Mountains to Sea Wānanga

A national marine and freshwater conference

Waimanoni Marae, Far North, Te Tai Tokerau

2019

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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 on this Wānanga – we explored key themes 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; succession, came 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.

This year's topic; He Wai Rangatira, came at a time where the trust is exploring what is at its core as it builds strategy for the future. The wānanga has 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 Coromandel in April 2020.

Contact List from the Wānanga

Video from the event

Photographs Facebook | Google

Acknowledgements

This wānanga is made possible thanks to Lotteries Community (Northland).

National delivery and succession planning for Mountains to Sea Conservation Trust is thanks to the Tindall Foundation.

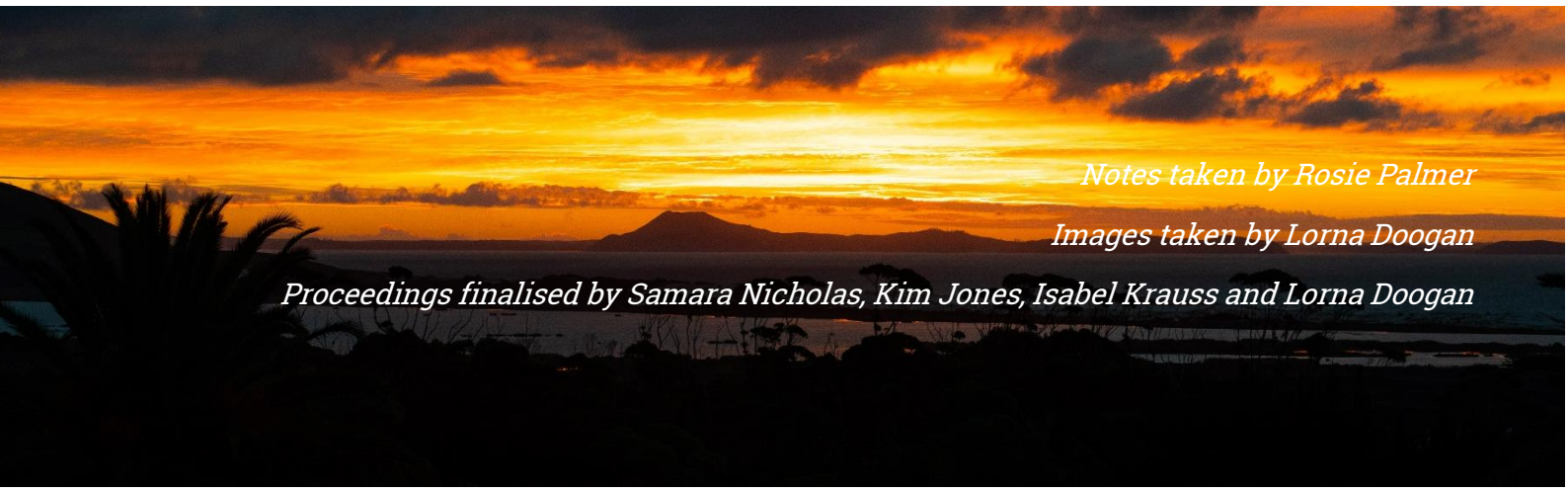
We would also like to thank 2plus for their support.

Nina Pivac for all her energy and time she put into organising the wānanga.

Maria Lawton for the yummy catering, brain and soul food.

Thanks to Ngāi Takoto for hosting us at Waimanoni Marae.

Thank you to Joanne Murray for sourcing Tupakihi Balm from Tuia Maara Whenua.



Notes taken by Rosie Palmer

Images taken by Lorna Doogan

Proceedings finalised by Samara Nicholas, Kim Jones, Isabel Krauss and Lorna Doogan

WĀNANGA PROCEEDINGS

Day 1

We were given a warm powhiri welcome onto the Waimanoni marae and made to feel like whānau by Ngāi Takoto.

The theme from the wānanga was “He Wai Rangitira”. The essence of this means that together we will explore waters significance through values; ancestral, spiritual, strategic and economic.

Through this, it is our intention to find ways to form stronger partnerships and collaborations for common goals and aspirations so we can achieve something meaningful together.

During the wananga we asked that participants welcome a process of openness. Listen, engage, reflect, participate.

We firstly listened to insights from iwi in the area to understand what water means culturally to each of them, and the actions they are taking to protect their freshwater and marine environments.

Ngāi Takoto

PDF

The dune lakes restoration project Ngāi Takoto have been involved in was discussed. The project was created through a collaboration between DOC and iwi. First, a short clip was shown reflecting on the journey the iwi has gone through to get where they are today.

The project took hold in 2015 with a government land claim settlement with other iwi. Ngāi Takoto were then given a platform to take on a responsibility as kaitiaki. The key pillar of the iwi was sustainable management of the land. There was then a focus on getting action happening in the community. The iwi were looking for innovative ways of understanding the environment as they understood that more knowledge meant more opportunities. The project involved working with DOC and was also closely connected with 5 iwi in the local area. DOC's focus was on improving management of 50 freshwater sites from mountains to sea and increasing community involvement in the process. The lakes that the iwi had some ownership of also covered a large area encompassing farms, wetlands and DOC land. It was viewed from a catchment-based approach so all could work together, and no areas would be neglected in the process. The main focus was on working with others and building connections.

There was a focus on working with farmers about wetland restoration as it was understood that Awanui is a huge catchment and within it are a large number of farms affecting the river health, which in turn affects the harbours. The importance was felt to make connections with the farmers now so there is a healthy environment for our tamariki and their future.

Horticulture and forestry strategies were put in place. There was also an environmental plan for the iwi, including key significant sites to focus on, and outlining a template for how the sites work. This plan was sent to government to keep track of as well, outlining the management of resources and the merging of tikanga.

There were 4000 hectares of wetland with no tracks in or out so drone aerial mapping technology was used. The drone can map 20 hectares in half an hour and picks up areas or species of interest that otherwise wouldn't be known, such as untouched wetlands, native orchids and mud flats. The plans could then include vegetation surveys, spectral analysis, topography and drainage mapping. The maps were provided to contractors, with tapu sites being marked off so they were not disturbed.

To involve the community, local people were given the opportunity to be involved with managing the land. This provided people from low income areas with work experience and increased skill

sets. The connection with the land could be established, increasing the values of protecting the land within the community. There was an incentive with wages earned and connections formed for more opportunities working in the chosen industry. There is a NorthTec programme that runs alongside the project, where students can study an environmental programme of their choice three days per week, and gain credits towards their qualification through the work they do with the project.

It started out as a two year project to give enough time for change to be observed. So far 55 -60 people have come through the programme. Out of those involved, 40 people have gone on to employment, many of whom have taken on supervisor positions as they now have the skills necessary for these roles.

The community days have been very successful, with 5000 trees being planted at Split Lake. At Lake Waiparera, where there is a lot of algal bloom, livestock have been fenced off from waterways. Planting days are now being planned and local schools and the community have been invited to help with the planting. Hopefully 1000 trees will be planted at this site.

The community involvement was made successful through posters educating the public on the project. There has been great education opportunities for local schools as the project brings in NIWA and MPI educators and local kaitiaki to run stations and engage the children during tree planting days. So far, the project has managed to plant about 40, 000 trees around the dune lakes, also carrying out pest control, water monitoring and fencing cows out of waterways.

A nursery has been set up at the Waimanoni Marae, where local seeds are collected, propagated, and then the plants can be sold to the community, with profits going back to the marae and into the community. Northland Regional Council want locally sourced trees as they have a higher success rate when planted back into the local environment so there is a need for this nursery in the area. Three community gardens have now also been developed with schools in the area.

Ngati Kahu – Sustainable Seas

Ngati Kahu worked in partnership with the local community and marine experts to create a short film project on Sustainable Seas. The focus of the project was on enabling a more holistic marine management. Government support was generated through sharing their stories, experiences and case studies on Maitai Bay to make some improvements to the area and increase protection of the marine environment.

The Maitai Bay campground had been under management of DOC for the past 10 years, and is operated through the local iwi Ngati Kahu, that live on the surrounding land at Maitai Bay. Maitai Bay is a very popular beach and campground, being rated in the top 10 beaches to visit in New Zealand for its beautiful scenery. The bay encompasses many different habitats of sheltered beach, shallow rocky reef, deeper reefs and headlands, exposed cliffs and a peninsular so the area is ecologically significant.

However, there had been an overpopulation of kina eating all of the seaweed and because of this, koura and fish had been crowded out of the area. Kina were then left with no predators to outcompete them and the marine ecosystem has become very unbalanced. Maitai Bay had become one of the most degraded areas in Northland.

The local iwi decided to propose a rāhui being put in place to support the ecosystem rebalancing through a no take zone on the marine life of Maitai Bay. Fishing and collecting shellfish are banned

on both Maitai Bay and adjacent Waikato Bay, as far as a point about 1km offshore. The rāhui encompasses the different habitats at Maitai Bay, in order to restore the ecology of the exposed coast and deeper reef as well as the shallow rocky coasts. The rāhui came into force on December 20, 2017, and will run through to March 1, 2020.

The rāhui was declared by hapū Te whānau Moana and Te Rorohuri, with Whetu Rutene being the project co-ordinator. The group decided to create this change locally, and hoped that central government could support the movement through legal enforcement with time. The rāhui movement was chosen to observe changes as it progressed, and encompass traditional authority and values to conservation. Even though the hapū who took responsibility for this movement were small, the message was put together very well and shared with the community through signage, brochures, online mediums and on national television. DOC supported the initiative and ensured campers were aware of the rāhui onsite. Opportunities were given for members of the hapū to be trained and involved in monitoring the rāhui.

Two pou were erected on the hill overlooking Maitai Bay to represent the iwi tupuna (ancestors) of the area; Kahutianui and her husband Te Parata. The other side of the pou, facing the water, represent Hinemoana and Tangaroa, the female and male atua (gods) of the sea and kaitiaki (guardians) of the area. This acknowledges that the area is going to be restored and that respect is needed from people visiting the area. The pou are seen as te rangatiratanga (chiefly authority) that help to share the knowledge of the area and the value placed on this environment.

Vince Kerr, a marine biologist, has worked with the hapū in this area over the last 20 years in Northland monitoring change in marine environments. Vince is also on the board of the Mountains to Sea Conservation Trust, with the trust supporting the rāhui by raising funds to provide monitoring during the rāhui, which can be used as an ecological baseline. The Experiencing Marine Reserves programme has been carried out in the area over the rāhui, with increased biodiversity now being observed in the bay.

These connections were at the root of the movement, as gaining support from other organisations allowed the rāhui message to be shared and community understanding and support for the rāhui followed. Overall there was a very positive reaction to the rāhui, with the general public wanting to foster the relationship between Māori and European practices.

To find out more about the work of Vince Kerr and the Mountains to Sea Conservation Trust go to www.howtokit.org.nz

Te Rarawa

In 2008 there was a hui (meeting) at a marae in Ahipara regarding closing access to coastal area as vast amounts of pāua were being taken out of the area. The iwi, local marae and the community of Ahipara joined together to form a committee to look at ways to protect the area. They wanted to find a balance in looking after the pāua population as well as acknowledging that many locals relied on Tauroa point as a food source.

The committee decided to implement a traditional rāhui, which used a tapu (restricted access) as a form of environmental protection, as well as erecting a pou in the area. The pou represented the five elements of te rangatiratanga, matauranga (knowledge of history and significance), kaitiakitanga (guardians of the area), whanaungatanga (relationships with the area), mana (authority and sovereignty of those areas). This brought back the traditional place names, stories and history of what happened at this area of Ahipara. The rāhui stretched 1 kilometre along the coast that most people fish pāua from. The area was also historically tapu, as it was the Tenana waka landing point of the hapū involved.

There are three marae with kaitiaki responsibilities of the rāhui, and locals have become honorary rangers, balancing Māori tikanga with conservation principles. Reactions to the rāhui were initially not positive, but eventually everyone accepted it once they understood the reasons behind putting it in place.

Since 2009 there has been monitoring in the rāhui area and it has replenished substantially over the years. After the first year, all of the pāua had come out of the cracks along the coast as there were now less predators for them. After three years, the area was laden with pāua, and the pāua could be found back up on the shoreline, where they were found historically. Now there is increased biodiversity and replenishment of pāua communities happening outside of the rāhui boundary and pāua, kina and koura are in balance. The rāhui is going to be left in place indefinitely as it is understood that if it is now removed, it will cause a lot of damage to the restoration process. The locals are now hoping to replenish the whole reef.

The community is looking after the resources they have and taking any actions necessary to increase the health outcome of the area. Pāua from the area have been transported down to Ruakaka to breed more, and then brought back to Ahipara to plant out 80,000 pāua into the same area to support the rāhui outcomes.

Introductions

We were asked to describe in one word what we each hoped to get out of the wānanga. The words included;

Connection, networking, experiences, inspiration, education, knowledge, learnings, listen, journey, insight, kaitiakitanga (guardianship), strength, expanding, rangatira (leadership), refocus, kia tere (hurry up), innovation, whānau (extended family), aroha nui (much love).

Mountains to Sea Conservation Trust

Kim Jones – Whitebait Connection (WBC)

PDF

As the theme for this year is He Wai Rangitira, it's great to spend the time exploring the values of water to see what it means for each of us. The wānanga is a chance to form stronger relationships and collaborations with others, as well as a process of reflection.

The MTSCT first started in 2002 by four passionate leaders. The intention was to communicate marine and freshwater science to communities and involve them in the experiences. Thus, empowering communities through restorative actions taken in their local environment. Currently there are eight trustees and Dr Roger Grace is the patron. There is now a team of 40 coordinators nationwide.

National wānanga's began in 2006 at Leigh. Over time, EMR and WBC collaborated as it was realised that they were stronger together. The team grew and the message spread further. Local communities are supported when a wānanga is held, and initiatives that have been started in the area are shared. It is a great chance to connect with locals and plan for the future. Regional growth is supported, by connecting and encouraging those on the ground in each area.

Our purpose is at the core of what motivates us and MTSCT has a kaupapa of collaboration, co-creating, and action that get powerful results. We recognise that our values, behaviours and actions can change over time, from our ancestors to present day. We still hold a love of the land, rivers and sea but maybe we have changed the way we show that love. We understand the importance of passing knowledge down through the generations, by doing it in a way that can be adapted to each person's values. By having such passionate people share this message, knowledge shared is heartfelt and interactions are more meaningful because of that.

Samara Nicholas – Experiencing Marine Reserves (EMR)

PDF

There has been great evolvement of EMR over the years, with the technology and gear changing over time to better suit people's needs. EMR's main focus is connecting people, both children and adults, to their sea. The Kaitiaki action plan model that we follow starts in the classroom, then gets students out in their local area and lastly takes students to a marine reserve (or other marine protected area such as a rāhui) to show them how the sea should look and inspire connections. The very positive feedback we receive keeps us going, as well as taking inspiration from influential N.Z. marine leaders such as the late Dr Bill Ballantine. Samara encouraged everyone to read his works (found) to help inspire us in the direction we should be taking with supporting sea life sustainably.

EMR has been working at Maitai Bay since 2004 and so many schools have visited this place over the years with each school observing the immense kina barrens that were found there. Whetu Rutene was a parent at Kaingaroa School during the EMR programme delivery in 2015. It has been great to see some of the biodiversity come back to the area with the rāhui now in place there.

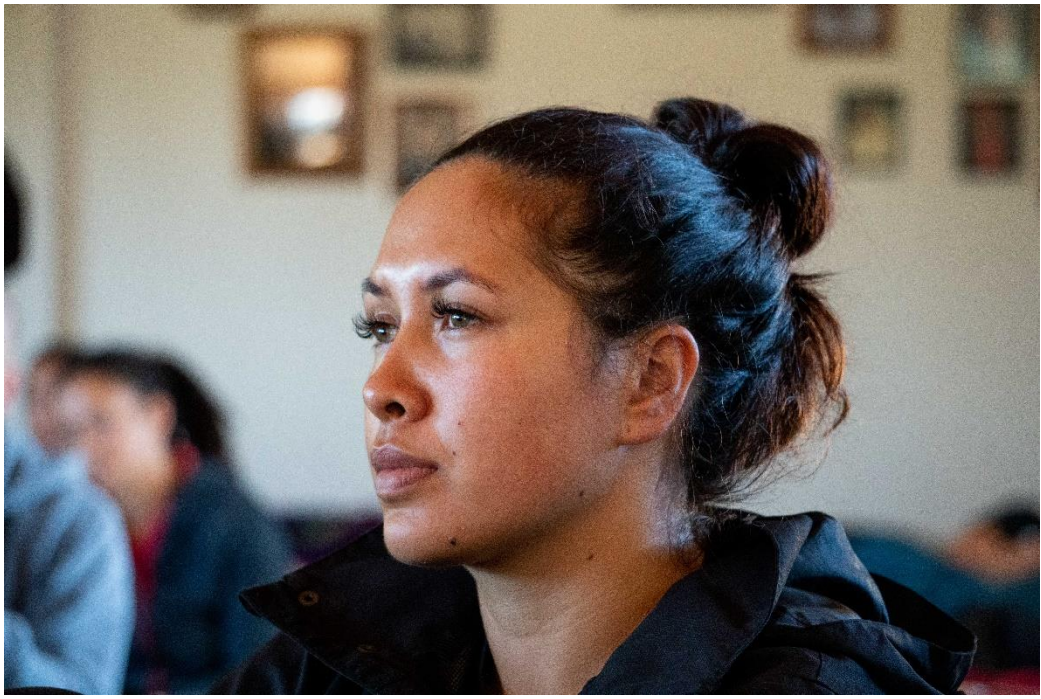
We now have eight regions involved in EMR nationally, and more recently Australia has based a programme on EMR called Experiencing Marine Sanctuaries (EMS). We celebrate the action projects that happen around the regions with a Poor Knights annual competition trip, that is very rewarding to all who come to visit with us.

We find that even more community support is gained through our community guided snorkel days, which increase engagement with people's local areas. We have also held community guided kayak and SUP days to take people through areas that we can't snorkel in, i.e. Motu Manawa (Pollen Island) Marine Reserves in Auckland, where the motorway runs through, which is too polluted.

The success of EMR comes down to connecting people to the sea by getting them in the water. This allows them to see first-hand the difference a rāhui or marine reserve can make to an area. We hope to continue the national expansion of EMR, supporting marine conservation and tautoko (supporting) the rāhui movement.

Nina Pivac - Whitebait Connection (WBC)

PDF



It is great having the wānanga located at Rangaunu Harbour, an area where people are connected to the water economically, culturally, spiritually, and what that means to us as individuals.

It has been a rewarding journey to focus on the health of our streams, rivers and lakes through the WBC kaupapa. It is so important being able to tailor WBC to what is relevant for the children and connect them on a deeper level, as well as encourage hands on learning where kids are empowered and inspired to take action for the future, where others can join them on the ride as well.

Since 2002 the WBC programmes have expanded to become more active with the involvement of schools and community groups contributing to follow up actions. Encouraging citizen science is a big part of WBC, ultimately getting kids out of the classroom, exploring and contributing to national databases around the country. There are now nationally available resources, like the National Inanga Spawning Programme, where people can be assisted to identify where inanga spawn and restore these areas to increase spawning productivity. Spawning reserves have been created, which increase the whitebait species, which are classified as in decline. We have found that sometimes focusing on something small, such as the inanga and where they spawn, is a good hook and can get landowners passionate. Then communities can think of the adult habitat and how they can help with this too.

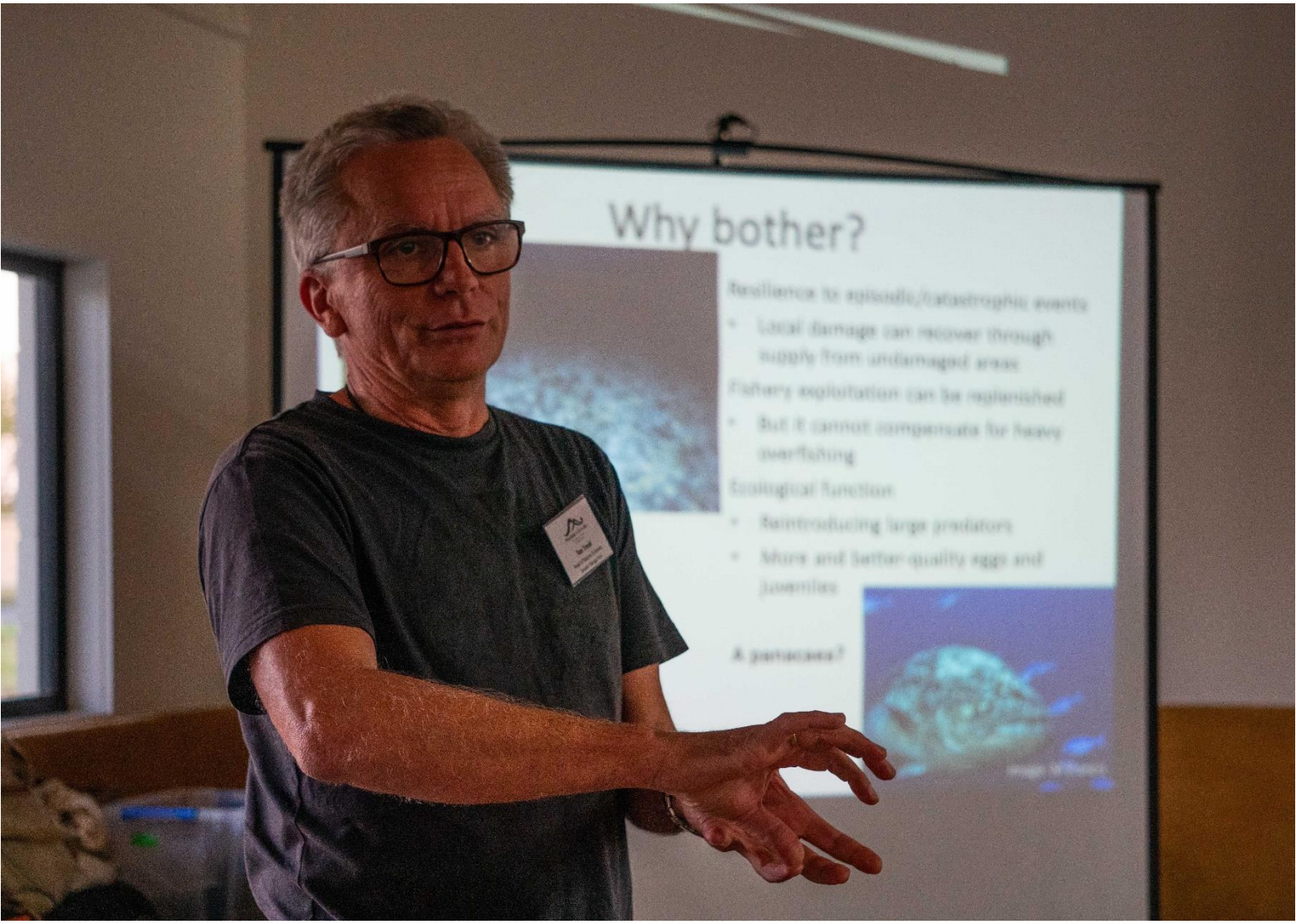
The passion for conservation and the environment that our team carries is linked to the kaupapa of our actions and connects with other people's values of sustainability to help spread the message. As tamariki are connected to their values, their sense of ownership is sparked and they can then spread the message and actions in their own ways, while WBC assist them with the tools to do this. Collaboration is key to our mission and we can come up with some actions together at this wānanga.

Marine Keynote address

Tom Trnski, Auckland Museum

PDF

Fish Larvae, dispersal and connectivity in fresh and marine waters – it is all connected.



Marine connections are made through people, but also how biological systems are connected to each other. There are many devastating impacts for native biodiversity by losing our seascapes and the general trend in marine environment is that we are slowly losing diversity and have seen a lot of change over the last few decades. Living in a marine environment is like living in a 3D landscape with not much structure. There is now a lot of human impact through sedimentation, pollution and marine populations, and nothing for it to hide behind.

The dispersal of marine organisms happens at egg or larval stage. The dispersal is initially facilitated by currents, and as the larvae develop, they can swim from 10 km up to 100 km, which alters the direction of their dispersal. Rock lobsters and some species of fish can disperse very large distances, over 1000 km away from their spawning site. Even seaweeds have propagules that are

part of their dispersal stage, although seaweed is dispersed at much shorter distances than fish larvae. Adult fish species move around but most marine organisms don't move much, or only move within a limited area. The larvae look so different from their adult stage that it can be hard to identify larvae species which is a challenge when tracking which species disperse where. The relationship between how long larvae are in the water and their dispersal movement is non-linear which also adds to the challenge of predicting where larvae species will end up.

There are three different species of freshwater eels found in New Zealand. We know that shortfin eels spawn in North Western Papua New Guinea. Australian specked eels spawn in Eastern Australia where they have a nine-month larval stage. It has been recorded that it takes them approximately six months to travel over from Australia, which can be 3000 to 6000 km in distance. Long finned eels are the only eels found exclusively in New Zealand as adults. They are thought to spawn north of Tonga and take about nine months to arrive in N.Z., by drifting around in the currents.

Inanga spend about six months in sea water before returning to freshwater, but no research has been done to show that they come back to the same area they have spawned in. Riparian vegetation, land changes, whitebait fishing and pollution are impacts influencing the inanga populations nationwide. It is important that we fix all the weak links in the chain of their history to make sure that they exist into the future. We already lost the N.Z. grayling, which had a whitebait phase. This species was last recorded in the late 1920's and was probably lost due to reduced wetland environments and overfishing.

Once whitebait larvae species grow, they can swim very large distances, equivalent to a human swimming a 50-metre distance in two seconds. The larvae can swim in viscous conditions for days without feeding. They can swim 12 km, based on their average swimming speed. This is due to the fish larvae developing advanced sensory systems. Their nervous systems are quite basic when they first hatch but then their vision and sense of smell develops quickly. They can detect polarised light and magnetic fields in the earth. The Leigh labs are now researching at what distance fish larvae can detect sounds, as they come into the reef. It's been found that freshwater fish that come back to freshwater, need to get close to the coast before they know that they are nearing freshwater. The do this by using polarised light as well as sound to know what latitude they are at and which direction they need to swim in.

There has been a lot of research done on Snapper, finding that they are very good at finding somewhere to settle as juveniles, by detecting plumes of freshwater coming out from streams, and relying on sea grass for shelter and food supply. The fish have been found to prefer to settle at night when they can't be seen by predators. Also, fish and larvae have been recorded experiencing physical interactions, like changes in chemistry, depth and currents to get to where they want to settle. As freshwater flows near the surface and seawater is denser, fish can use tides to catch a ride in and out of freshwater.

The N.Z. Galaxiid fish species have east and west species, but otherwise there is not much difference between them. Inanga are the only species shared with Australia and South America. All other Galaxiid species are found only in N.Z. The migration these species undergo between freshwater and saltwater is speculated to have evolved due to Galaxiid species avoiding parasites by going into saltwater as well, where the parasites can die off before species come back into freshwater.

Galaxiid larvae are very selective about which chemical sensory system they use, and they will come into freshwater during floods, allowing the freshwater current to pull them in and thus

allowing the physical environment to be a tool to work with their dispersal. The marine communities are thus connected through this larval stage, and populations are sustained. Some places can resupply themselves, where larvae sometimes go straight back to the same place they spawned from, but most places are inconsistent with the populations of each species found there on a given year. It depends on the species own abilities, as well as the physical conditions at the time of dispersal and migration. These areas are called open populations as it is unknown where the fish will end up. This population variability explains the inconsistency between areas where there is low recruitment one year and large population numbers there the next year. This variability mostly occurs in the larval stage as if any of the links they rely on are weak, they will go elsewhere to meet their needs. This includes if there is limited food supply, strong currents, no habitat to protect them, or fishing pressure, as all of these factors will destroy a population with time.

We can do something about the habitat conditions and fishing. This is where marine reserves can make a big difference. Marine reserves have been around about 100 years, although they can be hard to get established and get support from all of the population due to fishery demands. Most marine reserves are driven by the needs of people, as people want to preserve a beautiful spot, as well as the economic and political benefits they bring, rather than for the ecological benefits. Marine reserves provide a mass of abundance and diversity to the area and then the boundaries outside of the marine reserve have flow on effects.

Old females need to be protected as they have the high egg supply that sustain the future generations of their species. Is has been found that fish have a seven-year recruitment process, where the young produce more eggs once mature. The adults will spawn and then juveniles recruit, but the size varies greatly each year. There is a good recruitment pulse once every 7 years on average during a fish lifecycle. If all fish are caught in a two or three year period, then a fish population can be run down very quickly. If there is a fishing limit in place on allowing people to only catch big fish, then the evolution of fish is to breed earlier and then they don't grow as big. Using a slot range is a better way to fish as then big females are left unharmed to continue spawning.

Through studying the Great Barrier Reef marine reserve, which is 33% of the area, it was found that fish inside the reserve produced twice as many juveniles as those outside the reserve. Fishing industries were happy with this reserve as they had more fish being produced, which they could then catch outside of the reserve, as opposed to the numbers of fish they were catching before the reserve was established. This shows that the size of reserves matter, as once fish are outside of the reserve, some species are then predated on. Studies have found that a 30% marine reserve allocation is the best size for protecting fish populations long term.

In N.Z. the only big reserves are in areas where there are not many people. The goal is for 10% protection but currently we only have 0.3% marine reserve protection in N.Z. waters. Marine reserves can serve a very important function if we are faced with an ecological disaster as if there is a full complex ecological system in place, then the environment will be more resilient to change.

Fred Lichtwark; Whaingaroa Harbour Care

PDF

How to get your catchments waterways fenced and planted

Whaingaroa Harbour Care started in 1995 in Raglan and is still running today. Together, the community have planted 1.75 million trees. Whaingaroa Harbour was the worst in the North Island, with only one fish being caught every 18 hours. With the effects that have been put into restoring the area, you can now catch two fish within an hour. This improvement hasn't been seen anywhere else in the world, and it's all to do with land-based practices.

The group's key focus was on keeping sediment out of the harbour. There was also human effluent going into the harbour but that was only 3% of problem, the rest was coming from farmland that was being deforested. NIWA was engaged to do a reseeding program in 1995 as the shellfish had been dying but the shellfish stock kept on washing up dead on the foreshore after each heavy rainfall. Stock were down in the foreshore pugging it up and getting bogged there so now there is 175 km of coastline around the harbour that is fenced off. 450 km of further fencing for stock in the area was put in place over the years that Whaingaroa Harbour Care have been involved so that now 70% of the catchment is completely fenced off. Eco tourism and commercial and recreational fishing are the main economies in the area now, so the health of the harbour is of great importance.

A nursery was established where seeds were collected, and plants were offered free of charge to landowners but after five years there were still no farmers that wanted to make a change. A Council farm was created and used as a model to demonstrate sustainable farming. They started to transform the farm, digging out the drain to move the swamp and ensuring the stock wouldn't drown. Over another few years, the farm could be retired by a third and production was doubled.

Suddenly 65 - 70% of farmers took the concept onboard as they realised the economy could be improved through increased production and it was recognised as a good farm management practice.

Inanga were then observed spawning back in the areas where there was now riparian habitat. After one year the vegetation had grown, and the river health had greatly improved. The habitat that planting focused on bringing back was manuka, cabbage trees and flax. Manuka is a plant that is disinfecting so it kills off bacteria and pesticides found in the manure and runoff in the area. Cabbage trees have a big tap root that goes five metres into the ground and are like the kidneys of the earth that take up heavy metals and clean the water. Then harakeke and grasses fill in the gaps.

When riparian planting, keep plantings to the first colonising species and once these have come away, then three of four years later, you can remove the weeds that have grown through and follow up with larger species like kauri or totara to grow around the first plants established. The best median for establishing native trees into is clover, kikuyu and ryegrass. The native seedlings require a reduced amount of light, as this triggers them to germinate so the grass can provide shade for them. Also the grass reduces pests as they don't naturally push into rank grass and the grass provides mulch and retains moisture. If you pull the grass away from plantings or spot spray, then the weeds can come in and swamp the new plants. Make sure the cattle have been out of the planting areas for three to six months beforehand.

Landcare Research have found that a sustainable strip is seven metres across a riparian zone. This reduces grass growth for natural native regeneration to occur. Riparian planting in Whaingaroa Harbour reduced flooding, especially in the lower flood zones which could be retired from farming areas and further reduce flooding. There are eight people employed to grow 120 thousand plants per year, right through from collecting seed to propagating. Plants are sold for $2.75 to $3.75 per plant to farmers. This produces $250,000 to $350,000 per year to put back into employment and resources within the project.

NIWA monitored the harbour and proposed that the natural processes had been accelerated as the harbour would probably naturally fill in over time and turn from an estuary to a salt marsh before eventually becoming reclaimed land. But as the unnatural amount of sediment coming into the harbour was reduced, and the rest was flushed out to sea, an equilibrium within the ecosystem was

maintained. This surprised NIWA and more studies were then carried out to see why the result was so different from what was expected and find out more about how harbours work.

The biodiversity of the area greatly increased and both fish and shellfish populations surged. As the shellfish came back, the filtering capacity was greatly increased to keep the harbour clear. Sea grass has come back from only growing a few metres around the harbour to now growing hectares of it. Now Canadian geese are ripping out the seagrass, so it is an ongoing project. With urban streams, stormwater retention ponds have been put in and planted them up. Signs have been put on stormwater drains educating people that anything going down the drain goes out to sea.

Whenever sediment starts to come out of the harbour again, it can usually be targeted to an action happening from a landowner upstream. The problem can be rectified once the landowner is aware of the impacts of their actions on the waterways. This happened at Bridal Veil Falls, which 150, 000 people visit every year. There were large counts of *E. coli* being dispersed at the bottom of the waterfall, which was causing lots of respiratory problems to visitors. Once the area was fenced up and planting occurred upstream, the E coli levels went down from 1200, to 50.

Farmers now understand the economic value of doing this regenerative work on the land and they were keen for Fred to stand for regional council to clean up farming practices. With community support, they realised a lot more could be done for the area as a whole. Now there is going to be a consent to farm, where the farmers need a farm plan identifying all their streams and wetlands mapped out and a timeline of when the areas will be planted up. These conditions will need to be met in an agreed time frame, or they may get fined. A treaty settlement was recently established with the requirement to clean up the Waikato River as part of it. The consent conditions were able to be developed by working in partnership with the iwi and affected parties and together coming up with a model that councillors supported.

In the future, as we get carbon footprints attached to our produce, N.Z. will not look very clean. Farmers want the ecological output to be more sustainable and therefore more economically viable. As N.Z. relies on exports, it is critically important to show the importance of growing plants and riparian planting. The Whaingaroa Harbour project is a great example of how to get farmers on board with sustainable land practices that influence the economic and ecological outcomes for the country as a whole.

Day 2 - Show and Tell

Joanne Murray – **Te Ara Takahia**

Link

Te Kura Kaupapa Maori O Te Rawhitiroa is a kura based in Tikipunga who were looking for an environmental project to participate in. They checked out a local river and followed it to a new subdivision, where they saw bags of rubbish dumped everywhere, even in the river. Then they got to Whangarei falls and learnt that there was no swimming allowed due to the high bacteria levels found in the water. This was the catalyst for change and the students wanted to teach the community how to look after the environment. It was a student driven project with the main objective being to return the mauri to their river. Students got involved with organisations such as EMR and WBC, learning how to use species as bio-indicators and assess the health of waterways and the sea. The students started a project at He Kākano nursery, which WBC is still using today, as well as Waitaua awa, a tree planting restoration project that WBC has continued on.

The journey was captured through photos, videos, presentations and planning and turned into an online resource that is available in English and Te Reo Māori. It is there to inspire individuals and get communities to take up the challenge of looking after their local rivers. The Te Ara Takahia resource is now used all over the world as an exemplar of indigenous engagement with an environmental project. It helps to make learning authentic and gets kids out into the environment and engages them. It shares the importance of taking care of waterways right through from mountains to the sea.

A Citizen Science project was started to monitor the little blue penguins and see what their breeding patterns were. The data collected from this was then compared with other data from around the country. The little blue penguin is an indicator species of ocean health but they are in decline, so by monitoring their behaviours and breeding patterns, the data collected could be used to teach the importance of maintaining biodiversity.

Students developed monitoring technology using thermometers and data catcher units and then installed these into penguin boxes which would record temperature fluctuations indicating if there was a penguin present. The data was then wirelessly communicated to a nearby computer that would send the live recording through the internet. They learnt how to analyse this data and how to get findings out of that. They also used iNaturalist to submit their observations from night surveys.

Community workshops were held on details of the project, how to look out for penguins and how to use iNaturalist. There were community milestones met by doing beach clean ups with local schools and holding educational stalls at busy beaches. The biggest threats to little blue penguins were also identified with dog attacks having a large impact on the population. Students campaigned on national television and radio on how to protect the penguins and raised awareness of what actions people could take to help support local little blue penguin populations, as well as protecting biodiversity in the area.

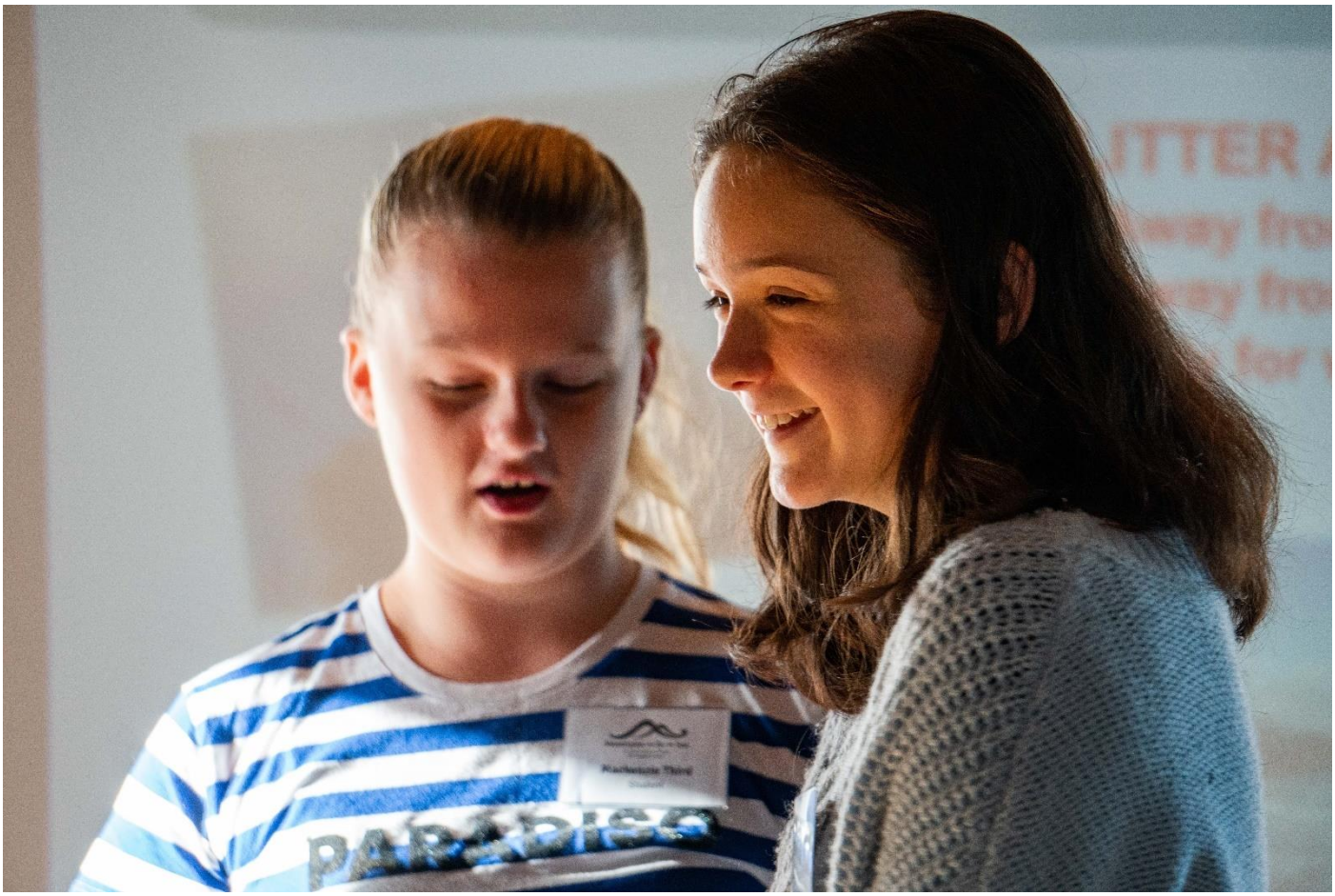
This image shows the monitoring method for data we looked at. Above is a snapshot of the online feed from one of the monitored burrows. The blue line is the control feed which monitors the atmospheric temperature outside the burrow, (see how it rises and falls according to the time of day?), and the red line is the temperature inside the burrow. As you can see the temperatures are aligned until a penguin enters the burrow and the burrow temperature rises and fluctuates, (from body heat), indicating an animal is present and moving around in there.

Pat Swanson and co. – **Project Litter**

PDF

Pat Swanson is a teacher that drives students to create environmentally sustainable action projects. He believes that environmental education starts with our tamariki and he supports the student driven projects to develop with interesting and innovative ideas. Curious Minds was the funder for a Citizen Science project carried out by Marine studies students in New Plymouth that worked in Project Litter. They had to choose a native marine species, find out about it on iNaturalist and what the threats were to these species. The students found out that litter was a huge threat and they then carried out a litter audit from the beach clean ups that they had organised, and colourful art sea walls were created with the litter.

The students have designed bins to be installed along the shoreline for people who find litter on the beach to dispose of. The bins were designed to collect particular types of rubbish as the students wanted to know what types of litter were found on the shoreline, where it was coming from and what the effects were on marine species. As many parking tickets had been found amongst the litter, they contacted the Council and encouraged the change from paper parking tickets to people being able to just use an app to pay for their parking. Many light sticks were found washed up on the beach and it was found out that they were used by the fishing boats to lure fish to their nets at night. It was found that many light sticks are used around N.Z. for this purpose and it is unknown how these are then disposed of. The light sticks were tracked with help from Met Solutions and they now hope to work with the fishing industry to help create changes. The students were presented with an Environmental award from Taranaki Regional Council for their work on Project Litter.



Steve Hathaway – **Young Ocean Explorers**

PDF

Steve takes his daughter Riley with him exploring the outdoors and as an underwater cameraman, he films her doing stories on marine animals and environments. The project came about by Steve filming for 'Our Big Blue Backyard' series, and then Riley got involved in a marine project for EMR that focused on turtles and plastic. It happened that Steve had just filmed some plastic in the ocean while shooting the series, so Riley used this footage and presented it to other children at her school. The inspiration came from this and they could see how other children were connecting to the story through a child leading it.

They have now done 20 episodes for 'What Now' and were involved with posters for the Hauraki Gulf forum that brings marine animals to life online. An interactive sight was then launched in October 2017 with the aim of sharing with children all over the world the wonders of the ocean. The site was mainly designed for teachers to use in the classroom with quizzes and games available, as well as a tool for sharing more information about the ocean. It has now had over 780,000 views of the content since being launched and there are over 2,000 teachers signed up to use the resource. It is a great Science resource for primary teachers that aren't confident in the Sciences, and also works to engage children that don't engage with more traditional forms of learning, as well as students with English as a second language. A new series is coming out soon with a new Young Ocean explorer, Tiki, and he will share the Māori perspective of the taonga of the ocean with viewers.

Sarah Kachwalla – **MTSCT Wellington - Taputeranga Marine Reserve**

PDF

MTSCT has now had ten years delivering EMR in Wellington's Taputeranga Marine Reserve. This marine reserve is located on the south coast of wellington. The reserve is 4.5 km across and expands 2.5 km offshore. Having now had 10 years as a reserve, crayfish are now being sighted very easily, with the body sizes increasing every year. Big moki and octopus are now sighted, along with more kelp. It has been great to share these changes with students over the years and it has inspired many to create sustainable actions in the area.

To celebrate 10 years of the Taputeranga Marine Reserve, lots of events were held for the community to be involved in. There was a big dive event where around 60 scuba divers got to experience the marine reserve and another community snorkelling event. There was a Pecha Kucha night where people involved in environmental and wildlife projects around the marine reserve were presenting. There was a celebration day which about 400 students participated in and got involved with different activities being held. One of the workshops was recycling old t-shirts into shopping bags, another workshop was D.O.C. workers helping students to design posters which are now up around the marine reserve educating others on the site and how to protect it. D.O.C. also brought their predator detector dog along for students to learn about what the dog's role is on the team.

Lara Taylor – **Enabling Ecosystem-Based Management for Sustainable Seas**

The Sustainable Seas National Science Challenge is one of 11 National Science Challenges that was designed to bring different agencies and community organisations together and work out solutions to major, complex problems. One of these focuses on sustaining our moana using ecosystem-based management (EBM) for the benefit of all New Zealanders. This is a form of holistic management based on seven key principles adopted for the Challenge including: co-governance, human activities, adaptive, knowledge based including Citizen Science and Mātauranga Māori, sustainability, and collaborative decision making. There are currently no examples around N.Z. that encompass all of these key principles.

Lara presented a narrative in the form of a poster that illustrated the importance of "Kotahitanga", interpreted here as "connections", which is an important element in bringing EBM to life. This includes connections between each other and different initiatives, between local and national scale and supporting each other. It includes connections between knowledge systems encompassing dual world views of Western and Māori knowledge. And connecting land uses with marine management and also connecting policy and legislation. All of this, across landscapes – from Mountains to Sea / Ki Uta Ki Tai.

One part of the Challenge is to figure out how we can improve policy and legislation to enable EBM and to better support initiatives and actions that are already underway. All New Zealanders can help to solve this Challenge and are encouraged to share their concerns, ideas and stories with the Challenge.

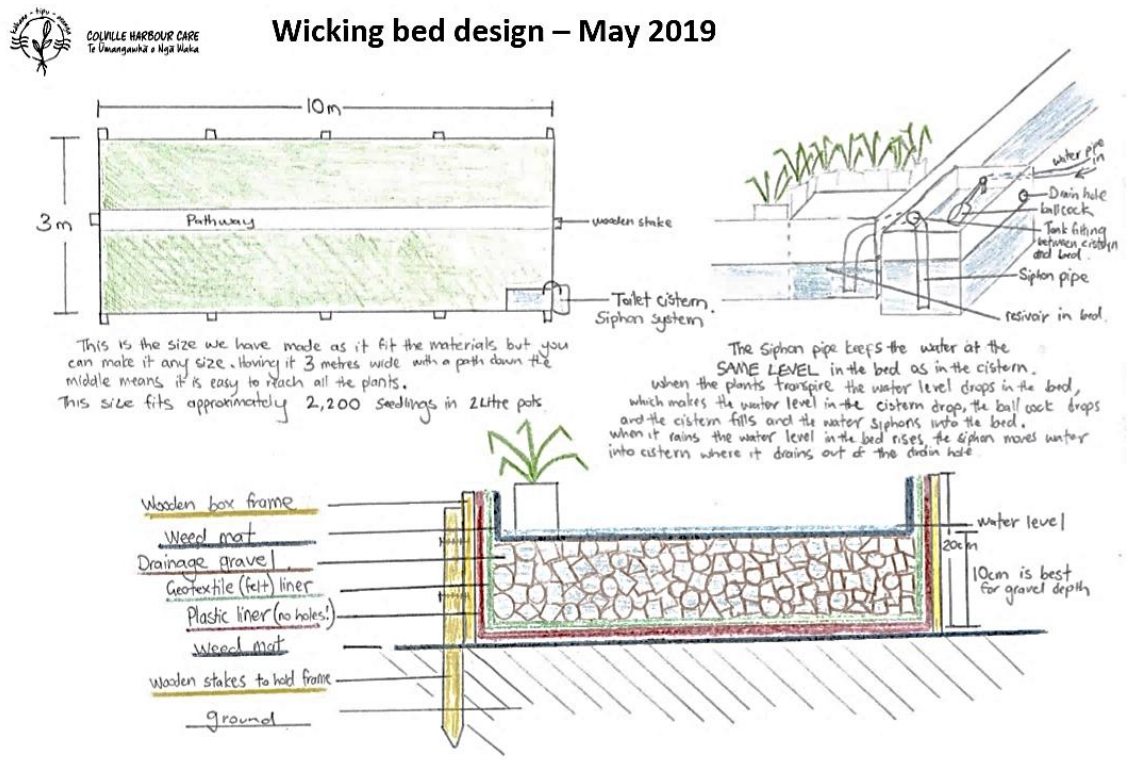
If you would like to do so, please contact Lara at taylorl@landcareresearch.co.nz.

Based at the top of the Coromandel, the Colville Harbour is a small harbour with a 4313 hectare catchment encompassing many kilometres of streams and one big river that flows through it.

In the past, old kauri logs were floated down the main river, and the area was deforested which caused sedimentation to build up. Cows have access to many of the streams which increases sedimentation and nitrates flowing into the streams. The seafood in pre-European times used to support 5,000 people and now there is not much to be found. A lot of pipi washed up on the beach that were dead and covered in algae, and it has been found that Council use poison near the river.

A community group was set up and followed the example of Fred and the Whaingaroa Harbour Programme to create behavioural change within the community and clean up the harbour. Planting days have been carried out with local schools and members of the community. With the community planting days and hired contractors, the aim is to plant 16,500 trees this coming winter. Seeds are collected and there is a nursery in place to propagate the seedlings. An irrigation system has been designed that doesn't require much water or any power to run. On average over the summer of 2018/2019 only 0.06 litres of water per plant per day was used. A sprinkler system can use 0.3 L per plant per day in the summer. This system can be left for a few weeks without needing maintenance. It was made using a paddling pool that is filled with a plastic liner, then topped up with gravel and then weed mat. The water is kept level with a toilet cistern which replenishes water as the plants transpire.

Beach clean ups happen regularly, and children carry out the marine metres squared project to check what is found living in the sandflats on the shore. There is a pest control programme in place with 357 rodent traps around the bay being serviced monthly by D.O.C. as well as bird counts carried out in the catchment.



Jeshua and Melanie – **Seal Rescue Ireland**

PDF

Jeshua is now based in Ireland but grew up visiting Matai Bay, which inspired his love of the ocean and how to protect the marine creatures relying upon it. Through travels he saw that people weren't relating with their environment through daily actions carried out and that people need to be educated in how to reuse plastic, so it doesn't have to be waste.

Seal Rescue is an initiative that is primarily based with the rescue, rehabilitation and release of seals. Most of the seals have been severely affected by human behaviour including climate change, fishing line and ingesting plastic. The seals in the centre can then be used to educate the public about proactive conservation strategies. As seals come up on the land, they are more relatable and attainable than other mammals that stay in the water. The public can come to visit the seals at the centre and learn about how waste can be disposed of sustainably and the dangers of leaving fishing line as litter.

Ecobricks is an initiative that has been started up at the Seal Rescue centre. This includes using soft plastics that cannot be recycled and stuffing a plastic bottle with this non-biodegradable waste. This keeps plastic from going out into the environment and the ecobricks can be used to build many different items, including furniture and housing as it is a good insulator.

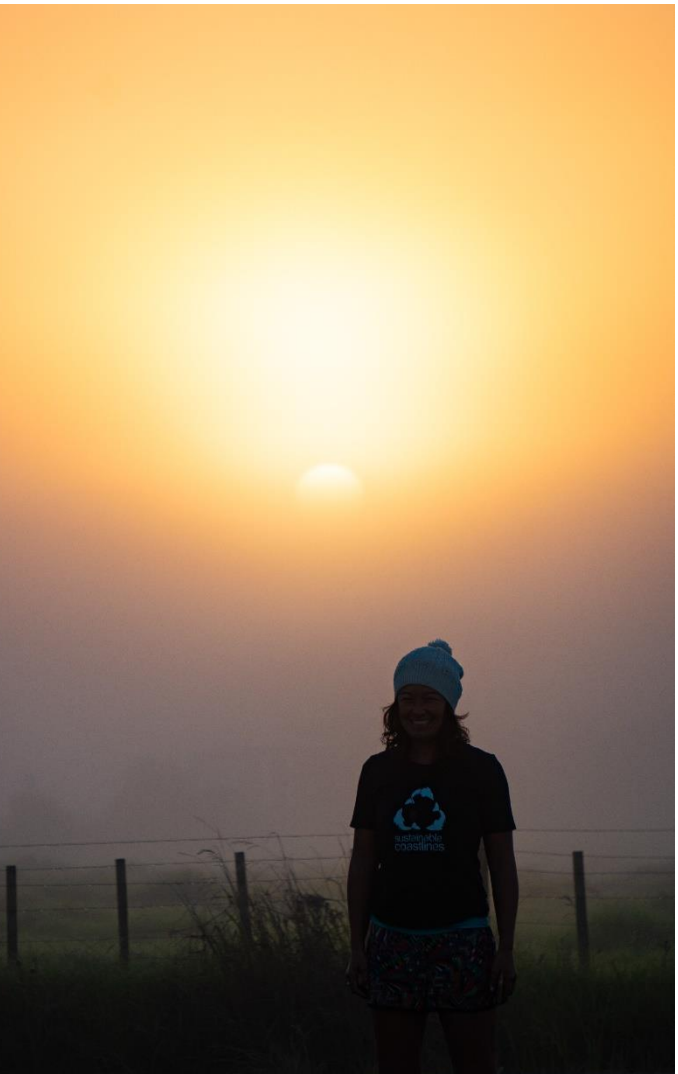
Ben Knight and Shelley Butt – **The litter project: A grassroots solution to litter in Aotearoa**

PDF

Sustainable Coastlines is one year into a Citizen Science Litter Project that focuses mainly on marine litter by coming up with a solution of how to reduce it. The three-year project commenced in May 2018 and is 95% funded by the Ministry for the Environment's Waste Minimisation Fund.

In collaboration with the Ministry for the Environment, Statistics New Zealand and the Department of Conservation, Sustainable Coastlines will design, build and rollout a national litter database that portrays an accurate picture of New Zealand's litter problem. Local solutions can then be developed to create a way of measuring the performance from data. By working to a United Nations Environment Program methodology, data will be collected at the highest standard of scientific rigor, allowing it to be used for national, regional and international reporting, including the relevant Sustainable Development Goals.

The project involves first selecting a monitoring site and mapping out a 100 metre long transect based sample and surveying out to 10 metres either side of the high tide mark. All non-biodegradable litter is collected, categorised by weight, counted and then the results are recorded in the online database. This process is repeated four times a year. The methodology is easy to do and people can carry out samples at any beach once they have set up a monitoring site and tech log-in. Once the data is entered online, they then get instant feedback on what they have collected with the weight, type and how it compares to other regions. The aim is for 108 sites to be used as monitoring sites of which there will be diverse habitats and surrounding land uses to compare against. Next, they are wanting to crowd source for solutions as a way forward so more people are engaged with the project and have ownership of the outcomes.



Sustainable Coastlines will also design, develop and rollout a national litter education programme that aligns with the New Zealand Curriculum. To deliver the education long-term, they will train and support teachers and educators to inspire change in their students; reducing consumption of single-use plastics and improving disposal behaviour to prevent littering. By combining evaluation of the education programme with on-the-ground litter data, the effectiveness of education and a range of other litter-reduction interventions will be measured, providing a strong understanding of the best solutions.

All project findings will be freely, openly and publicly available through a purpose-built litter solutions platform equipped with smart science communications and data visualisation tools. Politicians and business leaders, students and scientists, writers and researchers alike, will all have the right information to make decisions to solve New Zealand's litter problem.

Miriam Sherratt - **Papa Taiao**

PDF

Papa Taiao connect with senior secondary students and facilitate NCEA accredited courses that focus on environmental enterprise. The activities can include planting, pest control, animal pest management, fencing, and agriculture. Papa Taiao want to create open source unit standards for freshwater management, including monitoring and catchment management projects. This will allow students to get specific unit standards that inform their projects on wai restoration.

In 2017 they met with freshwater experts to come up with a framework. They came up with a draft four domains of unit standards including water quality testing, community engagement, emerging technology and wai Māori. The domains can be linked to the student's projects for example the water quality testing could be carried out by using a SHMAK kit to monitor the water, see what elements are out of balance, then identify what human impacts have influenced the water quality. This can then be followed up with a community-focused solution to engage the public, such as organising a tree planting day for the area surrounding the waterway.

Isabel Krauss – **The Waitaua Awa Restoration Project**

PDF

The Waitaua river is located upstream of the Whangarei Falls and is a project that started in 2003 with TKKM O Te Rawhiti Roa and Whitebait Connection investigating and restoring the health of the river. WBC has continued to restore the whole Waitaua catchment and, up to date, more than 5 kilometers of riverbanks were restored with over 60,000 native plants and the help of over 20,000 volunteers.

The plants are grown at the community nursery He Kākano, with support from the Whangarei District Council. Seeds are collected and propagated on site and the nursery has now been transformed into an outdoor classroom with a recent nursery upgrade funded by Whangarei District Council. Workshops will be run at the nursery on how to grow plants, linking it in with stream investigations and incorporating a Māori perspective into the process. He Kākano also uses a gravel bed nursery, which was developed by Dr Roger Grace. The gravel bed has rising and falling water levels to imitate natural wetland processes. The plants can then go directly into projects that support the riparian restoration of the Waitaua Awa. To ensure the success of the project Whitebait Connection uses a mix of funding from a range of different sources. As an example, the fundraising agency Million Metres has already raised more than $9000 for riparian plantings to restore the Whangarei Harbour. In the future, Whitebait Connection is hoping to restore the whole of the Whangarei Harbour along with restoring valuable Inanga spawning sites in the area.

John Macpherson – **Waiporohita Lake work by Fish and Game**

Fish and Game are solely funded from license sales of freshwater fish, trout and salmon fishing and duck licencing. They assist with restoring wetlands and waterways as this is also the habitat for the game they support people to hunt. They do this through supporting farmers to fence their waterways and create wetlands on their land. Building relationships is a big part of the job; with the community, local farmers, iwi and other agencies. As most of the birds are found on farms, access is needed from the farmers to monitor areas and check that cattle aren't in the waterways. Tree planting around the lakes is being carried out with all local hapū, and community involvement is being encouraged for this project. Fish and Game are new on the scene in the Far North, assisting Bushlands Trust, DOC, Northland Regional Council, Iwi-hapū and schools with these projects. Local community groups are also being assisted with pest control trapping as this is another way of supporting community efforts at managing the land sustainably.

The project to restore Lake Waiporohita was a collaboration with DOC and Northland Regional Council, Ngati Kahu, and Land Corp. They are carrying out pest plant eradication around the lake, and planting up with native species. Fish and Game became involved in the project trying to keep the Paradise Ducks and Geese out of the lake, as they make the lake pollution worse through sedimentation and added nitrates. They might try to use an electric fence to zap the birds as they come out of the water onto the land, where they are loafing in large numbers Currently scarecrows and Gas Guns are being used to scare the birds off, as well as allowing shooting with the aid of a special permit.

Management of the oxidation ponds in Kaitaia is another area Fish and Game assist Broadspectrum with as there was an outbreak of Botulism recently which caused around 1000 birds to die due to the bacteria. The surrounding wetlands were also affected with species dying, and then the wetlands that feed directly into the Awanui River, carried the bacteria here as well. Every day they are acting on this problem to find a solution.

Fish and Game, with the help of NRC, DOC, and Ngati Kuri, have been working on eradicating Gypsy Wort, (a pest plant that is only found in 3 places in NZ) from Te Werahi Wetland which is on Te Paki Station in the Far North. We have GPS marked all of the areas this plant is in and are running a spray program with the hope of clearing it from the Wetland.

James Tremlett – **Moananui**

PDF

Moananui is a collaborative initiative to engage communities with the ocean and their coastal environment. It is a partnership of three traditional voyaging societies in Tahiti and Aotearoa and is sponsored by Te Hā Trust as part of the Tuia commemorations. Tuia is an initiative that reflects on and talks about the legacy of colonisation for our people, land and sea and the mutual responsibilities for our land that we have from the ancestors that we inherited those values from. As part of the broader Tuia commemoration, Moananui aims to rebalance the narrative between people and the ocean while celebrating Pacific voyaging and ancestral history.

Tuia centres around a voyage that will travel around the country with three traditional waka and three European-style tall ships. The locations visited will be significant Pacific voyaging landmarks or sites of first encounters between Māori and Pākehā. As part of the Tuia voyage education programme, the Moananui team will visit communities between October and December. At each site there will be opportunities to engage with the waka and ships, to hear voyagers kōrero about the changes they observe on the ocean, and explore potential community solutions to these. There is also an opportunity for other environmental organisations to get involved, to celebrate the mahi of local conservation heroes. Other workshops are welcome to run alongside those hosted by Moananui.

Kiri Reihana Spraggs - **Wai ora Wai Māori**

PDF

Manaaki Whenua had a contract with the Auckland City Council seven years ago researching what a kaupapa Māori tool for freshwater monitoring would look like. They trialled some concepts on the ground and set up a framework for the criteria that would be important to include.

The approach was a dual approach combining existing science tools with the feeling of hauora, a concept of what freshwater means holistically encompassing physical, emotional, spiritual and social dimensions. This reinvigorates the Māori practices of how health is viewed while installing the same quantitative levels to measure and compare against as western science tools.

They took out kaitiaki and trialled if it worked and found that it simplified the involvement and empowerment of freshwater decision-making. By using the senses to enable an assessment of the waterway health, there is a deeper connection to the well-being of an area. The approach also looks at if taonga species are safe to eat and if they are thriving in their environment.

A Wai Ora mobile app was then created which enhanced ease of use when out in the field. By incorporating Te Reo translations into the app, the language could then be reintroduced to kaitiaki who had lost their language. A tool was made for marine and freshwater environments that included a rating system. The data collected from this will assist community groups with prioritising activities for restoration and future management programmes that can be taken to enhance the mauri of an area.

Field trips

Lake Waiporohita

We visited the lake with local iwi and D.O.C. rangers showing us around the area. The main problems they have tackled are removing pampas grass from the area while planting up natives to replace the pest species and deciding how to control the oxygen weed and gambusia that are found in the lake. They estimate it will take another 5 – 10 years to clean the lake and surrounding land up. The local iwi have a nursery near Maitai Bay where native seeds are collected from the area, before being planted back into the vegetation surrounding the lake to act as filters for pollutants that run into the lake.

There are also many Canada geese that are a big problem on the lake, and their numbers have doubled in recent years since arriving in the area 10 years ago. There are air guns around the lake that go off periodically, but the geese have gotten used to this noise and now do not react to it as they know it is not a threat. Geese can rear between 6 - 8 young a year and one goose can excrete 3.5 kilo of effluent per day with half a kilo of that being pure nitrogen. 2000 geese can contribute one tonne of nitrogen per day to a waterway.

This will turn a lake into an algal bloom. There are 12,000 Canada geese found around the Far North. Many solutions were proposed from the wānanga group on how to remove the geese, including using a big net to drop over them, shooting them from helicopters, poisoning them, releasing predators into the lake to wipe them out, pricking the eggs in the nest, putting floats in the lake to deter them landing on it, using pheromones to lure them into an enclosed area or rounding them up when they are molting as this is when they cannot fly and then killing them off.

The iwi will keep working at reducing the pest species found at this site through pest control and establish more native plants around the lake to reduce the effects of runoff from surrounding farms.

Maitai Bay

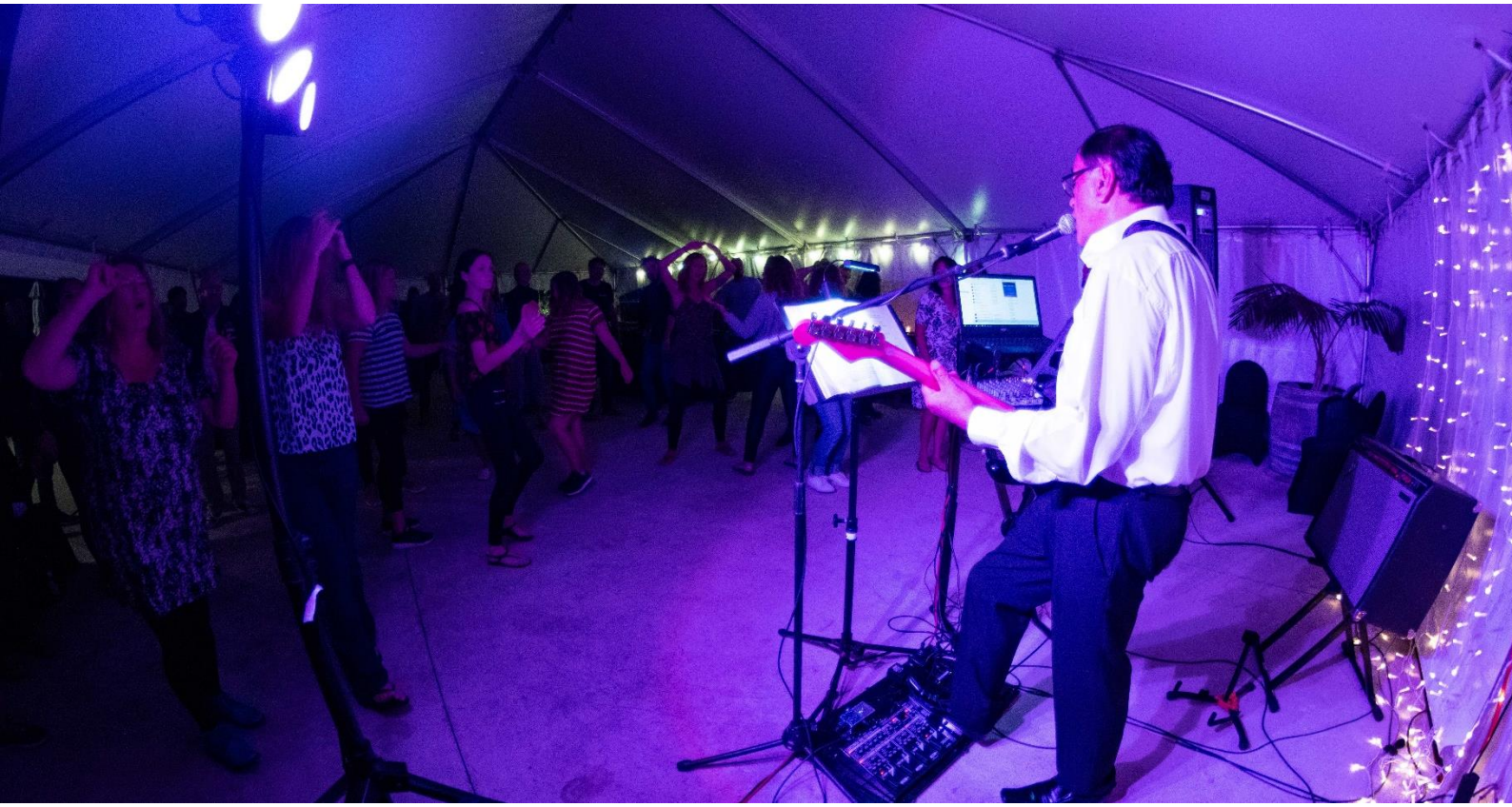
We first visited the pou and listened to the carver, Darren Pivac, explain to us the meaning of the pou and the significance they held in the bay. Whetu, who lead the rāhui movement also spoke to us on how the iwi were involved in the movement, as well as Vince and Oliver going over some of the sampling methods and tools that are used to monitor the biodiversity of the area.

You can watch a showcase of the rāhui here https://youtu.be/QGH6m_3xKXw

We then split into two groups to participate in the two activities that took place. One was EMR co-ordinators leading small groups snorkelling around the shallow rocky reefs in the bay, and the other group was led by Sustainable Coastlines. They led a Litter Project training workshop where we collected litter found along the beach, then sorted it into an audit and were shown how to record the results into an app that they have developed for the Litter Project.

Social Evening

Social evening hosted by Carringtons with entertainment by Montage.



Day 3 - Solution focused talks

Laurie Austen

PDF

Laurie became aware of the impacts of climate change by studying the toheroa population in the far north that has been in decline over the last few decades. He remembers how many there were on the beach as a child, and the large size that could provide dinner for a family with just a dozen collected. As the toheroa rely on large quantities of plankton to feed on, the dwindling plankton amounts that can now be found on beaches are thought to contribute to the decline in toheroa. There is now only a small amount of plankton seen on 90 Mile Beach in the winter months. In Dargaville there is still plentiful plankton found on the beach there, generated from the Kaipara Harbour, and a large toheroa population can still be found here.

There have been lots of theories as to why the toheroa populations have declined over the years. One theory is that the large quantities of toheroa that were harvested have possibly depleted the population to the point of no return. But it is hard to find this plausible as that was 40 years ago and now long after toheroa restrictions have been put in place, there has still been no recovery to the population numbers. In 1991, there was a NIWA survey carried out where 50 million toheroa were found in an area and then 2 years later there were none found in that same area so the theories that are out there are not in accordance with the sudden drastic change that was measured in the toheroa population at this time. Another theory is that the vehicles that do wheelies and skids on the beach are devastating to juvenile toheroa. Laurie tested this theory out using eggs buried 20 ml into the sand and found that they were untouched after being driven over in a straight line but were damaged when the driving was tearing up the sand.

Laurie then became interested in the effects of climate change and he began to research this using weather graph data showing progressive changes over the last 60 years in decadel increments. He

specifically investigated the wind direction and forces on the beaches where toheroa were once found in the far north. It was found that we are currently undergoing a change from a windy climate to a reduced quantity of wind. Gum digger early literature often mentions how windy it was in Northland, which now does not seem very significant. Laurie also found that there has been a complete reversal of prevailing winds over the last 10 years of recording wind speed. Particularly on the west coast, persistent strong westerly winds that shaved everything off at 45-degree angles have now reduced to the point that vegetation is now growing in a normal shape. The wind direction also influences the amount of plankton that is blown up onto the beach, and that this change may have influenced the plankton now found on the beach compared to amounts recorded there in the 1950's.

As we have also undergone a small degree of warming since the 1900's, it must be linked to how our wind direction and strength have changed over the years. This theory is backed up by the Mount Pinatubo eruption in 1991, which caused a measurable cooling of the Earth's temperatures and brought the temperature back to what it had been in the early 1900's. With this event, suddenly toheroa came back to such an extent that people could regather them and plankton was also found on the beach again. The NIWA survey that was carried out at this time is in accordance with the Mt Pinatubo eruption and could explain the sudden increase in toheroa numbers and then the decline again, as the Earth's temperature began to increase once more. The observed movement of warming can be seen in N.Z. with places further south now able to plant trees that could not grow in the cold conditions in the past, for example now avocados can be grown in Hamilton where they couldn't survive 30 years ago due to the severe frosts there. The substantial erosion occurring on 90 Mile Beach could also be attributed to the climate and weather changes that are taking place. As most of the land from 90 Mile Beach and north along the western coast is made up of sand, it could have been formed from strong winds here in the past. Now that the prevailing winds have stopped, sand dunes are not being rebuilt as they used to be.

Because toheroa are specifically adapted to a small niche environment, they can be used as an indicator species for the climate change that is occurring. They are now giving us a sign as one of the first species to drastically decrease in numbers on our beaches that we need to be coming up with strategies on how to save them, and other species with specific niches.

Attached is a link to a website that Laurie developed that demonstrates the negative impact of erratic and careless driving on 90 Mile Beach;

Image from Laurie's presentation.

Sam Judd - **Sustainable Coastlines**

Sustainable Coastlines is about enabling people to look after the places they love. It started ten years ago with the goal of restoring beautiful beaches and healthy waterways to N.Z. They found that the best way to do this was through inspiring people, as they are the cause of pollution found on beaches. As Millennials have been found to care more about the values of an organisation that they work for over the money, businesses are having to adapt to fit into that model and they can do this by contributing to the Sustainable Coastlines cause. Sustainable Coastlines is now turning into a social and corporate enterprise where businesses are involved in cleaning up beaches and planting trees as part of their environmental development workshops.

Education was seen as the main way to reach people and change behaviours. As you don't usually see people dropping rubbish on the beach like they do in town, the mission was to connect people to the fact that dropping rubbish anywhere will cause a problem and that litter can always find its way back to the sea. The changes seen through the sustainable messages spread in schools has been positive. For example, as an outcome of students adopting the litterless lunch approach, the lunch diet has changed from artificial packaged food to much healthier homemade food. Children now pick up litter everywhere they go, and this encourages adults to take up this behaviour as well. Psychologists developed a survey framework to measure behavioural change and the findings confirmed that the education programme was working.

So, they then went further and realised change could be made through investments and innovative product design. The Litter Project was developed to enable people to create their own solutions through an open-sourced tool. Advertising was tailored to local situations and to spark more local action with water-monitoring and land-based restorative actions taking place.

Another issue to focus on is that as so many fish are now eating plastic, these carcinogenic endocrine disruptor chemicals can then be passed onto people that enjoy eating fish. Research carried out in the Hauraki gulf found that 20% of fish monitored there had plastic in their gut at the time of being caught. This message of how these chemicals affect human rights is urgent and we need to develop the tools of how to reduce people's use of and reliance on plastic. When a lot of nutrients are pouring out of a river mouth, then a sediment plume develops, and algal blooms grow. Microorganisms eat the algae; they then die and rot which pulls oxygen out of the water and creates eutrophication. Species are unable to survive in these conditions and dead zones are created. The Waikato Port, Kaipara Harbour and the Firth of Thames are all areas that are at risk of becoming a dead zone in the near future. When you realise just how bad the issue is, the solution-based focus is to get to the root cause of the problem and look at what changes can be made and scaled up.

This was the motivating force behind applying 200 corrections offenders to help plant trees. The trees were planted in public places and the area was well mulched after planting (including gorse which is nitrogen fixing) which saved having to spray it, and the trees had a 98% survival rate. There were five other organisations involved in the project and they were then given the skills in how to facilitate offenders working in community projects. By widening the net of collaboration, prisons then got involved where inmates were educated in how to propagate seedlings and those trees could then be planted by local community groups and schools. The purpose and connection to nature that the prisoners gained from doing this project had a beneficial impact on their mental health.

An education centre was then developed as a hub on the waterfront in Auckland to spread the message of sustainability further. It encourages people to look at waste, water quality and construction as these factors are the major contributors to urban water quality problems. The hub showcases ways to construct by minimising waste as the building is made from shipping containers and reused pallet wood. To help with capacity development around the country, open sourced models and development are encouraged.

To scale up locally led initiatives, success can be measured through what you care about and these qualities enhanced by sharing the message with others. By collaborating with scientists, you can engage people by using monitoring frameworks. These can then be scaled out around the country measuring cultural, social, environment and economic improvement. By collaborating with others to have different types of skills contributing to a cause, a real change can be made. People want to help provide the framework and give the tools needed to make change through open sourcing. This can then involve training local organisations to produce the real scale changes needed to issues around sustainability in Aotearoa.

Capability and Capacity Workshop

Run by Sandy Thompson from Lead.

We split into groups where Sandy facilitated our reflections and aspirations for our roles and outcomes we hope to achieve within the Environmental Education sector.

Firstly we came up with some hopes for a sustainable future. These ideas are listed below;

Shared vision

- Collaboration with industry
- Strong communities
- Agriculture - low impact
- Sustainable housing
- Regenerative economic production
- Holes within reserves to fish
- Village gardens
- Range ecosystems
- Eat and drink from rivers /sea
- Drink from all water
- Pest control
- Regeneration
- Fish stocks
- Human impact minimal
- Oneness with nature
- Sustainable practice
- Connected to nature (people)
- Aroha
- Abundance
- Collaboration

- Collect kai
- Planting/ agriculture
- New reserve
- Integrated catchment management
- Sustainable
- Self-sustainable planet
- Nurseries
- Cultural connection
- Awareness of ecosystems
- Protection of most vulnerable systems
- ⅓ protected oceans
- Safe swimming
- Mauri
- People involved
- Riparian planting/ increased biodiversity
- All the same - whenua/tangaroa balance
- Worldview
- Value what's under the surface
- Networked and connected

Then we came up with a key word that summarised our vision. The words included;

- Inspired
- Connected
- Mauri
- Cherish
- Katoa
- Community
- Connect
- Educate
- Regenerative economy
- Biodiversity
- Rāhui
- Protect
- Kaitiakitanga
- Interconnected
- Abundance
- Sustainable
- Organic
- Kotahitanga
- Pure
- Wellness
- Harmony

We talked about what the key learning themes were for us and what we had got out of sharing knowledge with others at the wananga. These themes were;

- Local action
- Local solutions
- Collaboration
- Connections, networks, relationships → paramount
- Indigenous wisdom
- Ask for help
- Share
- Te ao māori
- Importance of measuring success
- Aim high/ be in it for long game
- Connectedness - social, environment, individual (health)
- Activism
- Holistic approaches
- Technical information - planting, pests, conservation
- Healthy minds and healthy bodies

We discussed what the main strengths were within each of our organisations and the opportunities we could see of how to grow our ideas and reach our goals. These included;

- Locally
    - Supportive canals
    - Motivated community groups
    - Iwi
- Regionally
    - Wide reach
- Nationally
    - Funding sources
    - Jacinda
- Sharing resources
- Helping people find their passion
- Leadership
- Massive knowledge
- Our mouths!
- Mauri
- Whakapapa to land and sea and people
- Connected to wider communities
- Love for water, connection to water
- Existing tools → access to these
- Whanau
- Hunger for improvement
- Sharing not competing
- Opportunities to influence within our mahi
- Networking regional hui
- Inspiring tamariki
    - Connection
    - Kaitiakitanga
    - Excitement
    - Aroha
- Corporate partnerships e.g. charge/ koha for EMR
- Support the Rāhui movement, celebrate
    - More connections to/ relevance to people
- Take advantage of skill sets of team
- Can follow through with ideas and actions
- Values of organisation
- Get students out there in the environment/ water
- Plants - own nurseries/ resources
- Structure/ formula already in place
- Networking and connecting → relationships
    - Collaboration with iwi
        - Guidance and education
        - NAG lobby government to take it seriously
        - Connect with landcorp firms
- National network of MTST
    - Celebration days and action
- South Auckland hui (regional)
    - School problem in collaboration with local initiative
    - Enviro schools and sustainable schools
    - Connect with sustainable communities
    - Integration with new initiatives relating to mauri of wai → wai ora
- Rehabilitation programmes from prison
- Inspiring others
- Lead by example - walk the talk

- Educate others
- Provide hands on project spaces
    - Marae
    - Matauranga Māori - ancient knowledge
- Specific to Aotearoa
- Conservation week
- Create local examples that can be replicated at a national level
- Seek out other people doing what you want to do in your rohe - connect
- Technology; Online platforms to share projects that are already out there

The main groups we thought that could support our mahi and get involved were;

- Council
- Iwi
- Public
- DOC

Our collective strengths / connections that we can utilise to achieve the outcomes we aspire for are;

- Government agencies
- Local connections
- Expertise
- Local knowledge
- Teaching
- Lesson plans

The opportunities that we can achieve collective action and collaboration with include;

- Joint projects
- Helping big organisations with people power
- WREEF - environmental educators meet two times a year
- Parliament
- Connecting with correction centres and mental health programmes
- Predator free Wellington
- Celebration - recognising student achievement
- Website/ hub for environmental actions
    - Access for everybody
    - Improve already existing platforms e.g. nature space
- Opportunities for gap filling (avoiding reinventing the wheel)
- Better communication within council and between groups/ project coordinators
- International visitors come in and ako
- A common mission/ hub
- Regional hui
- Interdisciplinary evidence gathering between organisations
- Work with hapu and support their kaitiakitanga
- Safe, transparent sharing of knowledge
- Dissemination of knowledge e.g. current research
- Respectful sharing → information, events, projects
- National sharing of best practice for riparian planting
- Multicultural/ diverse people-collective action
- DIY (and others) your environment
- Professional support with administration for setup and running of environmental projects

- Nationwide planting roadshow
- Local community actually supporting community action
- Sea game
- Supporting Rāhui
- Local body elections
    - Action station
    - Select candidates
- MTSCT and Sustainable Coastlines (SC) help at Anaura
- SC Litter Project in our places
- Get Whitebait Connection and EMR to every school of Aotearoa, training kaiako to run it themselves
- Chase DOC and Councils for data
- Education for fishermen that is relatable
- Connection through action
- Monitoring/ evaluating celebration
- How to measure success; changing perspectives and attitudes around valuable ecosystems
- Targeted restoration from mountains to sea. Based from marine protected areas
- Share social enterprise toolkit, evaluation example frameworks and capacity development models
- Collaborate on a collective evaluation system for connection to nature
- More research into causes
- Value natural components as equal

Ideas that MTSCT and SC Ambassadors can collaborate on;

- Expo introducing public to their groups - get more volunteers
- Funding to build monitoring

The workshop enabled us to consolidate the skills, knowledge and inspiration that the Wananga added to our personal kete, and we were energized to go and continue to create change in our local communities.

Evaluation and feedback

Overall

	Score							
	1	2	3	4	5	6	Total Respondents	Comments:
Venue					7	23	30	Awesome venue. More FW env to see?
Food				2	11	17	30	Less meat & plastic. Thanks for all veggie options. Possible vegetarian only?
Time Frame					10	20	30	More time to create shared actions. Could be longer, more field opportunities.
Overall Organisation					3	27	30	It would be great to have the people of the marae more involved in the korero.
Value for money					10	20	30	Excellently run and excellent venue, location. Thank you!

How effective was this wānanga in incorporating the theme 'He Wai Rangatira'?

Score						
1	2	3	4	5	6	Total Respondents
		3	5	5	8	21

"I feel reinvigorated" "Loved the theme but wish we could've incorporated specifically what water means to each of us into discussions/intros" "Didn't understand fully, perhaps we should've had the opportunity to reflect individually before coming together" "The theme is a bit abstract in my mind" "Didn't find the time to reflect on this personally" "Maybe a 15min talk at start would've helped, theme wasn't mentioned very often as overarching topic for wananga, although all field trip talks were super relevant and meaningful" "Amazing keynote speakers, learned so much, very energised and inspired" "Awesome to hear from hapu members" "Awesome mix of relevant presentations, networking ops, practical suggestions and inspiration, thanks! Add missing link - other pollutants/toxins (other than animal effluent)"

Rate the wānanga for effectiveness for networking

Score						
1	2	3	4	5	6	Total Respondents
				7	21	28

"Awesome - would have been great to see more local kaitiaki here too" "6 as long as contact is kept up and able to follow through" "I'd like to see visual list of contacts available to connect after wananga" "Awesome networking from local and national/international perspective"

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?

Score		
April is Good	Disagree with April	Total Respondents
27	0	27

"Perfect temperature/weather" "Great as end of busy season" "School holidays work well for teachers" "Yes but mid-holidays would've been better" "Yes but also October" "Yes but also November"

Ah-Hah moments and highlights

Freshwater

- Fred's talk, sustainable restoration led by a passionate community member
- Raglan Harbour reclaim.
- Canadian geese facts (nitrogen)
- Riparian planting techniques and species. Examples that prove methods work. Grass
- There are other ways of measuring water quality! Mauri ora of the awa.
- Canadian geese!

Marine

- Dr Tom Trinski's talk, ka pai!
- Local led rāhui brings together a community and connects people back to the land
- Rāhui, Tom's talk. Actually, all the talks.
- Rāhui - pou, Whetu - on brother!
- Effectiveness of rāhui.
- Tom & Sam specifically inspiring.
- Timed swim @ Maitai
- Rāhui - seeing the benefits and how it can involve so many different organisations.

General

"Understand better the connection between all things, cause + effect" "Grass roots actions and opportunity for excellent collaboration." "The team - smooth running of the event." "Our collective goals are all possible, but it will take a lot of collaboration, time (years) and effort." "Use of labour corrections." **"Asking community or individuals what success looks like to them and then figuring out how to measure it."** "Understanding the connection between land and catchment restoration and the health of our waterways and ocean." "Community led initiatives are super effective!" "Dancing and the opportunity to learn with equally passionate people." "Need for grass roots action." "Proactive conservation not reactive." "Grass roots actions - just do it!" "Opportunity for wellbeing research to benefit the whole environmental education sector Amazing speakers!" "All the importance of hands-on practical mahi! Local people making local solutions." **"Nature can restore itself very quickly if given the opportunity."** "The effectiveness of grassroots engagement and mahi" "Meeting and networking with people outside of MTSCT - top keynote speakers."

Ideas for Improvement

Plastic free kai - More snorkelling - More time to mingle and connect in an unstructured manner - Invite school students from different regions - Zero waste - Scholarship for groups - More teacher training & env ed training - Promote more widely to local community e.g. keynote speaker evening? - Earlier finishes or later starts - FW monitoring testing - SHMAK kits?- - Karaoke! - Te reo/ Waiata session - Elaborate on theme - make us discuss and think about it - Explain theme better - Skills workshops for existing WBC?EMR coordinators
Lots of time seemed to be focussed on inspiring new ideas/action instead of need to consolidate existing - Splitting into regions and coming up with collective actions to move forward with. - Te reo session for key words & practices. - Smaller groups for skits. - More workshops. Teaching of a skill (like litter project) Roz specialises in waste reduction at marae. - Beeswax wraps get made for next wananga. - Plastic free lunches - no bottled water. - Reusable containers available at sustainable coastlines. - Student voice - rangatahi from the area talking about their projects. - Would be very beneficial to involve stakeholders from the agricultural industry. Farmers should be exposed to this important information. - Include the young people! Funding/sponsors for students/youth to attend.- More student ambassadors from different regions. - Start in the hills. - Hot pool or sauna and massages. - More chances for attendees to engage with each other. - Link between NZ's high use of pesticides @ home, farms, horticulture and the direct impact on water sources not covered.- Impacts on health, biodiversity including mental health. Not covered would complete the big picture. - An academy of junior (10-16yr) - MTS kaitiaki cadets: importance of knowledge, logistics, clean gear. The smaller stuff before transitioning to coordinator.