the bite is normally painless. In a serious envenomation case, death is likely within approximately 20 minutes if basic resuscitation is not provided for ventilatory support. Medical management is supportive and the effects normally last 2-5 days. Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms present on the island in which the Blue Ringed Octopus is one. It is made very clear that the bite from this animal can be deadly, especially as we have limited medical facilities on the island. Photographs are included in this presentation, so that students are aware of what they look like and they are also discussed in the mandatory Coral Reef Ecology lectures. Laminated instructions of how to deal with a bite are displayed in the lodge, dive shed and medical centre. Volunteers and staff are told not to walk in the shallows in the day without booties on and are banned from the shallows at night.
Being stung by a cone shell	L	VH	Numerous species of Cone shells are seen on the reef flats here on Hoga in relatively high numbers. They have a barb-like dart within their shell that if fired when aggravated by being picked up or stepped on may cause death or serious injury. There is no specific medical treatment. Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms present on the island in which the Cone Shell is one. Photographs are included in this presentation, so that students are aware of what they look like and they are also discussed in the mandatory coral reef ecology lectures and pointed out to students if seen on the reef. All volunteers and staff are told to wear dive booties when in the water.
Being stung by Physalia 'bluebottle Portuguese Man 'O' War' hydrozoa	L	M	Physalia annually hit the shores of Hoga at least once or twice each season in very large numbers. They may sting students whilst snorkelling, swimming or coming up from a dive that may cause serious pain or result in anaphylactic shock (see above). When physalia are seen in the waters around Hoga all water based activities are stopped.
Being stung by stonefish or other venomous fish	L	VH	Stonefish are present in relatively high numbers on Hoga on the reef flats. Along the back of the fish are 13 spines which if trodden on, penetrate the skin of the victim and envenomate causing serious pain, injury or occasionally death. The likelihood of a sting

			<p>proving fatal is very low. Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms present on the island in which the Stonefish is one. It is made very clear that the bite from this animal can be deadly, especially as we have limited medical facilities on the island. Photographs are included in this presentation, so that students are aware of what they look like and they are also discussed in the mandatory Coral Reef Ecology lectures. Laminated instructions of how to deal with a sting are displayed in the lodge, dive shed and medical centre. Volunteers and staff are told not to walk in the shallows in the day without booties on and are banned from the shallows at night.</p>
Being stung by a stingray	L	VH	<p>Blue spotted stingrays are seen regularly in Hoga waters. They have a bony spine on their tail that contains venom capable of causing severe pain and potentially resulting death if pierced the abdomen or heart.</p> <p>Within hours of each group arriving on the island, all volunteers and staff are given a lecture on the dangerous marine organisms present on the island in which the Stingray is one. It is made very clear that the bite from this animal can be deadly, especially as we have limited medical facilities on the island. Photographs are included in this presentation, so that students are aware of what they look like and they are also discussed in the mandatory Coral Reef Ecology lectures. Laminated instructions of how to deal with a sting are displayed in the lodge, dive shed and medical centre. Volunteers and staff are told not to walk in the shallows in the day without booties on and are banned from the shallows at night. The likelihood a sting proving fatal is incredibly small as a major organ would need to be punctured.</p>
Control measures not implemented	L	H	<p>Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.</p>

2011 - WT04 Kaledupa/Sampela

Risk	Likelihood	Severity	Control measures
Falling/tripping over	M	M	All staff and volunteers instructed to walk sensibly around the site and wear shoes in the surrounding area. All staff and volunteers told to use torches at night. All staff and volunteers told to keep to the main footpaths. Strict limit on the amounts of alcohol drunk by individuals are enforced.
Fire on site	L	H	No Smoking policy observed in all buildings. Flammable materials, especially fuel, to be stored away from other buildings. Stringent electrical checks to be carried out pre-season and spot checks carried out through the season. Fire extinguishers and buckets of sand available in all communal buildings. All staff and volunteers are briefed on the location and use of fire extinguishers. Staff and volunteers are made aware of the fire alarm meeting point (the jetty).
Electrical shock	M	VH	Stringent electrical checks to be carried out pre-season and spot checks carried out through the season. Volunteers and staff told to report any potential electrical hazard immediately.
Theft	M	M	Volunteers and staff warned to lock their cabins at all times and not to leave valuable items unattended. Secure lockers are provided in the Hoga lodge. It is worth noting that the majority of recorded thefts on Hoga have been perpetrated by other volunteers or staff and not by the local community.
Assault, mugging or other violent crime.	L	H	This is highly unlikely as the local community have never shown any aggression towards to any of our volunteers or staff and no such instances have occurred in the past.
RTA whilst driving around the island	M	H	Only experienced, trusted drivers are used. Drivers briefed on safe speeds and driving practice before every journey.
Falling on the walkways in Sampela	M	M	Visitors to Sampela warned of the dangers. Smaller and broken walkways are not to be used.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non compliances and corrective measures to be available for inspection on site

**2011 - WT05    Bintang Sedang live-aboard dive vessel**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Engine failure and being stranded or overturned if the engine failure occurs in high seas	L	H	Bintang Sedang to be in radio contact with Hoga Operations Centre throughout journeys, so that rescues can be organised if required. Fully serviced life raft on board capable of holding 15 passengers in the event of needing to abandon ship. Bintang Sedang must always be within range of the speedboat from Hoga
Being swamped by high seas	L	H	Bintang Sedang to be in contact by radio with the Hoga Operations Centre throughout any trips away from the base. Journeys only to be undertaken if both the captain and the Operation Wallacea staff member on board are in agreement that it is safe to proceed. Fully serviced life raft on board capable of holding 15 passengers in the event of needing to abandon ship. Bintang Sedang must always be within range of the speedboat from Hoga
Becoming lost in poor visibility weather or at night and hitting a reef or drifting off a mooring and colliding with the reef.	L	M	An Operation Wallacea staff member with a GPS charts of the local area and knowledge of navigation to be on board at all times to assist with navigation. An Operation Wallacea staff member with experience of the Wakatobi reefs and the best mooring sites to be on board and involved in the decision over mooring sites.
Explosion or fire on board	L	H	Three dry powder fire extinguishers carried on the Bintang Sedang and staff trained in their use. Ensure that all dive tanks, oxygen tank and compressor on board are serviced before the start of each season. Fully serviced life raft on board capable of holding 15 passengers in the event of needing to abandon ship. First Aid kit on board for the treatment of injuries. Bintang Sedang must always be within range of the speedboat from Hoga.
Losing a diver at sea	L	VH	Ensure all dive boat leaders fully complete the Dive roster prior to each dive with a copy on base before leaving base. Ensure that the tender driver remains in the boat at the area in which the dive is taking place and that each buddy pair is collected before returning to the

			<p>Bintang Sedang. Ensure that all divers have a safety sausage attached to a reel with them for inflation at the end of the dive, this is to be inflated by each buddy pair whilst on the safety stop or throughout the dive if current conditions are strong so that the tender driver can follow the dive leader. Ensure the dive leader assesses the conditions and briefs the divers prior to each dive on how to deal with currents if present and whether to dive as a group or in individual buddy pairs.</p> <p>Advise the tender driver if there are currents and the possible direction that the dive will be taken.</p> <p>Ensure that everybody is back on the tender before returning to the Bintang Sedang.</p>
Climbing into the tender from the Bintang	L	M	The tender should choose the safest part of the boat for students to use. Hand all equipment to the boat crew prior to climbing aboard. Always help each other into and out of the boat
Slipping or falling on the boat	M	M	Decks to be cleaned daily. All passengers given a full safety briefing prior to departure.
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

2011 – WT10 Dive preparation and boats to dive sites

Risk	Likelihood	Severity	Control measures
Tanks falling off dive benches.	L	M	Ensure all staff and volunteers are instructed to lay tanks down onto dive benches at all times when they are not holding the tank.
Pressure gauge relief valve bursting	L	H	Ensure all staff and volunteers make sure that they turn on cylinder valves slowly and face the gauge away from them.
Dropping weight belts on feet.	M	M	Ensure all staff and volunteers are instructed to be careful when carrying weight belts and to lay them down on dive benches whilst kitting up. Ensure all staff and volunteers make sure that weight belt clips are secure.
Falling over whilst getting into & out of dive boat with equipment.	M	H	Make sure that all staff and volunteers hand equipment to boat handlers with care and make sure it is secure in the boat. Staff and volunteers should take care when getting into and out of dive boats in the boat bay to avoid falling or slipping.
Falling out of dive boat whilst going to dive sites.	L	H	Ensure all staff and volunteers are instructed not to wear weight belts on dive boats, and stay seated at all times. Make sure staff and volunteers are instructed to sit evenly on each side of the boat.
Slipping over on dive boat.	L	M	Ensure all staff and volunteers are instructed to move around the boat carefully and holding onto the side when necessary whilst kitting up for the dive. No-one should move around the boat whilst it is in motion.
Hitting head when backwards roll into water at the dive sites or tipping over boat on entry	L	M	Ensure all staff and volunteers are told to check behind them and let the boat leader know that they are going into the water. Ensure the divers enter the water in an agreed order so that the boat is not unbalanced. Ensure divers are aware of the possibility of the boat hitting their head when hanging onto the mooring rope.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

2011 – WT11 Diving

Risk	Likelihood	Severity	Control measures
Decompression sickness	L	VH	Ensure all diving procedures are followed completely. Limit dives to 2 per day, minimum 3 hour surface interval, maximum depth 18m for survey dives, and maximum depth of 30m for pleasure dives – advanced divers or equivalent only. Maximum dive time of 50 minutes with a 5 minute stop at 5m before surfacing. Ensure that the dive procedures are audited every month throughout the season. Ensure that all boats carry oxygen supplies and that there are sufficient oxygen supplies on Hoga to continue treating the patient throughout the period of the evacuation. Ensure that there is a qualified nurse on the island, and qualified staff who can administer oxygen. Ensure evacuation plans are in position for getting the patient to recompression facilities and that all relevant staff are aware of the procedures.
Being hit by boat on surfacing	L	VH	Surface slowly with arm raised and slowly turning to check for risks.
Being left in water at the end of a dive	L	M	Ensure all dive boat leaders operate the boat roster system for each dive. Ensure that the dive safety procedures are audited every month throughout the season. Ensure that all pairs of divers have a SMB with them for inflation at the end of the dive. Ensure that the boat roster is completed every dive.
Becoming separated from buddy	L	M	Ensure that all staff and volunteers are trained in the lost diver procedure.
Being carried away by currents or to greater depths by down currents	L	H	Ensure that risk assessments are completed for each dive site and used by all staff in dive planning. Ensure that the Dive Leader checks the conditions on the day before the group enter the water.
Barotraumas	M	M	All staff and volunteers informed of risk of barotraumas when diving and the safe equalisation procedure, which includes aborting the dive if equalisation is not possible. All staff and volunteers to be informed that they should not dive with an upper respiratory tract infection. All staff and volunteers to be informed of the dangers of using decongestants when diving. Ensure all volunteers and staff are informed of the serious danger of breath holding whilst scuba diving.

Injuries from dangerous marine animals	L	H	Ensure that all staff and volunteers are trained in the identification of all marine species likely to be encountered that can cause injury by having the Dangerous Marine Organisms lecture available on the network throughout the season. Ensure that all divers are instructed never to touch the coral or any organism and do not cause an aggressive response from any marine creature by approaching too closely.
Dive sites not being appropriate for in-water activities	L	VH	Experienced dive staff check each of the confined water dive sites to ensure there is no current, appropriate bottom composition, and a shallow drop-off. Maximum depth is to be less than 3m for confined water dive sites. Each of the Open Water sites is visited pre-season to ensure suitable depth, and that the topography has not been altered in any way that would compromise the safety of the dive site. Each dive site is checked pre season, and pre dive, for dangers such as strong current and dangerous marine organisms, and any site that represents a high risk to Open Water Students is taken off the list of suitable dive sites (and consequently not used). Each site is checked pre-season and pre-dive for its suitability in terms of depth, topography, salient marine organisms, current, etc. Any site that represents a risk to students is taken off the list of suitable dive sites until it can be reviewed by senior dive staff.
Factors increasing risk of accident due to: Alcohol Inexperienced divers Medically unfit divers Non-operation of buddy system	M	H	Ensure that all staff and volunteers are advised to limit drinking alcohol when diving the next day. Staff may tell volunteers not to dive if excessive amounts of alcohol have been consumed the night before. Ensure that all divers, irrespective of qualifications and reported experience are given a check dive by an Operation Wallacea Dive Instructor before joining the survey teams. All staff and volunteers to complete a medical questionnaire and appropriate medical advice sought before the expedition should the answer to any of the questions on the questionnaire be positive. All dive procedures to be followed precisely. All accidents and near misses to be reported immediately to the medical officer who will compile the statistics every two weeks and hold a staff meeting to discuss ways of avoiding further instances of accidents which do occur.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

Risk	Likelihood	Severity	Control measures
Being hit by a boat whilst snorkelling	L	VH	Ensure that all staff and volunteers are told that they must snorkel in pairs and with a Dive Master who drags an inflated SMB with him/her to increase the visibility of the group. Ensure that all staff and volunteers stop snorkelling every couple of minutes to check their location. Local community informed of the areas likely to have snorkellers and told to give a wide berth of marker buoys.
Being swept out to sea by offshore currents	L	M	Ensure that all staff and volunteers are told that if they encounter a strong current to abort the snorkel.
Being stung when wading at the start and end of the snorkel	L	M	Ensure that all snorkellers wear foot protection when wading into the water.
Being stung when swimming or snorkelling	L	M	Ensure that all snorkellers wear a wetsuit or other cover up to protect against stings in the water. Ensure that all staff and volunteers are trained in the identification of dangerous animals such as fire coral, stonefish, scorpion fish etc and instructed never to touch these or any part of the reef.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 - WT13      Operating compressors and various plant equipment**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Compressor start up/shut down: Incorrect sequence	L	H	Only staff members trained to correctly operate compressors allowed in the Engineering shed. All staff and volunteers to be informed that this area is OUT OF BOUNDS
Loading and unloading tanks onto charging bay: possibility of back injuries.	L	M	Ensure correct lifting techniques are demonstrated to all staff trained to use compressors.
Venting of filter bank could cause hearing damage	L	M	Ear defenders to be used by all staff during venting of filter.
Air contamination through a faulty compressor.	L	H	Ensure all compressor maintenance is carried out by the Authorised Staff Only Ensure that air quality from the compressors is tested before the start of the season and the results of these tests filed on site.
Incorrect storage of oxygen could lead to explosion	L	VH	Ensure the use of non flammable lubricants. Ensure that the cylinders are secure and not at risk of falling. Ensure that a strict no smoking policy is enforced in the vicinity of all the oxygen facilities. Ensure that no untrained personnel are involved with the storage or administration of oxygen.
Explosion when filling dive bottles	L	VH	Ensure that all dive bottles used are serviced before the start of the season.
Fire from handling of fuel	L	VH	Ensure that a strict NO SMOKING policy is adhered to in the vicinity of the fuel storage area. Ensure that the fuel store is locked and secure.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 - WT14      Emergency treatment and evacuation**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Insufficient communication facilities	L	H	A cell phone booster is installed on the island and this forms the main line of communication. Failing this there is a satellite phone on the island at all times. Radio contact is maintained between Kaledupa, the dive boats and the Bintang Sedang. Should these lines of communication fail there is always a speed boat on standby that can get to Wanci in 30 minutes.
Injury or illness requiring treatment on Hoga	M	M	A qualified Medical Officer will be based on Hoga at all times during the expeditions. There is a clinic on Hoga that can treat most minor complaints and provide life support whilst more seriously injured patients are transported to hospital facilities. A 24 hour emergency telephone line with English speaking doctors is available through the insurance bought by Operation Wallacea volunteers and this number can be contacted by the cell phones.
Diver with decompression sickness requiring a recompression chamber	L	VH	The nearest re-compression chamber is in Wanci; under 1 hours travel from the dive sites in Hoga. Operation Wallacea operates to very strict safety procedures. Limit dives to 2 per day, minimum 3 hour surface interval, maximum depth 18m for survey dives, and maximum depth of 30m for pleasure dives – advanced divers or equivalent only. Maximum dive time of 50 minutes with a 5 minute stop at 5m before surfacing. Ensure that the dive procedures are audited every month throughout the season. Ensure that all boats carry oxygen supplies and that there are sufficient oxygen supplies on Hoga to continue treating the patient throughout the period of the evacuation. Ensure that there is a qualified nurse on the island, and qualified staff who can administer oxygen. Ensure evacuation plans are in position for getting the patient to recompression facilities and that all relevant staff are aware of the procedures.
Injury or illness - treatment in Bau Bau	L	M	Any non-life threatening illnesses can be taken to Bau Bau for consultation and treatment.
Urgent injury or illness requiring evacuation	L	VH	Detailed evacuation plans have been prepared – see medical and evacuation report
Control measures not implemented	L	H	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.

**2011 - WT15 Mangroves and intertidal**

<b>Risk</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Control measures</b>
Being bitten or stung by a dangerous marine animal or tripping over	M	M to VH	In the muddy waters of the mangroves it is often impossible to see where you are standing. All volunteers and staff working in the mangroves to be given a special briefing to ensure that they wear sturdy walking boots and walk with a shuffling motion. All volunteers and staff working in the inter-tidal zone must wear dive booties or shoes.
Accidents with a parang	M	M	Only staff are allowed to use parangs. These staff will receive full training prior to being allowed to use parangs.
Tree sap causing temporary or permanent blindness	M	H	Only staff are allowed to use parangs. These staff will receive full training prior to being allowed to use parangs. Dangerous trees to be identified and avoided.
Being trapped by rising tides	M	M	All work in the mangroves and intertidal zone to be carefully planned around the tides.
Becoming lost or separated from the group.	M	M	All groups working in the mangroves are to be accompanied by an experienced guide. All volunteers and staff working in the mangroves and briefed on the need to stay together prior to every trip. All volunteers and staff working on the mangroves must return to the mainland before 5pm. Volunteers and staff working in the intertidal zone must follow the 'Dan Tag' system.
Control measures not implemented	L	M	Local Opwall coordinator to be responsible for auditing the control measures on a regular basis (see relevant audit form). These audit reports including details of non-compliances and corrective measures to be available for inspection on site.