Mountains To Sea
Conservation Trust
Nga Maunga ki te Moana

Mountains to Sea Wananga

A national marine and freshwater conference

"Succession"
For marine and freshwater conservation action and education

2018 Proceedings

Mountains To Sea
Conservation Trust
Nga Maunga ki te Moana

whitebait Connection
Kōreaua about freshwater life

Experiencing Marine Reserves

Our goal is to empower and support communities to achieve marine and freshwater conservation through science based experiential programmes, resources, projects and community engagement.

Whakamana te maunga Whakamana te wai He mauri o ngā tangata Ngā mea katoa he pai

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

visit www.emr.org.nz and www.whitebaitconnection.co.nz and www.mountainstosea.org.nz or email us at info@emr.org.nz

Preface

Nga maunga ki te moana, Mountains to Sea Conservation trust (MTSCT), was created in 2002 as a vehicle and guiding entity to enable a team of extremely motivated individuals to effectively communicate marine and freshwater science to NZ communities, involve them in experiencing those environments first-hand and in taking action for it, believing that the end result will be an improved environment and a strong foundational ethic of kaitiakitanga. All via the programmes; Experiencing Marine Reserves (EMR) and Whitebait Connection (WBC).

This is taken from the original trust deed created in 2002 and remains the same today.
A Charitable Trust is hereby established for the purpose of achieving the following outcomes.

(a) Environmental educational strategies, programs, resources and community engagement activities will be created, fostered and offered to the community.
(b) Advocate directly within communities and with Government for the establishment of a system of conservation measures and biodiversity protection areas.
(c) Support and create opportunities for young environmental professionals to work and engage with schools and communities in environmental education and ecological restoration and conservation management.
(d) Foster and support the pursuit of scientific research, understanding and traditional knowledge of aquatic ecosystems and biodiversity. Ensure that the results of the research are disseminated in the community.
(e) Provide technical, scientific assistance to the community, schools and environmental advocacy groups for the purpose of furthering the aims of the Trust.

Our team has grown and expanded in many ways since 2002 and currently has 7 trustees, 2 advisors and a team of 40 coordinators delivering EMR and WBC around NZ.

Our whakataukī is Whakamana te maunga, Whakamana te wai, He mauri o nga tangata. Nga mea katoa he pai. If we look after the water from the mountains to the sea, it will look after us. It is our life force.

That's a WHY – there's always a why – the why is one of the key motivating factors that leads thoughts and ideas into action and long-lasting behaviour change.

We all have slightly different 'whys' and many connections, things that unite us. Thank you to all those that had a role in what we created this weekend – we created many tangible outcomes as shown in these proceedings. We also created many non-tangible outcomes – the kind that spur us on and motivate us to keep going. Moments that become memories that don't fade. The 'Why' and making space to connect and be inspired is powerful.

MTSCT has been facilitating wānanga since 2006 for each of our programmes, then in 2010 we combined resources to run the EMR and WBC annual coordinator training events into one and invite a wider range of people – making it a mountains to sea focus, always with a different theme.

Last year's topic for the wānanga in Leigh was 'Citizen Science'. The dictionary explains citizen science as "the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists." In many cases, the trust works right in this space and we wanted to explore how we and the trust's work can contribute to the data and databases around NZ. We also

wanted to make sure that the data and research has meaning and purpose - otherwise, why would people bother?

This year's topic; succession, comes at a time where the trust is experiencing a phase of growth, with new regions offering the WBC and EMR programme. This wānanga was a platform to discuss the opportunities and challenges that come with this growth and where the trust is heading in the future.

Succession can be defined as "a number of people or things of a similar kind following one after the other', but it can also be seen in an ecological sense where a "plant or animal community successively gives way to another until a stable climax is reached". Both definitions can be applied to the trust.

Posters were developed as a result of the Succession workshop on Day Three of the wānanga. Although, the posters vary widely, a common theme that emerges is that the MTSCT and Freshwater and Marine Education (FWME) in general need strong leaders and proactive individuals with a wide range of skills that are supported by a stable framework. This framework provides systems that help individuals and the trust to meet their goals, and foster long lasting partnerships and collaboration. In the long term, true partnerships are needed with tangata whenua as well as strong ties to the whole community. Another fundamental pillar for long term success is knowledge of the freshwater and marine environment and the personal connection and passion for issues relating to freshwater and marine topics. A lot of this can only be done with long term sustainable funding. One thing that also shines through a lot on the posters is PR and Marketing as well as branding. If

FWME in NZ is to engage more people the communication strategy needs to be clear and consistent and goals and success stories need to be well documented and celebrated.

To wrap up the Succession workshop each group summarised their plan to the wider group. We then moved into evaluations, including each participant commiting to one personal action as a result of the wānanga. These actions will be sent to their owners in August 2018 to support participants to reflect on their progress and troubleshoot potential barriers they may come across.

This wānanga has truly explored ways of future-proofing the work of the trust in an ever-changing environment and how Freshwater and Marine Educators can position themselves to have long-lasting success. By no means have we solved all the challenges, but we are now much better placed moving into the future. Our mission and team continue to grow and our eyes are wide open to the challenges we face and some of the key steps we can take to ensure success.

We very much look forward to the next wānanga which will be held in the Far North in April 2019.

- ***Success is succession - what's your plan?*** -

The video of the event can be found here

Thank you

This wānanga is made possible thanks to the Tindall Foundation and DOC Community Fund.

We would also like to thank
2plus for their support.

Jude Heath for all her energy and
time she put into organising the wānanga

Kai Waka for the yummy catering and brain and soul food

Thanks to Kaiteriteri Recreation Reserve
for providing the conference room for
Marine Training and Coordinator Meetings

Special thanks to EcoTours for providing an
amazing experience for the wānanga participants
and providing shuttles for transfers

Thanks to SeaShuttle for the buses for
the field trips on Sunday

Thanks to the mana whenua from Te Ātiawa
and Ngāti Rārua for hosting us at Te Āwhina
Marae and sharing their stories with us

Thanks to the Choc Fish Co for the yummy Giant Kokopu
Choc fish for our World Fish Migration Day 'Happy Fish'

Notes taken by Sophie Journee and Isabel Krauss
Images taken by Te Kawa Robb and Lorna Doogan
Proceedings finalised by Samara Nicholas, Kim Jones,
Isabel Krauss and Sophie Journee.

Introductions - what people want from wānanga and what is their favourite freshwater and/or marine species

Karakia te Kai

Ki runga, (hand indicates up)
ki raro, (hand indicates down)
ki roto, (hand comes to chest)
ki tua. (hand reaches out)
Haumiē. (hand swipes sideways, as if playing a tennis forehand)

Experience the Riuwaka Resurgence with manawhenua

Te Puna Riuwaka, the Riuwaka Resurgence, is waahi tapu and of particular cultural significance to the people of Te Ātiawa and Ngāti Rarua. It is a place of healing and reflection, where people come to bring balance to their life.

The entrance to the walkway is marked by an ornate waharoa. Ngarangi explains that Tangaroa, pictured on the right side of the ‘roof’, encourages people to set their sights, follow their goals and set their goals high. Below Tangaroa the symbol of a hammerhead shark, ururoa, is carved into the right pillar. In Māori culture, a hammerhead shark stands for vigour, strength, determination or a person, who is dedicated to their particular pursuit. It is a reminder for people to be strong. Depicted on the left pillar is a Kakabeak or ngutukaka, which refers to an inspirational speaker or presenter and stands for brilliant oratory in all its forms. The overall message from the gateway is that people need to be strong and diligent, and that they need to pass on knowledge to those who are willing to listen. The waharoa was put up in collaboration with DOC in 2008 to acknowledge this special place.

Before heading to the resurgence it is important to give thanks and praises, so the journey is safe and productive.

As we all headed up the track we were led by the waiata of Ngarangi, Joy and Aneika. We stopped in a small clearing along the trail in order to reflect on our first impressions of our surroundings. Words like ‘calm’, ‘tranquility’, ‘mana’, ‘tapu’, ‘awa’, ‘fresh’, ‘cool’, ‘understorey’, ‘elder’ were used to describe people’s initial reactions to the space. Every time Māori walk in the forest they see ancestors talking from the water. Along the trail we were also greeted by a curious toutouwai (South Island robin) who graciously posed while we took our pictures.

Crystal Pool

The Crystal Pool is of special cultural significance and was a cleansing place for women after they had given birth. People come to the springs to rejuvenate, revitalise and let go of bad things. The message of the springs is that we need to learn how to let go and keep moving.

Riu-waka literally translates as ‘hole of the canoe’ and the shape of the resurgence resembles the shape of a canoe making a hole into the rock, there are steep cliffs on three sides of the resurgence, flanked by overhanging vegetation. The kaitiaki of all subterranean waters is Huriawa, who stayed in this area. When she passed her spirit went into the water and stayed. People are welcomed to fill their water bottles and to wash the taonga around their neck in the water and it will revitalise them.

One of the challenges mana whenua currently face is how the overall area can be re-developed and re-designed to acknowledge the space and its history. The aim is to recreate stories through landscape design and to educate the public around Māori values and the etiquette associated with a place of such significance. Swimming is seen as a form of polluting the river; therefore, education is needed to prevent swimming in the resurgence.

There is also pressure from the international dive community to dive the resurgence. In an accident in the 1960s a diver got stuck in the caves and it took six months to recover the body. This restricted the access to the water for drinking and cleansing and made it a dangerous place for Māori. In the Conservation Management Strategy the community is currently asked to identify the most important places and there is hope that the Crown will protect the resurgence in the future.

World Fish Migration Day - the happy fish

The World Fish Migration Day (WFMD) is a one day global celebration to create awareness on the importance of open rivers and migratory fish and it is coordinated by the **World Fish Migration Foundation**. On World Fish Migration Day organizations from around the world organize their own event around the common theme of: CONNECTING FISH, RIVERS AND PEOPLE. Many of these events are open to the public. By working together we create a greater driving force to raise awareness, share ideas and secure commitments. The wānanga participants worked together to form the shape of a happy fish which is the global symbol for WFMD. Afterwards we celebrated with some yummy chocolate Giant Kokopu from the Choc Fish Co www.chocfishco.co.nz

Why celebrate World Fish Migration Day?

Many migratory fish species are severely threatened. The main causes are man-made obstacles like dams, weirs and sluices, which disrupt the natural flow of rivers and prevent fish migration. Many fish need to migrate to reproduce, feed and complete their life cycles. Migratory fish make up a crucial link in the food chain and play an important role in healthy and productive river systems. Furthermore they provide an important food supply and livelihood for millions of people around the world.

Goals of World Fish Migration Day

Creating awareness is an essential first step to make real change. The main goal of World Fish Migration Day is to improve the public's understanding of the importance of migratory fish, the need for healthy rivers, the communities that depend on both, and the options we have to minimize or avoid impacts. The next step is to activate citizens around the world to take action on these topics. Ultimately we aim to create lasting commitments from NGO's, governments and industry on safeguarding free flowing rivers and restoring swimways of migratory fish.

Care about migratory fish and their environment?

Then join World Fish Migration Day now and help raise awareness! Feel like letting the event organisers know what you think about fish migration? Share it with them on Social Media using #worldfishmigrationday or go to www.worldfishmigrationday.com to organize your own event.

Marine keynote address

Aneika Young, Ngāti Rarua, Te Ātiawa/Cawthron Institute: He Pou Tokomanawa Kaitiakitanga in Practice.

An iwi-led project within Sustainable Seas National Science Challenge. The project aims to identify iwi priorities for management of Te Tai ok Aorere (Tasman Bay) and Mohua (Golden Bays), and aims to explore ways of empowering kaitiaki aspirations for tino-rangatiratanga over Te Tai o Aorere and Mohua through the development of a kaitikai framework

The presentation can be found here

Aneika Young's project is one of eleven projects of the Sustainable Seas National Science Challenge (http://sustainableseaschallenge.co.nz/). It brings together scientists to figure out the best approach to ecosystem based management (EBM). The project goal is to enhance the value of New Zealand's resources while proceeding to a healthy environment for future generations. The biggest challenge of the project is working together with 26 different stakeholders, which means relationships are key to the success of the project.

There are 5 different research programmes within the Sustainable Seas Challenge

1) Our Seas
2) Valuable Seas
3) Tangaroa: iwi & Māori
4) Dynamic Seas: Technical, technological
5) Managed Seas

Of these, programmes, Tangaroa is the only iwi-led project. The programme enables Māori to participate as partners in marine management, supporting economic growth and providing the practice of tikanga/mātauranga with annual meetings to discuss progress and challenges. The focal point of the projects is an area that stretches from Taranaki to the Chatham rise, which is an area of interest for many different stakeholders. The area of Aneika's case study is located in Tasman Bay and Golden Bay.

Research opportunities include developing an iwi-led process for research and empower communities as well as building relationships and collaborations between iwi and science. It is important to prioritise iwi issues for the Tasman Bay and Golden Bay and address challenges like sedimentation, which affects the scallop population. The aim is to build iwi capacity and capability and support iwi to be part of the conversations.

Project partners are Tiakina te Taiao and the Cawthron Institute. Tiakina te Taio is an iwi resource management collective that is the lead agency for the three year long project which finishes in 2019. The organisation represents a lot of iwi in this region and acts as a vehicle for environmental representation. The Cawthron Institute provides iwi with project management support as well as scientific expertise.

The Methodology for the research is iwi led and includes the development of an iwi communication strategy and iwi advisory groups (kaitohutohu) and the opportunity to learn about science (kairangahau). Networking is also an important key methodology (whakawhānaungatanga).

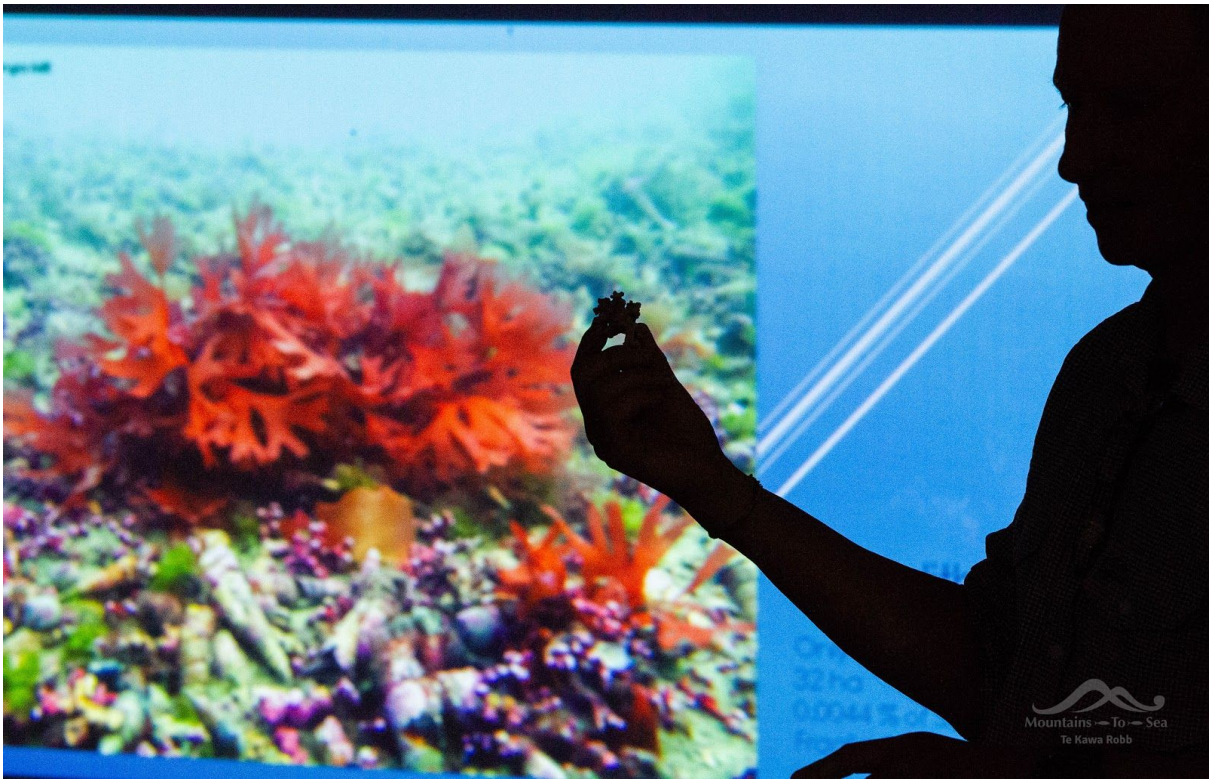
The aims of the research are:

- Examine mātauranga Māori to define and restore the cultural context of Tasman Region and Golden Bay and identify special places
- To evaluate environmental frameworks from a mātauranga Māori perspective to inform the development of a kaitiakitanga framework.
- To develop a working relationship with the wider challenge projects to initiate a marine ecosystem based management (EBM) interface dialogue process between science and mātauranga Māori.

Most of the methods used are qualitative, but some tools are also quantitative. A lot of the research involves wānanga and interviews, talking to whānau and key iwi leaders to put together maps and develop a local knowledge repository. Questions evolve around the definition of the Tasman Bay, observed changes over time, and current issues that affect the ability of being kaitiaki of the region. There are also new methods for analysing and visualising data. Progress is then reported back to iwi and the Challenge. Trialling tools include spatial mapping with GIS, the pressure-state response framework and the collaboration with the wider research and science community (Te Wheke Hononga).

The open discussion following the talk centres around the fact that it can be difficult to communicate Māori values and how Māori see the world. One of the biggest issues in Ngāti Rarua and Ngāti Ātiawa's rohe is around wastewater. Most of the wastewater treatment is done in low lying areas. Directing treated wastewater into freshwater streams and rivers, however, is a seen as a cultural offence where no swimming or harvesting of kai is possible and there is some very vocal people in the community to encourage change. Another area of controversy is the involvement of iwi in commercial operations that involve natural resources. There are challenges on how to behave towards the natural environment and not in all cases the environment comes first. Iwi, however, apply values as a measuring tool and will be held accountable by their whānau for the outcomes of commercial operations.

Rob Davidson: Marine Reserve Monitoring in the Abel Tasman over the last 25 years



Or: Protecting parts of the Sea: Do marine reserves work?

The presentation can be found here

Rob Davidson is an environmental consultant and can draw from years of experience in the field. In the late 80s he tagged snappers, then moved on to do subtidal survey work with DOC all over the upper half of the South Island. He was actively involved in the application for the Tonga Island Marine Reserve and has found his own consultancy in the early 90s. He specialises in monitoring the four marine reserves in the upper South Island.

In his most recent work he has surveyed and identified about 130 significant sites in the Marlborough Sounds that are identified according to a set of standardised criteria. He identified about 9 sites with Rhodoliths that together are about 32 ha in size – only about 0.0044 % of the marine water in the sounds. These biogenic communities used to be a lot more common in the Marlborough Sounds but were dismissed as 'foul grounds' by fishermen as they fog up nets despite being very rich in fish abundance and diversity. Most of the biogenic communities which create space and habitat for other species were therefore destroyed to make the seabeds more fishable. The destruction included lace corals off the coast of Abel Tasman National Park with 'chains and rollers', which are fragile animals and provide important habitat for fish. Other examples of seabed destruction include the small subtidal seagrass, which has disappeared from most coastlines in New Zealand although it is one of the most productive habitats in the world.

All of the significant sights face multiple threats including global warming and ocean acidification, but also direct threats in inshore coastal waters. The sediment that runs off the land as a result of land clearance smothers and clogs the seabeds and leads to habitat and species loss. In the region, the coating of sediment all over the seafloor can be seen in 7m depth of water. The other major threat is the physical disturbance of the seabeds caused by trawling and dredging, but also through anchorage (which is permitted without restrictions even in Marine Reserves). Because of these threats the significant sites are small and often close to rocks or irregularities in the seafloor which makes them less attractive for commercial activity.

Rob Davidson sees the New Zealand legislation as part of the problem to an effective protection of significant spots outside marine reserves. He criticises the tendency to focus marine conservation on fish species rather than whole habitats. He argues that a variety of different protection mechanisms similar to the Marine Estate Management Regulations in Port Stephens (New South Wales, Australia) could be beneficial to New Zealand as marine areas outside of marine reserves are largely unregulated.

Moreover, there is no legislation that is purpose built to give choices on different types of protection mechanisms (equivalent to the different types of protection on land). The Marine Reserves Act (1971) is a very difficult act to work with and as a result of this most of the 7% of marine protected areas are in two very large reserves. Most other marine reserves are tiny and scattered around the coast. The marine reserve in the Marlborough Sounds only protects 0.12% of the area of the Marlborough Sounds.

Tonga Island Marine Reserve

Tonga Island Marine Reserve was established in 1993 as the second marine reserve in the South Island.Monitoring at the site has been carried out since 1992, which has created a solid database. Monitoring methods include underwater counts, scallop density and size counts, horse mussel density counts, and baited videos. The tendency to target edible species in monitoring comes from the fact that these are the species most likely to respond to change but also due to budget constraints.

Results from monitoring the three marine reserves at the top of the South Island emphasise the effectiveness of marine reserves in protecting marine life. Crayfish numbers increase significantly and reach pre-fishing numbers (presumably) after seven to eight years. Population structure also changes with big females and big males appearing in the population, that are rare or absent in the control, i.e. fished, sites. This leads to an increase in egg production and it is estimated that the 12km of the Tonga Island Marine Reserve produce as many eggs as 120km of unprotected coastline. Most of these eggs end up scattered along the New Zealand coastline and travel as far as the Chatham Islands.

Blue Cod shows a similar trend with the fish being significantly more abundant and larger in the Marine Reserve than in the control sites. However, Blue Cod numbers outside the reserve have also increased due to changes in fisheries regulations in size and bag limit changes.

Tubeworms on the seafloor have also re-established, taking up 95% of the seafloor as they are no longer damaged through dredging and trawling. It is important to note, however, that not all species of fish are affected by marine reserves. Some marine reserves may be too small to effectively protect certain species, other species are simply not affected because they are not on the menu or cover wide ranges of coastline.

Davidson concludes his talk with a call for Action. People need to know that the marine environment has been significantly degraded and the creation of marine reserves is simply not enough. He urges to support and promote the revision of the Marine Reserves Act to include other forms of marine protection as the current legislation is too indiscriminate and slow to keep up with the fast pace in which marine degradation happens.

Freshwater Keynote address

Jane Goodman: Migratory galaxias – Nelson/Tasman stronghold populations, kōaro spawning and national population structure

The presentation can be found here

Much of Jane Goodman's current and previous work focused on migratory galaxiids. She is currently completing her PhD research on the population and genetic structure of migratory galaxiids nationally at the University of Otago.

In her MSc research she studied shortjaw kokopu in the Nelson/Tasman district and carried out surveys from 1999-2001. Although the surveys focused on shortjaw kokopu, they also spanned the habitat of the four other migratory galaxiids, all of which are found in the Nelson/Tasman region. Maps created during the research shows the distribution hot spots for each of the five species. Spotlighting as a main survey method proved to be very effective in finding large galaxiids.

Ideal habitat for galaxiids is at sites with riparian vegetation that create shade and cover, keeping the water temperature cool. Boulders and logs also form cover and hiding places during the day by creating micro habitats.

During their research the team found five kōaro spawning sites at Brook Sanctuary. The eggs were typically laid in fast flowing areas of the river on and around boulders and riffle areas. Genetic testing confirmed that the eggs and juvenile fish were kōaro. This is quite different to other species who prefer to lay their eggs on river banks in long grass (inanga) and leaf litter (banded and shortjaw kokopu).

As there is still relatively little knowledge about the recruitment of each of the migratory galaxiid species Jane's PhD research centres around the genetic structure of galaxiids and whether there are regional stocks and different populations throughout the country, as recent research on species catch composition and otolith analysis indicates.

Based upon biogeographic units and ocean currents the study creates 12 diadromous fish units and compares the genetic structure using fin clips from approximately 1200 individuals across these units.

The study expects to find a continuum of genetic structure with a higher level of structure within the populations that are less abundant like the shortjaw kokopu. Initial analysis found a definite difference between North Island and South Island populations for the Giant Kokopu. Inanga, on the other hand, are much less structured as they have got a widespread distribution and are generally close to the coast. This makes genetic mixing more likely, but there may be more structure at a finer habitat scale. Some kōaro are found to migrate as far as the estuary rather than going out to the sea so they are very likely to return to the same river as adults.

The results of this study suggest that genetic data can be applied to the management of migratory galaxiids and to be able to make informed decisions about creating a reserve network around the country. The results are also encouraging for community groups as their local efforts will pay off on a local scale if they take guardianship of their local freshwater environment.

Trevor James: Inanga spawning, fish passage, water quality and habitat condition mapping in the Tasman district

The presentation can be found here

Trevor James describes himself as a resource scientist at the Tasman district council, where he monitors the environment and the health of ecosystems. His presentation focuses on the health of rivers in the Tasman district and the fish populations within these waterways.

Mapping the eel and galaxiid populations in the district has shown that long fin eels are the most widespread of the native fish but are in decline. Inanga are mostly found in coastal areas, whereas kōaro are very far inland up to the high country - some are even lake-bound. Banded kokopu in the district are mostly found in low lying and coastal areas.

There are several examples of freshwater management in the Tasman district where fish habitat has been modified severely and also inhibit fish migration. At Thorpe Drain, which is a drain in urban Motueka, the fish communities are highly modified and banded kokopu are only found occasionally. At Ferrer Creek in Riwaka surveys were carried out to assess the effect of the tide gates on whitebait populations. The Tasman Valley Stream is an example of a highly modified stream with high fine sediment loads, very low summer flows and high temperatures due to the lack of riparian vegetation. Many of the wetlands have been removed or have dried out and there is less than 50 official sites in the Tasman district and Golden Bay where giant kokopu can be found. Hence, habitat pockets like residual pools in the Motuere Hill Country can be very important. A variety of different fish can be found in these pools during the summer months.

The most important factor for good stream habitat is variety - this means variety in bed material and substrate size, channel width and depth, streamside vegetation, bank shape and stream meanders. Unfortunately a lot of the stream vegetation has been cleared, which releases a lot of sediment into the stream and reduces shading and cover. Straightening the streams and lining the bed with geotextiles can also be detrimental to the fish populations as they can't burrow through the textile.

Stormwater pollution also imposes a threat on the native fish and raises the question of when stormwater treatment is going to be implemented through installing wetlands and installing setbacks from waterways. Half of the lowland streams in farmlands get too hot and too low in oxygen in summer to support fish life and there are more rivers declining than improving in water quality.

Fine sediment is also a large-scale problem and recent research by NIWA suggests that a major part of the sediment is released by pine forests at the bottom of the catchment. This could also contribute to the lower numbers of inanga in the Tasman region compared to Golden Bay or the West Coast parts of the region. It is important to find and report where inanga spawning occurs and protect these sites from disturbance, spraying, mowing and tree planting! Inanga spawning sites have already been identified around Borck Creek in Richmond, at the Motuere River, Moon Creek in Motueka and other sites in the district.

To restore fish populations it is also important to ensure that the fish passage is unobstructed as 75% of the native freshwater fish migrate up and down waterways. There are approximately 3000 barriers to fish migration in the Tasman district, most of which are culverts. Tasman District Council is undertaking work to remove barriers and obstructions, which is often neither costly nor hard to fix. Each year approximately 100 structures are remediated in a systematic approach which prioritises areas. A competition in 2016 named 'Show us your culvert' raised awareness in the community and helped to identify obstructions and barriers. There is now a fish friendly tide gate and habitat restoration projects as well as the hope for sustainable funding from regional council for large scale freshwater restoration.

Tim Olley: Fish passage for marine and freshwater succession

There are plenty of manmade barriers that prevent migratory fish from completing their circle of life and leaves them, quite literally, 'high and dry'.

In his presentation, Tim Olley presents a variety of video footage to show both problems and solutions to barriers for fish migration. A large number of culverts are either undercut, too high or create high velocity flows so fish and elvers struggle to climb upstream. Other examples include fixing flexible fish baffles into round and box culverts which creates resting pools for migrating species. The baffles flex in high stream flows therefore there is minimal impact on culvert flow capacity. But the solutions don't have to be hugely complicated and costly. As an example he shows the use of an old rubber mussel rope that is attached to the

culvert. Another examples is fixing flexible attachment sleeves into longer culverts and channels that create resting places for migrating species but don't limit the flow capacity of the culvert. Real-life experiments have shown that these measures can vastly improve the ability of elvers and migratory galaxiids to climb upstream. A local competition in the Tasman Bay area named 'Show us your culvert' also produced great results to raise awareness in schools and communities. There is hope that more local councils will apply these measures in the future.

Culverts acting as barriers to fish
- https://www.youtube.com/watch?v=qMFsZ-hiWVI
- https://www.youtube.com/watch?v=M2B4opETMP4

Fish passage solutions
- https://www.youtube.com/watch?v=YBqfRvFFXWY
- https://www.youtube.com/watch?v=7-SUJJHD_kA

Restoring fish passage in Nelsons Urban Streams
-https://www.dropbox.com/s/zmohi75ur6vy04y/Fish%20Passage%20Mitigation%20in%20Nelsons%20Urban%20Streams%20V1.3.pdf?dl=0

Feature movie
- https://www.youtube.com/watch?v=pprPaEMVRRA&t=18s

Freshwater field trip - spotlighting

After the presentations and dinner the wānanga participants got the opportunity to take part in a spotlighting activity at ‘Goodman’s Ditch’ near the Motueka Recreation Centre, that drains a large area of Motueka. The spot is located only a few hundred metres from the river mouth and is influenced by tidal movement.

The group was able to spot several freshwater bullies as well as some Inanga and Eels. Some fish were also temporarily caught in kick nets and placed into plastic water filled bags, to be able to have a closer look at them. During the field trip the participants also got the chance to chat to Tim Olley, Trevor James and Jane Goodman.

Mountains to Sea Conservation Trust Experiencing Marine Reserves and Whitebait Connection Programmes

The presentation can be found here

As organisers of the wānanga, Samara Nicholas and Kim Jones gave a short overview of the Trust's core programmes, Experiencing Marine Reserves and the Whitebait Connection programme.

Kim Jones: Whitebait Connection Programme

One of the key parts is being able to communicate freshwater and marine science first hand, as well as experiencing the surrounding environment and supporting and empowering communities.

The MTSCT team has grown and expanded steadily since 2004 and currently has 7 trustees, two advisors and 40 coordinators delivering a diverse range of programmes in many regions of the country. The wānanga is seen as in important tool to share knowledge and reconnect, within the teams as well as between the different regions and across both programmes. Associated with the growth of the team are also challenges, which sparked the idea for the 2018 wānanga theme 'Succession'. Succession in terms of ecological succession and succession planning are both relevant to the trust and merge together. It is important for the trust to set up systems where future leaders feel empowered to learn from previous leaders, but also allows for incorporating the leaders' own ideas and concepts. These can then be passed on to the next generation.

Whitebait Connection programmes start with introducing students to freshwater biodiversity and the realities of our freshwater environments. Students then go out in the field and collect information that they can then use to come up with action ideas for freshwater conservation. It is important to foster succession planning and understand the reason for this work - if schools and communities are tied into the bigger picture they may be more likely to get involved in the long-term. One example is the inanga spawning programme where WBC is contributing to the national database of inanga spawning habitat and has even developed their own map. Currently, there are over 60 sites that are restored nationwide.

Samara Nicholas: Experiencing Marine Reserves

In 2001, the idea of EMR came about based on the experience of being involved in establishing the Whangarei Marine Reserve at High School and showing local schools the comparison between marine reserves and non-protected marine areas. EMR's mission is to raise awareness and understanding as well as getting students and communities connected and inspired.

Since 2002, EMR has provided guided snorkel experiences for over 52861 students and whānau through New Zealand's Marine Reserves. The total number of kiwis engaged in EMR to date is 71192

The action projects are the most important part of the EMR programme. Some recent examples include Marine Metre Squared Monitoring, public presentations and Christmas floats to get the message out to the wider community. Students of outstanding action projects are rewarded with a trip to the Poor Knights (annually).

Engagement with the wider community is achieved through Community Guided Snorkel Days and Community Guided Snorkel Days, showing the community their local marine environment. Partnerships are key to the programme, which is highlighted through a video of the recent Kermadec Island trip with the Sir Peter Blake Trust.

EMR is currently present in 8 regions of New Zealand, stretching from the Far North to Otago in the South Island. EMR also has a sister-programme in South Australia called EMS (Experiencing Marine Sanctuaries). Part of the succession planning for EMR includes more collaboration with WBC to encourage schools to do both programmes - from the Mountains to the Sea. Succession at EMR also means to recruit new coordinators from the existing team of volunteers. In the future, EMR wants to continue the national expansion and collaborative direction with communities, government organisations and NGOs. It will also continue to use the WBC programme in a networked catchment restoration context and assist with Inanga spawning work. EMR will continue to be a community engagement tool to support communities to achieve marine conservation.

Rapid Fire Show and Tell from participants

Mark Burnaby - Restoring Otuwhero Wetland and Waterways Project

The presentation can be found here.

Mark Burnaby is the marketing manager at Abel Tasman Sea Shuttles and works closely with EMR in the Tasman Region. He has been involved with aquaculture and horticulture in the past and has a close connection with the land. Abel Tasman Sea Shuttles are very conscious about the impact on the environment; hence, the boats are designed to have minimal impact on the sea. Some of the buses also run on biodiesel, which is a very cost-effective alternative and also benefits the environment.

Abel Tasman Sea Shuttles works closely together with project ‘Janszoon’, taking students to the park for conservation and restoration projects. Mark has recently purchased a block of land at Otuwhero that is adjacent to a wetland. They are currently planning to restore ⅓ of the wetland with a vision to expand up the valley one day. It takes time for plants to grow back and cyclone Gita has made the project even bigger and more challenging. They also want to involve local schools in the restoration project and have already been getting help from Riwaka School.

Sally Carson - Can citizen science drive more than student learning: Diving Deeper with Marine Metre Square, using the new app for Mm2

The presentation can be found here.

Sally Carson is based in Dunedin at the Marine Studies Centre of the University of Otago. Sally runs several projects and courses including laboratory work, field courses, seaweek events, the Albatross education programme, the little blue penguin project and many more. Many of the resources can be found online: https://www.mm2.net.nz/resources.

Part of her work involves the Marine Metre Square (MM^2), which is a citizen science project and involves long term monitoring of the seashore, its biodiversity abundance and distribution. MM^2 is used as an engagement tool as it can be done on any shoreline. Its goal is to improve the local management of the marine environment through providing long term data sets. Latest developments include an App for data collection and new Māori resources. The number of MM^2 surveys, especially in Northland, has increased dramatically over the last year.

The next challenge for the project is the interpretation of the data and using the website for data analysis. One of the expected outcomes of the monitoring is the extension of southern species as a result of global warming that should be reflected in the MM^2 surveys.
With Otago being on the verge of establishing a marine reserve, MM^2 has shown to be a useful tool to enhance students' science enquiry skills and passion to look after the ocean's animals and plants.

Natalie Blandford - Kai Iwi Lakes Open Day 2018

The Kai Iwi Lakes consist of three main dune lakes located on Northland's west coast in the Kaipara District. The Kai Iwi Lakes Open Day started up as an event to engage people in the local communities and highlight the ecological significance of these lakes. People were able to choose from a range of different activities including circus workshops, waka ama, a giant SUP and stalls by the regional council and the coastguard. Another highlight was the guided snorkel offered by EMR. WBC was also present and promoted Check-Clean-Dry as well as providing information about the lakes and its biodiversity.

The event was advertised through facebook, local newspaper, Northland Regional Council and published on the world wetlands day website. The event, which was held at Lake Waikare, attracted about 300 people on the day. By completing all the activities and receiving a stamp for their 'event passport', people were able to participate in the prize-giving at the end of the day with prizes donated by local businesses. The event received a lot of positive feedback through a sticky dot board and interviews with participants.

Krysia Nowak - Enrichment programme - freshwater style

Krysia Nowak works for DOC in Turangi and runs an education programme called 'Taupo for Tomorrow', which is based at the Tongariro Trout centre and funded by Genesis Energy.
One of the issues she encountered during her work was that the three schools closest to the Tongariro Trout Centre weren't engaging as much as the schools from further away. She also discovered that the programme wasn't enough of a challenge for some of the students.

As a result of this she started the 'freshwater science leader programme', where one student from each school comes to the centre for one day per week over one term. The students learn about freshwater science, science communication and conduct experiments in the centre. In the following term the students then bring their own class back to the centre and teach the other students about what they have learnt. The programme has shown to improve the knowledge of freshwater science, communication and speaking and engages the whole class. It has also encouraged school's participation and action projects. The programme continues to partner with the schools and students as volunteers and communicators within their community. The future aim is to link up the programme with the Whitebait Connection programme to consolidate the student's learning by coming to the Trout Centre and achieve tangible outcomes.

Liz Gibson and Amanda Valois - Stream Health Monitoring Assessment Kit (SHMAK) update

The video shown during the presentation can be found here.

The SHMAK kit was initially developed by NIWA and federated farmers in the late 90s, and later adapted by the landcare trust to make it available for the wider community. Research and community groups can collect a wide variety of data with the current kit including velocity, benthic diversity and periphyton.

With new technologies and interests developing, however, the kit needed updating. The assessment now includes tools for *E.coli* and rubbish and has got additional supporting habitat variables. The new kit is currently being trialled with a range of different interest groups to assess whether the new additions are helpful and easy to use or whether more support and training is required for successful measurements and assessments. Partnerships and collaborations are important for the long-term success of the projects and links to management and science organisations are vital. NIWA is currently seeking feedback on the new kit before it officially rolls out nationwide.

Richard de Hamel - Creative marine education to inspire you

Richard is based at the Marine Studies Centre at the University of Otago. He has made it his mission to exceed expectations during classroom visits to make it worth while for everyone.
One of his mottos is 'Do the unexpected to exceed expectations and make people think!'.

As an example of how he starts his classroom session he sticks 3 sets of questions and answers on the wall. Students can then take a guess and stick some blu-tack on the answer which they think is correct. The questions are then left hanging on the wall until the end of the session when students are given the opportunity to change their answers. Apart from being a fun activity for students it also serves as an evaluation tool and for tracking the students' learning progress. He calls this method SPLAT.

Another example of his work in the classroom involves a programme on Māori fishing. He presents a large metal gaff hook and asks what people would be likely to catch with a hook like that. The answer often is "children, but you would have to get the bait right" (Chocolate or WiFi access for example). The problem with gaff hooks is that people don't know whether there is a fish attached or not as catching the fish works by pulling on the hook; its is essentially based on guesswork. In search for a better design Richard then refers to his fish hook bone necklace of which he has carved several himself by using models from the Te Papa museum in Wellington. Several experiments in an aquarium have shown the Māori fish hook can be quite effective indeed as long as the sinker is above the hook. The Māori fish hook seems to be a forgotten technology and Richard encourages students to make their own fish hooks and trial them in the sea.

Other classroom resources include sea creature puppets, an umbrella planetarium and a blue whale tape. Other useful resources can be found on https://www.otago.ac.nz/marine-studies/resources/

Kirsty Brennan - Just because I'm young, don't count me out

The presentation can be found here

Kirsty Brennan is employed by EOS Ecology in Christchurch, who have been part of the 'WBC family' since 2016. The team at EOS has seen a succession of knowledge and passion, and the strong need for action through these programmes.

EOS Ecology have been particularly involved with the National Inanga Spawning Programme (NISP) thanks to Curious Minds Funding from MBIE. This programme is designed to involve all ages, from kindergarten kids through to adults and aligns with the WBC core values of Information - Experience - Action. EOS uses a science-based approach to develop the resources with the goal of making the science comprehensible. NISP takes a visual approach so people gain understanding through images and overall aims for an engaging delivery to capture the audience.

The early childhood education resources include a board game, an inanga ABC board and several other interactive activities. While the students are playing with these resources they don't even realise that they are learning. For example, during the colouring in of good and bad inanga spawning habitat the children develop an emotional connection to the habitat knowledge.

The ultimate project goal is action and a long lasting positive impact, putting the learning into practice and connecting students with their local environment. When provided with the right tools, kids can come up with very thoughtful and creative solutions.

More information can also be found here

Aaron McCloy - A year in sustainable business development with Papa Taiao Earthcare

The presentation can be found here

The background for Aaron's work is the fact that there are not many work and employment opportunities, especially for young people, in the Far North. So, if students started their own business they would create their own jobs, make money and save the environment at the same time.

Papa Taiao earthcare offers a range of course options ranging from one day per week over three terms to a wānanga style block course. The course also offers achievement and unit standards and students receive between 20 and 42 achievement standards for the course. The attendance rate is at about 90%, which is much higher than for regular classwork. As students focus on the course and their business, mental health also seems to improve for some students. Students may keep all the money they make from their business, the only condition that is attached to the course from Papa Taiao earthcare is that their work must improve the environment at the same time! The course encourages meaningful kaitiakitanga: not only are the students doing something they love, they are also saving the environment!
They are also currently working on developing freshwater achievement standards that they can incorporate into their courses.

Some examples of the student-led business ideas are:

- Making 'Game of Thrones' style possum fur coats
- Making predator boxes
- Pest trapping services
- Northland monitoring service:
- Pests to pellets
- Oyster farming in the Far North
- Making sustainable fertiliser from a marine pest plant
- Making paint brushes from possum tail fur
- Making chicken feed from cockroaches that are fed by weed species.

Projects also involve project management for a restoration project and creating inanga spawning habitat through placing bracken fern bundles in a stream. One of the biggest achievements is that one of the businesses was awarded by the Young Enterprise Scheme. This shows the students are doing well on a national scale and have solid business models.

Stew Robertson - Abel Tasman EcoTours to Tasman Bay Guardians

The presentation can be found here

Abel Tasman Eco Tours started in 2013 and became even more successful after a name change to its current name. Local science communicators give visitors the tools to open their eyes and see the world through a different lense. Visitors are mostly from overseas but also include local visitors and some schools.

The founder of Eco Tours, Stew Robertson, did a marine studies course in 2010 and became passionate about artificial reefs. He monitored different styles of reef and measured reef biodiversity and capacity. He was also involved with the Rena survey and recovery.

The Abel Tasman Eco Tour business originally started small with the purchase of a second-hand aqua taxi, but has since upgraded and expanded to other boats. The tours include information about plants, biodiversity, the region's ecosystems and pest control. The company later also got involved with the Project 'Janszoon' and works with numerous school groups on bird counts, clean-ups and other conservation initiatives. As a local business the company is conscious of the environmental impacts and how it can give back and be kaitiaki of the region. Collaborations in the region have created cohesion and led to the formation of the Tasman Bay Guardians who will be the umbrella organisation for the WBC and EMR programmes in the regions. One of Stew's vision is the installation of an artificial reef at Tonga Island Marine Reserve.

Helen Forsey - Abel Tasman Tree Collective

The Abel Tasman Tree Collective is a newly formed group of local tourist operators and accommodation providers who aim to facilitate tree planting for environmental restoration. They receive donations through the office or the website and hope that visitors will make part of the donations. Local schools can then get involved with planting and restoring a particular area. The first project of the Tree Collective is the establishment of a community nursery with DOC that is run for about 10 restoration projects in the area.

Andrew Innes - What is happening at Tomahawk Lagoon?

The presentation can be found here

Andrew Innes is part of the ECOTAGO Trust that has established a database for action and to better understand wetlands. The trust wants to enable the community to look after their own backyard.

The background for the foundation of the trust was the toxic algae bloom in the Tomahawk lagoon in 2014 and the Regional Council's dismissal of the community's call for action. The reason for the dismissal was the apparent lack of proof and reliable data of what caused the bloom. The project involved local schools and monitored 5 sites in response to the increase in toxic algal blooms. Fortnightly partial as well as monthly full monitoring took place at the sites and included biotic and abiotic measurements.

The trust discovered a clear positive correlation between dissolved oxygen (DO) and pH: as the DO drops the CO2 from plant respiration forms a weak acid and will cause the pH to drop. The low DO at night could explain the significant fish deaths in both lagoons in the previous two years. The group also found excessive levels of *E.coli* at three sites in the lower lagoon. The hypothesis that this could be caused by birds in the lagoon was not supported by the findings. Nitrate was also positively correlated with rainfall amount, and the upper lagoon was healthier than the lower lagoon.

The biggest achievement of the trust to date is the funding of a restoration project in Otago and highlights the importance of partnerships to achieve environmental goals.

Ember Corpuz - Engaging South Australia

The presentation can be found here

Experiencing Marine Sanctuaries (EMS) in South Australia was founded in 2015 and is based on and supported by EMR. Initially it started as a pilot programme with 1 staff, 15 volunteers and 5 schools in July 2015. In its third year it now has 40 volunteers, 2 paid staff and has developed a programme for schools. Funding is an ongoing issue and the team needs to think outside the box to sustain funding for the programme. Thus far the programme has provided guided snorkels for 580 participants at 11 events. The team wants to continue and strengthen the EMS/EMR relationship and build on each other's capacities.

CJ Webster and Annette Litherland - Projects Landcare Trust is supporting in Top of the South including 'Mr Werp' project - Motupipi River Willow Eradication Project

The presentation can be found here

The New Zealand Landcare Trust is involved in a number of projects across the region and works with farmers, landowners and community groups to improve the sustainability of the landscapes and waterways in the Top of the South. The following projects are examples of the work that the trust coordinates:

1) Motupipi River

The Motupipi river is a great example of true collaboration. The project goals are to remove willows from the whole catchment and re-establish the riparian vegetation. Removing the willows from the top of the catchment to the bottom over a timeframe of 5 years is supposed

to improve flow and reduce sediment load of the river. Moving the fences back 5m and replanting will create more shade, reduce aquatic weeds and improve oxygen in the water. The project is a collaboration between schools, landowners and the community and funded by the Tasman District Council, the Tasman Environmental Trust and Fonterra. As part of the project, Takaka Primary School junior students worked on fish species and numbers, the middle syndicate focused on macroinvertebrates and the seniors were responsible for science and data collection. The project involves several stakeholders as the river runs through farmland and 2 settlements. As the regional coordinator, the NZ Landcare Trust focuses on linking farmers and communities. Generally, one of the biggest issues around fencing waterways is the cost of about $4000 per km of fencing.

2) The Whakapuaka Catchment

Another project the NZ Landcare Trust is involved in is the Whakapuaka catchment, where the trust collaborates with Nelson City Council. They tackle a variety of issues including sediment loads, nitrates, high water temperatures and water extraction. To prevent weeds from establishing in the fenced off riparian zone they are using several methods including weed spraying by drones and riparian carbon strips.

3) Farm Systems

This project investigates economic optimum dairy farm systems on 2 farms in Golden Bay and Motueka. It is a collaboration between Dairy NZ, Fonterra, the NZ Landcare Trust and Barrie Riddler. It recognizes that the most profitable farms are not necessarily the ones with the highest stocking rates and has developed a nitrate and greenhouse gas mitigation strategy.

4) SHMAK trial

The trust is also trialling the newly developed SHMAK kit and offers the community to take part in the citizen science project.

Jude Heath - Experiencing Marine Reserves Nelson

The presentation can be found here

EMR in the Nelson region was started in 2010 by Megan Wilson and is currently supported by Abel Tasman Sea Shuttles, the Tasman Bay Guardians and Whenua Iti Outdoors. Sea Shuttles has sponsored Riwaka school with both the EMR and WBC programme.

The overall EMR goal is to ‘raise awareness, understanding and support for marine conservation throughout Aotearoa through dynamic experiential education opportunities’. Students learn about biodiversity and learn how to snorkel in a pool before they carry out a local marine investigation. They then get the opportunity to go snorkelling in the Tonga Island Marine Reserve in the Abel Tasman National Park. One of the issues the EMR team in Nelson has been working on is how to make action projects more sustainable and continue the work. There is also a lack of signs at the marine reserve and it is important to educate the public through Māori history, rules and species identification.

A great success has been trialling Aquabots with Waimea College, where students were able to explore the reserve, take data and pass them on to scientists. This is a great example of how science technology can be linked with EMR and potentially WBC projects. A major motivation for action projects is the annual Poor Knights Competition where two students from the region win a trip to the Poor Knights Islands in Northland through either an action project or Ocean Art.

EMR Nelson acknowledges that finding leaders is key to succession of the programmes!

Field trip: Abel Tasman National Park and Tonga Island

Leaving from Marahau, the start of the Abel Tasman National Park, the group embarks on their journey by boarding Abel Tasman Sea Shuttle to go to Tonga Island Marine Reserve. On the way, Stew Robertson and Fay McKenzie explain some of the history and current developments in the area.

Project Janszoon

During the boat ride to Tonga Island Marine Reserve the group passes Motu Aorere nui / Adele Island. Adele Island has had 11 years of restoration in three stages:

1. Eradication of introduced mammals
2. Return of native wildlife (relocations and habitat restoration)
3. Long term succession: restoration of native vegetation and control of invasive weeds.

As the boat slowed down on its approach to Adele Island we were treated to a group of kekeno / NZ fur seals sunning themselves on the rocks. Whilst observing the seals Stew reminded us of making sure we keep a safe distance of 20m between ourselves and all marine mammals, in order to protect their well being.

Tonga Island Marine Reserve

Tonga Island Marine Reserve extends approximately 1 nautical mile offshore and is 11km long. The reserve was established in 1993 and it took seven years for a significant recovery of the ecosystem. Now, there are ~7 times more crayfish inside the reserve since it was gazetted, and they are much larger, up to 12 lbs. Blue cod stocks have also made a significant recovery, with 40 times more legal sized fish inside the reserve than outside. The overspill effect of the reserve can be found at Mosquito Bay Reef, which is a very popular fishing spot just outside the reserve. Generally, autumn and spring are the best times for seabird spotting.

Tonga Island marine reserve provides a safe haven for fur seals. There were local concerns that the seals prey on popular table fish, this was found to not be founded as these seals have been found to prey on small bait fish, squid and octopus who in turn prey on crayfish, there for the seals are kaitiaki for the crayfish!! In the shallow parts of the marine reserve

there are still very few kelps and the brown algae are still recovering. This is partly due to the geology of the surrounding landscape which consists Separation Point granite, which is porous and erodible. This makes it hard for algae to recover. Although on a recent dive in

the reserve, Stew found a significant stand of young Ecklonia kelp.

Once we arrived at Tonga Quarry half of the attendees went with Stew Robertson and Fay McKenzie to learn more about the park and its freshwater inhabitants. The rest were organised by the EMR Nelson team and briefed by new coordinator Jeremy Stead. Once we were kitted up for the 16 degree water it was time walk down the distinctive golden beach to our snorkel site. This area was historically quarried for its granite and the drill holes in the rock are still visible today.

Below the surface we were greeted by 4m visibility and very friendly spotties weaving through anemone encrusted boulders. Trainee EMR coordinators led the groups as part of essential training. It wasn't long until Jorge, from the Wellington Crew, was calling us over as he had found an eagle ray resting on the sand. This marine reserve's star attraction is the large numbers of paua that are not commonly found outside it's protection.

Although the visibility is pretty stirred up due to rainfall and large slips in the area, participants were still able to spot pāua and numerous kina on the rocks, as well as sea stars and crabs.

Experiencing Marine Reserves as part of our training practiced using iNaturalist NZ as a citizen science tool.

Whilst the snorkelers were exploring the treasures of Tonga Island Marine Reserve the other half of the group were taken on a guided walk through the Park by Stew Robertson.

Stew stopped at many picturesque vistas along the trail in order to talk about the variety of wildlife found in the park and the ongoing restoration work being done to protect the parks biodiversity. It also gave us the chance to really take in the breathtaking views surrounding us on all sides. Stew also talked about some of the history of the quarry. He revealed that Pakohe / Argillite rock is found scattered along the beaches of the park, and was commonly traded between Māoris pre-European contact when metal was introduced.

Along the trail we approach an area that appeared to have a high level of tree mortality, particularly the ponga (tree ferns). Stew revealed that this was due to the recent storms and cyclones that pushed the tidal waters much higher than they usually get, thus causing visible damage.

Whilst soaking up the melody of bird calls along the trail we approached the Onetahuti Bay stream, which is home to inanga. Some genetic studies have been carried out to see whether the inanga populations here are structured on a smaller scale. We were also lucky enough to find a population of banded kokopu slightly further inland at a spring. Some participants braved the chilly waters to capture a few banded kokopu so that we could all take a closer look!

Waikoropupū Springs

After exploring the stunning Abel Tasman Bay National Park the group was then taken to Waikoropupū Springs. On arrival we were greeted by local iwi and welcomed onto the site by a beautiful and emotionally charged waiata. As we made our way through the native forest towards the spring we were all captivated by the power and sacredness of this place and its significance to Aotearoa and freshwater conservation.

The Waikoropupū Springs are waahi tapu and one of the cleanest freshwater springs in the world. The latest water testing showed a clarity of 83m. Despite this, they are not entirely protected and local iwi are hoping for a Water Conservation Order to grant the springs the highest level of protection possible. Huriawa is the kaitiaki for the springs. It is seen as a joint issue between pakeha and Māori to have mātauranga incorporated in the way that people treasure water. People should respect water rather than just seeing it as a commodity.

Social Night

As with every wānanga, the social night is a highlight everyone looks forward to. This year's venue was The Park Cafe in Marahau. Entertainment was provided by the Steve Butler Trio.

The 'marine' participants as well as the 'freshwater' participants flexed their acting muscles by preparing a short sketch with a marine or freshwater theme.

This year the marine themed play mimicking a marine metre square survey was named the winner, with the creative use of props sealing their victory. Honorable mention goes out to Stew Robertson of the freshwater team for his sweet rapping skills though.

Succession Workshop

The central theme of the Workshop is the wānanga theme of 'Succession' and facilitated by Rochelle Selby-Neale. After settling down in the space and a short meditation, the participants are encouraged to think about the things needed to ensure success of Freshwater and Marine Education in New Zealand (FWME).

Every participant is asked to name ONE thing that is needed to ensure the success of FWME education in NZ (less than a sentence, more than a word).

Common themes are:

- Connectedness with the community and to the environment
- Relationships and Partnerships with the community and like-minded
- Consistent and sustainable funding
- Knowledge sharing
- Passionate educators but also passion for others
- Ownership
- Acceptance
- Awareness
- Inclusion of cultures, people, ideas and projects

For the next exercise, participants are asked to think about what characterized FWME in the past, the present, the future and the 'radical' future in the distance.

The following table tries to summarise and group all the notes from the participants. A lot of the past seems to be negative, the only positive arguments can be found in intergenerational knowledge and tradition. Approximately half of the participants address the method/way of knowledge transfer (traditional, through books, in the classroom). The rest focuses on research methods or the purpose of 'environmental management', if it was even present at the time.

The present seems to be more positive, with a lot of people stating experiential learning as the current reality of FWME, followed closely by technology. The answers are a lot more scattered with points about underfunding, Health and Safety, and concerns about FWME being isolated and disconnected being raised.

The future is defined by collaboration and technology as well as experiential learning, but concerns are also raised about climate change. There is also a need for sustainable funding, strong pathways, development and taking action.

The radical future, finally, is characterised by experiential, student led learning that is inclusive, holistic and harmonic. People are returning back to nature and take action for their environment. There is also sufficient funding for FWME in NZ

Past	**Present**	**Future**	**Radical Future**
- hunting and gathering, fight for survival - knowledge through storytelling and	- experiential learning - Technology - Underfunded	- Collaboration - New Technology - Climate Change	- student led, holistic outdoor education with experiential learning - people living in

tradition - non-existent - trialing methods, defining species - env. Management for our own gain - dry science and one-way classroom learning - knowledge gaps - disconnected , Māori values not represented	- Disconnected and isolated - Cluttered -Better integration of Māori world views -Health & Safety	- sustainable funding - Mātauranga Māori - Taking Action	harmony and balance with nature - True partnership with Māori - sustainable funding - Action for the environment by communities and individuals

Based on the wave exercise the group tries to identify emerging themes in FWME. While most of the group seems to agree that partnerships, connections to people and place, balance and time are key factors, there is also a lot more that emerges from that starting point. It is indeed hard to group the ideas and topics that come up and it sparks a lively discussion of where FWME is headed and what is needed for its success.
During the discussion it becomes apparent that it is very hard to see FWME isolated from the wider context and that fundamental change may need to happen within the communities. This includes a change towards true sustainable living, adaptable teaching methods and experiential learning and a change in how people see the world. These are tasks that go far beyond FWME.

With the recognition of the limits of FWME the group moves on to the more specific task of what is needed to thrive in the future and the best succession strategies. The group splits into regional teams and interest groups to work on a succession strategy. They are tasked with three brainstorming questions:

- Core areas to focus on
- Capabilities/talent needed
- What needs to be done differently/stay the same

Based on these questions the participants draw up a picture of their choice of the road to success. Templates include a waka and a river from the mountains to the sea.

While the posters vary widely, a common theme that emerges is that the MTSCT and FWME in general need strong leaders and proactive individuals with a wide range of skills that are supported by a stable framework in the background. This framework provides systems that help individuals and the trust to meet their goals, and foster long lasting partnerships and collaboration. In the long term, true partnerships are needed with tangata whenua as well as stronger ties to the whole community. Another fundamental pillar for long term success is knowledge of the freshwater and marine environment and the personal connection and passion for issues relating to freshwater and marine topics. A lot of this can only be done with long term sustainable funding. One thing that also shines through a lot on the posters is PR and Marketing as well as branding. If FWME in NZ is to engage more people the communication strategy needs to be clear and consistent and goals and success stories need to be well documented and celebrated.

Each group summarised their plan to the wider group and we then moved into evaluations. Evaluations included each participant commiting to one personal action as a result of the wānanga. These actions will be sent to their owners in August 2018 to support participants to reflect on their progress and troubleshoot potential barriers they may come across.

Evaluation

Ratings

	Score						
	1	**2**	**3**	**4**	**5**	**6**	Total Respondents
Venue					9	26	35
Food				2	7	26	35
Time Frame			2	7	11	15	35
Overall Organisation				3	13	19	35
Value for money					2	32	34

Venue	
Food	Too many onions! Kai Waka awesome. Park Cafe OK.
Time Frame	A little too much long distance travel for short stops. Hard to have after NZAEE. Not after another conference.
Overall Organisation	Needed details sooner.
Value for money	1 n/a. Paid for me.

How effective was this wānanga in showing Successions for marine and freshwater conservation and action?

Grading	Number
1	
2	
3	2
4	14
5	13
6	3
Total Respondents:	**32**

Comments:
Succession so much to offer
Talking more about specifics would be good as well as big picture (more time maybe?)
Possibly more for EMR than marine/freshwater in general
Just need more time to grow in some regions :)
Thought provoking and useful workshop
Very present and foundational but sometimes a little lost in the introduction of new things

Rate the wānanga for effectiveness for networking

Grading	Number
1	
2	
3	
4	
5	5
6	29
Total Respondents:	**34**

Comments:
6!

What do you think about the time of year? Is April the best time of year for us to hold our annual wānanga? If not, why and when is a better time?

Agree that April is good	**29**
Disagree with April	**2**

Comments:
Yes but maybe not around spring tides (would have liked to go out and check for spawning)
May
November (alternative suggestion)
Yes but also November
Yes but school holidays doesn't suit

Ah-Hah moments and highlights

Freshwater
Fish passage fixes
Sampling and analysis N, P, E.Coli
Time at Riuwaka Source
Fish passage
Fish passage
How to improve culvert
Kōaro go back to the same stream (cool)
Fish passage
Native fish catching on field trip
Fish passage
Building bridges and passages - videos for fish
Planting trees

Tim's video of removing fish barriers
Sacred water sources resonating with local 2 iwi
The Love Zone Inanga Spawning
The ease of passages for actions
How to fix culverts
Students creating training videos (SHMAK)
Fish passage solutions
Riuwaka and Te Waikoropupu
Marine
Fish hook
Realising I can use the people here at these events to enforce #MoreMarineReserves messages!
Richard! Great pres
Richard's fish hook demo
General
Better understanding of the provider/programme
Making/re-making local connections
Nga's korero walking toward spring - how to bring matauranga Maori into my mahi
5 min presentations
We have to live the values we teach - uphold our responsibilities to community and whenua.
Having wonderful mana-whenua guide us throughout the wānanga
Dancing
Team Meeting
Finding a new cousin
How others are incorporating learning outside the classroom and working with teachers to make it happen
Ngarangi's korero
Balance: we tend to over-extend ourselves/also not ask for help.
Overall discussion about Abel Tasman Park. Discussion about where we are going
Conserve habitat not just organisms
Ngarangi's korero about ancestors on carvings
I am not the only one with similar issues
Others learn from Australia too
Showing off our region
Discussion about what we want to see in 2030
Many conversations with individuals

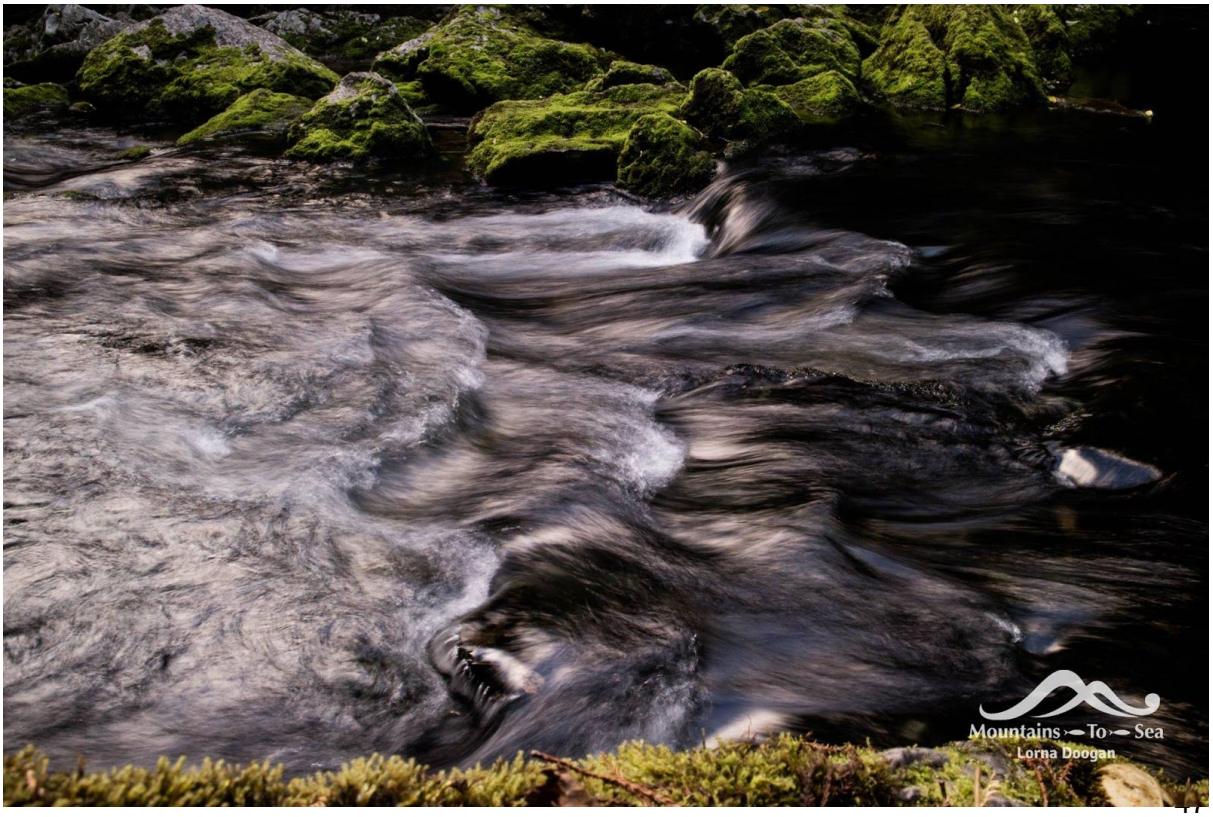
Ideas for Improvement

Time for EMR to discuss cool ideas for funding/marketing and what works well
Loved it all, but it felt very rushed. Maybe an hour (dedicated) for us to catch a breath and lie on the grass and absorb all that's happened in the two days.
Have dinner earlier
More small group intros on first day - maybe organised mix ups of groups earlier to get to know people.
Factor in the downtime so worktime is more efficient
Training after the wananga
More hands-on practical opportunities - practice using the tools available
Organisation committee meetings
Downtime
More downtime
More realistic timeframes for when going off-site
More stretching breaks in between speakers
Downtime for chatting sharing
Games' at start of wananga to get to know eachother better. More time at 'happy fish'
More dancing :)
More networking time. Wananga first, training after.
Buffer time
More downtime - make it one day longer to fit everything in so not so exhausted
Go to hot pools so we can combine fun activity with downtime and chance to chat
Too much time in bus - more time on the shore/sea/forest
More definitive planning time with regions
Online evaluation to save paper
If you aren't onsite - better more notice of different venues - long days for old people.
Some experts sharing more knowledge on field trips about locations/research
As part of wananga do a group action in the area
More snorkelling. More chat/network time
A bit rushed on field trips. Do less better!
Earlier dinner and bedtime!
More science - latest research
A little more downtime. More games and less PowerPoint
Lights off earlier for some
Games Fun and getting to know each other

Ideas for location of next wānanga (2019 'home Northland or Auckland)?

Far North - Kaitaia	4	
Waiheke	2	
Far North - Hokianga	3	West Coast - Northland.
Northland	4	Ngunguru, Waitangi
Great Barrier	2	
Auckland	3	Papatuanuku Kokiri Marae
Whananaki	1	Supported by Community Led Development Group
Far North	4	Not Coromandel haha. Whatuwhiwhi

Next 'away' location ideas:		
Dunedin	2	Otepoti
Sub-Antarctic	1	
South Australia	2	in 2020 once EMR/EMS relationship, maybe Giant Cuttlefish trip and wananga
Otago	1	2020
Wanganui	1	Te Awa Tupua. Learn about the river having rights.
Fiordland	1	
Stewart Island	1	
Coromandel	4	



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