EMR Volunteer Training Modules

Version 1

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Glossary:

AED	Automated external defibrillator
Benthic	Seafloor, the bottom of the ocean
CPR	Cardiopulmonary resuscitation
DRSABCD	Danger, Responsiveness, Signal for help, Airways, Breathing, Circulation, Defibrillator
EEZ	Exclusive Economic Zone
EMR	Experiencing Marine Reserves
EMS	Experiencing Marine Sanctuaries
MTSCT	Mountains to Sea Conservation Trust
SAFE	Safety Assessment and Follow-up Evaluation.
WBC	Whitebait Connection

Te Reo Māori Dictionary

Kaitiaki	Guardians
Kaitiakitanga	Guardianship, stewardship
Kaupapa	A kaupapa is a set of values, principles and plans which people have agreed on as a foundation for their actions.
Manaakitanga	Showing respect, generosity and care for others.
Mataitai	Customary seafood gathering site, shellfish bed. They recognise and provide for traditional fishing through local management. They are areas closed to commercial fishing that may have bylaws affecting recreational and customary fishing
Rāhui	Rāhui is a restriction that sets aside an area and bans the harvesting of resources
Taiao	Environment
Taiāpure	local fisheries of special significance, that may have additional fishing rules
Tāmure	Snapper
Te Kura Moana	The school of the Ocean - Experiencing Marine Reserves
Te moana	Ocean

Whakamana te maunga

Whakamana te wai

He mauri o ngā tangata

Ngā mea katoa he pai

Haumi e

Hui e

Taiki e !!

If we look after the water from the mountains to the sea, it will look after us.
It is our life force.

Module 1: Introduction to MTSCT and EMR

Welcome to Experiencing Marine Reserves (EMR)! We are excited to have you on board as a volunteer! This module will introduce you to the EMR programme and the Mountains to Sea Conservation Trust (MTSCT). As a volunteer, you are an essential part of our programme and help us to raise awareness, understanding and support for marine conservation throughout Aotearoa through dynamic experiential education opportunities.

Figure 1. EMR volunteer Carla with a group of participants at our Takapuna snorkel day

Who are we?

The Northland-based MTSCT was established in Northland in 2002 as a charitable umbrella and support organisation for the EMR marine education and Whitebait Connection (WBC) freshwater education programmes. This trust was established to fill a needed gap in the education system to educate young people about marine conservation. EMR has expanded over the years and is no longer limited to Northland. Our EMR and WBC programmes are run throughout Aotearoa from Northland to Otago with each region delivering their programmes independently as MTSCT accredited providers. The information provided in this training module is primarily focused on the Northland and Auckland region's style of delivery and may

vary by your region. We also have a sister organisation in Australia known as 'Experiencing Marine Sanctuaries' (EMS) which delivers the MTSCT programme with an Australian focus.

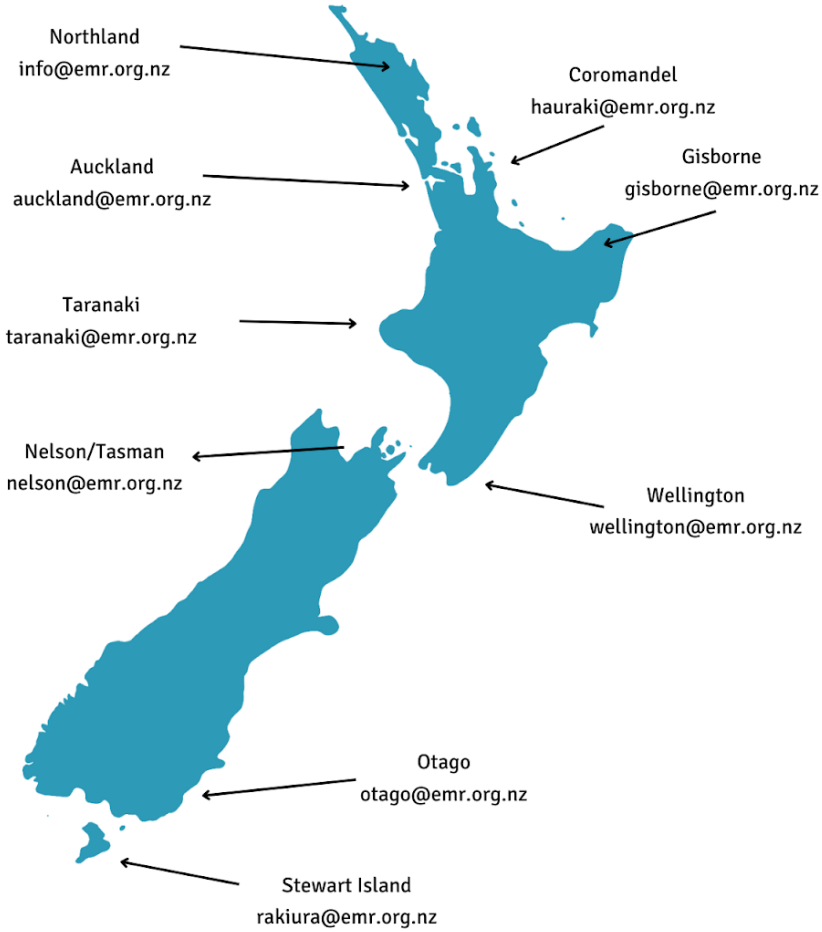

Figure 2.Map of New Zealand and the EMR regions and contact details.

What do we do?

Through the EMR and WBC programmes, we engage with schools and communities by providing hands-on experience in marine and freshwater environments. Through meaningful experiences, we hope to inspire, empower and support Kaitiakitanga, and conservation action. For primary to secondary school students, we provide the Mountains to Sea (MTS) programme. Through in-class and pool learning sessions to local investigations and excursions to marine reserves, we aim to raise awareness, understanding and support for conservation through experiential education opportunities. We provide snorkel equipment, instruction, resources, and risk management, enabling students to engage with the marine environment fully. Due to

the seasonal nature of the programme, the MTS programme is usually offered in terms 1 and 4 when the weather is warmer and more suitable for snorkelling.

Figure 3. Koha briefs a group of students before their Goat Island snorkel adventure.

The school programme aims to:

- Introduce students to marine and freshwater biodiversity
- Facilitate investigations of local marine and/or freshwater areas
- Marine reserve experience (by snorkel)
- Comparisons between local and fully protected areas
- Support kaitiaki action projects for their local environment

Alongside school delivery, we also run community events! From snorkelling, kayaking and paddleboarding to guided walks and 'spotlighting' stream searches, we provide a wide range of hands-on opportunities for the public to engage with conservation issues in both the marine and freshwater environment. These experiences on and around the water inspire participants to engage with local conservation efforts and become kaitiaki of their local areas. We bring together western science and mātauranga Māori concepts for delivery and run events at various protected areas, such as rahui, mataitai and Taiapure. These protected areas act as 'wet libraries', providing real-life examples of the impacts of environmental issues and the benefits of protection.

Core values:

- Communicate with and work alongside manawhenua/moana in the rohe we work in
- Ensure our programme follows tikanga, is delivered authentically, and incorporates Mātauranga Māori and Te Ao Māori.
- All snorkelling in accordance with EMR SOP, MTSCT SMP and adventure activity safety audit standard (certification AAO 534).

Our kaupapa:

- No take - All school, group and community events and field trips are no-take (no matter where we are!), unless cultural or scientific aspects to the kaupapa on the day. We see marine reserves as rich educational tools and often refer to them as 'wet libraries'. Our no-take kaupapa also creates a safer snorkelling experience for participants and adopts the concept of manaakitanga (showing respect, generosity and care for others)
- Look and learn at all times - When running field trips and events we encourage participants to look around them and enjoy the incredible variety of species which exist within protected areas and compare it to their experiences in non-protected areas.

Your role as a volunteer:

As a volunteer, you can help us provide safe and supervised experiences for school and community groups and the public, enabling participants to experience our beautiful marine and freshwater environments first-hand.

Figure 4. EMR Volunteer Olivia debriefs a group before snorkelling

Module 2: Introduction to Marine Conservation

The marine environment refers to living and non-living things found in, on and around the ocean, te moana. Te moana is deeply embedded in New Zealand's culture, identity and history; as an island nation, approximately 65% of New Zealanders live within 5km of the sea. Despite this, many kiwis don't know how to swim - nearly three in ten New Zealanders can't swim or float in the ocean for more than a few minutes. Ocean currents and diverse undersea landscapes within our waters allow diverse communities to flourish, with marine biodiversity accounting for 30% of Aotearoa, New Zealand's biodiversity (Gordon et al., 2010).

New Zealand is an ocean nation whose marine environment is managed in various ways. The territorial sea (shore - 12 nautical miles) is part of NZ's sovereign territory, and the government has the power to govern the area as they do land. From the edge of the territorial sea to the 200 nautical mile mark is the exclusive economic zone (EEZ).

NZ has one of the world's largest exclusive economic zones (EEZ), covering a range of ecosystems from the subtropical Kermadec Islands to the sub-Antarctic Islands. The EEZ of a country extends 12-200 nautical miles (22-370km) from the coast, with New Zealand's EEZ being 15x more extensive than our land area. While the EEZ is not part of NZ's territory, it has full rights to exploring, exploiting, conserving, and managing all of the area's living and non-living natural resources. However, it cannot establish marine reserves in the Exclusive Economic Zone; as such, all reserves are within the territorial sea, from the shoreline to the 12 nautical miles (22km) limit.

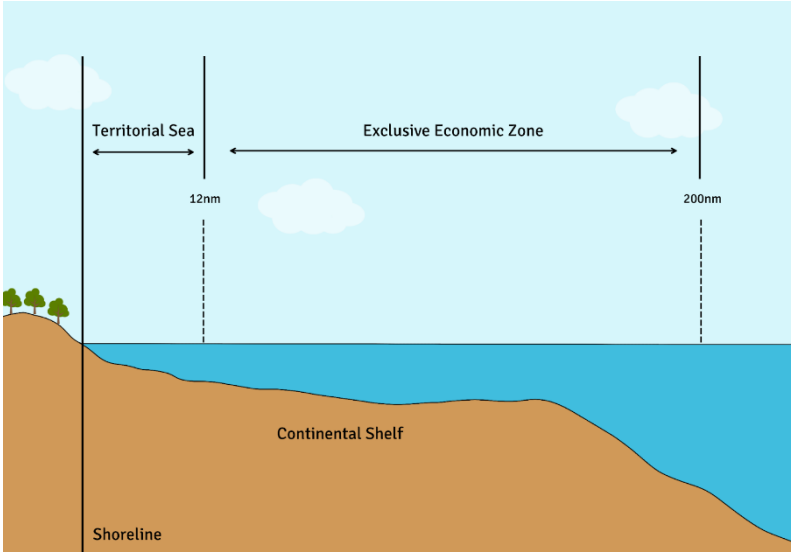

Figure 5. Diagram of the nautical boundaries of the territorial sea (12nm) and exclusive economic zone (12-200nm).

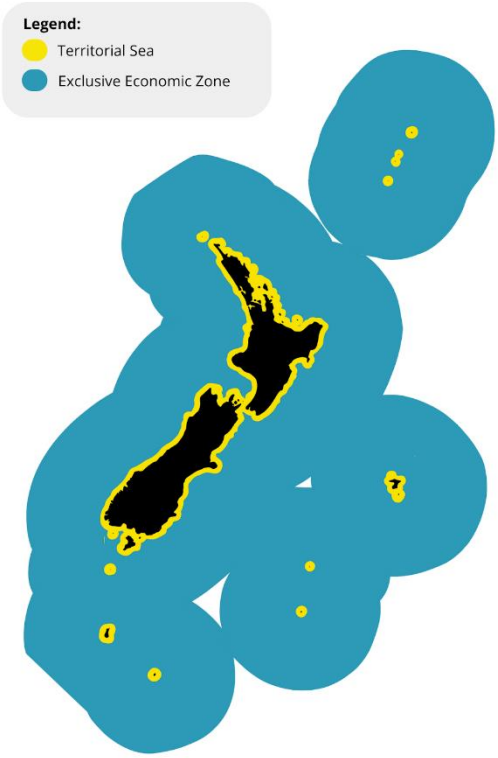

Figure 6. Map of New Zealand and its territorial sea (shoreline - 12nnm, orange) and exclusive economic zone (blue, 12nm-200nm).

Unfortunately, much of New Zealand's marine environments are affected by human activities, with overfishing, pollution and sedimentation just a few of the many issues threatening te moana. These issues are most prevalent in in- and nearshore areas, with our growing population, commercial and recreational fishing, and coastal development increasing the pressures on our marine environment.

Our taiao - the environment is changing. Many coastal areas around Aotearoa are becoming increasingly degraded and reshaped by human activities, with overfishing creating top-down and bottom-up shifts in ecosystem processes driving further environmental loss. Many of these changes have been rapid and unidirectional; action is needed to help protect our oceans and reverse the effects of past actions.

For example, there have been top-down shifts in fish stocks, with commercial and recreational fishers taking more fish than is sustainable. The loss of large predators is reflected in changes in the environment. The loss of tāmure - snapper and kōura - crayfish, in particular, has been a massive driver of the loss of kelp forests throughout the northeast coast of New Zealand. The loss of these top predators - or keystone species - has led to an uncontrolled increase in kina - sea urchin populations. These grazers are one of the main herbivores in our coastal marine environment and when left unchecked, graze through seaweed and kelp, leaving behind a bare or low productivity area. A kina barren. The loss of these kelp forests leads to a subsequent decline in other rocky reef dwelling species and a significant loss of biodiversity, an ecological desert.

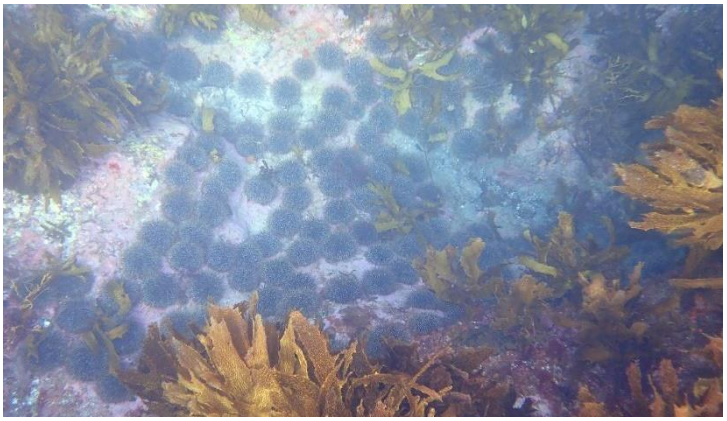

Figure 7. Kina barren

Kelp forests can only regenerate when predator abundance increases, and the predator-prey balance is restored. Whilst slow, predator recovery is achievable through management of the marine environment - particularly marine reserve establishment. These predatory fish significantly influence an ecosystem's ecology, and their removal has flow-on effects on ecosystem processes. By protecting certain size classes (minimum size limits) and putting the 'big ones back,' we can further protect these ocean predators. Many studies have highlighted that bigger fish are better breeders, producing disproportionately more eggs than smaller fish and often spawning more frequently. These big breeders produce larger, better-quality eggs with better-surviving offspring than smaller fishes. The establishment of marine reserves can protect fish within the reserve's boundaries and act as seed stock - helping to support the recovery of animals outside the boundaries.

Figure 8. Snapper circle snorkellers at Goat Island Marine Reserve.

A range of measures are in place to manage Aotearoa's marine environments; these include seasonal and regional closures of fisheries, cable protection zones, customary areas (mataitai, taiapure and rahui) and marine reserves. Each measure offers various levels of protection to our marine environment, with no-take reserves providing the greatest level of protection to both living and non-living aspects of the environment.

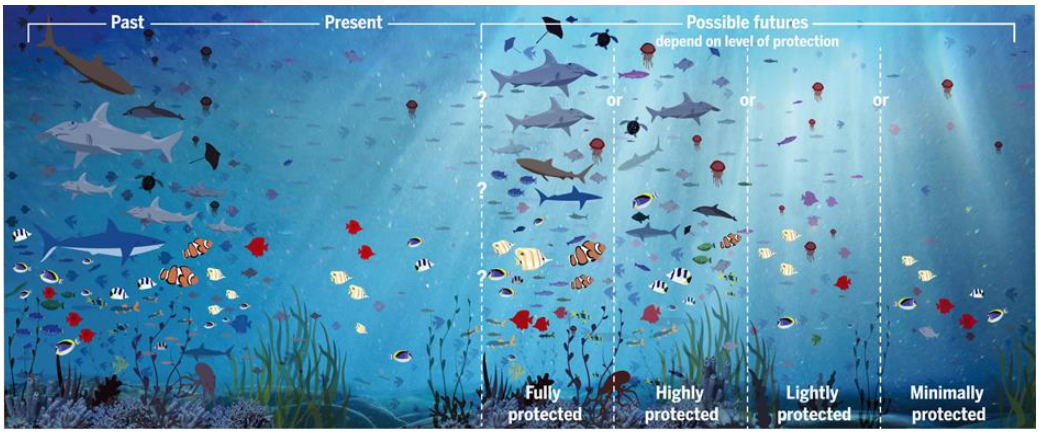

Figure 9. Comparisons of past and present biodiversity and recovery at different levels of protection. Image source: Grorud-Colvert et al., 2021

Types of marine reserves:

Marine protected areas: Marine protected areas (MPAs) help ensure our marine environment remains free from alterations and human impacts; it limits impacts through restricting the use of the area. MPA's are not all the same, they range from full to minimal protection and have variable outcomes dependent on the level of protection from threats. In New Zealand, MPAs are completely protected from the surface to the seafloor and are strictly no take - including shells, rocks and sand. Activities that do not harm marine life are still permitted in marine reserves - including swimming, snorkelling, boating, and diving.

Marine reserves are established as conservation tools, helping to conserve existing biodiversity and allowing ecosystems to return to a more natural state. The return and recovery of fishes to MPAs also supports the recovery of benthic (seafloor) communities, with kina barrens experiencing phase shifts, with predators helping to control kina numbers and allow kelp to regrow.

Goat Island Marine Reserve is one such example where the establishment of the reserve has allowed predators to thrive, kina to decline, and kelp forests to return to a healthy state. Despite the benefits of closing off an area to fisheries, a number of principles must be followed to ensure our marine environment is best protected.

- Marine reserves must be **representative** of all habitat types. They need to cover a range of habitats to protect the diverse range of marine ecosystems and the biodiversity within them.
- Likewise, they need to be **replicated**. There is value in having the same habitat protected multiple times in different areas and not putting 'all your eggs in one basket'.
- Marine reserves should also be sensibly spaced and designed to facilitate **connectivity**. Marine reserves are not fenced or physically bounded, meaning the animals within them can move around; this spillover out of marine reserves makes animals vulnerable to fishing efforts.
- Marine reserves should be suitably **sized.** Smaller marine reserves are vulnerable to edge effects whereby animals move out of the reserve and are caught by fisheries. Larger marine reserves not only have lesser edge effects but also provide a much-needed sanctuary for a variety of marine life.

For more information on New Zealand's marine reserves, check out the links below:

- https://www.doc.govt.nz/nature/habitats/marine/type-1-marine-protected-areas-marine-reserves/
- https://www.doc.govt.nz/nature/habitats/marine/marine-reserves-a-z/
- https://www.environmentguide.org.nz/issues/marine/marine-protected-areas/mechanisms-to-protect-marine-areas/

Figure 10. Students at Goat Island Marine Reserve before their snorkel excursion.

Rāhui: Rāhui are a customary management tool used to restrict access to an area to protect through prohibition. In the context of marine protection, it restricts the harvesting of kaimoana (seafood) from a particular area to allow nature to restore itself naturally.

While there is some overlap, rahui and MPAs differ in their approach and purpose. MPAs are permanent closures to fishing to protect marine environments in the long term. Rahui, however, are temporary closures which assist with the temporary closure of a marine area to help replenish kaimoana stocks so they can be harvested in the future.

Area Management Tools (AMTs):

Taiāpure, mātaitai, and temporary closures are the main Area Management Tools (AMTs) available to Tangata Whenua to help them sustainably manage traditional customary fishing grounds. These tools recognise traditional Mäori fishing grounds that are important for customary food gathering. They also allow local Tangata Whenua to advise the Minister of Fisheries directly on how best to manage fishing in the local area. These reserves recognise the connection between tangata whenua and te moana and allow them to manage important traditional fishing grounds more effectively.

Mātaitai: Mātaitai reserves are areas closed to commercial fishing that may have bylaws affecting recreational and customary fishing. These reserves allow customary fishing and recreational fishing without needing a permit. In practice, they are a right of fisheries management and apply only to NZ Fisheries waters - not to land. They are one expression of the rights to management of fisheries guaranteed in the Treaty. Some mātaitai reserves have bylaws that tangata kaitiaki/tiaki (guardians) use to manage non-commercial fishing. Bylaws apply to all people fishing in a mātaitai reserve.

Taiāpure: Taiāpure are management tools used to manage fisheries and are often managed in collaboration with commercial and recreational fishing stakeholders. They are established to ensure access to abundant and safe kai moana.

To learn more about Area Management Tools and other types of marine protection check out the links below:

- https://www.mahingakai.org.nz/resources/what-are-amts/
- https://www.mpi.govt.nz/fishing-aquaculture/maori-customary-fishing/managing-customary-fisheries/
- https://www.doc.govt.nz/nature/habitats/marine/other-marine-protection/

Module 3: Essential Ocean Knowledge

We are excited to have you onboard as a volunteer and want to equip you with essential ocean knowledge to help you understand the things we need to consider and hope to teach participants about when in the marine environment. Whether we are kayaking in a sheltered bay or exploring offshore islands, these fundamentals will help you to stay safe while in, on and around te moana.

EMR uses a range of snorkel sites including local unprotected marine areas and marine reserves around New Zealand. Snorkelling in the open water environment involves the dangers of changing weather, surface conditions, currents and tides. On all EMR events, the EMR coordinator will establish safe operational parameters and boundaries for environmental conditions for each site and communicate these with you.

Part 1: Ocean tides

Many of our events are dependent on tides, with tide times determining the distance to access site, depth of water etc. Many events are run at or near high tide to ensure that there is the greatest amount of water available to paddle on, or the greatest area possible to snorkel in. Some locations also have better visibility or access at certain tides or between tides.

Tides are the rising and falling of the sea, usually twice in a lunar day due to the gravitational pull of the moon and sun. These gravitational forces cause the ocean to 'squeeze' and produce two tidal bulges, one on the side facing the moon, and one away from the moon.

Flood tide Change from low to high tide

Ebb tide Change from high to low tide

The difference in ocean height between high and low tide (tidal range) varies by location and lunar cycle. The biggest tides are during 'spring tides' in which the sun and moon are aligned with the earth and their forces combine to pull the water in the same direction, creating a larger tide than usual.

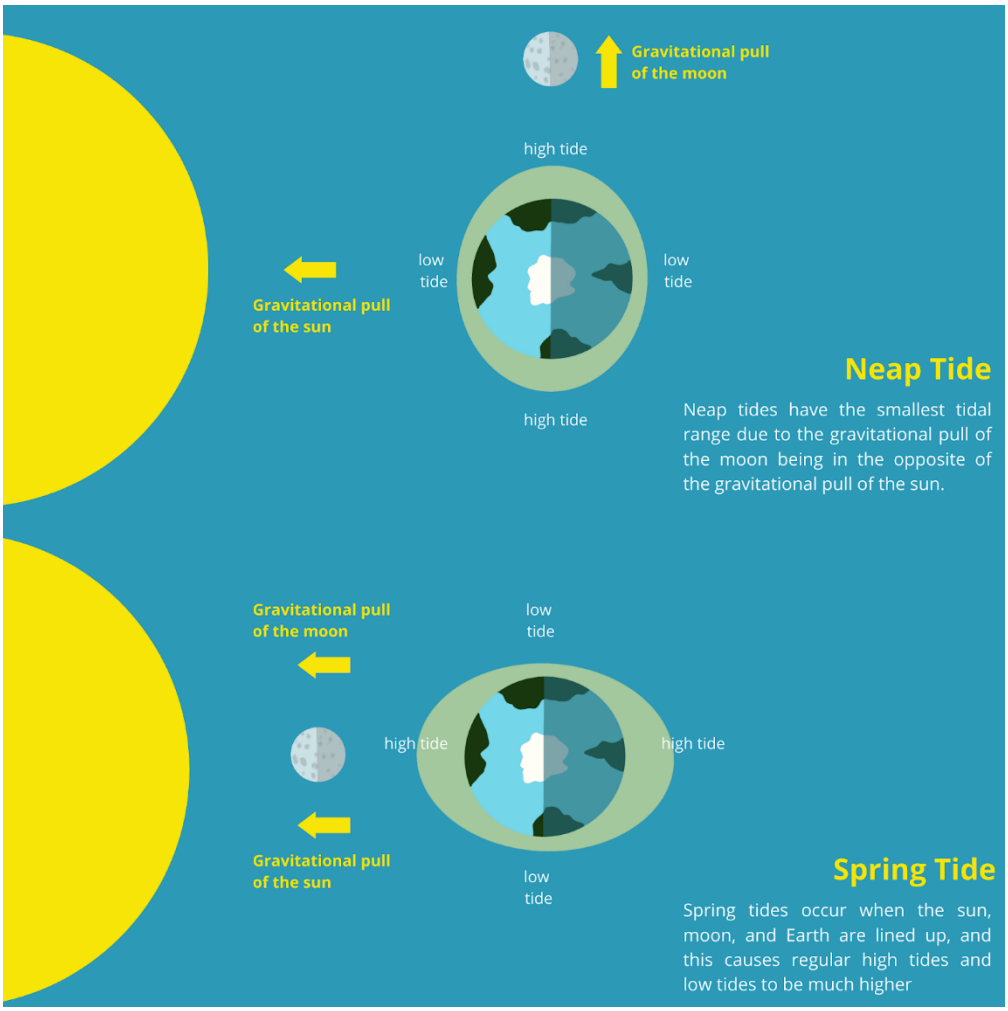

Figure 11. Neap and Spring tides diagram

Part 2: Currents

The ocean's currents are continuous and directional movements of seawater generated by a range of forces including wind, the coriolis effect (spinning of the earth), depth contours, shoreline configurations, ocean and air temperature and water salinity. Ocean currents act as a great conveyor belt, mixing nutrients, moving warm and cold water around, and delivering nutrients through the upwelling of cold nutrient rich waters from the depths of the ocean.

Ocean currents are largely driven by wind and thermohaline (temperature) forces. Wind drives major surface ocean currents, with the spinning of the earth driving the water to travel at an angle to the wind, developing spirals. These ocean currents also vary by season.

Deeper ocean currents however are driven by temperature gradients, with vertical movements known as upwelling and downwelling. On their journey, these waters bring both matter (solids,

substances, and gases) and energy (heat) around the globe. This great conveyor belt moves nutrients around the globe, creating hotspots of life and feeding frenzies.

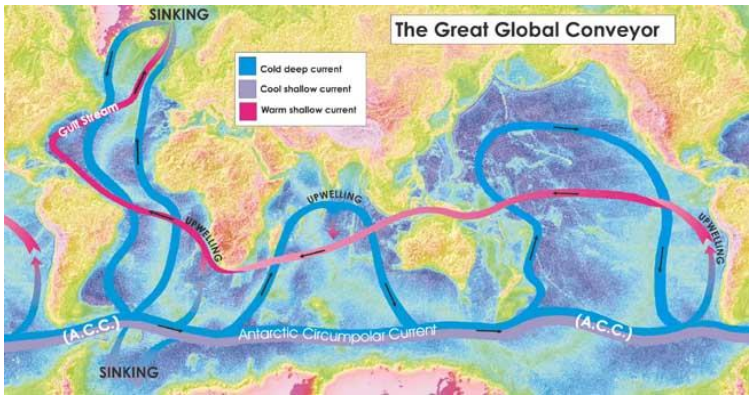

Figure 12. Great ocean currents and global conveyor belt (source: NIWA)

A great example of these currents is the east Australian current which you may remember from finding nemo! This current brings warm water down from the equator across the east coast of Australia. This current also has an offshoot called the east Auckland current which brings warm water down the east coast of the north island. This current also brings seasonal visitors including whale sharks, turtles, and tropical fish! You can check out some of these critters and find out more about our unusual visitors at Whats that Fish NZ.

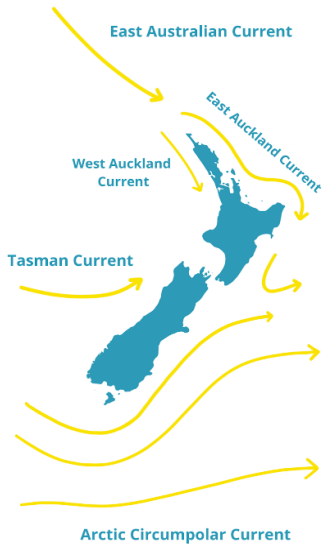

Figure 13. Ocean Currents of New Zealand

Part 3: Waves

Before every ocean event, we carefully look at the ocean conditions, evaluating the size of waves, surge, ocean currents and wind. Waves form because of two factors: the interactions between water and wind, and the interaction between water and land. Waves are largely driven by wind, with energy passing through water causing it to move in a circular motion. Wind driven, or surface waves, are created by the friction between wind and surface water, with continual disturbance creating a wave crest. These waves are found in the open ocean

and along the coast, and even in lakes where there is sufficient fetch (length of water) for the waves to form.

Waves and surge can be potentially dangerous to participants doing water activities. As such, events will not be run in high wind conditions or when there are strong waves and swell.

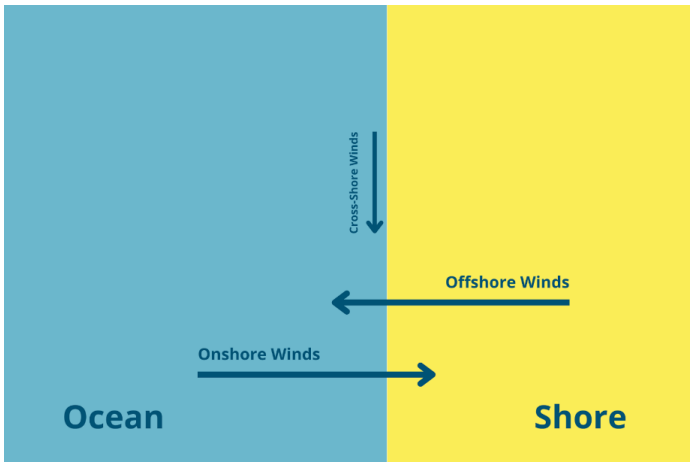

Figure 14. Onshore vs Offshore Winds

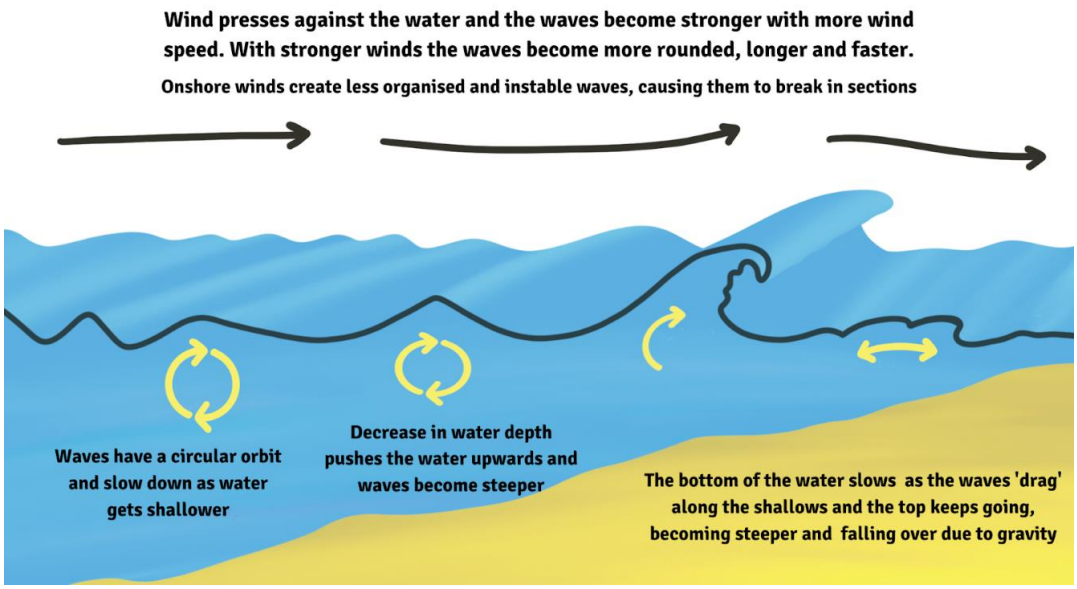

Figure 15. Wave formation diagram

Severe weather, strong winds and atmospheric pressure may also drive the formation of potentially hazardous waves. These waves are generated further from shore in deeper water and intensify as they get closer to shore.

Storm surges are the abnormal rise in sea water level during a storm, above the normal predicted tides. Storm surges are potentially dangerous as they bring water further inland causing flooding, destruction and blocking off travel routes. Storm surges pose significant drowning threats due to unpredictable ocean conditions. Even if the water looks clean, it may also contain bacteria, pathogens, and chemicals capable of making people very sick - as such it is a good idea to wait several days before swimming after heavy rainfall and storms.

Waves can also be formed from underwater disturbances such as earthquakes, landslides, and volcanic eruptions - the biggest of which being tsunamis. These waves are very long waves, and if you see the water suddenly rapidly and unexpectedly receding, this is a key indication that a tsunami may be coming. Approaching tsunamis are usually predictable and civil defence will send out warnings where possible. One of the signs of a potential tsunami however is the occurrence of a large earthquake - if it's long, get gone. Evacuate the water and move to higher ground.

Part 4: Temperature

Keeping warm is essential whether you're swimming in the tropics or in the polar regions. There are many ways to keep warm while in and on the water and your choice of exposure equipment influences how comfortable you will be in the water. Feeling cold can be subjective and vary from person to person - while you may be toasty warm, someone else may be cold! Water conducts heat faster than air so you will get colder faster in water than air. In New

Zealand water temperature varies by region and as such different exposure protections are needed to stay warm while in and on the water.

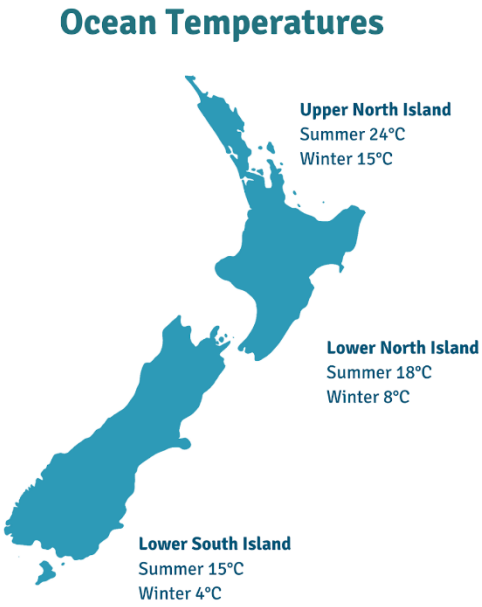

Figure 16. New Zealand summer and winter ocean temperatures

Staying warm is important when in the water - when you're cold your blood vessels constrict, and blood flow is slower, and you are at risk of hypothermia - when your body temperature drops below a safe level. Hypothermic people may feel confused, be shivering, drowsy and have hypertension, muscle coordination drops, and fingers, lips and ears can become blue. In severe hypothermia there can be critical failures of the heart and circulatory system.
Since 90% of body heat is lost through the skin, wetsuits and exposure protection can help you maintain your body temperature and stay comfortable in the water. All participants are offered wetsuits on EMR snorkelling events and may be offered hoods and gloves for additional exposure protection in cooler weather.

Wetsuits are made of a type of rubber called neoprene - neoprene traps a thin layer of water between the wearer's skin and the neoprene so the wearer is always 'wet'. A well fitted wetsuit will keep the wearer warm as their body heat will warm the thin layer of trapped water and keep most of the water out. Because of this - it is important to not pee in your wetsuit else you will be swimming in a warm layer of your own pee and inevitably cause the wetsuit to be stinky

for the next wearer. It is also important that a wetsuit fits like a second skin and is not loose or baggy.

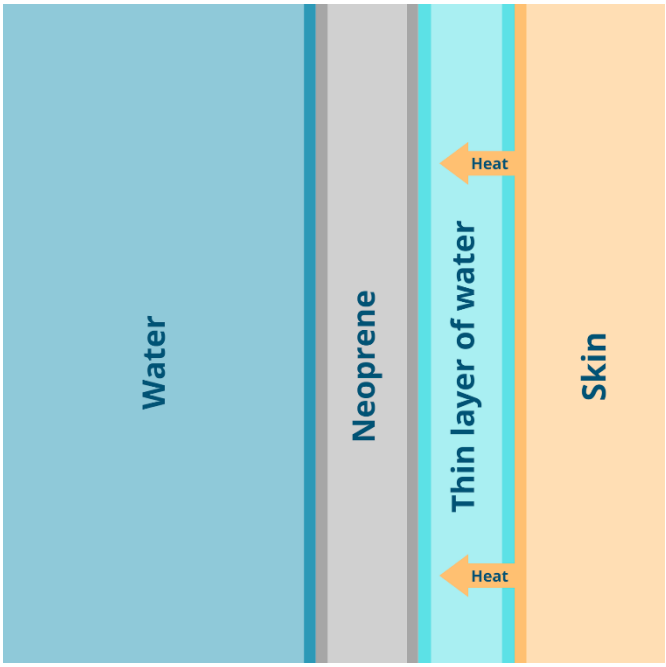

Figure 17. Diagram of how wetsuits work to insulate the wearer.

Neoprene also acts as an insulator and the thicker the neoprene - the warmer the wearer will be. In the Auckland region wetsuits are 3mm thick whereas other regions will have thicker neoprene due to cooler water temperatures. Regardless of thickness - they won't keep you warm if they don't fit correctly. If water is flushing through your suit it will reduce your overall body temperature.

Part 5: Visibility

Visibility is generally considered to be the distance at which an object underwater can be readily identified - such as how far you can see straight ahead and how far you can see looking up or down. Visibility can be reduced by anything that blocks, scatters, or dims the light. Particles in the water can reduce visibility and can be slight or severe depending on the density, type and number of suspended particles.

Rain: Rain can create runoff which brings sediment (including mud, sand, clay and dirt), pollution and other contaminants off the streets and into the water. This is particularly seen in near-urban areas.

Particles in the water: Currents, wave action, choppy seas and rough weather can disturb the seafloor, bringing up settled sediment suspended in the water column and reducing the distance we can see. Likewise, people in the water can stir up the sediment by touching the bottom with their fins or hands.

Algae blooms: Algae blooms happen when there is an influx of nutrients, either natural or human driven - which causes naturally occurring algae to reproduce and bloom into large numbers, reducing the water's visibility and often causing it to change to a murky green colour. These clouds of algae extend from the surface through the water column and may limit snorkelling altogether.

In the Auckland region, visibility is particularly poor in urban areas and is dependent on rainfall, wave activity and tides.

Part 6: Hazardous Aquatic Wildlife

In New Zealand we are lucky to not have to worry about poisonous and venomous animals in our outdoors! However, there are hazardous aquatic wildlife to look out for.

Rays: New Zealand has 26 species of rays and skates which are wide, flat fish belonging to the same family as sharks. While rays and skates are similar, skates are usually not as large or as venomous. While rays are not aggressive animals, if attacked or accidentally stood on they can inflict painful and serious wounds with their stinging barb.

Stingrays and eagle rays have sharp, serrated spines which they can use to protect themselves when they are threatened - such as when stood on or attacked. Stingrays and eagle rays differ in their stinging risk. Both long, and short-tailed stingrays have their spine at the base of their tail, using their tail like a scorpion to thrust the barb into whatever is threatening them. Long tailed rays have a greater range of motion, whereas short-tailed rays typically can only reach to the front of their faces (one body length). Eagle rays also possess a sharp spine, however, it is at the base of their body, so they cannot swing their barb around easily.

These spines are covered with backwards facing barbs, which means that like an arrow it can go in easily but cannot come out easily. If stung by a stingray it is best to **leave the barb in and do not attempt to remove it,** to neutralise the toxins, hot water can be used. Seek medical attention immediately.

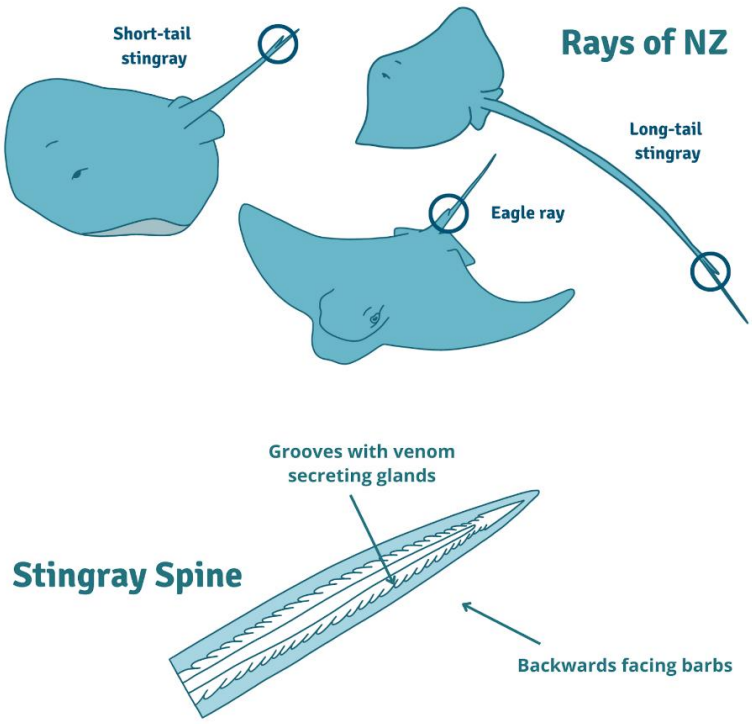

Figure 18. Rays of New Zealand and stingray spine anatomy.

Moray eels: Moray eels aren't poisonous, but they do have a nasty bite! Moray eels have two sets of jaws allowing them to clamp down on their prey. More serious bites may require stitches. Like many ocean critters, they will only attack divers if they feel threatened.

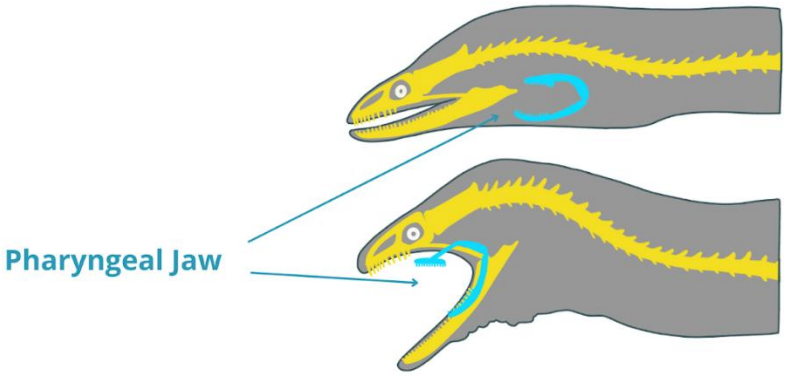

Figure 19. Pharyngeal jaw of moray eels.

Sharks: New Zealand has a very low risk of shark attacks, with sharks being uninterested in humans. Sharks are like the garbage cans of the ocean - cleaning up the sick and injured fishes of the sea. By staying away from fishers cleaning fish (putting blood and guts into the ocean) and staying vigilant when around spearfishermen you can avoid interactions with sharks.

It is good to be aware of sharks in the area and stay away from feeding frenzies or feeding events, such as floating carcasses and fish cleaning by fishermen.

Venomous fishes: Scorpion fish are found in Northern NZ and are found in healthy reef systems such as the Poor Knights Islands. They are not aggressive, however, to defend themselves, they will stick out their dorsal spines which have a toxin in them. A sting from this fish is painful, but not deadly - if stung, immerse the stung area in hot water and seek medical attention. Spiny dogfish and elephant fish also possess venomous external spines, and all produce a similar toxic response in victims.

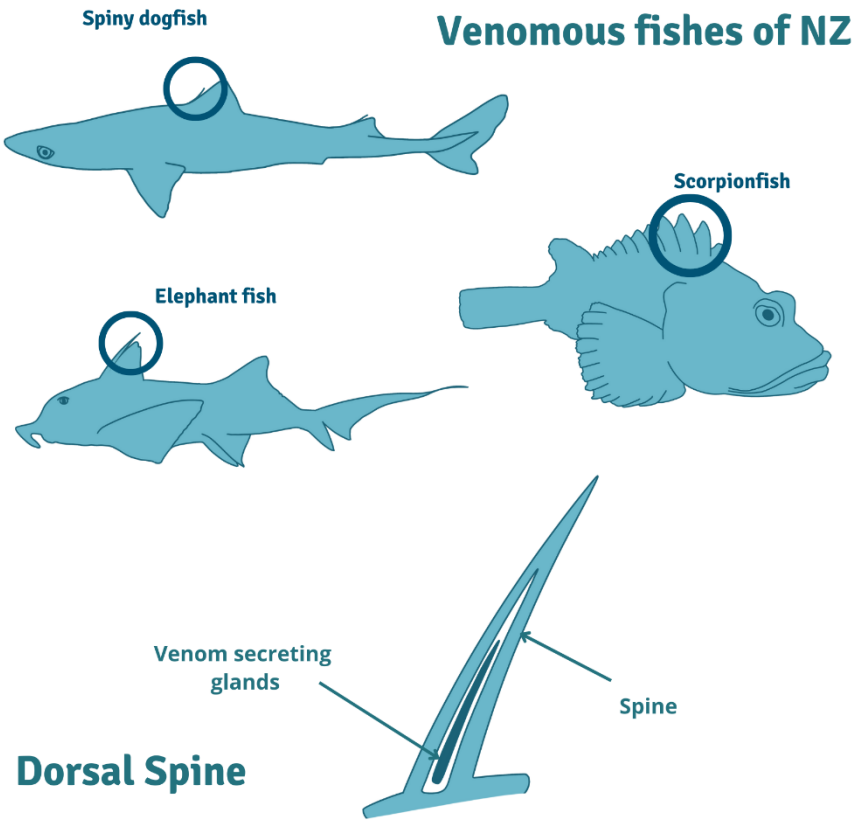

Figure 20. Venomous fishes of New Zealand and dorsal spine anatomy.

Module 4: Snorkelling and freediving essentials

Part 1: Reading the weather

Before setting out on your adventure, it's important to know the weather conditions and plan accordingly. Before every snorkelling and freediving trip, take a careful look at the conditions and if it doesn't feel safe, don't get in. Once in the water, constantly maintain awareness of the surroundings and the ocean conditions as they can change throughout the day.

- Tides vary by region so check out the local times and heights of high and low tides in advance. Some areas are best explored at certain tides or in between tides - plan accordingly.
- Wind can affect the surface conditions and wave height! Pick days with low wind to ensure you have the safest conditions and best visibility. Wind speeds of less than 15kts are suitable but a light breeze of 4-6 knots is most comfortable. On windier days it is best to snorkel in sheltered areas where winds will be less strong and waves less intense.
- Wave height: Pick days with low wave height, you can check out wave heights using weather forecasts. Wavy conditions can make it difficult to enter and exit the water, with hazardous entry points increasing the risk of injury. Wavy conditions are also not very fun - you can get bounced around and into rocks, underwater visibility can be greatly reduced, and it can be more difficult to swim in.

Part 2: Seeing under the water

Water changes the way light travels through the water, making things look different when you are under the water. To see clearly underwater, divers wear flat diving masks with windows of air - when light passes through air, the light bends and the swimmer/diver is able to see through the water. However, objects appear larger and closer underwater due to the bending of light through water.

The perception of colours also changes with depth, with different wavelengths (colours) of light being absorbed as visible light propagates through the

water. Light waves with the highest wave lengths (red) are absorbed first (a process called light attenuation), at greater depth these colours appear grey because the wavelengths responsible for this colour is absorbed. At depths greater than 30m, there are only blue and green components visible and without a torch everything will look much less colourful than it would at the surface.

Figure 21. Bending of light through water

Visibility can also alter the colour of the water, with sediment and other particles in the water further reducing the colours present. In murky water for example, everything would look green at shallower depths.

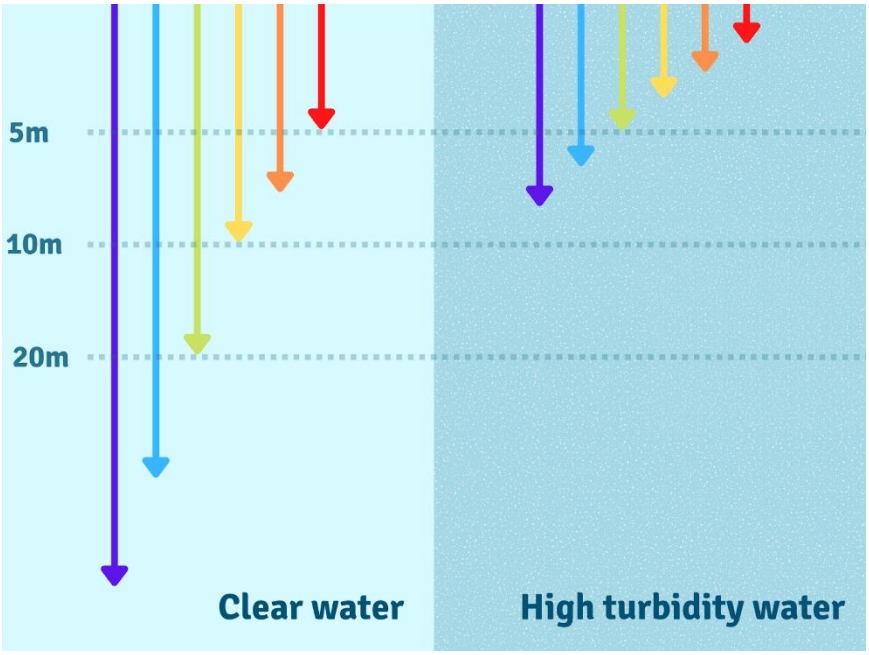

Figure 22. Difference between colours at depth.

Part 3: Water pressure

Hydrostatic pressure describes the pressure put on an object by water - when diving into the ocean by even a few feet, a noticeable change occurs. You can feel an increase in pressure on your eardrums - this is due to an increase in hydrostatic pressure, the pressure of water pushing down on you. For every 33feet/10.6m you go down, the pressure increases by one atmosphere.

Many animals, including air breathing animals, have no trouble at all with changing water pressures. In humans, however, we are not as well adapted and need to equalise the pressure as we go down. When following Boyle's law, as the pressure increases the volume decreases. If you take a balloon or plastic bottle down 10m, the balloon/bottle will be half empty.

This also happens in our airspaces in our ears, sinuses, lungs and mask. As the pressure increases, we feel a squeeze - you can equalise this by pinching your nose and blowing gently, moving air from the throat to the ears - just like when on a plane.

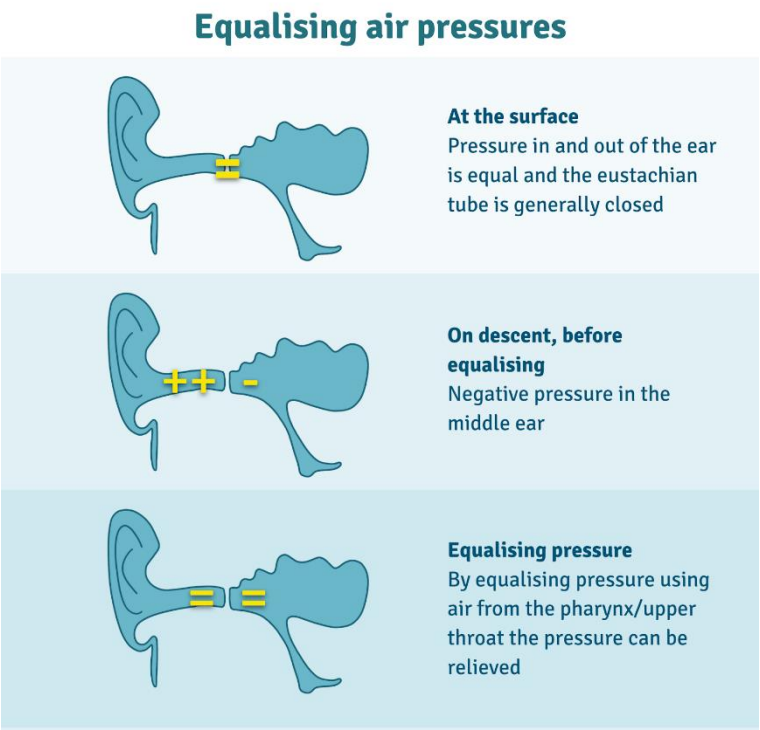

Figure 23. Air pressure and equalisation changes when diving

Part 4: Buoyancy

Buoyancy describes the upward force exerted by a fluid that opposes the weight of a partially or fully immersed object. Positively buoyant things float, and negatively buoyant things will sink. Buoyancy however changes with a number of factors. Saltwater weighs more than

freshwater so it exerts a greater upwards force on an object - for this reason you may find it easier to float in the ocean than in a lake.

When we add air spaces, in our lungs, wetsuit, or floatation devices, the person will become more buoyant and float. When you dive down, the hydrostatic pressure will cause these air spaces to decrease in volume and the diver will become less buoyant. To counteract this, many divers and snorkelers will wear weight belts, these help the diver to dive down without floating back to the surface.

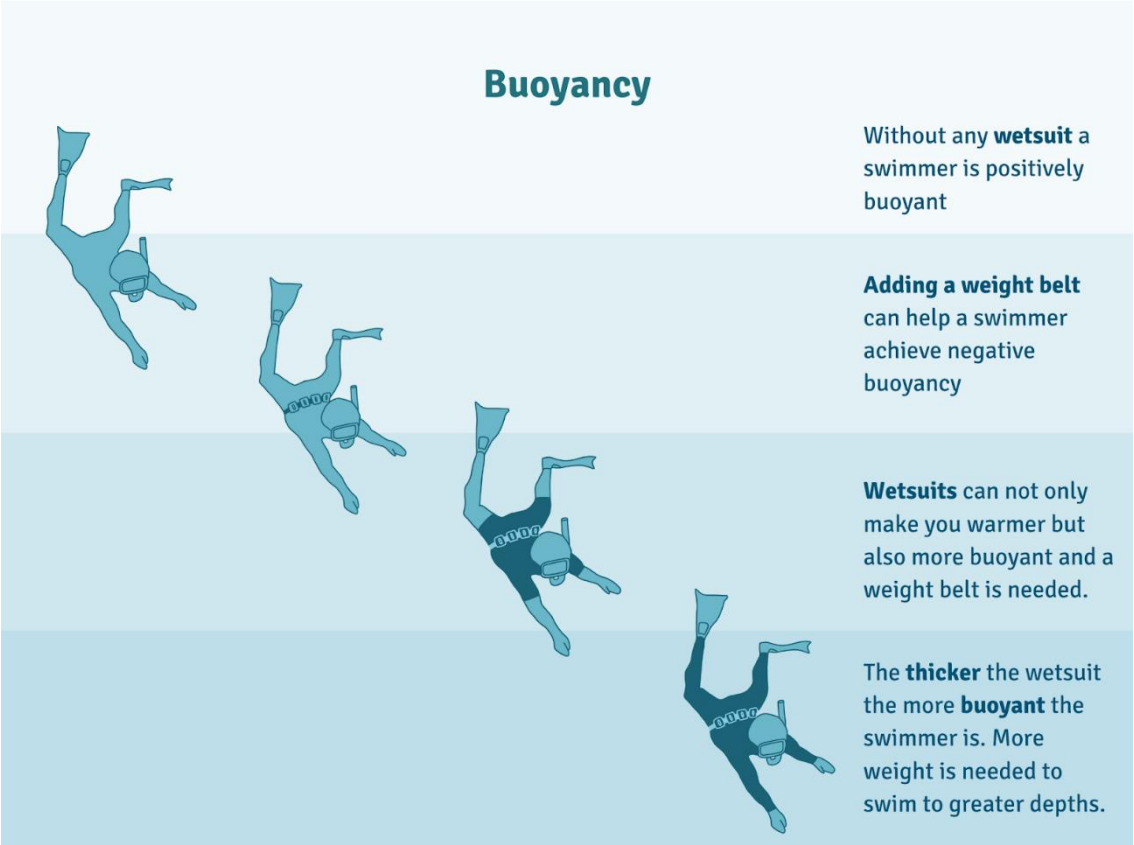

Figure 24. Buoyancy changes when diving

When wearing a weight belt, add weight slowly and get used to the new weights, ascending from depths and equalising before adding more weights. The amount of weight you need depends on a number of factors:

- Your weight and size
- The thickness, style and size of your wetsuit (more airspaces = more buoyant)

- Type of water (salt vs fresh)
- Depths you want to dive to

Whichever depth you are wanting to dive to, you should weigh yourself to be buoyant on the surface even with a full exhale for safety reasons. This ensures that if you get in trouble on your dive, it will be as easy as possible for your buddy to rescue you and keep you at the surface.

Part 5: Sound through water

Sound is the movement of waves through mediums which are gas, liquids and solids. These waves propagate differently depending on the medium. Sound travels much faster in water than they do in air -they also travel a long way so it is difficult to tell where it is coming from. Sound travels 4-5 times faster through water than air and can be difficult to pinpoint.

Figure 25. Changes in sound underwater

When underwater, you'll notice that the ocean is a noisy place! This is described as the ocean soundscape - the noises created by the ocean's inhabitants. Urchins grazing, fish communicating, dolphins echolocating are all examples of ocean noise.

To find out more check out this awesome article! https://www.nzgeo.com/stories/the-undersea-orchestra/

Part 6: Snorkelling and diving hazards

The first level of safety in freediving and snorkelling is YOU. The number one rule of any ocean activities is to never go alone. Take buddying as seriously as your diving and keep in close communication with your buddy and don't push your limits - if you are uncomfortable, refuse! Ocean activities do come with risks. These risks may include low risk and low severity events such as slipping on loose and slippery rocks when entering and exiting the water, scratching self on oysters, barnacles, and shellfish, and colliding with other snorkelers.

More severe risks can include strong currents and waves, near drowning and shallow water black outs, hypo- and hyperthermia, and boat traffic.

To reduce risks while snorkelling and freediving we can do a few different things:

- Make sure you're weighted correctly - add or remove weight to establish good buoyancy
- Always dive with a trained buddy
- Dive with your snorkel out - this ensures you can take a breath straight away without clearing your snorkel.
- Have a float to rest on - this could be a dive float or a boogie board
- Always do recovery breaths - three deep breaths at the end of each dive will ensure you replenish the oxygen you used during your dives
- Dive relaxed and healthy - not feeling great? Stay home and recover before doing any diving
- Have good dive technique - long strong legs will help propel you further through the water than bicycle kicks and swimming with arms straight is more hydrodynamic than outstretched to the side
- Don't hyperventilate! Hyperventilation does not store more O2, relaxing conserves O2!
- Have a plan for emergencies!

Signs that something is wrong while snorkelling and freediving varies by person, however signs may include:

- Change in finning

- Speeding up
- Unfocused eyes
- Grabbing for a rope
- Escaping air
- Can’t keep head above water
- Anything out of the ordinary
- If you think you should act, ACT!

Some of the risks and diving hazards to be aware of are:

Injury from aquatic life

Oysters are the most common injuries from aquatic wildlife, inflicting severe and deep cuts to snorkelers when care is not taken. Wash cuts and scrapes with disinfectant.

Eagle rays and stingrays should also be approached with caution, do not swim over rays in less than 2 metres of water and always approach from the front where the ray can see you. Shuffle feet when entering the water to alert rays to your presence. If you are stung by a ray - do not remove the barb and seek immediate medical attention. Hot water can be used to help neutralise the sting.

Jellyfish stings, particularly from blue bottle jellyfish, are uncomfortable and can cause severe pain when in sensitive areas such as eyes and mouth. Flush the stung area with water and remove the tentacles with gloves or a towel. Immerse the stung area with hot water for at least 20 minutes. If hot water is not available, an ice pack can help relieve the pain. Vinegar should not be used for bluebottle stings since it doesn't help the sting and may increase the person's pain.

Barotraumas and equalisation

Changes in pressure when diving can cause a change in the volume of fixed air spaces such as your ears and mask. Ear pain and mask squeeze can occur when diving down without equalising. Gently squeeze your nose and exhale to clear the ears and prevent pain. To avoid mask squeeze, blow air into the mask with your nose as you dive down.

Return to shore and seek medical attention when barotraumas are suspected.

Near drowning

Near-drowning is a term typically used to describe almost dying from suffocating under water. It is the last stage before fatal drowning, which results in death. Near-drowning victims still require medical attention to prevent related health complications.

To prevent near drowning, always snorkel with a buddy and snorkel within your personal limits, don't go out if it's too rough. In the event of near-drowning, get your buddy back to shore/boat as soon as possible. If trained and sufficiently buoyant, give rescue breaths - it is more important to get to shore/boat than attempt rescue breaths/CPR in the water. CPR will not work while in the water as you cannot get sufficient force on a person's chest.

Once on shore/boat commence DRSABC.

Shallow water blackout

Shallow water blackout (also known as hypoxic blackout) is an underwater 'faint' which is brought on by holding your breath for long periods of time and a lack of oxygen to the brain. This is a complete loss of consciousness and occurs when there is less than 50% oxygen saturation in your blood and is a strong sign you need to change your diving.

SWB is prevented by:

- Never hyperventilate
- Never ignore the urge to breathe
- Never swim alone
- Good breathing cycles - relaxation breathing, one full breath (slow full inhalation through belly, chest and throat), breath hold/dive, and recovery breaths (3 full breaths when coming up from a dive, Passive Exhalations, followed by quick inhalations, Pause at end of inhalation and perse lips).

The biggest risk of shallow water blackout comes from prolonged breath-holding with little rest in between, especially if there is intentional or unintentional hyperventilation. It often comes

without warning and there is an increased risk of permanent damage due to the brain already being deprived of oxygen when the swimmer/diver goes unconscious.

If you are doing deep or prolonged dives, be a good buddy!

- Practise one down one up, wait for the other diver to surface for at least 30 seconds post dive to ensure they are not experiencing any issues before carrying out your next dive down
- If your buddy is diving deep, dive down to meet the diver, watch for signs of trouble and swim up together
- Recovery breaths at the surface, encourage your buddy to do full breaths when coming to the surface

If a Shallow water blackout happens:

- Get diver to the Surface and keep Airways supported (SAFE)
- Remove Facial Equipment (SAFE)
- Blow, Tap, Talk (BTT) (15sec)
- Remind diver to stop diving for the day
- Figure out why it happened

Loss of Motor Control aka "Samba"

A samba is a loss of motor control due to hypoxia. During a 'samba' you have jerky body and eye movements and become unresponsive. This is a clear sign that you are pushing your limits.

To respond to a samba event:

- Support the diver and keep their airways clear of the water
- Encourage them to breathe verbally
- Assist them to remove facial equipment
- Check for injuries
- Remind diver to stop diving for the day
- Figure out why it happened

Exhaustion and cramps

As with any activity, physical exhaustion can occur when snorkelling. Calf cramps and exhaustion are particularly hazardous when in rough waters and strong currents which may move the snorkeller into hazardous areas and increase the risk of water ingestion and being swept from shore.

To prevent exhaustion and cramps, keep fit and healthy, keep hydrated, get a buddy to help you to shore and rest. While in the water you can relieve cramps by pulling the toe of your fin up to your chest.

Relaxation breathing can help relieve stress and exhaustion. Reduce your physical activity, prepare mentally for a breath hold, belly breathing with normal rhythm - through the nose breathing is also possible.

Hyperthermia

Hyperthermia is when a person's body temperature is abnormally high, it can occur when in the sun for an extended period of time and there is a failure of the heat-regulating mechanisms of the body. Signs of hyperthermia include excessive sweating, exhaustion, flushed or red skin, muscle cramps, spasms and pains and nausea.

Heat exhaustion and stroke can occur from extended periods of time in a wetsuit in the sun and sunburn on exposed skin. To prevent heat exhaustion and hyperthermia, sunblock exposed areas, ensure you are adequately hydrated, and stay out of the sun when in a wetsuit. To treat, get out of the sun, remove wetsuit, give fluids, and watch vitals.

Boat traffic

A big danger to swimmers and snorkelers is strikes from boats, jet skis, and windsurfers/foil boarders. Injuries can result from direct contact with the vessel and associated things being towed (i.e., sea biscuits). Ensure you always have a visible dive flag with you. NZ maritime rules mean that boats are only allowed to pass the flag at 5 knots (walking speed), however, not all boaties follow the rules and as such you should remain vigilant. If hit, signal for help, remove from water and do DRSABCs.

Module Five: EMR Essentials

We are super excited to have you on board as an EMR volunteer! Volunteering for EMR is a fantastic way to meet likeminded people, get out into the ocean, give back to your community and help inspire Kaitiakitanga for our marine environment! We have lots of different opportunities for volunteers to be engaged with and these vary by region and season. Below is an outline of some of the essential volunteer information.

Part 1: General overview of roles and responsibilities

Volunteers with the EMR programme are required to have the following minimum skills:

- Strong swimmers (can swim at least 200m continuously)
- Ability to listen to instructions
- Conservative behaviour
- Fit and healthy
- Free from the influence of drugs or alcohol. Note that all our events are smoke/alcohol free
- Snorkelling experience (not required! land-based support is much appreciated)

Volunteer responsibilities and code of conduct:

- Take reasonable care of their own health and safety.
- Be courteous of other volunteers/participants. Respect all cultures/ethnicities.
- Respect that our events are family friendly, and you need to ensure that all language is appropriate for the audience (we want you to have fun, but please keep the chit chat to the kaupapa of the event)
- Take reasonable care that what they do or don't do doesn't adversely affect the health and safety of others
- Check that the group understood your instructions/key messages in briefing
- When helping participants get into snorkel gear - let them get their own wetsuits on but if they are struggling, ask them if they need help/are happy for you to assist them (our 'duty of care' as an organisation precludes any inappropriate contact with children)

- Cooperate with any reasonable policies or procedures the business or undertaking has in place on how to work in a safe and healthy way
- Comply with any reasonable instruction given by the business or undertaking so that they can comply with HSWA and the regulations.
- As a volunteer you will be under the direct supervision of an existing endorsed coordinator/event controller (police vetted), however when working with schools, some may request vetting for our volunteers

Give plenty of notice if you can no longer make an event, you have signed on for. If you can no longer participate in a snorkel/school day please give us **at least 4 days notice**. If you are unsure if you can participate in a snorkel day hold off on registering - we are happy to receive registrations up to 24 hours prior. Any later and you might not have lunch catered for you but you are still welcome to come along.

We have had issues in the past of volunteers pulling out last minute or not showing up on the day. This means that we don't have enough volunteers to be able to run the days safely and we end up having to turn participants away. Which has been disappointing and stressful for our crew. As part of our volunteer database, we track which events/school days that you participate in to provide you with a certificate at the end of the season - we also track the short notice (less than 4 days) pull outs and the no shows. We have implemented a 2-strike reliability policy.

Agree to comply with our Safety Management Systems, policies and SOPs found on www.emr.org.nz On the day volunteers will be inducted into the SMS and relevant SOP/event plan for the day, including a verbal Health and Safety briefing from the event controller. Volunteers will be verbally briefed about the work to be undertaken and potential hazards, location of first aid, facilities and emergency procedures on the commencement of every activity. Site familiarisation is undertaken, and relevant issues explained wherever these arise.

Main roles of volunteers on event days:

The roles of volunteers vary throughout the day, we greatly appreciate volunteer assistance in setting up, running, and packing down our events. Set up may involve, setting out snorkelling

gear, setting up gazebos and tables, taking photos etc. During the events we may ask for your help in getting people into and out of gear, collecting evaluations and giving non-participants information on our events! One of the most fun jobs on the day however is getting into and on the water!

EMR volunteer snorkel guides assist the EMR coordinator with delivery of activity, including supervision of the student's and participants in water. Snorkel guides are expected to be confident snorkelers/swimmers, fit and healthy and free from the influence of drugs or alcohol. This person is responsible for supervising a buddy group, assisting the group to exercise snorkel skills, and following instructions of the EMR snorkel leader/instructor. You will help participants get into their snorkel gear, teach them snorkel basics, and take them for a great tour of their local environment!

Land observer 'spotter': Land based volunteers provide effective lookout for surface activities and hazards. They check on the number of groups in water and signal to the EMR Coordinator/Snorkel leader if a group member drifts away from the main group.

Kayak support: During our snorkel days we have a rotating role of being the kayak support, the kayak support keeps watch of the snorkelers and assists where needed with bringing people back to shore and keeping groups in the snorkel area.

Police Vetting Process: Volunteers are only required to undertake the vetting process if there may be times when they are the sole supervisor of the children and/or the school requires it. This will most commonly occur when the volunteer is helping for school delivery and transport of children for school events and field trips.

Part 2: Snorkelling equipment

All volunteers are welcome to use our EMR snorkel equipment while assisting on EMR events. We provide masks, snorkels, fins, and wetsuits for all participants, and in cooler snorkelling conditions also offer hoods. Volunteers are also provided with dive knives and weight belts;

however, dive knives are for emergency use and rubbish removal only and are not to be used to harvest kaimoana or feed fishes (i.e., breaking open kina).

All groups are required to at least have one body board. These boards provide floatation, visibility and buoyancy aid to children and non-confident swimmers.

All in-water volunteers are provided with the following clothing and equipment:

- Whistle
- Red' Supervisor' rash vest
- Suitable wetsuit, mask, snorkel and fins
- Dive knife
- Weight belt (optional)
- Bodyboard (one per group minimum)

Part 3: In water signals

Hand signals are essential to snorkelling, freediving and scuba diving communication. Whole arm hand signals (okay, help/assistance needed and urgent help needed) are key for communicating from a distance to other participants and crew, both in-water and shore-based. Hand signals are useful for communicating in the water or from a short distance without removing snorkel from the mouth or putting your head above the water.

	Q: Are you okay? A: I am okay Whole arm for distance communication, hand signals for close and subsurface communication

	I need help but it’s not urgent help
	Urgent help needed (emergency only)
	Go up/Ascend
	Go down/descend

Part Four: Health and safety

As a volunteer, your health and safety responsibilities are to:

- take reasonable care of your own health and safety
- take reasonable care that what you do or don't do doesn't adversely affect the health and safety of others
- cooperate with any policies or procedures of EMR
- Comply with instruction given by the EMR snorkel leader so that they can comply with Health and Safety regulations

Avoiding accidents:

- Participants must have a snorkel buddy and if freediving deeper than 3m snorkelers must observing the one up/ one down rule
- Group size (**1:4 if all children, 1:6 if mixed children and adults**) is manageable and to SOP standard.
- Buoyancy aid (boogie board) as floatation device, minimum one per group.
- Wetsuits to avoid hypothermia
- Headcounts regularly, keeping groups together, and don't let anyone go back by themselves. Avoid losing participants by regularly head counting your group and making sure that you reiterate that they need to stay close
- 3 whistle blasts to alert that there has been an emergency, stop what you are doing and return to shore immediately
- First aid kit is kept in the event tent or in the beach box next to the shore watch person

Part Five: Safety Operating Procedures (Quick guide)

- **Community Guided Snorkel Days:** For EMR Community Guided Snorkel Days, the ratio is a maximum of 1:6 (1:4 snorkel guide 'supervisor' to child ratio and 1:6 snorkel guide to adult or mixed group with a maximum of 4 children (under the age of 13). The absolute maximum number of participants in the water at any time during these events is 60.
- **Unforeseen hazards (danger at sea) –** During the snorkel EMR leader may continually identify and manage hazards, be alert for 1 blast of whistle for your attention, in the event of unforeseen dangers at sea, for example marine life or sea conditions changing, EMR snorkel leader will sound **three whistle blast**s and calmly organise evacuation to the nearest safe landing point or re-group and make our way back to assemble on shore (no one returns to beach alone)
- **Stay close** – remain within 50m and within audio and visual distance of the EMR snorkel leader to communicate any hazards, minor incident requiring first aid or a medical or more serious incident.
- **Lost group/group member:** Head counts of the group are conducted on a regular basis, if someone is missing; ensure the rest of the group are secure with adult supervision

and establish where the lost group member was last seen. If you cannot find the group member, use three whistle blasts to alert the EMR snorkel leader, notify the EMR snorkel leader, who may then activate emergency procedures.

- **Unresponsive snorkeller**. Notify EMR snorkel leader using three whistle blasts emergency procedure. Use the diver tow to get the unresponsive snorkeler back to shore and bring the entire group back.
- **Comments and complaints procedure:** The complaints policy is found on our website. Health and Safety feedback and/or comments can also be submitted via our programme websites www.whitebaitconnection.co.nz and www.emr.org.nz
- **Emergency procedure:** EMR coordinator will coordinate emergency procedures. If required, send for help, call 111 for ambulance, police or fire. Advise emergency service of whereabouts, using name of the road and location. Get someone to wait by road and direct emergency services to problems.

Part Six: Emergency responses

- Emergency response plans will be known by staff and are made available to participants and other relevant parties
- **Minor injury:** Assist the participant in getting back to shore OR get another supervisor to assist the participant in getting back to shore. Do not allow the participant to return by themselves. Alert snorkel leader (one whistle blast, not emergency), help the participant get to the first aid kit on site, and alert a team member with suitable first aid qualifications (EMR staff all have first aid certifications). **First aid kit is kept in the beach box in the tent.**
- **Lost group member:** Ensure the rest of the group is secure, alert snorkel leader (one whistle blast and arm in air) who will then inform you of next steps and help find the lost group member.
- **Cold snorkeller, lips are turning blue and they have stopped shivering:** Hypothermia with cyanosis, immediately signal to the kayaker and take your group to shore.
- **Cramping:** To relieve leg cramp whilst snorkelling pull the end of your fin towards you gently, while massaging the muscle with your other hand. If cramping does not ease, alert the kayak who will assist the participant in going back to shore.

- **Unresponsive snorkeller:** Notify your snorkel leader using **3 whistle blasts and waving arms (emergency).** Respond by bringing the diver back to the surface (if required), achieving positive buoyancy for the snorkeler (by dropping weights if wearing a belt and using buoyancy devices such as a boogie board). All group members will be brought back to shore, with the volunteer or snorkel leader using the unresponsive diver tow to get the unresponsive diver back to shore. Once on shore, follow **DRSABCD** Dangers? Responsive? Send for help Open Airway Normal Breathing? Start CPR Attach Defibrillator (AED) as soon as available.
- **Fire, earthquake or tsunami:** Activity supervisor will take charge. In the event of a very small fire, using water may be appropriate however, personal safety and that of participants is paramount, do not take risks, raise the alarm and move out of the area. Advance warning of a tsunami in New Zealand is highly likely, and timely evacuation from coastal sites is therefore very possible. In the event of an earthquake, snorkelers will be immediately evacuated to an evacuation meeting point. If on land and outdoors, find a stable, safe place away from trees etc which may fall.

Module Six: On the day

How to guide a snorkel experience

First time volunteering for EMR? Not a problem! Your fellow volunteers and our crew will walk you through it all. Before you start guiding on the day, ensure you have a full kit of gear. Make sure that you have a body board to take out with your group, knife, whistle, and a red rash shirt on identifying you as their guide. Here is a handy guide on what to expect and what you need to cover with your group before you head down to the water.

Step One: Getting geared up to go.

Introduce yourself to your group, get to know their names and find out more about them and assess the experience level of your participants

- How comfortable are they in the water?
- Have they snorkelled before?
- How are their snorkelling skills?

These are all questions to help you get to know your group and know what to expect when in the water.

All participants will then be fitted for and get a mask and snorkel, wetsuit, and fins (flippers).

- There are different sized masks for adults and children, ensure they take a mask from the correct box and if needed - do a fit check by asking them to put the mask on their face and breath in through their nose. **If it sticks - it fits**! Snorkels are all similar sized, however, do check the mouth pieces that they are not missing the lugs (bits you bite onto).
- Wetsuits can be fitted by asking the participant to stretch out their arms, **the arm of the suit should fit from shoulder to wrist**. Big tight? That's okay, the tighter the better as they will stretch when you get into the water. Wetsuits should be put on while standing on the grass, not concrete as this can damage the suits.
- Fins should fit comfortably and not be too large. You can test the size of fins by putting your foot on the front of the blade and asking them to lift their heel like they are taking a big step. **If the heel slips out it is too big.** Check that both flippers are the same size

and ensure participants don't walk on land in fins. Only put fins on before entering the water.

- If participants are wearing their own gear, check it is fit for purpose before using

Once participants are kitted up and comfortable, you can start your briefing!

Step Two: Snorkel briefing

- Reintroduce yourself and each other; perform karakia

Whakamana te maunga

Whakamana te wai

He mauri o ngā tangata

Ngā mea katoa he pai

Haumi e

Hui e

Taiki e

If we look after the water from the mountains to the sea, it will look after us. It is our life force.

- Introduce the **snorkel site** and give some brief information on it's history and why we are visiting the site
    - Where is the entry and exit point
    - Where is the first aid kit and meeting point
    - Use of dive flag, where are our limits for swimming/snorkelling
    - Is it a marine reserve?
    - What is special about the site?
    - What can we expect to see at this site? What marine life will you see?
- Reinforce our **kaupapa**
    - Our events are strictly no take, unless there are cultural or scientific aspects to the kaupapa on the day. All marine life is to be protected regardless of the MPA status, no fish should be fed. We are kaitiaki who are looking and learning.
- Explain how the guided snorkel will run

- Group will stay together within a few metres - a **highfiveable distance** or "stay within arm's length". Buddy system for diving - one down, one up (remind about equalisation for older groups who may be better at diving)
- Will be in the water for ~45minutes (depending on the event), if participants get cold and want to come back, they will have to come in with the kayak/another guide, or the whole group will come back together.
- Don't return to the beach alone, always go with a guide or the kayak, they will be escorted by a supervisor

- Explain how to **wear a mask** - it goes over the eyes and nose; you can't breathe in through your nose while wearing a mask, if you breathe out of your nose it will fog. Keep on the eyes or neck, NOT on the forehead.
- Explain how to **swim with fins** - put on fins on the shore and then walk backwards through the water. When swimming, keep the legs long and no bicycle kicking.
- Explain the **hand signals** - Are you okay (close and far), I am okay (close and far), go down and go up, I need help but it is not urgent, I need urgent assistance.
- Explain the whistle signals - **one whistle blast** - stop, look and listen. **Three whistle blasts** - emergency; everyone get back together and go back to shore as a group and go to the emergency meeting point.
- **Hazards** specific to the site
  - Stay away from rocks, sharp shells, urchins etc.
  - Don't swim above or down to rays
  - Currents, waves and tides
- **Emergency procedure**
  - Where is first aid kit
  - Where is the onsite cell phone, dial 111 for emergency and ask for first response
  - Name of road and closest location for ambulance
  - EMR person in charge and where is emergency assembly area

Step Three: Guided snorkel

Help participants put toothpaste inside their mask and rinse off in either a bucket or the sea. Participants can then put their fins on by the water, walk backwards into the water, and begin snorkelling when they are waist deep.

Key things to keep in mind while guiding a group

- Keep together as a group
- Point out cool stuff to participants – from stingrays to nudibranchs, there is plenty to see!
- If there isn't much to see, help your participants practice their diving
- Keep an eye on your participants, help them if they are struggling with their mask and snorkel if they are getting cold and want to go back, use your hands or whistle to get the kayak supports attention and ask them to help take them back.

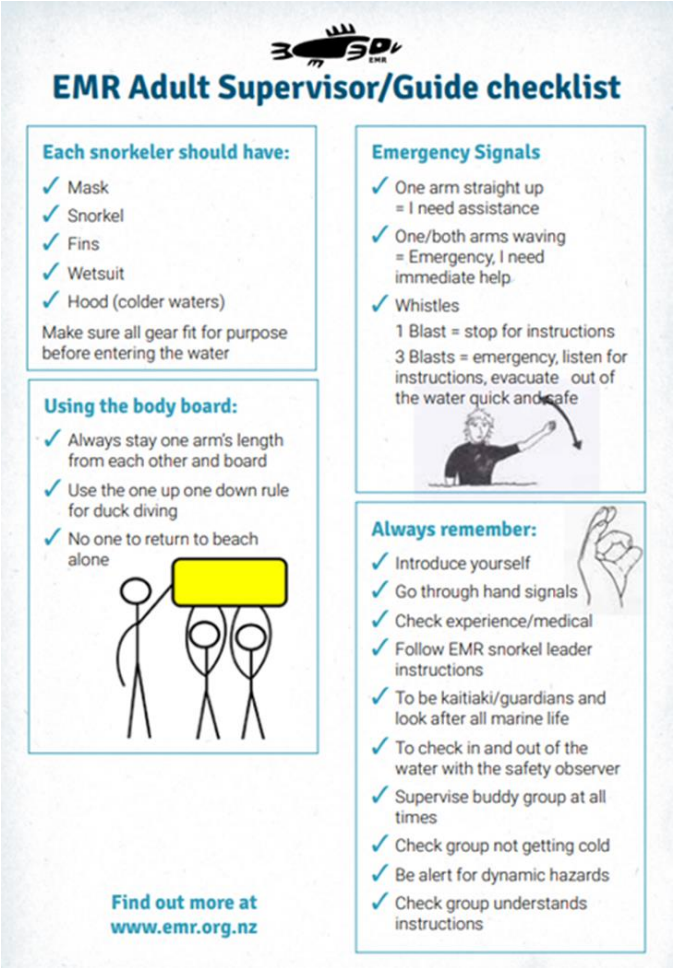

Figure 26. EMR supervisor and guide checklist

End of training module:

Congratulations on finishing this EMR training. We will test you again after our theory and practical training sessions before the season starts or onsite at a snorkel day. The volunteer progression will be:

Trainee snorkel guide --> Assistant snorkel guide --> Senior snorkel guide

We look forward to seeing you at an event in the future!

Knowledge building: Glossary of Māori Words Relating to the Sea

A

Aho	Fishing line
Aihe	Dolphin
Ākau	Shore / especially rocky

H

Hao ika	To fish with a net
Hāpuku / whāpuku	groper
Hī ika	to fish with a line
Hīnaki	eel-pot
Hine-moana	personified form of the Ocean (Ocean Maid)
Hao ika	

I

Ika	fish
Īnanga	whitebait

K

Kai moana	mātaitai sea food
Kākatai	blue reef heron
Kākihi / ngākihi / kekeno	limpet
Kāniwha	barbed hook
Karatī	young snapper
Karengo / parengo	sea weed dried as food
Karoro	seagull
Kawau	cormorant / shag
Kekeno	seal
Kete	shellfish bag
Kina	sea urchin
Kokiri	leatherjacket
Kōpūpūtai	sponges
Kotore moana	sea anemone
Kororā	penguin (blue)
Kōtuku	white heron
Kōura	crayfish

Kōurara / tarawera	shrimp
Kūaka	godwit
Kuku / kūtai	mussel
Kupara	John Dory
Kupenga / rangatahi	fishing net
M	
Manaia	seahorse
Manga	barracouta
Mangō	spotted gummy shark, Mustelus lenticulatus
Mangō-tuatini	white shark, Carcharodon carcharias
Mātaitai reserve	type of marine reserve placed over
Mātaitai	Reserve type of marine reserve placed over traditional fishing grounds by tangata whenua
Matau	fish-hook
Moana	sea
Moana nui	ocean
Moki	medium to large carnivorous fish
Mōunu	bait for fishing

N

Ngaru	wave (sea)
Ngōiro	conger-eel
Ngū	squid

O

One / tuaone / tatahi	beach

P

Pakake	kelp
Pākaurua	stingray
Pātangatanga / pātanga / pekapeka	sea star / starfish
Paketi	spotty
Pakirikiri	blue cod
Pāpaka	crab
Pāraoa	whale (sperm)
Parore	mangrove fish
Pātiki	flounder
Pāua	univalve mollusc / abalone

Petipeti / tepetepe	jellyfish
Pipi	cockle (general)
Piri	high tide
Pouraka / tāruke	crayfish trap
Pūpū	winkle
R	
Rāhui	total ban on harvesting seafood, due to loss of life at sea or to guard against overexploitation.
Rawaru	blue cod
Rimu / rimurimu	seaweed
Ruku	diving or to dive
T	
Tahatai	seashore
Tahuna	sandbank
Tai	tide / sea
Takakaha	butterfish
Takitai	coastline

Tamure	snapper
Tangaroa	God of the Sea
Taniwha	a guardian / monster / protector that lives in the ocean / seashore / cave.
Tapu	sacred forbidden
Te marae nui o hine-moana	Moana The vast plaza of Hine-Moana
Timu	low tide
Tio	oyster / rock or mud
Tipa / tupa	scallop
Tītī	mutton bird
Tohorā	whale (southern right)
Toheroa	a bivalve mollusc
Tope / kapeta	school shark, Galeorhinus galeus
Tuatua	a bivalve mollusc
Tuere	hagfish
Tuna	eel

W

Waharoa	horse mussel
Waka	canoe
Warehanga / haku	kingfish
Werewere	barnacle
Whai	stingray
Whanawhana	flipper
Wheke	octopus