Mountains to Sea Wānanga

A national marine and freshwater conference

"Citizen Science"
For marine and freshwater conservation action and education

Friday 21st April – Sunday 23rd April 2017
Omaha Marae, Leigh, Auckland

2017 Proceedings

Mountains To Sea Conservation Trust
Nga Maunga ki te Moana

whitebait Connection
Xstream 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 6 trustees, 2 advisors and a team of 30 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 the 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 was Storytelling at Whangara, Gisborne. One of our keynotes and facilitators Story expert Moya Sayer Jones showed us this video as part of her training workshop "Going back to the start", which fits with the fact that we held the 2017 wānanga at Omaha where it all started in 2006. This year citizen science for marine and freshwater conservation action and education. WHY – because it's a big part of what we do – becoming more so and there are both opportunities and challenges around that.

If you look in the dictionary you'll see citizen science explained 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".*

To us that translates as supporting people to be involved in practical marine and freshwater science data collection and interpretation that is meaningful to them and feeds into a project with a purpose – otherwise why would they participate – what would be the point? There has to be a why. This year's wananga has really cemented that fact for us and given us many ideas, connections and pathways moving forward in this space.

We very much look forward to our next wānanga which will be held in Nelson in April 2018!

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 and MBIE Unlocking Curious Minds for their funding support.

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Huge thanks to Omaha Marae Committee for hosting us at 'Te Kiri' marae.

Thanks to the Leigh Harbour Valley Society for their support for our freshwater training and spotlighting activity.

Thanks to Eryn Hooper for being our note taker.

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Mountains to Sea Conservation Trust (MTSCT) Presentations

Kim Jones - MTSCT – Whitebait Connection

Full presentation here

MTSCT was established in 2002 and the original trust deeds still remain the same today. A clear formula is used to achieve the goals of MTSCT. The team has grown and expanded over the years. Today there are 6 trustees and 30 coordinators delivering the programmes.

MTSCT's whakatauki is "if we look after the water from the mountains to the sea it will look after us . It is our life force". The why is the key motivating factor for the work that is carried out. Everyone was encouraged to think about our why, "why are you here?". Tangible outcomes and the why keeps MTSCT going.

The first Wananga for EMR was held here at Leigh in 2006 and this is the first one here since then. There has been one every year since then. In 2009 the WBC and EMR wananga merged to form the Mountains to Sea Wananga.
Last year's workshop video with Moira was played "Going back to the start". This emphasised the power of story which is becoming a more and more of a part of what MTSCT does.
Kim told her story about how she has got the where she is with MTSCT. Theme of Citizen science is so important to MTSCT. It feeds into a purpose, there has to be a why and WBC provides that to people.

The work Kim has carried out has reconnected her back with her roots in Pahi River. The spawning sites are on her late grandfather's farm. Huge achievements have been made within WBC with 16 co coordinators, replanting and facilitating the identification of spawning sites. Over 64 000 volunteers have contributed to the work over the years.

Supporting communities to take action allows motivation and action to be carried out. There was a project with Auckland Council pinpointing where the Inanga spawning was. Fencing of the habitat and an artificial habitat was put in. Working with landowners made them really motivated, providing long term motivation. The data was put into into a database to facilitate sharing what this project identified. School projects allow an inquiry to be made. The question was asked, how do you manage the need for data and the need to keep your why?

There is a national approach to delivering citizen science and this includes the National Inanga Spawning Programme (NISP) that has been funded by MBIE Unlocking Curious Minds. The Snells Beach Stream project is an example of getting students engaged and the school is now caring about whitebait and contributing to the project. The school has adopted the stream, have been collecting water quality and Inanga spawning habitat data, writing letters to the government and the children are becoming active. This project brought the knowledge about the whitebait and the rapid disappearance of their habitat caused by housing development and drainage (culverting streams) to the forefront of the community.

Take home message - We protect things that we care about, often protection comes in the form of citizen science and sometimes all it takes to get that action is the why.

Samara Nicholas - EMR

[Full presentation here]

Big shout out to our sponsors. Without them our programmes couldn't go ahead.

What is EMR about?

EMR starts in the classroom with an introduction to marine biodiversity, students then learn to snorkel (or increase their snorkel skills). This lesson incorporates more than just learning to snorkel, it covers important skills such as looking after each other (safety) and supporting each other - manaakitanga.

The programmes allows participants to experience the local marine environment and marine reserve (or other marine protected area if marine reserve not available) then they are ready to take action. The goal is to raise awareness and support for marine conservation through the experiential education opportunities.

The history of EMR was explained. EMR started off with very little equipment in 2002. They

then got equipment though Wettie and now have a really good set up (new super stretch suits).

EMR has guided snorkel experiences for 40000 students and whanau who have snorkelled in Marine Reserves through EMR. Today over 55000 people have engaged in the programme and events. This year EMR have delivered over 30 community guided snorkel days.

Kaitiakitanga is a really important element of the EMR programmes. It's about teaching a balanced connection to the marine environment. Forming foundations for a protective way of thinking and inspiring and engaging people are also key elements of the programme. EMR has an active focus on marine conservation.

Classroom introduction teaches how amazing the NZ marine wildlife is and how many endemic species there are here. Teaching snorkelling skills, a local investigation, trips to the marine reserve.

For Samara there is a real buzz when you know you've made an impact or created a long lasting memory. With all the engagement the programmes have, they get a lot of action and citizen science. EMR are always learning and consolidating what they do.

An example of a really good action project was when a student presented information she had learnt through the programme to her Marae about kina barrens and the impact Marine reserves can have on reversing these. The marine metre squared project is a great action project that EMR has also promoted. EMR has been expanding recently and there's been a lot of work on the branding.

There are some great projects coming out of our regions, especially Wellington. This year there has also been a great response to our annual Poor Knights competition trip and the Bobby Stafford Bush EMR Ocean Art aspect has also been a great hit. Because all regions are involved in this trip, it's a great way to engage and create focus in the regions.

EMR regions that have seen a lot of strength and growth this year include EMR Nelson and EMR Auckland. We have a fantastic team of coordinators.

There has been lots of media attention too. Video of a News report from the Auckland area was shown. There has also been expansion in South Australia - Experiencing Marine Sanctuaries.

EMR always working on innovative ways to increase community engagement, for example the community guided snorkel days in unique areas, which attract all ages. The Sir Peter Blake Trust - Young Blake Expedition to the Kermadecs in 2012 is another example of working and collaborating with a range of groups which encourages a wider engagement and reach.

Local Orientation

Fiona McKenzie –
Ngati Manuhiri Kaitiaki Charitable Trust Resource Management Unit

Full presentation here

The Manuhiri Kaitiaki Charitable Trust is a subsidiary of the Ngati Manuhiri Settlement Trust.
The Ngāti Manuhiri Rohe is the area of interest for the iwi that they work within. For a small iwi, it's a large area to be looking after and has a very long coast line.
Last year Fiona covered the length of the coast line and from the whole coastline you can look at Hauturu/Little barrier. It's a really special place. The waterways north and east of Whāngaparāoa are known to Ngāti Manuhiri as Te Moana Nui ō Toi. There are lots of significant natural features within the rohe including 9 significant rivers and many streams.
There are 6 regional parks in the areas that are all coastal, all with pa sites which means there is a strong working relationship with Auckland Council. There are 3 marine reserves in this area too.

As part of the Treaty settlement Ngati Manuhiri are treaty partners which gives them statutory acknowledgement and thus input into decision making.
The Kaitiaki have a huge role in managing the pressures of increased population. They are looking after the cultural and natural environments.
Rahui is something that they are able to use today and is an effective tool.
They engage a lot with AC, DoC, WaterCare, Quarries and are consulted with when there are proposals for change and development. The resource management unit undertake assessments on quarry sites, have input on the cockle ban at Whangateau as well as supporting researchers e.g. Auckland University and understanding sedimentation tipping points. Knowledge is power so sharing knowledge allows us all to find solutions to challenges. They are also involved in riparian planting engaging with individuals and developers. Further still they are working on a project reintroducing native freshwater organisms.

Keynote Speakers

Dr Victoria Metcalf - Fostering Curious Minds

[Full presentation here]

This Participatory Science Platform fund and initiative is all about building networks and connections and lifting engagement with science and technology across New Zealand. There was a discussion about childhood opportunities to build curious minds. Today Victoria works with children to build that curiosity.

The question was asked to the room, what are the critical components on a successful research project? How do we go about putting a community idea into action? The Participatory Science Platform (PSP) is a programme designed to engage young people communities and scientists in collaborative science projects. There are lots of different levels of citizen science and involvement can be at a range of different levels.

PenguinWatch is a good example of citizen science where people can log in online and interpret images which can add to a database. The participatory science end of the spectrum is when community members contribute to the whole project from conception to the end of the project. In many cases they are leading the project.

The government has started this PSP because a more scientifically literate population is good for New Zealand. It is linked to three key action areas (enhancing the role of education, public engaging with science and technology, science sector engaging with the public) in the National Strategic Plan for Science in Society (A Nation of Curious Minds *He Whenua Hihiri I Te Mahara*) and these concepts were put together in a document which is a blueprint of how they are being put into practice.

The pilot platform is currently running in 3 areas (since 2015); South Auckland, Taranaki and Otago where there are regional managers who act as both applicant mentors and matchmakers to assist with forming the optimal project team. Everything that is funded has to be locally relevant and collaborative. When looking at funding applications the three key criteria that projects need to demonstrate: regional two-way engagement, pedagogical rigour as well as defining the robust science which needs to stand up to scrutiny. Also important are the project's value for money and clear descriptions of how grantees are going to facilitate the projects.
Some of the projects that were funded on the community-led end were discussed e.g. Project Hotspot. On the scientist-led end of the spectrum the example was given of the weta project in schools in South Auckland.

The fund is not for one particular type of science or technology. Applications need to meet the three pillars of the stool (engagement, pedagogy, robust science) but can cover diverse areas of science and tech. A short film was shown from Richelle Kahui McConnell, project lead on a PSP project on composting These PSP projects highlight that everyone has a skill and knowledge to bring. A key element to this is recognising that everyone has the ability to pick up skills to do science.

Lots of projects are carried out in schools. An example was given about the mould in homes project. This looked at the presence of mould in children's homes. It turned out that they had a suite of communication methods to communicate the outcomes of the project such as songs and even t-shirt designs to raise awareness of their findings. There is a diverse range of projects that have been funded through the Curious Minds PSP grants. Other projects from South Auckland include a project investigating the effectiveness of fitness programmes designed by either children or adults using FitBits.

In another project methane generation from food scraps was investigated. The aim of this project was for the Marae to be zero waste. This led on to further funding to investigate origins of beach litter. Five early childhood centres have also engaged with the PSP fund. This project looked at building a device to measure air quality that can be used and understood by young school children. Point in case is that no one is too young to be involved in the projects.
The Oruarangi Stream has had a huge dye spillage in the past. Students went to look at the status of the stream and it was found that the dye was still oozing out from the mud which was still having an effect on the waterway. The project studies the effect of the dye spillage of the ecology in the waterway.

A school and marare in south Auckland are studying dung beetles and how they impact on nutrient run off when they break down cow manure. They are looking at how different soils respond to dung beetles.

Te Wharekura o Manurewa project on their local awa was a project carried out all in te reo Maori. This project highlighted how the PSP fund is helping to integrate Maori culture and science. Another project in the area also looked at waterway health of the Otara Creek (Sir Edmund Hillary Collegiate).

In Taranaki there are a range of projects currently going on such as the kiwi and bat conservation projects, a composting project, heirloom vegetables on a marae project, electric motor building, off grid schools, understanding the tools used to make the Motunui epa and coastal habitat restoration project. Marine or freshwater related projects are as follows:
Project Hotspot is a project lead by a community group and run through schools. The project aims to collect data on what has in the past just been anecdotal evidence, clearing up misconceptions of what marine life is out there. There are layers to this project. Each school took on a different question and linked it to an aspect that was action-oriented that they can use at the end. Something that has come out of this project is that they noticed that reef herons can be identified by their individual leg patterns. Litter caused by parking tickets was investigated and the local school children are now lobbying to get them changed to paper tickets. Plastic gun cartridges were found in huge numbers on a beach litter pickup and an action that has come from this has been discussions with the clay pigeon club to change their practice and use of plastic cartridges.

The Waitara Kaimoana Survey is a community survey that uses transects to survey the Waitara Reef to assess its health as it is a popular area to gather kaimoana. This project is

building relationships between the community, adding additional value to the project. A video about building relationships was shown.
In south Taranaki the subtidal reefs projects is being carried out. They are mounting a camera off shore which has provided lots of challenges but they are being overcome.
The Maru Wai Matara project incorporates cultural health indicators to measure the health of local waterways.

Otago also has a wide variety of projects spanning from healthy homes, dark skies tourism feasibility, moth projects, cat tracking, snowline study etc. Funded projects in the marine or freshwater space include the following:
The Wanaka Grebes project, which looks at the nesting success and behaviour of grebes on the lake. Another interesting Wanaka project is using the local lake swimming group to measure water quality.
The Shining a light on our environment project is developing a low cost tool to take water quality measurements. Sediment and Seashores is an ongoing project that came out of an existing platform (MM2) but this additional funding allows the platform to be tested in different ways. It is contributing to tackling a local issue. It is looking at the impact of dredging in the Otago harbour. Lots of schools are involved to count and test sediment

change and striking results have so far been found.

ECOTAGO leads another project using schools to investigate water quality and the environmental health of Tomahawk Lagoon (TL).

The final project that was discussed was the project working with schools tracking penguins using GPS to monitor penguin movements and their nest sites.
These project bring so many benefits. If we observe the benefits in schools, the projects facilitate project-based learning, empower the children, gives them a reason to stay involved through localised learning and encourages them to ask more questions. It also allows integration into the whole school curriculum. These projects are interdisciplinary, which promotes innovation and will help to generate an innovative New Zealand.
For the communities the projects increase scientific literacy and recognise the many sources of knowledge. They provide a safe place to break down previous issues and the projects are action orientated.

For the science sector, the approach within the PSP democratises the science process and is encouraging more open science. The mentoring role that local managers play is paramount to the success of the projects and that could become a more normalised approach to funding science.

The future of PSP is to change the paradigm by normalising this as one way that we do science. Science should involve more PSP-type approaches and Victoria hopes this will be happen in the future and also for the PSP to change the education of science in New Zealand.

Dr Nick Shears - Marine reserve monitoring in New Zealand: opportunities for citizen science?

[Full presentation here]

Focused on the Goat Island marine reserve. Videos shown of sites inside the MPA and outside the MPA. The video showed the dramatic difference in habitat and structure. Daniels reef, outside the MPA had very low productivity and was mainly Kina barrens. There is a recovery of snapper and cray fish inside the MPA and kelp has been restored. The reserve has experienced ecosystem changes, in the reserve the kina barrens have changed to natural balance. The same thing is being seen in some other reserves in north-eastern New Zealand. The marine environment is under increasing pressure. Three examples of what's changing were discussed.

1) Crayfish - Monitoring is carried out by divers. In the 1990s about 40 crayfish per 500m2 transect were observed. Now it's ~7. Outside the reserve 10-15 legal size lobster in the 90's, now <1 per transect. So, both in and outside the reserve there are declines. This follows trends in CPUE in the CRA2 fishery which has decreased. The trends in the reserve are following what's seeing outside. Cray from inside go outside and fishermen catch fish on the boundary. Wagon wheels of cray, which is when they bunch up together in exposed sandy areas to defend themselves, are now very rare in the reserve.

GPS tracking the crayfish shows that the MPA doesn't cover the area used by the crayfish. There is proposal to increase the size of the goat island marine reserve, through the sea change process.

2) Snapper - Bated video analysis indicates that they are ~20x more abundant in the reserve than outside. There are inherent problems with monitoring snapper due to the differential effects of people on fish behaviour. Inside the reserve people attract fish but outside they are generally more scared of people. This can skew results. Using baited camera methods to get around this. They are now using new stealth camera methods, baited stealth video (BSV). Un-baited video was also used. They recently discovered that the length of a Snapper can be determined using head to eye ratio meaning that a side on photo or still image from video can be used to determine the size. The idea with this is that anyone can estimate the size of the fish. This method doesn't work with all species but for snapper it works really well. There is also a method to estimate density of the fish too in these un-baited video shots.

   There was a difference in the methods of monitoring. Baited underwater video (BUV) indicated the biggest difference inside and outside of the reserve and un-baited underwater video (UUV) indicated the least difference inside and outside the reserve. This suggests that the differences we see inside and outside the reserve aren't as big as we first thought. Baited video is under sampling large fish outside the reserve and behavioural effect is inflating the marine reserve effect. The difference may not be as big as we previously thought but the role of the reserve remains vitally important.

3) Changes in reef habitat – using satellite imagery - They are currently using satellite imagery to estimate depth from the images. It's then possible to remove the effect of depth on the spectral signature so that you can then map underwater habitats. It is important to ground truth the data obtained by satellite imagery with dive surveys. There are lots of opportunities with citizen science e.g. using drones for this sort of work. Online analysis tools e.g. Zooniverse also help with this work. There is huge potential for utilising people and their camera with GPS ability. Photos allow knowledge exchange and can monitor impacts and changes such as tracking disease events and blooms of benthic dinoflagellates on shallow reefs.

   When ground truthing the images it is possible to match a group of pictures to a pixel. Benthic Photo Survey (BPS) software is available as an open source software. Able to match GPS, depth and photo data into one file which then allows habitat to be mapped. BPS is available here:
   http://jkibele.github.io/benthic_photo_survey/
   http://openresearchsoftware.metajnl.com/articles/10.5334/jors.104/

Dr Sally Carson - Sediment and Seashores, a Community Driven Approach to Marine Monitoring

Full presentation here

Marine Metre Square project (www.mm2.net.nz) is a citizen science project on long term monitoring of the rocky and sandy/muddy seashore.
When it was set up there was a number of objectives but generally it aims to get people to look closer. Collecting data that was of value to science to monitor change in time and comparing locations. It helps to set up networks between schools and scientists. A website has been set up so that there is a platform to collect the data. It allows information to be captured that can be used for science capturing local knowledge. The website can store the data and can be viewed with data visualisation tools. There is also a blog to help with identification.

The shore guides have been really popular. The methods developed have been really easy so that everyone can be involved and barriers are removed by not using expensive equipment.
It was developed for different levels and can be tailored to the curriculum and specific subject areas. It meets the goals of the curriculum.

One way success is measured is through engagement with the project. So far there have been over 1800 registrations on the web site. Auckland makes up 25% of those registration. However, a much smaller percentage are doing the surveys and even fewer are actually uploading the data. Groups are very keen and then they give the data to the project but they are needing to change the idea it's their data, everyone's data.

One group gathered evidence to decide where they thought a marine reserve should be. The school group submitted their finding to propose a site for an MPA. Most citizen science projects involve donating data to scientists. Most of the learning and understanding comes when the citizens are involved from day one and they are involved with developing the research question as well as involved in the analysis and interpretation.

Sediments and seashores is a project that looked at the impact of increased dredging of Otago Harbour on the rocky shore community. This project l is one example of how Marine Metre Squared can be used to address a local marine conservation issue. They worked with 10 schools with a range of students from year 3 to year 11. Various sampling sites were set up at mid and low tide. 6 contact sessions were held with every school so there was a lot of time invested. They went into the classroom and outlined the issue and then got the children to come up with the plan. The children had to think about all the things to execute the project. They then had a very good understanding of why they were doing the Mm2 surveys. After collection the data they went back at the classroom they went back to enter the data. Quality control of the data was there as two scientists quality checked the results.

Lots of questions were asked. What did they learn? how could they improve the quality of their data? The children then went back out to the field. Then had two sets of data and they had to think about how were they going to compare it. The children came up with some analysis tools and were able to develop a vulnerability index and compared their sites to other sites in the area. All the schools then got together with other stakeholder and presented the results. In addition to the population surveys, students discovered a triple fin spawning sites, identified mollusc egg cases and found the rare 4 and 4 sea star.

There are a suite of positive outcomes from these projects such as providing an authentic platform for learning, great professional development for the teachers and engagement with the wider school communities, the parent body and knowledge was fantastic.
This project received lots of great parent feedback and student feedback.
Student outcomes included an increase from 93% to 100% who has visited the shore line and an increase from 76% to 100% of children who had counted animals on the shore. There was a noticeable increase in ID skills too. The positive science outcomes of this project included getting significant results and scientists are currently trying to write a paper from the data.

Going forward the group would like to increase the sample size and continue with quality control of the data by engaging with master student to ground truth the data. Simple methods to measure and compare the levels of sediment at each site are also underway. Engagement with the port authority was initially poor but the rapport has improved with time.
It was a partnership project and well thought out so was successful. Marine Metre Squared

is a tool but you need local context to make it work. Partnerships are so important with scientist, schools and community. Baseline data is extremely valuable to understand species distribution over time and study the impact of climate change. Traditional values and community knowledge are also important to capture.

Future plans for the project include developing an app so that data can be direct and will shorten the steps required. They would like to better connect with other projects like nature watch and encourage stewardship and marine restoration projects.
It is also hoped that long term engagement and commitment can be encouraged. They would like to build it into a long term plan and make it part of schooling year. Adding in a reward system may also help to encourage longer term engagement.
Linking with other organisations, developing a reporting system so that it can compare to other shore lines is another goal for the future. Ultimately the project would like to see communities be effective guardians of their environments.

Sediment and Seashores, a Community Driven Approach to Marine Monitoring

1. **Overview of the Marine Metre Squared project**
   - How many people know about the project? how many have done a survey? how many have uploaded the data? how many used the data?
   - Not going to go into details of how to do the surveys (that will be covered on workshop tomorrow) – but wanted to share with you:
     - 1. the successes of the project to date (and issues)
     - 2. highlight a case study of where Mm2 is being used successfully by the community to address a local environmental issue (and how we are measuring that success)
     - 3. Highlight areas where we want to develop the project, and
     - 4. Discuss how you could use Mm2 in your regions to not only increase understanding of the local environment but also collect relevant data that could lead to improved management of the coast and influence environmental changes.

2. **Success of this participatory science project to date...**
   - Fits will with governments "Science and Society strategy"
   - Resources excellent and very useful
   - Survey easy to do – can do on any shore (sandy. Muddy)
   - Works at all levels (primary and secondary)
   - Web site getting better

- Fits well with NZ Curriculum – both front end (goals vision) and specific subject areas
  (science, math, etc)
  " Students explore how both the natural physical world and science itself work so they can ***participate as critical, informed and responsible citizens in a society*** *in which science plays a significant role."*
- Relatively easy to do

And issues - Mm2 initially designed to capture community knowledge of their local shoreline, it soon became evident that participants were happy to engage in doing a survey willing to pass over their data, and most were keen to participate and contribute to an ongoing citizen science project, but few had any idea of how the project could be used to answer questions surrounding local issues

3. **Case study of the application of the Mm2 project – Sediments and Seashores**
   - address a local issue
     - changes in land use increasing the amount of sediment entering our coastal environment – worldwide issue
     - in Otago Harbour (southern NZ) the source of the sediment is slightly different with sediment coming from the increased dredging.
     - Intensive study with schools – where the project was co-created – students were involved in planning the project, and methods, and well as deciding on criterial to analyse the data
     - Presented the data back to the wider community including the port company...
   - Value to schools
     - enrich the school science – authentic / local issue
     - curriculum links, teacher comments
     - feedback from wider school community
     - value to students
       - engagement with the science, environment
       - increase in students going to the shoreline
       - reasons for wanting to do it changed...
       - increase in identification skills...
     - how extended involvement increased science understanding and skills
   - Value to science
     - Science report and data

- Not perfect, pleased to report we have extended funding to carry out a second year
    - Develop methods to better estimate sediment coverage
    - Methods to improve the quality of the data / MSc to ground truth the data
    - Increase

4. Support application of Mm2 to local regions

Now that we have piloted some simple tools for the community to monitor their local coast want to work alongside schools / organisations / communities to support them to:

- understand of value of long term data sets (*Why should we engage with this project?*)
- interpret their data (*What does this information tell us about our marine environment?*)
- ask questions about issues relevant to their region (*What is having an impact on our marine environment?)*
- design further studies to answer those questions *(How can we better understand what is affecting our marine environment? What can we do to help restore our coastal environment?)*

5. Development with Mm2 project

To engage schools and communities across NZ's coastal regions to participate in the Mm2 project we need to show them how the project can be used to address issues of local concern...

- delivery of workshops and field days in each region to creating partnerships (scientists, educators, community groups and iwi), supporting data collection and facilitating further enquiry and stewardship / restoration projects..

- To engage with scientists, environmental managers, iwi and community leaders about environmental questions of relevance and how the wider community can contribute data and support development of further studies (eg. changes in populations over time, movement of introduced species, occurrence of lesser known, rare and endangered species).

- To develop methods, resources and training systems to improve the quality of the data collected (eg. app for data collection) and create links to other relevant tools and organisations (eg Naturewatch (www.naturewatch.co.nz), Te Tiaki Mahinga Kai

(http://www.mahingakai.org.nz/community-tools/marine-cultural-health-index/).

- facilitation of the extension of the project to address local questions and encourage stewardship and restoration projects;
- help share the learning and the successes with the wider community
- To develop a feedback (rewards) system to acknowledge contributions and long term involvement of participants.
- Development of a reporting system to help participants interpret and understand the health of their local marine environment.

6. Conclusions

Kiwis rely on the ocean for their wellbeing and livelihoods. This project is about educating and supporting communities to be effective guardians of their coastal environment.

Show ‘n’ Tell

Don Neale – Power to the People - Marine Citizen Science and DOC

[Full presentation here]

Citizen science is a link between citizen and science, getting people involved. DOC has stretch goals (targets), which include a network of Marine Protected Areas (MPAs), to restore 50 freshwater and estuarine catchments, advance partnerships and increase public involvement in conservation.

DOC has a big role in citizen science but the big question is, how can DOC best be involved?

How do you think DOC can best use citizen science?

Soozee McIntyre – Tuna monitoring around the Hikurangi swamp

Full presentation here

Looked at number of sites around the catchment – where was suitable habitat and where were future release sites? They measured the length of the stream and then stunned the fish and caught them. Involved loads of people over 9 days. Caught a mixture longfin and shortfin tuna. Real engagement by a few particular individuals. They also dissected a few to get more information about the health of the population.

Emily Roberts - Taranaki Project Hotspot

Full presentation here

Project Hotspot comes from an EMR action project and is an example of a Participatory Science Project. Collecting sighting data for orca, reef heron, little blue penguin and NZ fur seal. Identify reef herons by leg markings and orca by dorsal fins. The project is led by the Nga Motu Marine Reserve Society, supported by scientists and run through schools. Getting the community to record sighting data. Get schools to critically analyse the data and to design and conduct investigations.

Final step is students to communicate science to end user. Investigate litter – what rubbish are they finding? Lots of bottle tops, glow sticks from the squid fishing boats, plastic syringes, fishing line. Plastics then breaking down into micro plastics.

Students picked up lots of shotgun wads – where were they coming from? Used modelling to find out where they were coming from. Powerful evidence to take to the gun clubs. Action and results - the gun clubs have now phased out the use of plastic wads.

Sarah Neighbours - Litta Traps – Stormwater Pollution Monitoring

Full presentation here

In Taputeranga marine reserves, there is a big rubbish problem after heavy rain. Wilford School have developed an action project to address this issue.

Enviropod (originally Stormwater360 product) captures the rubbish and fine sediment from stormwater drains. LittaTrap (newly designed product) captures the rubbish so you can record what you've got. The LittaTrap is very easy to maintain by hand. Stormwater 360 donated traps to the Wilford school project for students to use.

The school students compared two sites in different areas - one in a shopping and one in a residential area. They monitored and recorded what was trapped. The project was intended to be for 6 weeks but was extended to 12 weeks because the kids loved it so much. The

information was shared with the communities. Outside the pub, loads of cigarette butts were caught. The children plotted the results and looked at the results. They then extrapolated how much rubbish would be going into the sea in different time scales.

This project enabled the promotion of behaviour change, with the hope to reduce stormwater pollution. This year it was incorporated it into the EMR programme delivery and a monitoring protocol has been developed. There is now a 'How to' for other schools and teaching resources have been developed. We now have 4 additional schools monitoring their local drains and will be using the data collected to show the community the problem and find solutions through promoting behaviour change.

Stormwater360 have been very supportive and are excited about how their product can be used with the community, hopefully nationwide. It is hoped that stormwater monitoring projects can be incorporated into schools across the country to educate the wider community and reduce pollution.

We have been using this project to share information with the community about how the pollution issue on our beaches is linked to the stormwater drains. It is hoped that if people are more aware of the issue, they may think twice about their actions.

Tammy Jensen - Working with Early Childhood in the Citizen Science space

Kim Jones approached our centre to see if we would like to take part in the National Inanga Spawning programme. This involved assisting in developing early childhood resources and lesson plans about Whitebait that link to Te Whaariki curriculum as well as providing feedback on these and potentially trialling some ideas in Term One.

We introduced our new little friends 'whitebait' through the use of 'The Whitebait Wriggle' book to gauge initial interest and to share information. Kim's involvement and specialist knowledge of whitebait helped foster interest and discussion.

Children engaged in different learning experiences such as creating a jigsaw. We drew our own giant kokopu and with the help of our kaiako designed our very own puzzle we shared with our peers. Tamariki also drew their own pictures of the galaxiids' and narrated stories.

The concept of 'citizen science' links strongly to the principles and strands of Te Whaariki

(Early Childhood Curriculum) and the Programme provides many opportunities for these to develop such as building relationships with community and exploring our local awa and feeling a connection to it or sense of Belonging (Mana Whenua).

Some examples of Te Whaariki links to Science include:

- Developing research skills – how, what, when, why and that pursuit of knowledge is a worthy investment of time
- Providing opportunities to learn about and use scientific tools and equipment such as a magnifying glass, microscope
- Learning how to observe, collect and make use of information
- Increase use and comprehension of technical language as children ask questions and communicate ideas
- Team approach – work within a 'community of learners'

Te Whaariki curriculum strengths:

- Flexible and adaptable
- Space for emerging curriculum
- Inquiry approach to learning
- High levels of whanau involvement

Challenges:

- Mixed age can be a challenge as children are at different developmental stages
- Te Whaariki is not prescribed. Each centre varies in how they apply it to their day to day planning
- Curriculum is largely child-led. Kaiako need to be careful with how they interpret and guide a child's interests. Careful not to take over 'sabotage interests'

Where to from here:

- Continue working with Kim on developing and trialling draft resources and increasing our knowledge about Inanga
- Field trips to spawning site and Kaipatiki Creek next to centre
- Continue involving parent community
- Tank set up
- Continue researching and learning alongside our tamariki

Our children have become active learners, engaging in meaningful, authentic

curriculum, developing research skills and becoming connected and engaged.

Joanna Roberts - Project aware

Full presentation here

Project Aware has two main focuses; marine debris and protection of sharks and rays. Citizen science comes in with the 'Dive Against Debris' programme. This is a underwater clean up, conducted by scuba divers.

Rubbish is removed from the sea floor and recording for an accurate account of a problem that was once thought of as 'out of sight and out of mind'. Keeping the global rubbish issue at the top of the political agenda is important, in order to make change. A huge proportion of the litter collected is unnecessary disposable plastic, like single use drink bottles. Also a big problem in NZ is fishing line.

The Project AWARE website (www.projectaware.org) gives us a platform for storytelling. It is also a universal platform where baseline data can be established. Recently (2016) The Adopt a Dive Site initiative has formed, allowing divers to take ownership of their data, and pledge dive a specific site every month, which aids the continuous collection of data with a constant time scale.

Nick Hempston - EOS ecology

Full presentation here

Whitebait Connection in Canterbury are based within an aquatic science organisation, EOS Ecology. EOS Ecology led a collaborative science project in 2016 called 'Whaka Inaka' which engaged with the communities in Christchurch about inanga spawning. EOS Ecology wanted to engage more people within the community with science and developed a Pest Monitoring Programme associated with Whaka Inaka for 16 schools. This is where the Whitebait Connection relationship began.

The Pest Monitoring project was successful with the 650 school students collecting 350 data entries about pest activity along the riverbanks, in over 15 weeks at 30 sites. They also helped to check on the Whaka Inaka inanga spawning sites. A report card was developed to show the results from the schools' efforts:

http://www.eosecology.co.nz/files/2016_WhakaInaka_PestMonitoring_ReportCard.pdf.

In the second half of 2016, 'Environment Investigators' was developed and implemented across 16 schools in Christchurch, including three pre-schools. This programme used the WBC framework and focused on inanga, utilising the National Inanga Spawning Programme (NISP) resources. The NISP resources were developed by EOS Ecology's graphic designer.

The WBC framework, with the inanga focus, was successful in engaging over 1,200 kids and sparking passion and kaitiakitanga for their environment. The concept of the 'love zone' was brilliant and worked for all age groups. The habitat assessments enabled kids to really understand what makes up a good spawning habitat and caring for inanga in fish tanks provided a lasting connection with inanga and the drive to protect their native fish.

Actions that stemmed from Environment Investigators included lobbying councillors at meetings for improved inanga spawning habitat (through kids giving presentations and writing letters), creating flyers and delivering to their communities, undertaking a community survey about river issues and starting up river care groups within the school to maintain a connection with their local river. Even at a pre-school level, kids were able to understand key scientific concepts and tell others about the threats and habitats of inanga, writing their own inanga stories and artwork and creating inanga songs.

Amanda Valois - NIWA freshwater ecologist

Full presentation here

Highlighted the advances in citizen science in policy and law. There is an act in the US which allows scientists to use crowd sourcing data in scientific papers.Citizen Science should be something to be rewarded for and not just a bonus.

They are looking at 3 key technologies to adopt in New Zealand:

1. An open source photometer for nutrient testing
2. At home *E.coli* kits
3. Aquatic invertebrate taxonomy app.

Making these kits fully accessible to citizens is key. Results can then be uploaded to Nature Watch. Citizen science could also be used in riparian restoration to allow better

outcomes.

Lena Cassidy-Clark - Marine studies at Whakatane High School

[Full presentation here]

As a school they are very lucky to have lots of great marine resources around them. Very much about how to help the kids and help them learn. Teaching the students to love the oceans. Loads of students love the course and it brings children to the school.

It's a very diverse course. From learning about zonation on rocky shores to dissections. They are now wanting to expand into citizen science.

The course is taught in Y9, Y10, Y12 & Y13. Going to Heron Island as an annual school trip is a real hit. Katharina Winsczyk, a student from Whakatane High School, was able to provide what the course brings from a student's point of view.

Scuba diving courses are also a part of the course and children can gain credits through the course. A future idea is to help create a marine reserve.

Eryn Hooper –
Local Marine Resource Management & Monitoring in Vanuatu

Full presentation here

The 3 year project involves working with local communities to help them manage their own marine resources better, particularly with continued pressure from the effects of climate change and population increase. The main aim of this project is to build the capacity of local people so that they can make effective and timely decisions to best manage changes to their marine environments. The project has developed a toolkit from which each community can choose modules, which are best suited to their needs.

For the reef health surveys, rather than counting species or estimating coverage, the methods involve a community consensus approach where a minimum of 5 people go and assess their reef. The estimate is based on local knowledge. There is a scale from no gat to fulap and a mark on this scale indicates the agreed value from the input of all the monitors.
A key point for this project is that the communities can initiate instant action from what they found rather than waiting for outside technical assistance, which in the past has demotivated community engagement. Management can be initiated by transposing the line to a graph which will instantly indicate what management action is required.

The project utilises key community members who lead the monitoring and have a higher level of training within their communities.

Lorna Doogan – EMR in Auckland

Busiest year ever for Auckland EMR with 850 people taken snorkelling. Video of Kai iwi lakes was shown, a very successful night dive that was carried out after years of planning: www.youtube.com/watch?v=ohb7vTAL9JQ&t=29s

Helen Kettles – Our Estuaries hub

Full presentation here

Citizen Science role inputting into management, consents, policy. But main thing to work

in partnership to make a strategic difference to estuaries.

Estuaries are home to a lot of threatened species and provide a very high ecosystem service - 12.2% of all the things humans need. There are 400 estuarine systems in NZ but they are all under a lot of pressure. Helen's team have developed a website – DoC providing information and supporting others and using the internet to enable resource and knowledge exchange. It's a live document and people are encouraged to add ideas and suggestions. You can zoom in and out of the first map and can find restoration projects: around NZ, 50 coastal wetland groups and 42 catchments under restoration.

DoC's goal to have 50 freshwater ecosystems restored from mountains to sea. There are currently 42 on the map under restoration. But to know if they are "restored" you need to monitor the health of the estuary, and a second map shows what Councils and the wider community are doing on that.

The 3rd interactive map is around experiencing estuaries, e.g. tracks, kayak trails, videos and resources for teachers. Other pages have lots of other resources and links. There is a social media hub so that there is one place people can see what's going on. Analytics show that there are a lot of users.

Future plans for a Citizen Science menu, GIS portal and Science page. Gifts and gains approach – people add their information and benefit from the collective. Seagrass App coming – Project Seagrass. Role with estuaries, engaging with the active community, utilising online tools.

Amy-Rose Hardy - The BarefootScientist

Full presentation here

The barefoot scientist is all about local engagement and the management of freshwater. It's modelled on the barefoot doctor approach. Current examples of community engagement include regional stakeholder advisory groups, individual catchment management projects and restoration initiatives which involve community monitoring.

Managing water is a matter of urgency. Challenges to fresh water quality in the taitawhiti context. There are plantation forest harvest impacts on communities. Often there can be unseen effects unless there is constant and regular monitoring. That's what the barefoot scientist approach is trying to achieve. An example was given of mass movement Kopuaroa Bridge no. 3

Reference to the Gluckman report and the key messages from that report was that water monitoring is very much needed, particularly the monitoring of water quality and quantity due to land use change. The importance of community monitoring and reporting and why we need it was discussed. There was then a discussion about why the barefoot scientist model has been used. It is very similar to the way in which the barefoot doctors were used.

The comparison was made about certification with the barefoot doctors and that for the barefoot scientists it is an important point so that councils recognise the skills of the barefoot scientists.
A case study of weather forecasting using traditional knowledge was discussed - using environmental indicators to predict the following seasons weather. Motu School and community – differences in the sites that they were working on in caparison- amazed the school kids

What is required for this to work? The resources that are required for this to work were discussed. Governance of the project is also a key element for success of the projects. Skills required of a barefoot scientist was discussed and there is a constant review and

evaluation of the processes. Key message for healthy water systems that if we “put bad stuff in or take too much water out” there will be a detrimental effect on the freshwater environment.

Freshwater Field Trip

Saturday 22nd April 2017

Mahurangi River, Elisabeth Street Reserve, Warkworth
National Inanga Spawning Programme

The Whitebait Connection (WBC) are currently undertaking a project to monitor inanga spawning activity on the Mahurangi River, Rodney. Auckland Council sponsored WBC to map the saline wedge and potential spawning habitat along the river in 2016. In 2017, WBC have been monitoring sites identified through this work as having potential for spawning, to look for spawning activity and eggs.

In conjunction with this work, WBC, with funding from MBIE, have been working with EOS Ecology in Christchurch to develop resources that can be used by individuals, schools and

community groups to guide them in identifying, mapping, monitoring and restoring sites for inanga spawning. These resources can be found at:

http://www.whitebaitconnection.co.nz/teaching-resources/inanga-spawning.html

The Freshwater Field Trip to the Mahurangi River involved trialling these resources at a site with known inanga spawning activity. Participants discussed how to map the saline wedge, assess potential spawning habitat, install temporary spawning habitat (hay bales), check hay bales and surrounding vegetation for inanga eggs and restoration techniques for known spawning sites.

Participants got to see temporary spawning habitat in situ and see inanga eggs (and slug/snail eggs!) that had been laid in the previous new moon spring tide. They also got to see native fish caught in the gee minnow traps set that morning on site.

New Zealand Premium Whitebait, Warkworth

New Zealand Premium Whitebait (Manāki) started with an aspiration to restore and enhance the native species that make up the whitebait catch. In 2006, Paul Decker, Dr Tagried Kurwie and the team at Mahurangi Technical Institute in Warkworth were successfully able to hatch some of the whitebait species for reintroduction into local streams affected by the development of the Northern Motorway extension. Over the next 8 years, the team successfully developed their ability to breed all of the whitebait species.

In 2014, with the environmental aspirations successfully achieved, New Zealand Premium Whitebait was formed to undertake the commercial development of whitebait farming. Now, after 2 years of further development, New Zealand Premium Whitebait is able to produce 100% sustainable whitebait year round. The team is currently focusing on breeding Giant Kokopu due to their short egg stage.

Participants on the Freshwater Field Trip got a guided tour of the NZ Premium Whitebait facilities, led by Paul Decker. The facility includes tanks of Giant Kokopu in different stages of their life cycle, tank maintenance equipment and a harvesting room, where fish are stripped of eggs and milt.

Marine Field Trip

Saturday 22nd April 2017

Practical soft sediment and rocky shore MM2 survey workshops with Dr Sally Carson from the NZ Marine Studies Centre.

We headed to the Whangateau Harbour to conduct our soft sediment survey as close as we could to the low tide. The project has been designed to provide meaningful, valid environmental baseline data on the state of seashores around New Zealand. It will enable us to not only take a snapshot of seashore biodiversity, but to form a baseline against which future change may be measured. Sally had the equipment we needed, a 1m x1m square quadrate (easily made with rope) a 10cm diameter core, a small trowel, a sieve and bucket , a small ruler, pencil and data sheets. We split into group and got underway. There are plenty of resources online too https://www.mm2.net.nz/resources

It was great to get a hands on introduction to the marine metre squared project in the soft sediment and learn about how the ‘core’ sample can give you an indication of health. MM2 can also assist with investigating environmental such the effects of increased sedimentation. We learned all about the field techniques but also increased our skills in species ID and making sure the data is actually imputed to ensure the information collected can be useful in the future! We also had a look at the rocky shore at Goat Island.

We then got ready for a snorkel at the Cape Rodney-Okakari Point Marine Reserve (Goat Island), NZ's first marine reserve, with Experiencing Marine Reserves. The ecosystems within the marine reserve are healthier and in a more natural state than those outside its boundaries.

Snorkellers were buddied up with our EMR coordinator supervisors, as an essential part of training new members of the EMR team. We were amazed by the abundance of mature snapper, hiwihiwi, huge silver drummer and a variety of other reef fish. We all came out of the water feeling refreshed and inspired!

For our group field trip, half of us went on the glass bottom boat, while the rest were treated to a snorkel at Whangateau on the

high tide.

Social Night

Hosted by the Goat Island Marine Discovery Centre. www.goatislandmarine.co.nz

Presentations by PhD candidates Caitlyn Blain and Rosalyn Putland. Catlin Blain was looking at kelp productivity along turbidity gradients (sedimentation) full presentation here; and, Rosalyn Putland was looking at underwater sound and marine mammals full presentation here.

Entertainment by The Nukes www.thenukes.co.nz

Citizen science workshop

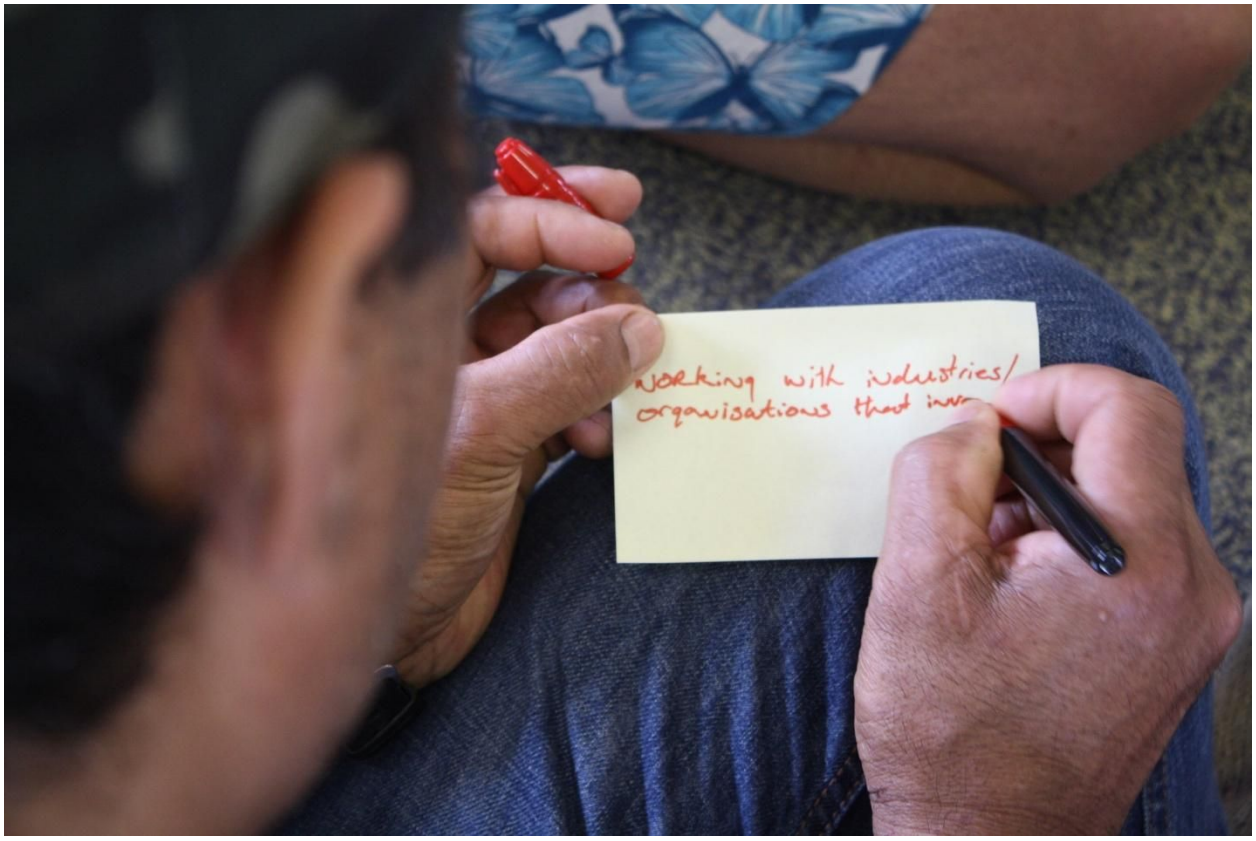
A full copy of the notes can be found here.

With so many projects that have strong science component already underway, it was a perfect opportunity to delve deeper into problem solving, and identifying pathways forward for citizen science. A starting point was seeking a definition of citizen science including mātauranga māori, as both centre on the co-production of knowledge on the environment. The word cloud uses key terms, with the size of the word reflecting the number of mentions.

NZ marine and freshwater citizen science initiatives
Participants added their knowledge of initiatives underway – listed below are those not currently included in the 2016 Inventory Citizen Science Projects and Programmes.

- Experiencing Marine Reserves Programme as well as the Whitebait Connection
- Whale watching in Cook Strait - http://www.doc.govt.nz/news/media-releases/2015/whale-watching-in-cook-strait/

- Whangateau shellfish surveys (from c.2007)
- Tawharanui Marine Reserve fish & crayfish surveys (50X10m fixed transects, since 1977)
- http://www.fish4all.co.nz/ - app for NZ recreational fishers to report their catch
- Ghost fishing http://www.ghostfishing.org/
- Project Aware http://www.projectaware.org/ combatting marine debris; protecting sharks and rays as well as 'Adopt a dive site' http://www.projectaware.org/adoptadivesite
- Tuna/eel monitoring in Kaipara Nga Kaitiaki O Nga Wai Maori (5 hapu) partnered with NIWA
- NaturewatchNZ platform projects e.g., kelps and shore species
- Project Baseline, Wellington (Facebook)



Barriers

As with many of the citizen science workshops I have facilitated over the last 18 months, there is a strong focus on social aspects. Although this reflects the roles of many workshop participants (i.e. coordinating public/school programmes, educating groups), it also underscores the 'citizen' component of citizen science, and the need to balance scientific (e.g., data production) and social interests (e.g., participant motivation and learning).

Persistent negative perceptions

- Perception of low data quality, lack of credibility of volunteers providing data
- Lack of value to science
- Perception that data aren't making a difference, taken up by policy/decision-makers, not influencing outcomes

Data management, storage and use

- Centralisation of data collection
- Ease of data entry, data management, locating sources of data, knowing how community data used by agencies, clear presentation of outcomes
- Data consistency between projects (national vs local)
- Difficult working environment once you go from tidal to intertidal
- Integrating mātauranga māori

The lack of tools and resources

- Time/access, funding (including data collection)
- Sourcing enough (reliable) volunteers to collect data
- Multiple overlapping platforms
- Lack of knowledge, using local knowledge

Project delivery

- Defining project purpose
- Others/scientists not willing to collaborate, distrust
- Constant (agency) restructures
- Bureaucracy and Health & Safety legislation
- Inaccessible environments (incl. landowners, forests, biosecurity)
- Lack of quick feedback

Community group sustainability

- Access to technology and skills/training
- Competition between groups working in same sector
- Communication from group to group and with project partners
- Succession planning and lack of leadership

Personal/social challenges

- Loss of motivation
- Lack of self-belief/confidence
- Pervasive community issues (e.g., poverty, health)
- Public denial of environmental problems
- Cultural barriers and language; value judgements

Moving from barriers to solutions: practical actions and pragmatic principles

A challenge set out at the start of the wananga by Kim Jones, National Whitebait Connection Coordinator to 'Know your Why' resonated with participants and served as a touchstone for self-reflection. It also underscored how often the 'Why' the overall purpose and philosophy guiding action is lost. In responding to the barriers outlined above, many participants went back to the 'Why' and used this to shape their responses.

Communicating the 'Why'

Starting point: the disconnect between scientists and citizens and between citizens themselves. Attitudes include 'It's not our problem, we don't need to take action', the scale of problems and distrust of data/information sources.

Opportunities: a greater connection and purpose for everyone by 'knowing your story', delivering a clear message, purpose and aims to avoid confusion. In short, explaining why we need everyone's help and letting everyone know that we're not doing enough now for the environment. Helen Kettles (DOC) described Predator Free NZ as 'a call to arms': Clear message, definition of project and branding – people can easily understand the 'why'.

Successful projects create a story that everyone wants to be a part of, and that also targets issues that the public connect with. Every story has a beginning, middle and an end. The 'idea' is the beginning of the story, and the middle is getting the people to do the activities, and the end may be a hub, communicating the project through a website or an app, both for volunteers and new participants who want to be part of the story and to help. Successful projects are great news stories; celebrate and share with end users.

The inspired leader

Inspired leaders are needed to follow the story through, collate the data and communicate findings effectively so that participants can understand why they were doing the activities, and what was achieved. They also help motivate participants by providing positive feedback, particularly when there are setbacks. Monitoring results may show negative trends so it's important to have shorter-term goals to maintain motivation e.g., how many volunteers involved; how many trees planted; incidences of flood. Activities have to be meaningful to volunteers and funders. While realistic goals short-term goals are needed, so are long-term blue-sky goals: have a 100-year plan rather than just for the next project. This enables the volunteers and their children to have a pathway into the project.

Empowering participants

To overcome a sense of isolation and loss of project purpose, a suggestion was to develop mana-enhancing projects incorporating matauranga maori cultural indicators. At the same time, building cultural awareness and bringing the local community together but walking alongside them to ensure they retain ownership of the project. Tailoring communication to suit individual community needs: in the Far North, face to face meetings are more effective than social media.

Meaningful data
Maintaining community groups' sovereignty while having access to nationwide databases, frameworks and protocols (e.g., a 'menu' of CS methods) to provide groups with guidance, longevity and stability. Methods that can be standardised and customised to suit different communities. To reach this goal, we need communication between government, iwi, community groups, and scientists in councils/trusts/CRIs that community groups can go to for support and interpretation. Peer review processes as well as science mentoring would support this goal.

By ensuring that projects tick policy boxes and that data are usable so that there is evidence to support action. Other opportunities include incorporating CS into state of the environment reporting. Actively marketing CS data results not only to supports funding applications, but can also highlighting the mutual benefits to end users. At the same time, end users need to be identified early and brought on board. Examples include Project Hotspot, where thanks to project data, Port Taranaki now promote orca in the port as well as DOC rules around vessel proximity to orca; an Experiencing Marine Reserves action project on port dredging, led to Port Taranaki changing their monitoring, and including CS in their assessment of environmental effects.

Refocusing funding
Securing funding through high level policy change, partnerships with community, corporate and philanthropic sector, and embracing social enterprise. Reframing funding focus from 'what can you do for us', to 'what can we can do for you'. A pathway into social enterprise may be accreditation or certification, introduction from primary and intermediate school level and leading into secondary level. Developing training resources and creating links with industry. An example is Papa Taiao (http://www.papataiaoearthcare.nz/) which provides practical conservation training for young adults in Northland. Model of growing recognisable skills and being paid to use the skills as already occurs with some community groups training their own members in lieu of hiring contractors.

Supporting citizen science
A suggestion was that govt/agencies prioritise projects that have a CS component (as occurs in the US) and include a reward system for applicants. A website connecting CS initiatives with potential funders would capitalise on business that want brand affiliation to 'green' causes. Lending libraries (another US example) to enable groups to borrow tech/monitoring equipment, provide free training videos etc. A 'funding roadmap' would guide newer groups where to source funding from, and a resource for managing with volunteers including what works and what doesn't work would help design activities.

Overall priority actions
The workshop wrapped up with groups briefly prioritising actions and highlighting key principles:

- A national citizen science hub developed from local workshops designed to bring key players together. The hub needs strong leadership, dedicated funds to support

it, and a simple user interface
- Collaborate to establishing marine reserves and marine monitoring programmes
- Develop national schools environmental monitoring programme
- Evaluate projects (ongoing)
- Encourage and enable social enterprise
- Community empowerment: build leaders and connections, provide mentoring and skills development
- Keep telling the story of the ‘why’ (nation; community specific)
- Share visions and promote inspirational stories using visual media
- Get full investment of the end users to ensure project sustainability

Evaluation

What is your why?

To get ideas for where DOC can go with marine citizen science	Helping create a brighter future and making a difference through connection to each other and science
Deep concern for the state of the world's oceans and marine life and their future	Share the love, share the earth, share the passion for this crazy, beautiful biosphere
To speak for the fish	Share enthusiasm for a world that is unseen by many
Love for Mother Earth	My response to the God who created it, cares for it and enjoys it
Seeing other people 'get it'	Inspiring solutions
Connection - to people and the environment	Inspiration and new ideas
For future tamariki	Arm myself with the tools to protect this environment and inspire communities to do the same
Wai ora, wai rua, wai māori	Generating an army of passionate marine educators that inspire minds of young and old all over New Zealand
To save the world, using little steps to make a big difference	To learn to soak it all in
Enable an 'industry' in sustainable practice	Connection, engagement, seeding mindset change for awareness and sustainability
To learn more about the environment that we live in and inform this information to my peers	Empower students to take action
Love for moana and whenua and desire to see it continue	Sustainable funding for ongoing environmental projects
Be the change you wish to see in the world (Ghandi)	Make scientific data input available from educated schools to help monitor environmental actions
To make the world a better place and leave a living planet behind for our tamariki	Water as the source of all life and the need to protect it

Making progress toward un-stuffing the marine world. It is in serious trouble	Greater Wellington Regional Council keen to get into citizen science as it fits into collaborative freshwater limit setting and integrated catchment management
Working toward a sustainable environment for future generations	To be inspired and informed with a quest to support wider NZ estuaries community
Learn more to share more - knowledge is power	Because dad couldn't come so I came in his place
To connect, collaborate and support others in the field - essential to true ocean protection	To bring the ocean into sight and into minds - with more awareness comes more positive action
Capture local knowledge to make a difference	Love for the ocean, to learn how to inspire better and to complete EMR training
To make people aware of what mother nature gave us and how beautiful it is and that it needs protection so that it doesn't disappear	

Ratings

	Score						
	1	2	3	4	5	6	Total Respondents
Venue	0	0	0	0	3	34	36
Food	0	0	0	0	5	32	36
Time Frame	0	0	0	0	13	20	32
Overall Organisation	0	0	0	0	2	35	36
Value for money	0	0	0	0	0	32	32

Venue
Stunning spot and surrounding area; Loved seeing the Leigh environs; Could be closer to the sea; whanaungatanga tikanga māori followed - sharing knowledge, supporting each other

Food
OMG! So good!!; Amazing, friendly cooks and lots of food!; Great chefs, yum!; Great except could have been more clarification on what was vegie; Great to try new foods

Time Frame
Just long enough; Maybe half day presentation and half day field trip instead of whole day of each; A little ambitious with field trips

Overall Organisation
You guys did an incredible job; Emails and communication amazing; Amazing!; Samara and Kim and Lorna - you rock!; Thanks for all your hard work

Value for money
It's amazing - you continue to support our team to travel up here and rego and we couldn't have come without it!; Full programme relevant to theme.

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

Grading	Number
1	0
2	0
3	0
4	2
5	10
6	28
Total Respondents:	40

Shared with attendees but now needs to be spread further afield to showcase the wānanga and citizen science
The PSP presentation made me understand citizen science the most with the principles of it and all the different case studies/projects happening
Great to see so many projects/opportunities
More difficult for sub-tidal marine
Awesome but still feeling overwhelmed
Relevant, engaging and great having ideas shared
Amazing to hear creative ways of engaging communities
Involve more policy wonks!
Lots of awesome examples - this is how we create collaboration!

Great focus - I think communicating science would have been good too
Showcased a huge range and opportunities within New Zealand
Lots of new ideas, mainly from show and tell

Rate the wānanga for effectiveness for networking

Grading	Number
1	0
2	0
3	0
4	0
5	11
6	22
Total Respondents:	33

Would have been great to have more local groups/public sector workers attend. Look at ways to encourage attendance in future
So many good chats and connections
Love the contact list
Great networking whilst staying together at the marae
Great to be able to pick brains and find new contacts
Fantastic to catch up with everyone
Great to mix with a different group to NZMSS/NZCS. Great focus on community education
Great! Photos next to contacts on list would be awesome
Got to work on my networking skills!
Fantastic networking opportunity
Great to meet new people
Loved the informal conversations
Highly effective!
Awesome group of varied groups
Always great and heaps of fun
Nice balance in programme, time to talk informally
Will try to get more organisations along to the next one
Great opportunity to meet face to face
Loved meeting so many inspiring folks

Powerful people with great values
Fantastic!
Doing the show and tell helped a lot, maybe some more activities to help networking. A great one was the world/NZ map

Time of year

Agree that April is good	31
Disagree with April	5

Please keep in school holidays (comment made by five people)
Perfect - EMR has simmered down and WBC hasn't yet begun
Yes but not near Easter or Anzac holiday due to cost of travel (comment made by three people)
Utilise daylight saving in March
Yup! Holiday rush is over and the sun is still shining
Good to keep it same time every year
Prefer outside of school holidays
Good - misses other major conferences and in the gap between busier periods
Could there be the opportunity to do an EMR training in October for new/upcoming coordinators? Could mean efficiencies to season delivery?

Ah-Hah moments and highlights

Freshwater
Trip to Whitebait facility inspiring!
Hearing Denise say that she'd learnt something on the freshwater field trip! My work is done
Whitebait aquaculture field trip
I found the NZ Premium Whitebait institute fascinating
Finding whitebait eggs
Where whitebait eggs go! Connections of PSP
Whitebait don't like black, stormwater/litter traps are awesome/citizen science has great value

Stroking Tuna during spotlighting mission
Getting an overall picture of the captive kokopu production
Seeing fish eggs and kokopu
The use of Giant Kokopu for whitebait industry due to short phase eggs.

Marine
Snorkel rescue scenarios
MM2 - going to make kits when I get home!
How MM2 can work at different levels
Kina make sound
Nick's talk about the ineffectiveness of small marine reserves, good ammo for size increase of our reserve
Snorkelling in mangroves
Seeing connection between inter-tidal study at low and snorkel at high tide
Mud flats are cool
MM2 workshop/seeing Eagle Ray and Snapper/the Nukes/field trips in general
Snorkelling and glass bottom boat
MM2 - I'd heard about it but the clarification and demonstration has inspired me to use it with groups in the future

General
Solidifying and confirming my notion that finding 'why' is imperative
Team meeting (Wellington), hanging out
Everyone's presentations - sharing their successes
Waking to karakia at 6am
The Nukes! Glass bottom boat tour
The people
Marae based learning and sharing and the food!
The aroha throughout the wānanga
Enjoyed the Pecha kucha presentations
Understanding that CS has different purposes in different situations, e.g., data gathering v's community engagement
Visiting the whole area!
Reminder around the focus on 'why'
Leigh marine lab dinner
Really enjoyed the 10 minute showcase talks

Regional meeting consolidation and planning
Future is looking better for our young people as young people are standing and presenting
Talking to a range of people from a range of organisations
Project Hotspot presentation
So many highs! Stormwater trap, MM2,marine teachers, field trips, loved show and tell

Ideas for Improvement

Could have dived Whangateau after MM2 so that the tide was right and to save travel time
More show and tell time (comment made by three different people)
More 'name games' on first day, not last
More active learning, less sitting and listening
Regional time to hui then share region's ideas and connections
Seating for presentation - uncomfortable on the floor and couldn't always see
More time between activities - more down time to reflect and hang-out/network (comment made by three different people)
Workshop action - group by region or 'like' areas
Tikanga from the start
Allow gap between activities to allow for over-runs (comment made by two different people)
Split activities - half day presentations, half day field trips/activities - not all presentations in one day/one big block
Later party venue!
Use video to show wananga content
Short, inter-active workshops on the Friday (show and tell)
Time to write skits before the social so that the social can be used to relax, enjoy the entertainment and socialise
More doing rather than waiting around so that we can get the most out of the snorkelling and stream monitoring
Perfect!
More atmospheric setting - use music/lighting
More energising activities - Monica run activities in between long periods of talking to break it up
More comfortable transport
Tell everyone to be at next activity an hour earlier than needed
More of the 5 minute brief presentations with case studies and success stories

Less sitting and listening, more interaction and dialogue activities to get the same info across
More wharepaku breaks - not 3 hour stretches without a break
The Nukes - the lead singer's whale impersonation

Contact List

MTSCT National Marine and Freshwater Wananga in Leigh, Auckland 2017 - Contact List

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