MANAWATŪ RIVER SOURCE TO SEA

PLASTIC POLLUTION CHALLENGE

2020-2021
PROJECT REPORT

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ZERO WASTE ACADEMY

Plastic Pollution Challenge

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MANAWATŪ RIVER SOURCE TO SEA

Manawatū River Source to Sea is a community-led movement for like-minded people and organisations in the Manawatū River Catchment. It promotes a combination of existing groups' "activities on the ground", as well as new collective action, such as the Plastic Pollution Challenge. The ultimate aim of Manawatū River Source to Sea is to:

- Enhance and replenish the mauri (lifeforce) of our streams and rivers
- Enhance and replenish indigenous biodiversity (including soil biodiversity)
- Enhance the wellbeing of human communities by providing nature-based experiences

ZERO WASTE ACADEMY

The Zero Waste Academy (ZWA) was established in 2002 and is located within the School of Agriculture and Environment at Massey University. The aim of the ZWA is to facilitate educational and R&D engagement between New Zealand's waste and recycling industry and the University's academic community around shared zero waste, circular economy and sustainable development objectives. Functionally, the ZWA's role involves teaching, research, industry / community consultation, and advisory and advocacy for effective product stewardship systems via the New Zealand Product Stewardship Council (see: www.nzpsc.nz).

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TOGETHER WE ARE MAKING A DIFFERENCE

PART 1

INTRODUCTION – WHAT THE REPORT WILL COVER

Welcome to the 2020 and 2021 Plastic Pollution Challenge (PPC) Report!

This report provides a high-level overview of activities and achievements following the first cycle of PPC actions, which included the development of a plastic pollution strategy for Palmerston North via a community workshop in June 2019. This report is structured into four sections:

- Brief history of the Plastic Pollution Challenge
- Seven Strategies for Palmy agreed at the 2019 Workshop and
- Citizen Science in action – 2020/21 sampling results from the Manawatū River Catchment
- Strategy workshop outcomes 2021 – where to next?

1. BRIEF HISTORY OF THE PLASTIC POLLUTION CHALLENGE (PPC)

PPC started out in 2018 as **Palmy's Plastic Pollution Challenge (PPPC)**. It was inspired by a local school boy's Manawatū Science Fair research project which was presented at the **Environment Network Manawatu (ENM)** Strategy Day in 2018. The presentation included two years' worth of plastic pollution data collected from the so-called "Napier Drain", an urban stormwater outlet into the Manawatū River. The research findings shocked and challenged the attendees and a core team were galvanised into action. In collaboration with **Massey's Zero Waste Academy (ZWA)**, and supported by **Palmerston North City Council (PNCC)** and **Manawatū River Leaders' Forum (MRLF)** the PPPC team embarked on a citizen science programme, sampling litter from 41 randomly selected sites along the urban streams in Palmerston North, which flow into the Manawatū river. The team together with the large group of citizen scientists from the local community collected 11,263 litter items in total. These were washed, dried and categorised with the help of the public at a range of awareness raising and school-based education events.

More than 80% of the items found were either plastic or foamed plastics, with four categories, i.e., '*single use shrink wrap*', '*plastic bags*', '*food wrappers*' and '*miscellaneous soft plastic fragments*', topping the list. 80% of the litter was found in 14 sites, with the historically and culturally important Te Kawau stream being the waterway most compromised by plastic pollution in the city.

The outcomes from the sampling were shared at a public plastic pollution strategy workshop in June 2019. Participants developed seven key strategies to address the problem, which was now clearly measured and understood by the local community. For more information refer to the 2019 Project Report: https://www.enm.org.nz/plastic-challenge/pppc-report

As the reach of Palmy's Plastic Pollution Challenge expanded beyond just Palmerston North City, the name was changed to the more generic Plastic Pollution Challenge (PPC).

2. SEVEN STRATEGIES FOR PALMY AGREED AT THE 2019 WORKSHOP

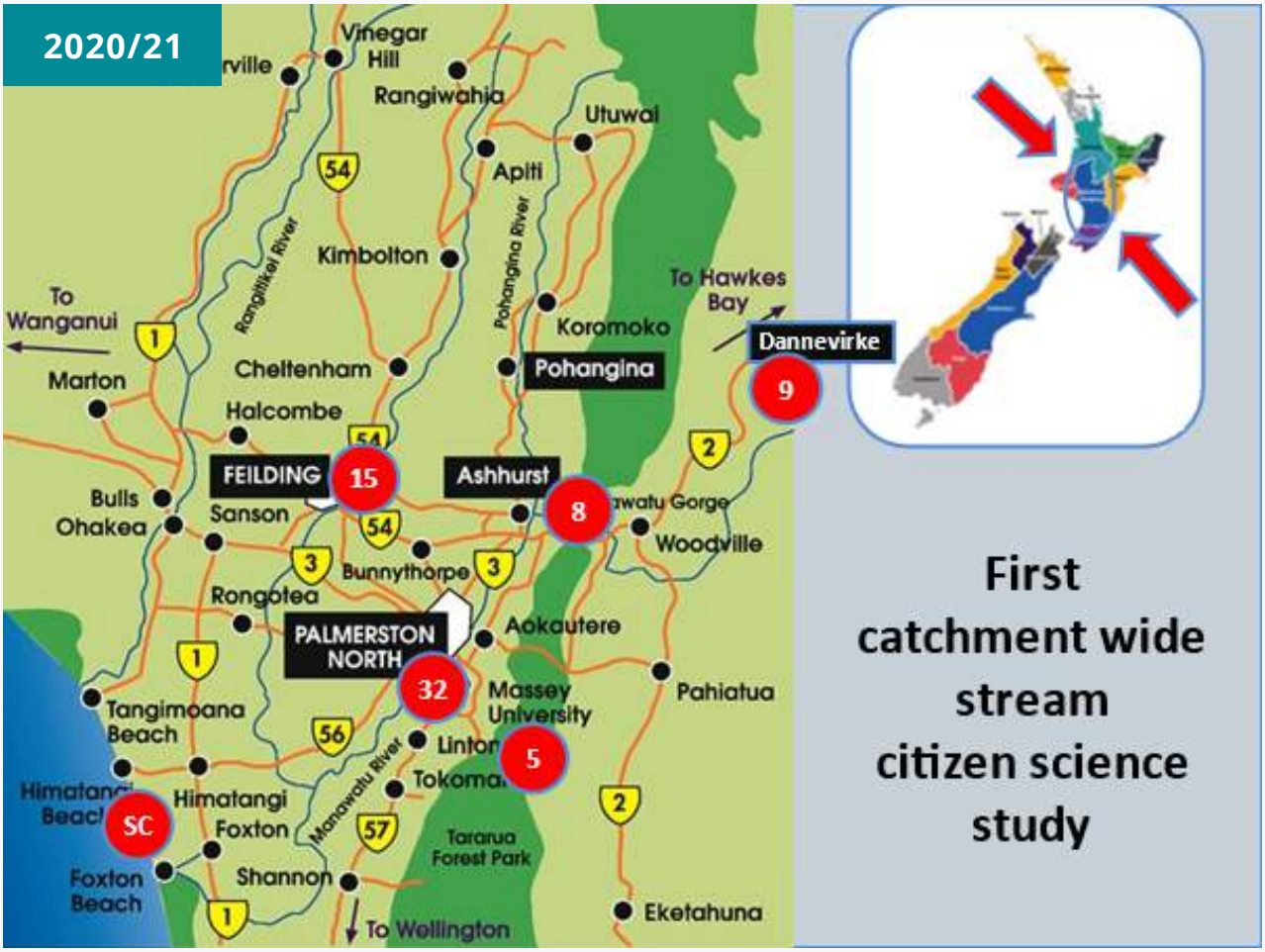
The following picture summarises the seven strategies agreed at the 2019 plastic pollution strategy workshop for Palmerston North. They will be introduced in more detail in their respective sections which will also capture the highlights of related community action.

COMMUNITY DEVELOPED STRATEGIES FOR PALMY

Work on the implementation of the seven strategies was designed and delivered in partnership with Te Ao Turoa, an entity of Rangitāne o Manawatū and Massey's Zero Waste Academy, and supported by Palmerston North City Council.

3. CITIZEN SCIENCE IN ACTION

The interest generated by the 2019 plastic litter monitoring, and the community sorting and awareness raising events, also resulted in the question of what was happening in other townships and streams throughout the Manawatū River Catchment. The feedback from the community was to expand the PPC citizen science programme beyond just Palmerston North and to create New Zealand's first catchment wide freshwater plastic pollution monitoring programme.



In 2021, PPC repeated the 2019 sampling at 32 out of the original 41 sites in Palmerston City and also grew the monitoring programme to include other communities in the catchment. With the addition of *stormwater sampling*, this resulted in a larger and more robust scientific database to strengthen future planning for actions.

PPC received funding support from the Manawatū River Leaders' Forum and the Ministry for the Environment Waste Minimisation Fund. PPC was invited by the Ministry for the Environment to participate in the development of nationwide litter data sampling methodology and data standards in collaboration with NIWA, Sustainable Coastlines, and Statistics NZ. This collaborative work is ongoing.

PART 2

IMPLEMENTATION OF THE SEVEN STRATEGIES FOR PALMY – COMMUNITY IN ACTION

Implementation of the seven strategies for Palmy – Community in action

The 2020/21 PPC programme focussed on implementing the seven strategic elements of the Palmerston North City plastic pollution strategy which was formalised at the 2019 community workshop. It was developed and implemented in partnership with Te Ao Turoa, a Rangitāne o Manawatū entity, and involved schools, councils, businesses, research institutes and many other members of the local community.

For this workstream, PPC received funding through a Ministry for the Environment Waste Minimisation Fund grant with co-funding from Palmerston North City, Horizons Regional Council and Manawatū District Council, as well as an additional small grant from the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC).

The following provides a brief summary of each element of the community developed Palmerston North City plastic pollution strategy and an overview of actions and achievements. Some actions address multiple elements of the strategy but have been recorded under one strategic element only, in order to avoid duplication. The report provides just a brief summary and ultimately cannot do justice to all of the many activities, new relationships and conversations that happened during the 2020-21 PPC project cycle.

In addition to this more comprehensive report, a brief video was produced to summarise progress against the seven strategies: https://drive.google.com/file/d/1EggH9ZWtcUxu11NkqykelEd5T687Rjrt/view?usp=sharing

STRATEGY 1 | 2 | 3 | 4 | 5 | 6 | 7

NEIGHBOURHOOD PILOT TO ENHANCE CARE AND CONNECTION TO PALMY URBAN WATERWAYS

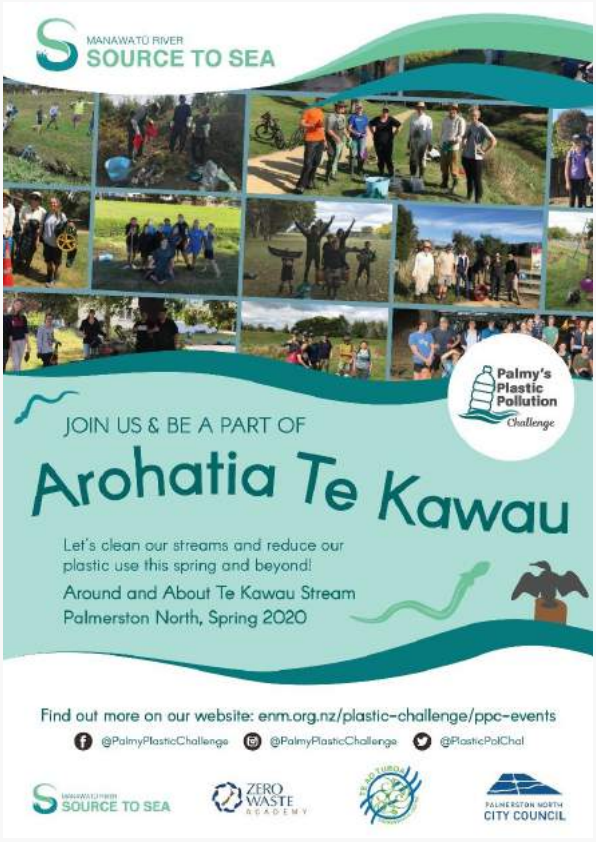
>> *Under this strategy, workshop participants wanted holistic restoration of the urban stream environment. Many of their ideas could be integrated within a neighbourhood pilot focusing on one of the more open stretches of Te Kawau. A pilot project would also provide opportunity to create inspiring media (such as film) and to identify which ideas are most applicable across the whole city.*

Participant suggestions included community-council collaboration to reduce littering and illegal dumping, clean-up actions and the establishment of kaitiaki for stream stretches, streamside planting and wetlands development for native species habitat and stormwater management, and new pathways to connect people to the stream, with signs to celebrate Te Kawau's heritage and ecological value.

PPC actions and achievements during 2020/21 project cycle

PPC actions around Te Kawau need to be seen as complementary to the ecological restoration efforts underway in a partnership between PNCC and Rangitāne o Manawatū. Work around the Te Kawau neighbourhood pilot, Te Kawau clean-ups and citizen science activities were conducted in partnership between PPC and Te Ao Turoa Environmental Centre.

The neighbourhood pilot was run under the motto "Arohatia Te Kawau" – Love Te Kawau stream.



In a Te Kawau specific video, Siobhan Karaitiana-Lynch explains, why Te Kawau is so important to the Rangitāne o Manawatū people: https://drive.google.com/file/d/13XxzhSB6_6JEu11gp3s1Z4J96jZBzexh/view?usp=sharing

Local schools as kaitiaki

Most of the neighbourhood engagement was focused on the two sections up-and down-stream from Highbury Bridge as well as the section bordering Takaro Park. Monrad School has very much adopted the section down-stream from Highbury Bridge and organises regular clean-ups, involving more than 200 children on the day. Our Lady of Lourdes School has taken a particular interest in Takaro Park, where the children are also involved in clean-up activities.

Signage

Signage was erected, both at Highbury Bridge and Takaro Park to alert the community to the efforts of the children and the importance of Te Kawau.

Signage at Highbury Bridge

Signage at Takaro Park

Fruit not litter – piloting a solution for Highbury Bridge up-stream section

This section of the stream experiences incredible amounts of fly-tipping. It was the only section along Te Kawau that had significantly more rubbish during the second clean-up than the first (for results on clean-up activities refer to Strategy 7). A lot of the rubbish comes straight over the fences of bordering properties.

In consultation with Manawatū Food Action Network[1] (MFAN) and Palmerston North City Council it was decided to trial planting fruit trees along this section and see whether or not they can replace the rubbish in the long term. Council staff planted the first six feijoa trees in August 2021.

[1]MFAN is an initiative under the ENM umbrella to contribute to food security and resilience in the city, with a particular focus on Highbury, Awapuni and Takaro. For more information, go to: https://www.enm.org.nz/manawatu-food-action/About-MFAN

Litterati Challenge

The Litterati Challenge was a fun activity which:

- Aligned with World Clean Up Day 2020 and with the vision of the #IChooseHighbury group (who meets in the library) to tidy up their local area.
- Provided an opportunity to trial run Litterati, an application to record litter as it is being collected from places. Despite heavy rain, as of 28/11/20, 4,841 pieces of litter had been collected under the Litterati challenge code that was set up for this event.
- Strengthened the relationship with Te Pātikitiki library and local community close to Te Kawau Stream.

More Palmy Rocks, less plastic litter

This event too, was run in collaboration with Te Pātikitiki Library. It provided lots of opportunity for face-to-face engagement with members of the community, especially parents and children during school holidays, who might have not heard of the PPC project otherwise

Some small group discussions about the issues surrounding plastic litter, recycling and some potential solutions took place. Recycling bins blowing over and public bins overflowing came up a number of times.

More Neighbourhood Action coming up: Napier Drain has found a kaitiaki

Inspired by what is happening along Te Kawau, Moana Seafood Ltd. has decided to adopt the upstream section of Napier Drain at Kelvin Grove. The downstream section is already the focus of Parkland School. PPC is looking forward to reporting on this new neighbourhood initiative in the next report.

8 March 2021 – Moana NZ – Clean-up and sampling at Te Kawau

ACTION ON PLASTIC FOOD PACKAGING

>> *Workshop participants sought a reduction in food packaging through bans, through the development and adoption of re-usable and compostable packaging, and through awareness-raising. They asked for eco-labelling and recommended the development of an interactive app that would allow consumers to scan products and receive easy-to-use information about the packaging. They also asked for the renewal of the Manawatū Food Action Network, linking food packaging reduction to food resilience. They noted that the re-localisation of food and community-based growing, cooking, preserving, and sharing would cut down on both food packaging and transport packaging.*

PPC actions and achievements during 2020/21 project cycle

A range of activities emerged under this strategy. One, with potentially far-reaching consequences, was to develop an interactive teaching programme which introduced the PPC to a group of business students from Korea. Closer to home, a lunchbox competition invited children and parents to take plastic out of the lunchbox, and action was taken in the hospitality sector to reduce single use drink bottles and cups. Supergrans, a member of the now very active Manawatū Food Action Network provided an entertaining evening with lots of tips on how to minimise plastic packaging in fridge and pantry.

Korean Students exploring alternative food packaging

Like most tourists, the group of students from Kyung Hee University in Seoul, South Korea arrived in New Zealand in January 2020 considering it as an environmentally conscious country with stunning landscapes. However, they witnessed some disturbing levels of plastic pollution in the local waterways during their litter sampling activity at three sites. Their samples were brought to Massey, where they were sorted, weighed and recorded as a practical element of their environmental education programme.

The Korean students came to New Zealand as part of an international PaCE short course in business studies which was designed and managed in conjunction with the PPC. They shared some of the findings and recommendations from their involvement in the PPC at the Palmerston North City Library on the 13th February 2020.

- Zarina was one of the students and she said she never collected or sorted plastic litter in her country. It was interesting and useful to her: “People here care about the environment and get involved in action-oriented work. We are taking that spirit from here”.
- “In Korea, we never had an experience like this. I was very much impressed”, said Hui Jung, a student from the group.
- Another student, Lee Dohyeon said that he wanted to “clear plastic pollution from the waterways in his hometown. However, there are no groups or movements there”. Regional movements of the community like this are good to make a difference, he added.

Inspired by what they found during plastic litter sampling, the Korean students chose four different 'food packaging challenges' from their home country and they researched and developed potential eco-packaging alternatives. This group of international students rose to the plastic pollution challenge and discovered the relevance that understanding plastic litter issues could have to their university's business studies programme back in Korea. They all saw the opportunity to create new eco-packaging solutions which can be practical and profitable and help resolve plastic pollution.

The students' presentations can be found on the ENM website and accessed through the links:

1. Alternatives to plastic https://bit.ly/3afKVVG
2. No pain no plastic https://bit.ly/3BffcQe
3. Do you know Tteokbokki? https://bit.ly/3oMOWZY
4. Do you love plastic? https://bit.ly/3uLT5OW

Lunchbox contest

PPC ran a Lunchbox Challenge during Plastic Free July 2020. The aim of this was to target under 18's (and their parents) to raise awareness of, and share tips on how to decrease, the amount of plastic food packaging associated with school lunchboxes. Information about the challenge was sent to all schools in the Manawatū catchment region and shared widely on social media.

Reducing single-use container/packaging campaigns

There is a growing perception that single-use compostable packaging is an acceptable move away from plastic. However, it is very unclear how much of this compostable packaging is actually as benign as it is claims and making it into the commercial composting process required.

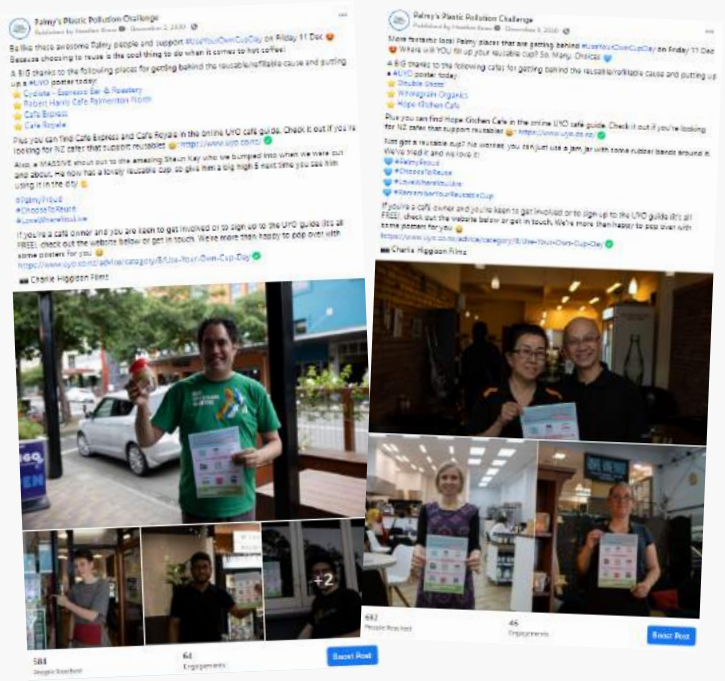
In order to reduce the amount of single-use packaging – no matter what it is made from – PPC started working with Palmerston North City Council and local businesses to promote refillable and reusable solutions. Rather than develop a new, separate campaign, it was decided to align with two existing national campaigns to reduce the number of single use plastic bottles: RefillNZ and UYO.

RefillNZ is an award winning, grass roots campaign that aims to prevent plastic pollution at source by making it easier to refill reusable water bottles on the go than buy water in a single-use plastic bottle. To cover their costs, RefillNZ charges $20 for a 'Refill station' to join, which allows the business to put a sticker in their window and be added to the map on the RefillNZ website and app. When PPC first looked at the RefillNZ map for Palmerston North, only the council water fountains were shown. No local businesses were on there. PNCC agreed to support this initiative by purchasing 30 stickers to help sign up local businesses to the RefillNZ programme at no cost to the owners.

UYO is a not-for-profit, responsible-cafe finder. UYO stands for Use Your Own. They describe themselves as a ProActivist Cafe Guide. The UYO campaign runs a very active Instagram account with about 20,100 followers. They have excellent guides, signs and ideas to help people reduce single use waste, in their hospitality business, their personal life or at their work place. They run campaigns such as Use Your Own Cup Day / Friday and promote giveaways of reusable cups, bottles and other items. Plus, they celebrate the cafes and businesses that support the UYO kaupapa and help to amplify their good work and key messages.

At the start of December 2020, 24 local hospitality businesses were visited to discuss refillable and reusable alternatives to single-use cups and bottled water. PPC promoted the RefillNZ and UYO campaigns and provided a flyer with further information. PPC offered the cafes a RefillNZ sticker and a poster for Use Your Own Cup Day 2020 (UYOCD), which was on Friday 11 December 2020. A representative from PNCC joined in, to promote the council's food collection service, to business not already signed up.

Due to the nature of hospitality businesses, it wasn't possible to talk to the decision maker in all of the places that we visited. However, out of the initial 24 businesses that were visited, 12 signed up to RefillNZ and 18 put up UYOCD posters after one visit. PPC shared photos and celebrated the businesses that got involved via PPC social media accounts.



Examples of PPPC social media posts promoting local cafes supporting UYOCD 2020

PNCC Facebook post promoting article about refilling and reusing

PNCC put out a media release on Wednesday 9 December to publicise the collaboration and roll out of this campaign. The article received a large amount of positive feedback on social media and this led to other cafes contacting PNCC to request RefillNZ stickers for their windows.

The PPPC coordinator was interviewed on The Breeze and MoreFM's breakfast shows on Friday 11 December (UYOCD) about the need to reduce single-use plastic and to promote choosing to reuse.

Re-usable coffee cup campaign

In the lead up to UYOCD 2020, PPC also ran two reusable cup giveaways on social media to help spread the word. This spread the message beyond usual circles and celebrated local cafes welcoming reusable cups.

As a result of this action:

- PPPC and PNCC have built positive relationships with a range of hospitality businesses and have an awareness of which ones are active with respect to reducing their waste and which are keen to do more.
- Palmerston North has an increased number of water 'Refill stations' spread well across the city (including out to Ashhurst). At least 27 local businesses have joined the scheme via the council's free stickers or by purchasing the sticker themselves.
- A number of cafes have taken further steps to decrease their single-use plastic waste.

PPPC social media posts for reusable cups giveaways in the lead up to UYOCD 2020

Smart and easy ways to reduce your food waste – Supergrans workshop

This evening event was coordinated by Supergrans, an active member of the Manawatū Food Action Network. The workshop covered best practice on how to reduce food and plastic packaging waste, whilst saving money at the same time. The PPC coordinator spoke about the global plastic issues, but mainly focussed on the local PNCC waste reduction goals and what actions individuals can take to reduce their own plastic footprint.

SUGGESTIONS FOR PNCC WASTE & RECYCLING INFRASTRUCTURE

>> *Workshop participants identified ways that PNCC could support reductions in litter and in single-use plastics, such as pamphlet drops and other campaigns, more rubbish bins and legal dumping options, water bottle refill stations, polystyrene recycling, and plastic-free city events (e.g., at The Square).*

PPC actions and achievements during 2020/21 project cycle

The PPC project has provided a new and vital platform for PNCC to work together with the local community on solutions to plastic pollution in our city. In 2020, several groups of interested citizens took the opportunity to visit the Awapuni Resource Recovery Centre and learn about the challenge of recycling plastic which the city is facing. As part of this new era of collaboration, PNCC has initiated a community-led Zero Waste Action Group (ZWAG), of which PPC is a founding partner. The aim of the ZWAG is to develop a broad framework of community supported actions which assist the implementation of the Waste Minimisation Management Plan (WMMP). PPC submitted to proposed changes to plastic recycling. And last but not least, PPC and REACT, another ENM member group, participated in the sustainability-themed 2020 Park(ing) Day organised by PNCCC.

Visits to Awapuni Resource Centre

The goal of the tours was to raise awareness of what is happening here in Palmy and encourage attendees to work to minimise their own plastic waste following the session. Everyone that attended learnt something new about what could and couldn't be recycled here in Palmerston North. Many attendees were surprised by what they learnt. Clear messaging is required in order for the whole city to understand precisely which plastics can be recycled and which ones the community needs to start reducing the use of /stop buying, for example #3, #4, #6 and #7 items in general, but also #1 plastics such as coloured bottles of soft drinks and meat trays. Another concern are compostable plastics in household waste as there is no facility to extract them from the household waste stream and redirect them into commercial composting.

Note: During the duration this project, PNCC voted to change the local plastic recycling service to stop collection of #3, #4, #6 and #7 plastics. This change came into effect in mid-May 2021.

Submissions to Palmerston North City Council

The PPC made submissions on:

- The Palmerston North City Council Waste Minimisation and Management Plan (WMMP) development process.
- The Palmerston North City Council Recycling System Review.

In respect of the most recent PNCC Recycling System Review, PPC acknowledged PNCC's reasons for proposing to stop the collection of plastics numbers 3, 4, 6 and 7, but advocated for the following actions to mitigate the negative impact of this reduction in recycling services:

- PNCC to advocate that government will progress banning single use plastics
- PNCC to promote a reduce / reuse culture locally (i.e., work effectively at the top of the waste hierarchy) as this is the only way to work towards eliminating the problem than forever just reacting to and managing waste issue.
- Recycling is really important to help to reduce immediate problems but this needs to align with the PPC developed Palmerston North Plastic Pollution strategy and be based around a long-term circular economy model.
- As PNCC goes ahead with reducing kerbside collection for non-recyclable plastics, PPC would like Council to run an education and communication campaign to ensure that the city and its citizens clearly understand:
  - what can and can't go into the PNCC kerbside collection
  - what is happening with #1,2,5 items after they are collected
  - what alternatives are available to avoid single use plastics
- Pilot the education campaign with a range of groups in the community PRIOR to it being rolled out to the whole city.



Palmy Park(ing) Day

The sustainability-themed "Palmy Park(ing) Day" 2020 was organised by PNCC and originally aligned with Keep NZ Beautiful week. To keep in line with the Park(ing) Day theme, PPC worked with ENM member group REACT to make car frames out of bamboo around bikes. These were decorated with rubbish collected out of Palmy's urban waterways. A display about the PPC efforts to date and a range of well-informed volunteers ensured that passers-by learnt all about the project. A lot of people stopped to engage in conversations. The bikes generated a lot of interest and led to a number of discussions about oil and its part in the plastic pollution problem. Photographs and videos of the bikes were also shared very widely on social media by people, especially local councillors, that attended the event.

Zero Waste Action Group

Under the leadership of PNCC a community-based Zero Waste Action Group (ZWAG) was initiated and meets every two months to discuss emerging issues. At this point, the focus is on PPC and MFAN activities such as addressing green waste/composting and food rescue with representation from ENM member group Just Zilch for the latter. Other areas of interest such as demolition waste will be added as interest groups emerge. ZWAG benefits from the research done at the Massey Zero Waste Academy.

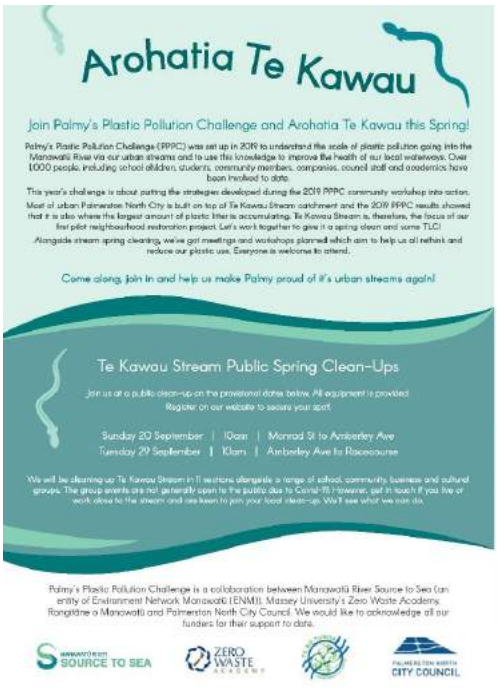
> We have been supportive of (Palmy's) Plastic Pollution Challenge since it began because its initiatives and activities help to drive community behaviour change, and restore the health and values of our urban streams.
>
> During this recent 2020-2021 project phase, PPC was able to mobilise community participation in litter clearance, stream cleaning, citizen science and monitoring activities, as well as to raise public awareness about the harms of plastic pollution and what actions we can take to prevent them.
> We acknowledge that PPC has contributed towards Palmerston North City's goal of becoming an Eco City with a sustainable future and reduced ecological footprint. PPC complements well Council's effort in effective planning of infrastructure and the protection, maintenance and enhancement of our natural and built environment.
>
> There were many opportunities for Council to engage, collaborate and support PPC's activities. These included participation in stream cleaning and sampling, disposal of litter removed from clean-ups; planting feijoa trees along stream reserves, providing feedback for signage to remind the public about the importance Te Kawau stream; and funding participation in RefillNZ initiative as part of campaign to reduce single use containers/plastic. Council will also benefit from PPC's: - lessons learned from its trial on community-based installation and maintenance of Litta Traps to prevent plastic pollution from entering our stormwater; outreach efforts in schools about plastics pollution and encouraging students to take action; and participation (through Environment Network Manawatu) as one of the 4 founding members of our city's community-based Zero Waste Action Group.
>
> ***Mike Monaghan, Water and Waste Operations Manager***
> ***Palmerston North City Council***

GROUP EDUCATION AND AWARENESS RAISING TO PROMOTE BEHAVIOUR CHANGE

>> *All table discussion groups at the 2019 workshop called for more education and awareness-raising. They asked for information on the health and ecological impacts of plastics and on steps individuals can take. They wanted programmes to identify and promote champions and business leaders. Some participants encouraged positive and small-step campaigns, but at the same time they asked for a wholesale change in culture and mindset. Several tables identified anti-smoking campaigns as a model approach. They encouraged using multiple types of media and getting the message out to diverse groups.*

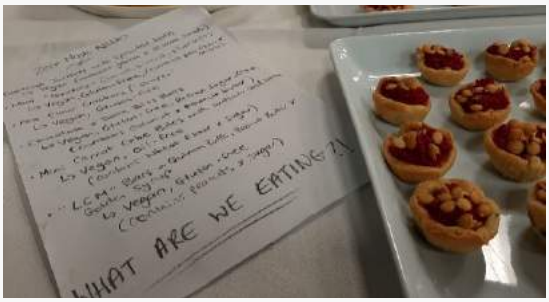
PPC actions and achievements during 2020/21 project cycle

Education and awareness raising very much underpinned the 2020/21 PPC programme cycle. The Arohatia Te Kawau event programme covered a range of topics, some of them already described in previous sections. Practical engagement in clean-ups (Strategy 7) and citizen science (Part 3 of this report) helped people to experience hands-on just how much litter is in our environment. Hannah and Liam from the Rubbish Trip shared very practical tips on how to reduce waste on a personal level – it does not have to be hard. An event run together with the team from the national Zero Waste Network (ZWN) introduced participants to the thinking behind a circular economy approach. Several talks to Massey students and others, organised by ENM member groups the Sustainability Club, Green Drinks and Manawatu Estuary Trust, were well received. And last but not least, a couple of short video clips were produced to make people think twice what they put into their shopping cart.



The Rubbish Trip - Hannah Blumhardt and Liam Prince

This was an engaging, informative and evidence-based presentation about how individuals, communities, councils, industry and government can work together to turn the findings of the Plastic Pollution Challenge into practical action for a better, safer world. Apart from insights into good and best practice from around NZ and beyond, Hannah also shared the contents from her personal zero waste daypack. A collection of reusable containers and bags for shopping, a glass jar that can double up as a coffee cup and a reusable drink bottle, together with some cutlery, and one is set for all eventualities. And it is as easy to grab the daypack in the morning as it is to grab a briefcase or laptop. And then there were all the treats, home made by Hannah and Liam – no plastic packaging here…



Closing the loop – in collaboration with Zero Waste Network

This event was coordinated by the ZWN and focused on showcasing local businesses, such as Be Free Grocer and Whole Grain Organics who are excelling with respect to waste. Other talks by local academics who are researching and taking action, covered design for waste minimisation and the principles of a circular economy in general. There was lots of time for networking and discussions after the presentations. A potential opportunity to align PPC school activities with the outstanding educational programme run by Wholegrain Organics will be followed up as capacity allows.

Series of talks with Massey students

Organised by the Sustainability Club, Massey students had the opportunity to learn all about litter related citizen science, including stormwater sampling using LittaTraps and microplastics during three lunchtime sessions.

Educational videos

PPC was extremely fortunate that funding stretched to work with local up-and-coming film maker Charlie Higginson, Runner Films, who, amongst many other things, produced a couple of fun video clips to challenge conventional shopping wisdom:

1. 'Compostable' single-use takeaway cups – Watch video here
2. Yoghurt pots – Watch video here

SCHOOLS-BASED INITIATIVES & YOUTH ENGAGEMENT

>> *Workshop participants called for increased participation through schools, especially primary schools. Schools could be involved in clean-up days (and perhaps inter-school clean-up competitions). They could register as kaitiaki of stretches of urban streams. They could declare themselves "single-use plastic free" and take actions to reduce plastics in stationery and lunchboxes. Youth engagement was understood to be more challenging because "eco isn't cool", but suggestions included gamification, film-making, and volunteering with community groups and eco-businesses to develop work skills and experience, including research experience. Plastics could be a science fair topic.*

PPC actions and achievements during 2020/21 project cycle

Guided by this recommendation, the PPC team planned to engage and encourage primary and intermediate school participation in the PPC during both summer data collection/stream monitoring as well as the autumn sample categorisation/data analysis phases. As part of the school engagement strategy, Heather Knox, the PPC coordinator, previewed a number of films on the plastic problem and chose a feature length film made in New York focussing on 10-year-old students taking action about plastic in their school, neighbourhood and city. A zoom discussion with the director and producer confirmed her choice; the director of Microplastic Madness, Debby Lee Cohen also offered to do a Q&A with students. It was determined that the PPC would trial utilising this film as part of school-based youth engagement initiative. The following provides a brief overview of the range of school-based activity and the learnings which resulted from using films to raise awareness and provoke action around plastic pollution:

At Parklands School three classes of Year 5 and 6 students viewed the whole 75 minutes and then had a lively Q&A with Debby Lee. In making the film she had interacted with students of this age and her relaxed friendly and natural interactions made the session a really positive experience. Debby Lee established a warmth with the classes; she listened attentively to the children's accounts of their sampling from the Napier Drain, their recycling efforts and one boy's experience of catching a fish with plastic in its gut. Her enthusiastic responses, for example to their move to ensure the school only purchased paper made from recycled materials, made the children really attentive; they sensed someone who really knew about the plastic problem and who had interesting comments to offer. This was our first international link into a classroom and both the vision and sound worked well so discussion with New York flowed well.




One class at Russell St School spearheaded environmental and recycling efforts in the school and viewed the film. The class brainstormed questions for the director and then, during their lunchtime, linked up with Debby Lee. Again, she was warm and interested and with a smaller group of students, gave more in-depth answers. She praised their initiatives in the school of planting an orchard, collecting food scraps for their hens and monitoring the school's recycling. The class had also made a video urging potato chip manufacturers to use recyclable packaging and in light of this asked a number of questions about the filmmaking process. Debby Lee was able in her responses to share background information about how long the changes in the New York school had taken to accomplish. She spoke to them as equals and the students were really invigorated by this experience by having someone like her validate their efforts.

Another highlight was the ongoing dialogue with Enviroschool Coordinator Sarah Williams who opened many doors to current and potential future schools engaging in plastic pollution monitoring, litter clean-ups in the context of environmental education.

Each of these school-based programmes fulfilled the PPC aim of growing youth engagement with the issue of plastic pollution across the school year, so that the local activity of stream sampling for plastic litter was set in a wider, global context for the students.

A summary of all 2020 school engagement in Palmerston North is shown in Table 1.

TABLE 1 - School engagement in Palmerston North

School / Event	Date / Time	# Attendees	# Classes
Riverdale School	16 Sept 20 / 13:45-15:00	96	3 x Year 3-4
Russell Street School	21 Sept 20 / 09:00-10:45	35	1 x Year 3-4-5
Parkland School	19 Oct / 10:30-13:00	64	2 x Year 5
Enviroschools Hui at Mt Lees	21 Oct / 12:30-14:00	55	N/A
Ross Intermediate	6 Nov / 09:00-10:30	29	1 x Year 7-8
Russell Street School	10 Nov / 09:45-13:00	30	1 x Year 3-4-5
Monrad Intermediate	17 Nov / 09:00-12:30	144	5 x Year 7-8
	TOTAL	**453**	**13 classes**

In addition to the formal school engagement, PPC was delighted to welcome many students engaging in the clean-up and citizen science activities as part of their community service programmes. The engagement of students and parents from Carncot School, in particular, was very welcome.

ADVOCACY FOR CHANGE IN CENTRAL GOVERNMENT WASTE POLICIES & PROGRAMMES

>> *Many of workshop participants' solutions require action beyond the local level, for example nation-wide bans, incentive schemes (e.g., bottle deposits), funded research into plastic alternatives, and the development of industry-funded hubs to take responsibility for commercial packaging. In general terms, participants want an integrated central policy framework based on funded research, the precautionary principle, full-cost accounting, product stewardship, and polluter pays.*

PPC actions and achievements during 2020/21 project cycle

The PPC is a voice for the environment. The team takes action locally, but has also contributed nationally, by helping develop a national standard and training resources for monitoring plastic pollution in freshwater eco-systems. Whilst the PPC team are *walking the talk* and getting directly involved with addressing plastic pollution via stream clean-ups and citizen science monitoring, PPC is also a voice of advocacy on behalf of the wider community.

Along local advocacy (covered under Strategy 3) the PPC team has contributed to national consultation process facilitated by the NZ Ministry for the Environment (MfE) for example, PPC supports:

- The government's past use of the provisions of the Waste Minimisation Act (WMA:2008) to have previously banned micro beads and single-use plastic bags. The local indication from PPC research is that these measures are having a positive effect on reducing plastic pollution in our local waterways.
- The government's proposals for future further use of the provisions of the WMA:2008 to:
  - Declare six *Priority Product* types, namely: Tyres + Electrical and electronic products (e-waste) + Refrigerants and other synthetic greenhouse gases + Agrichemicals and their containers + Farm plastics + Packaging (beverage packaging, single-use plastic packaging).
  - Increase the waste levy rate in stages from the existing $10 per tonne to $50 or $60 per tonne by 2023 (for landfills that take household waste) 2- Apply the levy to all landfills (except clean-fills or farm dumps) 3- Propose to improve waste data.
  - Move away from hard-to-recycle and single-use items. Here the government has two proposals that would help kiwis. The first proposal is to phase out the following types of unrecyclable plastic, i.e., 1- Some polyvinyl chloride (PVC) and polystyrene packaging and 2- All oxo-degradable plastic products. Following these measures, the second proposal is to phase-out seven types of single-use plastic items: (namely: single-use produce bags, tableware (e.g., plastic plates, bowls, cutlery), non-compostable produce stickers, drink stirrers, some single-use cups and lids. This includes plastic-lined paper cups, (but not disposable coffee cups), plastic cotton buds and plastic straws.

The PPC has been very deliberate in seeking to support and collaborate with other organisations working in the sphere of plastic pollution. For example, PPC supported both of the key NZ scientific reporting initiatives, which have created a public-good knowledge-base which has helped to grow awareness and give direction to community support for addressing plastic pollution.

- The Royal Society: https://www.royalsociety.org.nz/major-issues-and-projects/plastics/
- The Prime Ministers Chief Science advisors (PMCSA): https://www.pmcsa.ac.nz/topics/rethinking-plastics/plastics-and-the-environment/

Microplastic sampling at the Manawatū River as part of the global 100 Plastic Rivers project

This reporting builds on a growing consensus and groundswell of industry /community awareness of and willingness to address key systemic recycling issues nationally. The PPC supports the direction offered in the following reports, which point to a way forward for addressing the underlying waste and recycling issues which cause plastic pollution:

- *Rebooting recycling*: *What can Aotearoa do?* (http://www.wasteminz.org.nz/wp-content/uploads/2018/05/Rebooting-Recycling.-What-can-Aotearoa-do-FINAL.pdf)
- *Recommendations for standardisation of kerbside collections in Aotearoa* (https://www.wasteminz.org.nz/wp-content/uploads/2020/08/Final-1.0-Standardising-Kerbside-Collections-in-Aotearoa.pdf)
- *Designing New Zealand's Container Return Scheme (CRS)* (https://www.marlborough.govt.nz/services/recycling-and-resource-recovery/rubbish-and-recycling-projects/designing-new-zealands-container-return-scheme) NB: despite this project being undertaken by a widely representative group this outcome is now being systematically undermined by vested industry packaging lobby groups ref: *NZ beverage backlash: Industry blasts government's container return scheme as 'costly and bureaucratic'* (ref: https://www.beveragedaily.com/Article/2020/08/11/NZ-beverage-backlash-Industry-blasts-government-s-container-return-scheme-as-costly-and-bureaucratic)
- It appears from recent public announcements that the government is seeking to be quite directional and assertive in investing to resolve plastic pollution and systematic recycling issues (i.e.*$124 million Government investment in recycling infrastructure) via the Waste Minimisation Fund (WMF) and potentially other avenues. (i.e. Government steps up action on waste - funds recycling infrastructure and expands levy scheme* https://www.beehive.govt.nz/release/government-steps-action-waste-funds-recycling-infrastructure-and-expands-levy-scheme)
- In addition, New Zealand as a whole is moving to align with growing international commitment to address plastic pollution and waste issues globally via the new international obligations under the Basel Convention. From 1 January 2021 a permit will be needed from the Environmental Protection Authority before the import or export of certain types of plastic waste. The Government has approved regulations under the Imports and Exports (Restrictions) Prohibition Order (No 2) 2004 (ref: https://mfe-inhouse.cmail20.com/t/r-l-juhjtijl-odijihldtr-r/).

These are all positive indicators that waste and plastic pollution is being understood as a serious issue and that change is beginning to happen. The PPC has been right in the mix advocating for this and more… Unfortunately, local data shows that there is still a long way to go before we fully address the issue of plastic pollution. The experience of the PPC shows that everybody can be part of positive change-making. PPC shows that grass-roots efforts like ours can make a difference.

CLEAN-UP CAMPAIGNS

>> *Workshop participants offered many ideas suitable for September's World Clean-up Day and other clean-up campaigns, including registering kaitiaki to take responsibility for specific stretches of urban waterways, competitions between schools and via social media and the phone app Litterati, "don't drop it" messaging, and alternatives to illegal dumping.*

PPC actions and achievements during 2020/21 project cycle

In partnership with Te Ao Turoa Environmental Centre a major focus went on cleaning up Te Kawau Stream twice (September/October 2020 and February/March 2021) from top to bottom:

The following are some important statistics from the two phases of stream cleaning activity:

- 1,135 Te Kawau Stream clean-up participants + 252 participants in related clean-up activities
- 1,908 kg of litter recorded from Te Kawau Stream clean-ups + conservative estimate of an extra 1,000 kg of items collected that could not be weighed (chairs, carpets, traffic cones, large / awkwardly shaped items)
- Approximately 2,300 of volunteer hours committed to the 20/21 Te Kawau Stream clean-up campaign.
- Overall, more participants collected less litter during the second clean-up campaign; and there appears to be some improvement. Site-specific issues are better understood and get addressed through local community action. Of the seven sites that were cleaned up twice, the bagged litter weighed less at three sites, marginally more at three sites and significantly more at one site at clean-up II vs clean-up I.
- There are a couple of sites where household fly tipping is a prominent issue and this needs to be addressed in collaboration with the local council and other community groups.
- The exercise confirmed that a long term, holistic management response is required for Te Kawau Stream in order to solve the range of issues that it is facing. This needs to involve ecological restoration, weed control, rubbish bin placement and bin design, signage and social services.

Clean-ups – weight of bagged litter

Site #	Name	2020 / kg	2021 / kg	Difference / kg
1	Colquhoun Park	51	32	-19
3	QEC ca. 25% partial clean up only	0	14	N/A
5	Clausen Reserve to Seddon	0	69	N/A
6	Seddon - Featherston	108	166	+58
7	Featherston - Takaro Park	123	50	-73
8	Upper Highbury	98	247	+149
9-10	Tui Park- Kawau Reserve - Monrad	444	81	-363
11	Monrad - Amberley	87	103	+17
12	Amberley - Racecourse	93	109	+17
13	Racecourse to Mangaone confluence	0	35	N/A
Total		1,004	906 (788)	

Who participated in the clean-ups:

- 3 schools and 1 school student organisation
- Monrad Intermediate (x2), Our Lady of Lourdes, Carncot School students, School strike 4 Climate Manawatū
- 5 community and 2 student organisations
- All Saints Church, UNANZ, English Language Partners, Manawatū Multicultural Centre, ENM staff and whanau, Massey Student Wildlife and Conservation Club and Massey University Veterinary Students' Association
- 4 businesses
- Smith & Sons Renovations & Extensions, Iplex Pipelines NZ, ANZ and Moana NZ
- Palmerston North City Council – Community Service event
- Horizons Regional Council – Community Service event
- Rangitāne o Manawatū Community Service event
- 6 events were open to the public / volunteers and attracted people from all walks of life

Memorable Moments

- Arriving for a Sunday morning clean-up in the pouring rain, after we'd said that we were going ahead whatever the weather, and it beginning to hail 10 minutes before the start time. Sheltering under a tree to get changed into some waders and not expecting anyone else to show up. Then, surprisingly, people turning up, the sun coming out and everyone having a good time. Plus finding some crazy things in the stream.
- Doing classroom Q&As with Debby Lee Cohen from Cafeteria Culture following two showings of Microplastic Madness. Seeing how excited the students were to talk to her in New York and hearing their well thought out comments and questions. Plus, learning about how Debby Lee got into this area and feeling the passion and enthusiasm that she continues to put into making positive change.
- Talking to people about what 'treasures' they'd found during clean-ups and seeing them get quite animated about their finds. Plus, bumping into people long after clean-ups and them telling me what litter they'd found (either at the clean-up they attended or subsequently). At the Parking Day, two boys stopped to talk and one said that he'd been involved in a stream clean-up with his school. He then told me very proudly that he'd found a brick in the stream!
- Meeting people all along the spectrum of 'waste awareness'. Being inspired by advocates such as Hannah and Liam from The Rubbish Trip and Palmy teachers that are having a profound impact on their schools and local areas by educating their students about environmental issues. Plus, meeting people that have just started thinking about this type of thing and are making small changes to their everyday life to reduce their waste or push for change. Going into local cafes and seeing how many of them are working towards reducing their environmental impact.
- Seeing local politicians and political candidates get into the local streams and understand the issues first-hand. Plus being invited to speak to the PNCC environmental committee about the project.

Heather Knox

PART 3

CITIZEN SCIENCE IN ACTION

Citizen Science in action

Plastic pollution and other litter in Palmy's streams has been an ongoing issue for many years, see e.g., Te Kawau Stream full of rubbish 2014. This issue is a source of frustration and concern for many residents, businesses and PNCC. The desire to do something positive about this environmental issue was constantly communicated by participants throughout the 2018/19 project Phase 1, then known as Palmy's Plastic Pollution Challenge (PPPC)[1]. This resulted in widespread ongoing involvement in the PPC 2020/21 project Phase 2 covered in this report.

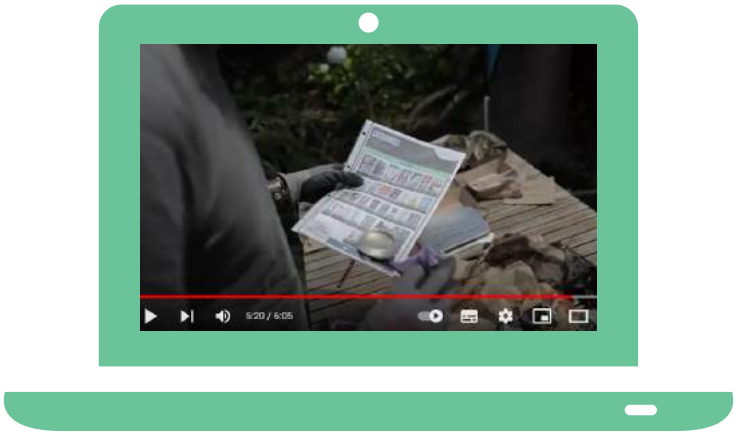
An important aspect of the project is to provide people, community, and business groups the opportunity to further their understanding about the extent of the plastic pollution problem in urban streams. Stream sampling during the 2018/19 project cycle demonstrated unequivocally for the first time, the extent of the local problem of plastic pollution in Palmerston North. The team developed and used robust scientific methodology, to create a baseline data-set. This methodology has been shared and refined so it can be used to track future progress addressing this issue, both locally and across New Zealand. The initial research findings can be found in the 2019 PPPC Report. The publication of that report and the development of the Palmerston North plastic pollution strategy have prompted further action by community including the repeat of sampling in 2021 and the expansion of the programme to other townships.

A Manawatū River Leaders' Accord Community Grant for 2020 and 2021 helped to fund the development of an Education Toolkit in 2020 as well as the citizen science programme for 2020/21.

The Education Toolkit outlines the sampling methodology and Health & Safety requirements for school and community organisers. The toolkit was updated following the 2020/21 sampling season; Version 2 of the toolkit can be found here: https://www.enm.org.nz/plastic-challenge/citizen-science-toolkit

Covers of the PPPC 2019 Report (left) and Education Toolkit (right)

[1] For consistency purposes, PPC = Plastic Pollution Challenge will be used throughout this section, unless there is a direct reference to the 2018/2019 project phase.



In addition to the document, PPC also produced a methodology video to allow viewers to see sampling and sorting in action: https://bit.ly/PPC_Methodology

Sampling was repeated at many of the original 2019 sites in 2021. In addition, sampling was geographically expanded to include Dannevirke, Ashhurst and Feilding, taking a whole of catchment approach[2].

This section of the PPC 2020/21 report summarises key outcomes for citizen science in action since the conception of the project in August 2018. It begins with a high-level comparison of 2020/21 litter sampling across all streams in the catchment, followed by more detailed analysis and comparisons for Palmerston North, Dannevirke, Ashhurst and Feilding. Insights from stormwater sampling and engagement with national initiatives conclude this section of the report.

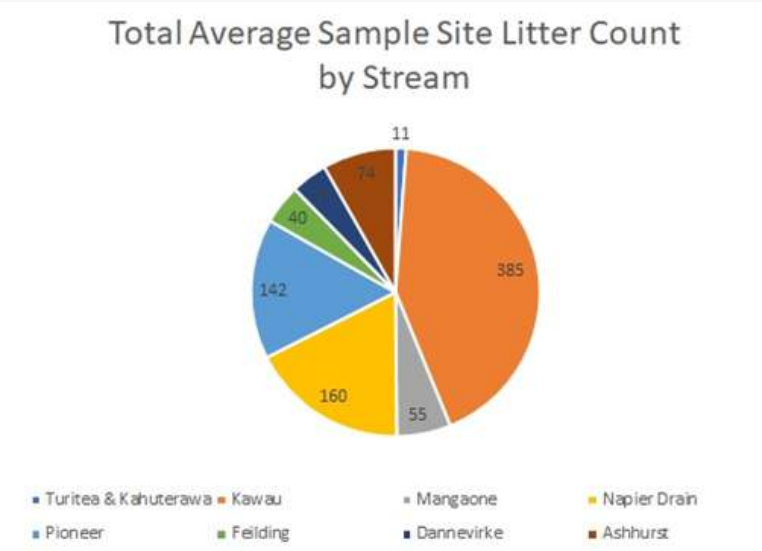
[2] Note: potential streams for sampling in Levin and Foxton were investigated, but not included in the 2021 sampling activities as they either did not connect to the Manawatū River or there was no capacity at local level to participate in the citizen science programme.

1. STREAM SAMPLING – SUMMARY OF KEY FINDINGS

Palmerston North City and Manawatū River Catchment

The data from Palmerston North conveys both, a good and a bad news story, with some relatively clean and some badly polluted streams. Comparing all the streams sampled in summer 2020/21 provides the following insights:

- The Turitea and Kahuterawa streams on the Massey side of Palmerston North City showed the lowest average litter density by far in the catchment, with 11 items per 100m²
- Te Kawau, on the other hand, while somewhat improved, continued to be the stream with the highest litter density, with 385 items per 100m²
- ·The Napier Drain (at 160 items / 100m²), Pioneer Drain (142 items / 100m²) and Mangaone (55 items / 100m²) sit between these extremes



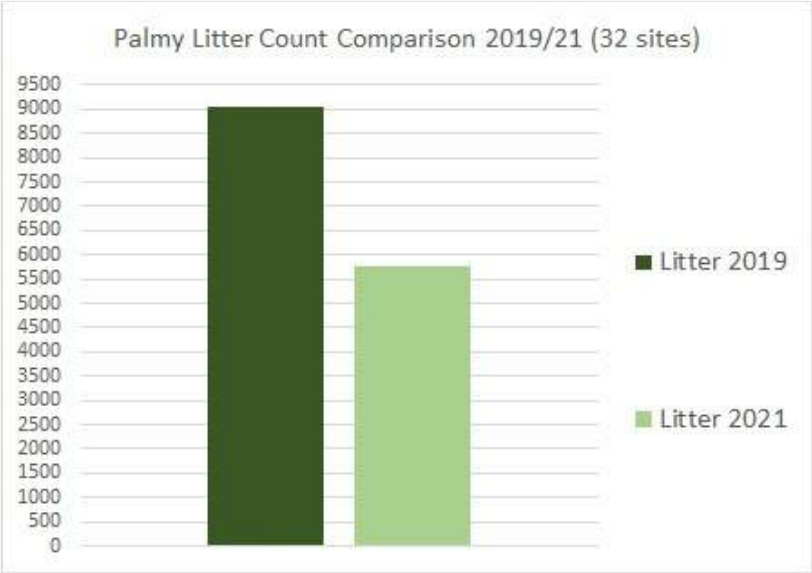
Graph 1 – Stream litter density comparison across all streams sampled in the catchment

- The Ashhurst Stream recorded 74 items / m²
- The Mangakino in Feilding recorded an average of 40 items / 100m² sampling site
- The Tapuata Stream in Dannevirke had the best result outside Palmy with an average of 37 items / m².

A general observation from sampling at different streams and locations is that litter density tends to be much lower in stream sections flowing through open and undeveloped rural areas or along the outskirts of urban development. This applies equally for Turitea and Kahuterawa, Mangaone, Tapuata, Mangakino and Ashhurst streams. Litter density clearly increases in heavily urbanised areas.

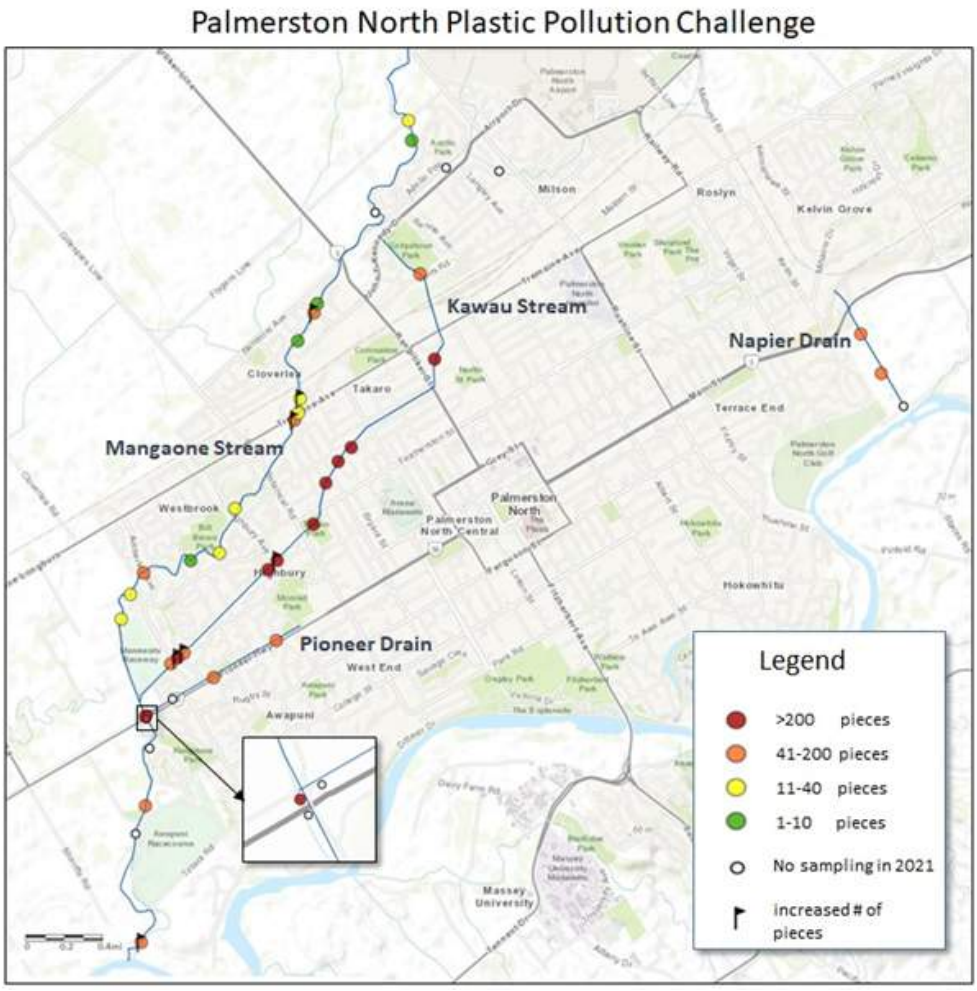
Palmerston North City – comparison of sampling sites summer 2018/19 and summer 2020/21

Litter sampling across 41 randomly selected 100m² sites in the 2019 monitoring programme, collected 11,263 items in total. In the PPC2 2020/21 monitoring programme, the PPC team and local citizen scientists returned to sample at 32 of the original sites. In order to undertake a direct comparison, the 2019 litter data was adjusted so as to only account for the sites resampled in 2021. As per Graph 2, the adjusted 2019 total was 9,031 items. In 2021, only 5,767 items were collected from the comparable sites. This represents a reduction of roughly 36% of litter items found across all resampled sites.

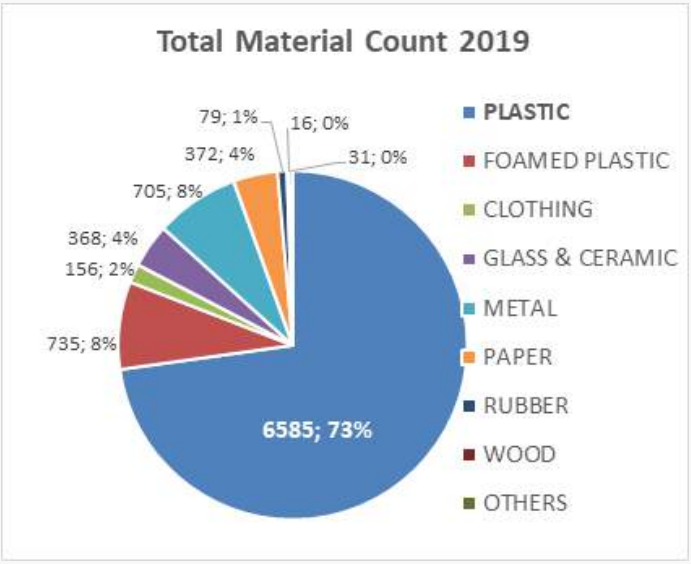


Graph 2: Comparison of the 32 sites in Palmerston North sampled both, in 2019 and 2021

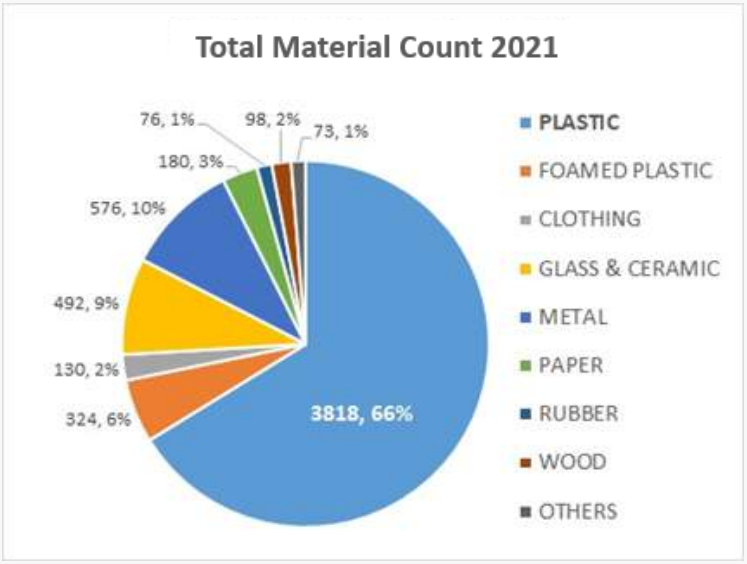
The following map shows litter density for the 32 sampling sites sampled in 2019 and 2021. In this report, the map only shows the resampled sites ('o' identifies 2019 sites not resampled), with an adjusted range of litter density bands to reflect lower occurrences of litter in the 2021 samples across the catchment. The little black flags indicate sites with an increased litter count in 2021. All other sites saw a reduction or stayed consistent.



Overall, the combined percentage of plastic (73%) and foamed plastic (8%) dropped from just over 80% in the 2019 sample to 72% (66% + 6% respectively) in the 2021 sample as shown in Graphs 4 and 5.



Graph 3 – Total material count for 2019



Graph 4 – Total material count for 2021

Some general observations for Palmy streams:

- Overall, litter collected from the sampling sites appears to have reduced by an encouraging amount. However, with two data points only, this does not yet represent a trend.
- The number of plastic bags collected declined significantly. It appears, the bags found this time had been there for some time and had probably entered the stream prior to the plastic bag ban evoked by government. This indicates that banning plastic items can have a rapid and profound impact on the environment. In respect of the upcoming New Zealand government proposal for further bans of hard to recycle materials[3], this appears to offer a degree of encouragement for this strategy.

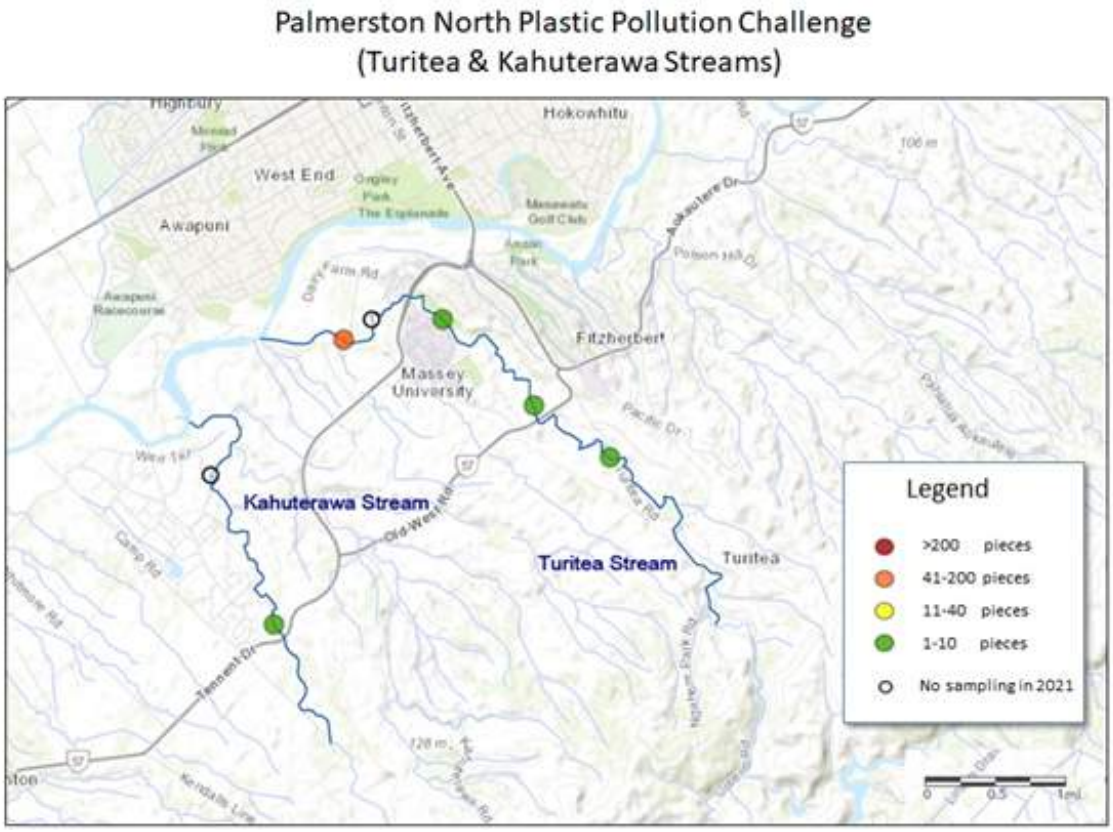
Again, it must be recognized that the PPC data-set is quite limited - so one would overstate this point beyond saying it appears interesting and potentially an important endorsement for government to keep using the WMA:2008 to address plastic pollution. The other key thing to note is that this point shows the potential value of systematically monitoring plastic pollution to record and evaluate the impact of government actions, such as banning '*hard to recycle plastics*'.

[3] Ref. https://environment.govt.nz/news/taking-action-on-problem-plastics/

Turitea and Kahuterawa

In November 2019, a Massey student chose 7 random sampling sites along the Turitea and Kahuterawa streams, which are on the Massey side of Palmerston North to explore litter density in a more rural setting, using the PPC methodology.

The following map shows the distribution of the sampling sites across the two streams. 5 of the sites were re-sampled in summer 2021.



A comparison of the 2018/19 and 2020/21 sampling results shows:

TABLE 2 - Sampling results comparison

	2019	2021
Number of sampling sites	7	5
Number of items collected	79	54
Average items per site	11.2	10.8
% plastic items	44	51,9

Outcomes from the two sampling rounds are very similar, with an increase in the percentage of plastic items found in 2021. This data provides a useful control and reference point for understanding the urbanisation effect on the generation of plastic pollution. Other interesting aspect to explore further in this data is to examine if the types of plastic which are generated in a rural setting is different for that of the urban setting on the city side of the river.

Plastic and metal items on a data collection site

Dannevirke – Te Kāuru

Planning for the Dannevirke Plastic Challenge and the initial launch were done by Te Kāuru, the Eastern Manawatū River Hapū Collective, in 2020. However, due to Covid-19 the actual sampling of the Tapuata Stream had to be postponed to summer 2021. As a result, two of the schools who had initially signed up for the challenge were no longer able to participate.

In total there were 9 randomly selected sites done between Cole Street Bridge and the Transfer Station during four events.

The map on the right shows the distribution of litter along the stream. In total we found 335 pieces weighing 5.75kg (not counting the litter picked up as part of the general clean-up.

The two sites with the highest amount of litter found were Cole Street Bridge (worst site) and Taradale Bridge. The site with the lowest litter count was the High School downstream site.

Table 3 shows the selected sites, data collection dates and number of participants:

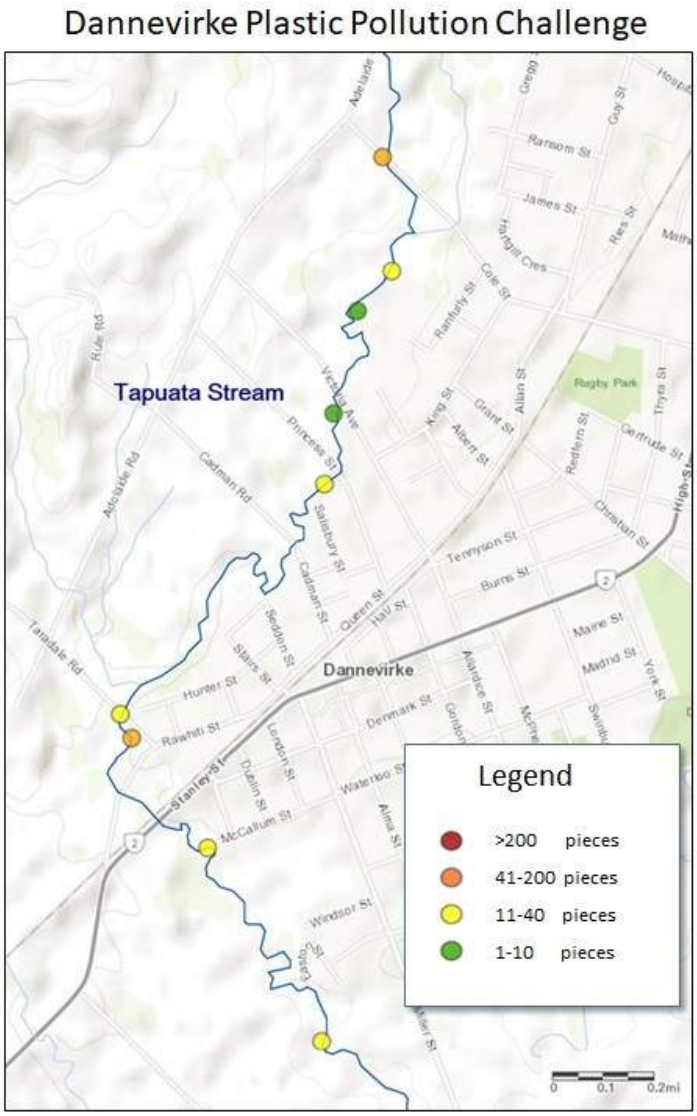
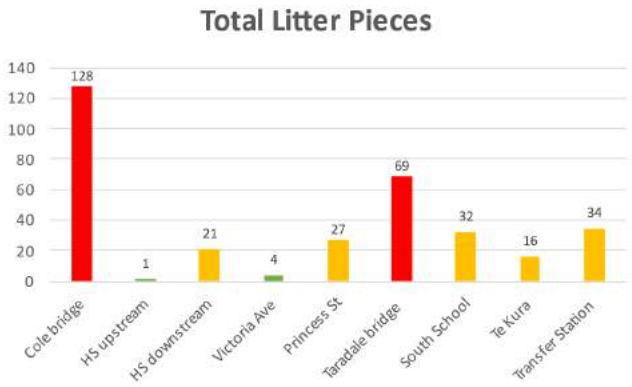


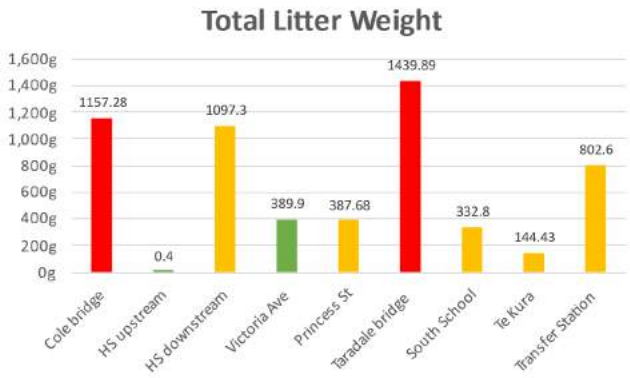
TABLE 3 - Events in Dannevirke

Date	Events	Sites sampled	# of people
26 February	"Train the trainer" and Agresearch	Transfer Station Princess Street Cole Street Bridge	6 adults
28 March	Public Day Sampling and clean-up	Traradale Street Bridge Taradale Street standard sampling site	6 adults 2 children
18 May	Kura	Private Property	10 children 4 adults
21 May	High School	High School area 1 High School area 2 Victoria Street	45 children 9 adults
Total	**4**	**9**	**57 children** **25 adults**

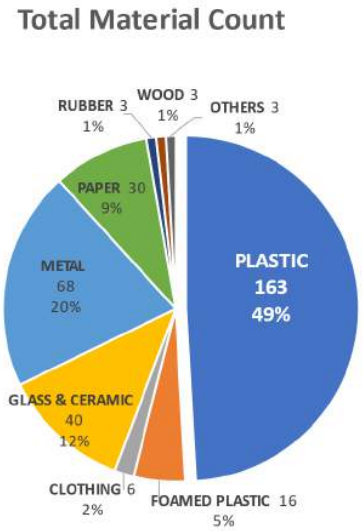


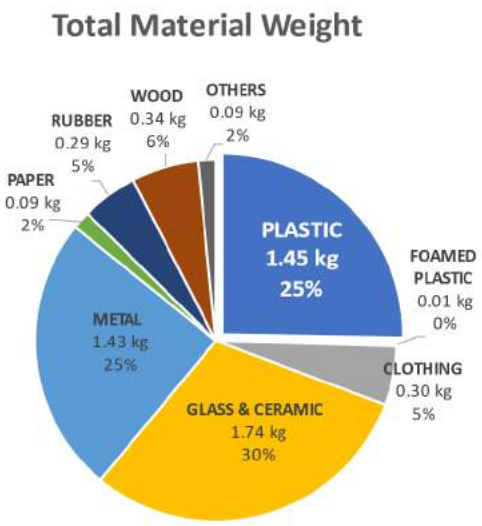
Not surprisingly, plastic and foamed plastic combined represented 54% of the total piece count. This was lower than in other stream sites, but still points as plastic being the biggest litter issue in our streams.





Graphs 5 and 6 – Total litter by site





Graphs 7 and 8 – Total materials

Ashhurst – RECAP

Planning for the Ashhurst Plastic Challenge and the initial launch (clean-up at Raumai Reserve) were done by RECAP in 2020. However, due to Covid-19 the actual sampling of the Ashhurst Stream had to be postponed to summer 2021. Most of the Ashhurst Stream between North Street and Napier Road flows through private properties, residential and farming/ nurseries. Permission had to be obtained from landowners to access the stream. These sites were not suitable for large groups engaging with the sampling. Other sites such as North Street Bridge and Mulgrave Street Bridge and Drain are in areas with high traffic volume, and not suitable for public events either.

In the end it was decided to do a public clean-up along Yorke Street and Customs Street and include sampling at a couple of sampling sites in the area. The clean-up attracted 19 adults and seven children. Participants were rather surprised to collect 20 bags full of litter weighing in at just over 119 kg and a pile of large items including engine parts, large pieces of wood, carpet, a traffic cone and a tyre, estimated to weigh between 50 and 60kg all up. Selected items from the clean-up, including a facemask, various types of plastic, cans, etc. were displayed at the Ashhurst Community Board to raise public awareness. Sampling could not be done on the day as the site was contaminated with a dead sheep.

The sampling itself was done over two days with a team made up of RECAP, Ashhurst Action Group and PPC members. In total 8 randomly selected sites were sampled between North Street and Customs Street. The worst site by far with 499 items was Mulgrave Street Bridge. All other sites were below 50 items. The litter was sorted, counted and weighed at the Ashhurst Library. A big thank you goes to Ross from the Library for hosting the activity.

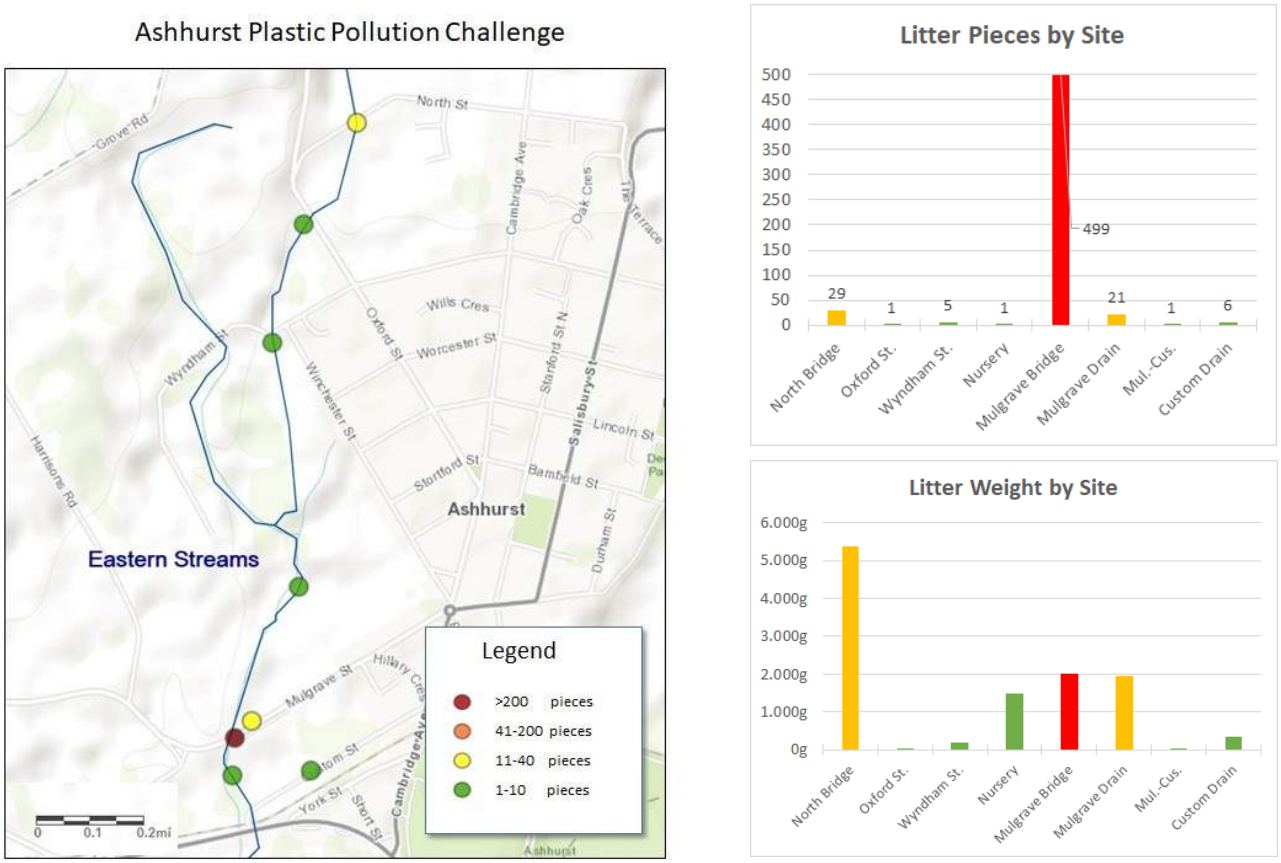
Other public engagements/activities:

- A poster competition for children in the community, to design a poster encouraging people to 'Keep Ashhurst Tidy' to be displayed around the village.
- The showing of the "Microplastic Madness" movie at the Ashhurst Library. This event was held on Friday 25th June (taking advantage of a teacher only day at Ashhurst School) and also offered the opportunity to find new purposes (such as seed sowing) for plastic items that can no longer be recycled in Palmerston North, along with poster making on the subject of practical ways to reduce plastic at home and school.

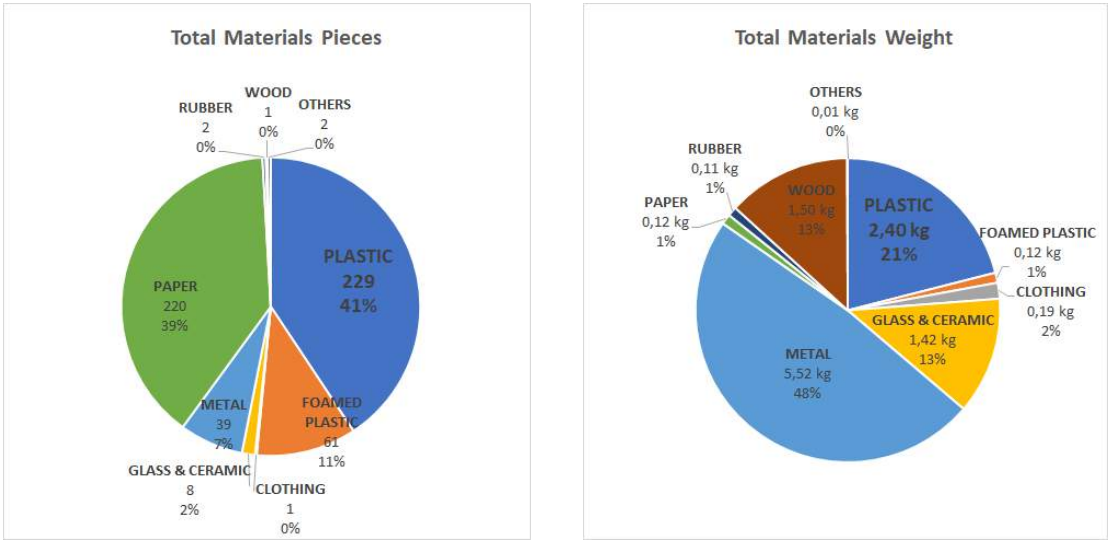
Winning poster of the competition

The map below shows the distribution of litter along the stream. In total it was found 593 pieces weighing 11.39kg. Mulgrave Bridge is located in the industrial area of Ashhurst.

Once again, plastic and foamed plastic combined represented 54% of the total piece count. The following graphs show the results of the data analysis of these sites:



Graphs 9 and 10 – Total litter by site



Graphs 11 and 12 – Total materials

Feilding – Te Wero Paratiki o Kawakawa – Ngā Kaitiaki o Ngāti Kauwhata

Te Wero Paratiki o Kawakawa was delivered in partnership with Team Kauwhata, under the leadership of Dennis Emery. Ngāti Kauwhata has a strong commitment to Mātauranga Māori as well as providing cultural experiences and education to schools.

Manawatū District Council supported the project through some co-funding and a presentation to council on what was planned for the milestone was well received.

The Mangakino Stream in Feilding was chosen as the most representative stream for sampling as it runs through rural as well as urban areas. It was agreed to sample 14 sections between Root Street and Kitchener Park. The initial site assessment resulted in the elimination of North to Duke and Warwick to South sections as the stream is bordered by private properties along both sections. The Rata to Manfield section could not be sampled as it was closed off to public access during the sampling period. However, we had an opportunity to add extra sampling sites in the other sections to accommodate school preferences.

In total we sampled 15 sites with three schools. We conducted the Tū Toa Wananga and Colyton School sampling in partnership with PTC (Partnership Through Collaboration). The events were opened with a cultural induction and also covered water monitoring activities. The Tū Toa event was also supported by Kitchener Park Trust.

Manchester Street School has an existing programme with Enviroschools. The school has three sites at which they are going to do SHMAK kit-based monitoring once a term over the next three years. The opportunity to trial litter sampling was taken up and will be added to their stream monitoring programme going forwards.

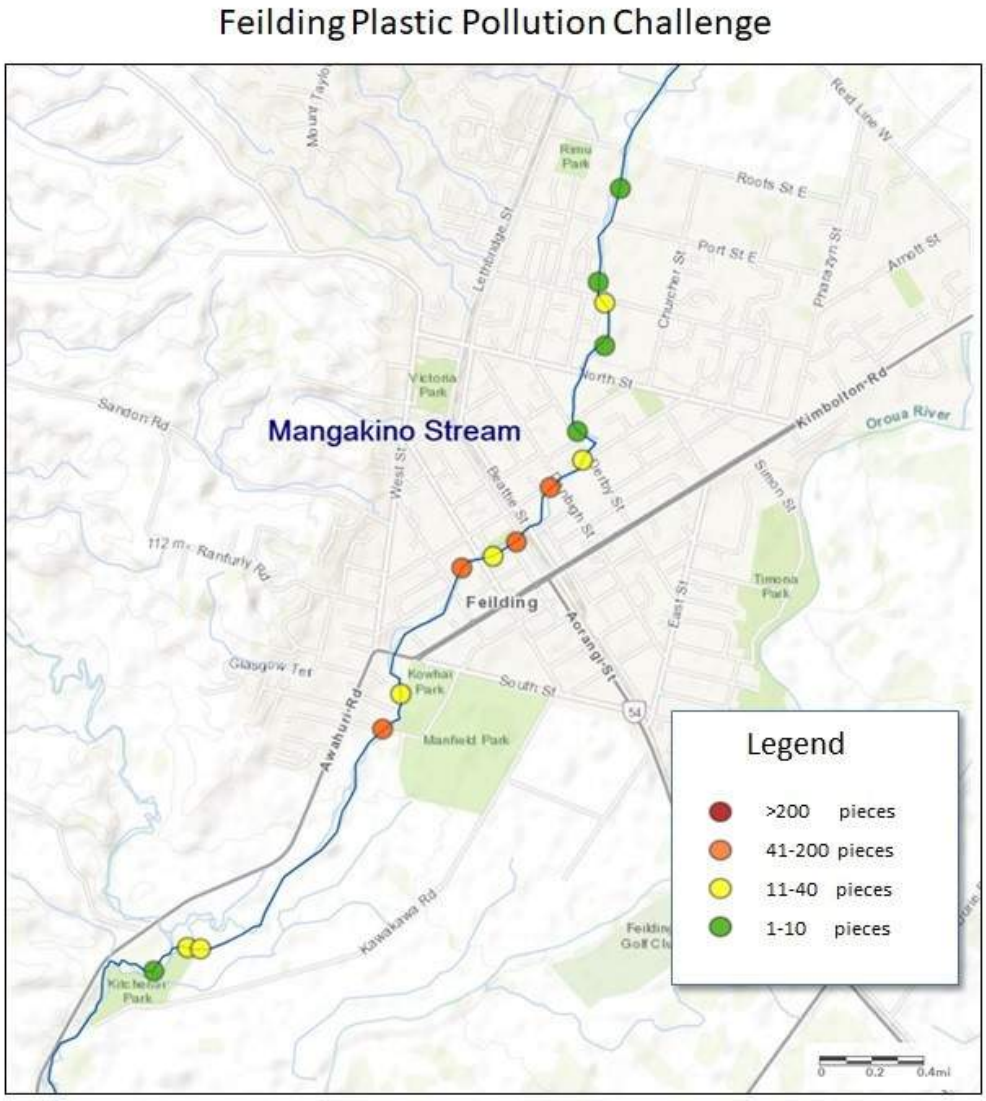
As Team Kauwhata is building up its western science capacity, a 'Train the Trainer' session was organized to transfer skills in site selection, site assessment, litter sampling and sorting.

A scheduled event for a lunch time sampling and clean-up session with a local business had to be cancelled due to staff unavailability. Remaining sites were sampled by the PPC team.

Activities closed with a public event that included sampling at two sites and sorting of the litter samples found in Feilding.

In total, 131 people engaged in Feilding, 81 children and 50 adults. A total of 605 items of litter, weighing 11.76 kg across the 15 selected sampling sites was collected.

The following map shows litter density at the 15 sampling sites along the Mangakino Stream.



As the map above shows, three of the four C-sites were in the town centre and one was the bridge at Manfield Street. This site had a very high number of broken glass pieces.

At the sampling site between Manchester and Warwick Streets the team noted that recent cutting and mulching of vegetation had resulted in some larger items being shredded into a multitude of pieces. It was recommend that Council ask contractors to remove large pieces of litter before cutting the grass.

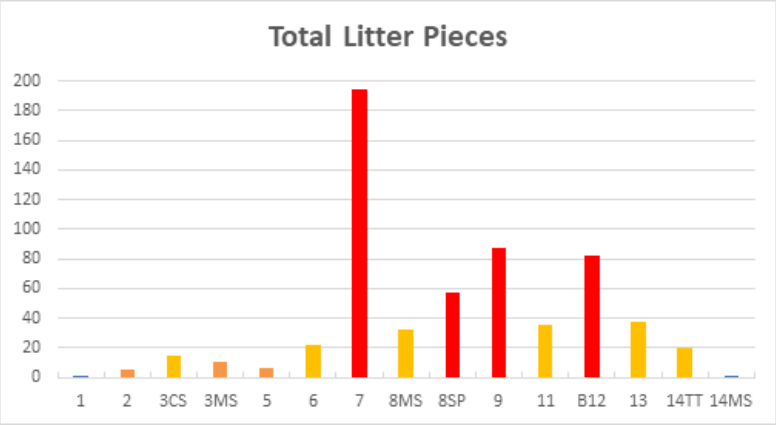
One site along Grey Street appears to attract fly-tipping, as the street runs in parallel to the stream. The participants noticed (and removed) a full bag during site assessment, and found the contents of another bag spread out in the sampling site on the day of sampling. Council had asked us to sample near the Skatepark – this was an optional site and had the fourth highest litter count.

It was recommend that the 4 C sites get revisited on an annual basis to monitor developments.

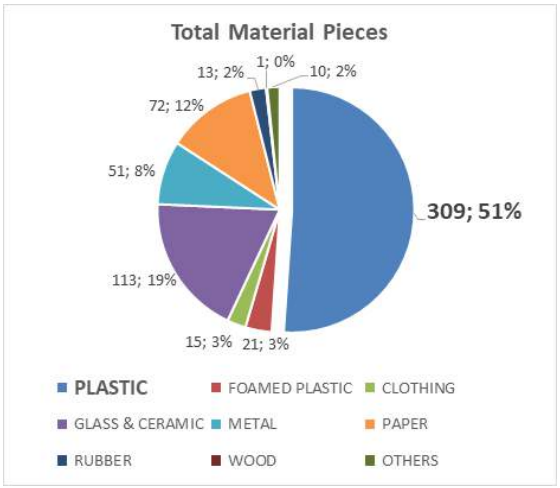
The map also shows lower litter density at the outskirts of town. This corresponds with findings in Palmerston North.

The highest count of items per site was 194 items. This was in the site prone to fly-tipping. The contents of the discarded rubbish bag had spread across the bank and started to fragment into numerous pieces. The lowest item count of one piece per site was found at both the top and bottom sampling sites.

330 out of the 605 items were plastic and foamed plastic representing 55%, followed by glass and ceramic pieces with 113 pieces (18%) and 72 pieces of paper 12%).



Graph 13 – Total litter by site



Graph 14 – Total materials

Raising Awareness – Publicity

The Manawatū Standard reported on the Feilding activities and allowed us to comment on challenges around recycling and single use plastic more generally:

Recycling changes should come with incentives, says environment advocate | Stuff.co.nz

An environment advocate says restricting unrecyclable materials from the recycling bin is a good step, but it doesn't address why people still use them.

Link: https://www.stuff.co.nz/manawatu-standard/news/300314482

From the Source to the Sea – beach sampling with Wildlife Foxton Trust

Apart from reducing negative impacts in the freshwater ecology, the key purpose of sampling all the streams for plastic pollution, is to reduce the amount of plastic ending up in the sea, where it is known to cause harm and contribute to the globalized issue of ocean plastic. A beach sampling event at Foxton Beach, organsied by ENM member group Wildlife Foxton Trust, gave PPC participants an opportunity to compare (sampling) notes and learn more about Sustainable Coastlines' Litter Intelligence project.

27 Nov – Beach litter sampling event at Foxton Beach, close to the Manawatū River mouth

2. STORMWATER SAMPLING

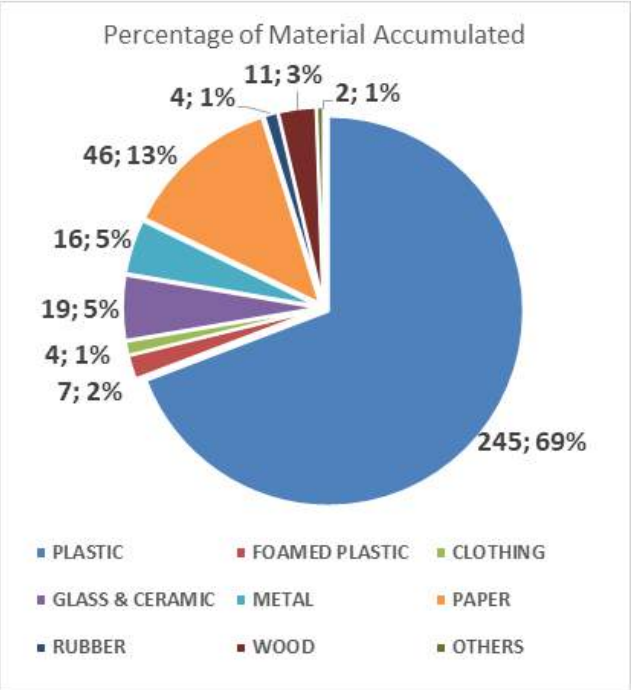
The initial idea was to instal Litta Traps in the Te Kawau stormwater catchment, as roughly 60% of the city's stormwater ends up in Te Kawau and this stream is also the most polluted and degraded waterway. The selection of suitable sites for this aspect of the citizen science PPC project was more difficult than anticipated for the following reasons:

- For sites in the road corridor, council requires a Traffic Management Plan (TMP) to install and monitor the traps, in the main to ensure safety. This can only be done by somebody suitably qualified. Such a person was unfortunately not available to the project. Therefore, the decision was made, to target privately managed drains in carparks and private business complexes only.
- Drains were a range of different shapes and sizes. At some of the preferred alternative locations the drains were round or too small. The Litta Traps require square drains over 45cm in length and width or rectangular ones over 45cm by 65cm.
- At the point of installation, it became evident that there are a number of biological and physical hazards associated with installing and servicing the stormwater interception systems. For example, the weight of the stormwater grate will exclude many people from safely accessing the Litta Trap baskets. Many of the drains had not been cleaned out for a significant period and contained large amounts of organic material that needed to be removed before installation could be successfully completed.
- A chemical spill noted at one of the sites during the trial highlights that there is a risk of future chemical spills, or the presence of unknown hazardous substances, that may not be identifiable by sight or smell. This means that a full health and safety risk assessment and plan needs to be developed and implemented with the necessary safety equipment.

In the end, eight Litta Traps were installed in locations at Massey, Parkland School and the Arena Manawatū sport complex to gain a basic understanding of the general feasibility of community stormwater monitoring in the future. Over the monitoring period, a total of 375 pieces of litter were collected from the Litta Traps. The two sites where most litter was found were both at the Arena (Sites 8 and 7), following by Site 6 in Parkland School. Most of the material found was Plastic, comprising 69%, 245 pieces of the total litter sampled. The other materials that were found the most were Paper with 46 pieces (13%) and Glass & Ceramic with 19 pieces (5%).

Meeting with Higgins and PNCC to discuss installation of the litter traps at Takaro Park. This collaboration provided some excellent learning about eh PNCC street cleaning systems

The PPC experience with this pilot trial showed that stormwater interception systems work but entail a number of challenges which in this instance stretched the resources of the PPC team. For example, the health and safety factors of working in active road-side scenarios and biological and other hazards associated with stormwater systems, require a higher level of resources and training than was available to the PPC team in the context of available time and funding. The key PPC learning from this aspect of the project was these challenges need to be fully understood and managed in order for a community-based approach to operating stormwaters interception technologies (i.e., such as the Litta Trap) to be safe and successful.



Graph 15 - Percentage of material accumulated

The positive is that this small Litta Trap experiment showed that this technology was effective in removing plastic and other forms of litter from entering the drains directly and from there into the urban streams and Manawatu River. Whilst being involved in stormwater interception technologies was challenging (and in reality, exceeded the immediate capacity of the PPC team), stormwater is such a significant source of plastic pollution these challenges need to be worked through. A key finding of this project was that stormwater systems play a critical role in potentially minimizing plastic pollution in future, so problem solving solutions need to be found to make these work for both community organizations and local authorities alike.

Contents of Litta Traps after first monitoring period

3. NATIONAL LITTER DATA STANDARDS

PPC continued to build the relationships with Sustainable Coastlines, NIWA and UCOL.

- PPC is now a full member of the national Data Governance Group and work continues to align stream sampling methodology so that the stream sampling data collected in 2021 can go into the Litter Intelligence app.
- PPC continues to liaise with Dr Amanda Valois (formerly NIWA, now Greater Wellington Regional Council). She joined PPC in October, along with a collaborator from Wellington Mountain to Sea, to carry out an example sampling. This helped her to understand Palmy's stream sampling sites better. There are some clear differences between Palmy's very urban monitoring sites and her sites in Wellington.
- The PPPC team formally met with Dr Jennifer Sweny (UCOL) and her team about opportunities to collaborate and involve UCOL students in the project. There was a lot of positivity on both sides and it has been agreed that Dr Sweny will attend the PPPC team monthly meetings going forward.
- Ben Knight from Sustainable Coastlines joined the PPC team for a training session on stream litter sampling and sorting.

Additionally, PPC presented to the Litter Projects Working Group, chaired by MfE , in November 2020. PPC has since formally joined this group.

Ben Knight joining the team in Palmy

PART 4

STRATEGY WORKSHOP 2021 – WHERE TO NEXT?

Setting direction for the next PPC phase – Workshop recommendations

On 1 May 2021, thirty-six (36) community participants attended a workshop hosted by PPC, to review progress and discuss future direction. This report proposes a strategic direction for PPC that is grounded in participants' recommendations.

1. WORKSHOP RECOMMENDATIONS - COMMUNITY-LED STRATEGY

a. *Citizen science and associated clean-ups—the core activities of PPPC and PPC—have proven success. Keep going, sustainably, selecting highest value activities*

Participants recommended that PPC continue supporting teachers and schools that are already involved in citizen science and clean-ups, and also that PPC choose high-impact neighbourhoods to return to on a regular basis. In both cases, participants suggested the value of working to build relationships that embed local project sites in the wider community. As initiatives become better established and more independent of the PPC coordinator, there may be increased opportunity to extend to new schools and neighbourhoods. Participants showed particular enthusiasm for working with Enviroschools and in neighbourhoods along Te Kawau stream.

b. Continue public awareness raising. Aim to reach new and more mainstream or diverse audiences. Aim to link pollution reduction to reduced plastic consumption and lifestyle change

Participants would like to see PPC engage a more diverse and mainstream audience. Suggestions included school holiday sorting and weighing events in The Plaza and informal meet-ups in cafes.

c. Work cooperatively with PNCC to reduce fly-tipping

Participants were concerned by the amount of fly-tipping and by how increasing costs of rubbish disposal contribute to fly-tipping in low-income neighbourhoods, noting that some households have difficulty affording food. PNCC was asked to lead change. PNCC can expect neighbourhoods to be more accountable while also referring those on low incomes to PPC for support. Participants generally wanted PNCC to provide free council rubbish bags for those on low incomes, although at least one participant disagreed, recommending mentoring and education instead.

d. Change the System. Encourage action at all levels.

Participants noticed that all types of change add up and have the potential to lead to new system dynamics. They called for integrity in personal lifestyles, awareness-raising within existing social networks, support for businesses that offer viable alternatives, and advocacy for high-level policy change—including policy changes to support container return schemes, minimum recycling standards for businesses, and product stewardship.

8 June 2021

Sharon Stevens, PhD

2. OPPORTUNITIES FOR ZERO WASTE ACTION GROUP

In addition, PPC is in conversations with the ZWAG to explore opportunities for funding to deliver the following work programme which is linked to the WMMP as well as the strategies identified during the workshop, as shown in Table 4:

TABLE 4 - Opportunities for Zero Waste Action Group

Opportunity	Maintaining: 'Behaviour change / relationship building - social media /school interactions – up to 8 hours per week.	Maintaining: 'Citizen science research support (i.e. onsite group management – safety / data collection / technical analysis' capacities up to 8 hours per week
Activities related to supporting the change to the new recycling regime, excluding 3,4,6,7 Reducing recycling contamination	Messaging – community engagement via Facebook and other Social media – keep connecting on an ad hoc basis – we might want to advertise for a supported volunteer, as this is a specific skill-set…	Design and implement some community-based recycling contamination QA audits
Fly-tipping – focus 'Te Kawau' (increase in waste disposal cost is likely to increase fly-tipping along Te Kawau) Fly-tipping wider PNth	Neighbourhood engagement - building relationships with Te Kawau community to reduce fly-tipping	Undertake a peri-urban litter and fly-tipping study
Maintain and support current community interest in ongoing stream clean-up activities.	Support PNCC in setting up a hot-spot clean-up map for the city, including our most notorious stream sections. Depending on what model is chosen and financial support is available this may need to be operated by the PNCC, or draw on any existing platforms such as Keep NZ Beautiful (further exploration required), or be a self-service/maintenance option.	
	Support ongoing interest by likes of the ANZ and specifically Moana Seafood in their proposed activities at Napier Drain - and on the back of this example, seek to grow the commercial/business sponsorship of clean waterways in the city. Secure funding to keep focussing on the two sections up-and down-stream from Highbury Bridge – this would be in the main neighbourhood engagement.	
School engagement around PPC and broader PPC / zero waste education goals	Secure funding to meet the ongoing demand for the work the PPC have been doing in schools with a specific focus on discussing and understanding the local recycling scheme rule changes / national level plastic pollution and waste related programmes (i.e. David Parker's announcement of New Zealand's support for coordinated global action on plastic pollution through discussions towards a new global agreement at the United Nations Environment Assembly in 2022 and 2- the NZ government's announcement of a sequence of bans of a raft of single-use plastics by 2025) and supporting, enhancing and extending the school recycling systems research and programme development.	
Urban stream regeneration	Begin ground-work / project design for a wider 'urban stream regeneration' focus. This would require initiating a collaboration framework with multiple teams in Council, including stormwater, parks, recreation, etc and Iwi. This is a critical future project aspiration which needs some catalyst time and resource funding.	
Living Labs – understanding Microplastics in our environment	Liaise with UCOL and Massey to deliver achievable next steps, for example: • Indicative microplastic sampling and analysis. NB: this could be an effective direction for the 'Living Lab' funding provided by the PNCC to Massey (i.e., a different budget line in Council Plan. This would require liaison with the Massey Sustainability programme). • Begin some ground work around future recycling market development, upcycling and the development of a local/NZ circular plastic economy. The aim of this work area would be to get some runs on the board to position the PNCC to access future large strategy funding bids related to developing the MRF into a larger regional recycling processing and remanufacturing hub.	

APPENDIX

1. LITERATURE LIST

Key sources of science academic institutional reporting:

International

- The New Plastics Economy: Rethinking the future of plastics https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics
- UN https://www.unenvironment.org/interactive/beat-plastic-pollution/
- Marine Litter vital graphics fact and figures http://www.grida.no/publications/60
- ISWA Marine litter taskforces https://marinelitter.iswa.org/reports
- Plastic pollution coalition https://www.plasticpollutioncoalition.org/blog/2019/5/10/breaking-un-decides-to-control-global-plastic-waste-dumping

New Zealand

- Prime Minister's Chief Science Advisor - Rethinking Plastics in Aotearoa New Zealand https://www.pmcsa.ac.nz/our-projects/plastics/
- Plastics in the Environment - Understanding plastic waste in Aotearoa https://www.royalsociety.org.nz/major-issues-and-projects/plastics

Video learning about ocean plastics

- UNEP https://www.unenvironment.org/news-and-stories/video/plastic-pollution-how-humans-are-turning-world-plastic
- National Geographic https://video.nationalgeographic.com/video/00000157-38e9-da6e-abf7-7bfde5e30000
- Microplastics on the menu for manta rays and whale sharks https://play.stuff.co.nz/details/_6106074321001
- Responsible Business https://www.responsiblebusiness.com/news/africas-news/5-powerful-videos-highlighting-need-end-plastic-pollution/

Key Issues with plastic

- Food chain - NZ microplastic in most fish https://www.newsroom.co.nz/@viewingroom/2019/10/03/841120/microplastics-found-in-most-local-fish
- Endocrine disruptors from plastic http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10619136 + https://www.sciencedaily.com/releases/2009/03/090326100714.htm + Ian Shaw University of Canterbury professor of toxicology. https://www.youtube.com/watch?v=yW7v15TFqm8 + https://www.youtube.com/watch?v=k-HuNMZuwiI
- Socio-political considerations A good read https://www.theguardian.com/environment/2018/nov/13/the-plastic-backlash-whats-behind-our-sudden-rage-and-will-it-make-a-difference

- Micro plastic NZ Are washing machines to blame for Auckland's microplastic scourge? https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12245811
- Int. mp https://www.theguardian.com/us-news/2019/jul/30/paddling-in-plastic-meet-the-man-swimming-the-pacific-garbage-patch

Sust packaging PS case study

- Bostock Brothers launch compostable packaging take-back scheme for customers https://www.stuff.co.nz/business/117662733/bostock-brothers-launch-compostable-packaging-takeback-scheme-for-customers
- Holy chicken, Countdown wraps plant-based packaging in plastic https://www.stuff.co.nz/business/industries/106702507/holy-chicken-countdown-wraps-plantbased-packaging-in-plastic
- New compostable apple stickers adopted by Bostock https://www.stuff.co.nz/business/113316626/new-compostable-apple-stickers-adopted-by-bostock

Industry sector strategies - Hospitality

- Hotel industry having a change of heart as businesses become more sustainable https://www.stuff.co.nz/business/117004178/hotel-industry-having-a-change-of-heart-as-businesses-become-more-sustainable + Hotels war on plastic https://www.stuff.co.nz/business/117146687/hotels-battle-to-stop-millions-of-plastic-toiletry-and-butter-containers-going-into-landfills
- More than 100 signatories commit to using recycled plastic in new products in EU https://www.insidewaste.com.au/index.php/2019/09/23/more-than-100-signatories-commit-to-using-recycled-plastic-in-new-products/
- Unilever Zero Waste Challenge https://vimeo.com/97222082 + Unilever outcomes: http://www.waste-management-world.com/video-gallery/wmw-weekly-newscast.html?bcpid=2405324449001&bckey=AQ~~,AAAAAEheacc~,POub7blnBC-Leu0uCpdg5kyy6daxQ3_&bclid=2405336528001&bctid=4049686517001 NB: clip begins at 4 mins

Personal reduction strategies

- Recycling isn't working – here are 15 ways to shrink your plastic footprint https://www.theguardian.com/environment/2019/nov/27/how-to-shrink-plastic-footprint-recycling
- An environmentally-friendly lifestyle can be challenging, but it's possible https://www.stuff.co.nz/environment/climate-news/115650834/an-environmentallyfriendly-lifestyle-can-be-challenging-but-its-possible
- ZW household https://www.theguardian.com/commentisfree/2019/aug/19/heres-what-i-learned-from-my-privileged-western-failure-to-go-plastic-free-for-a-month

Biodegradable Plastics Contacts

- http://www.smartpackaging.org.nz/bioplastics/biodegradability-vs-compostability/ + Friendly http://www.friendlypak.co.nz/

Design a circular economy recycling waste / resources back into new products - illustrating the concept of zero waste as a design continuum

- 9 building materials made entirely from waste products https://www.citymetric.com/skylines/9-building-materials-made-entirely-waste-products-932
- 13 Products Made Using Recycled Materials http://mentalfloss.com/article/50227/13-products-made-using-recycled-materials
- Amazing products made of trash: the resource of the future https://www.cnbc.com/2018/03/28/companies-hope-to-turn-trash-into-treasure-.html
- 10 products made from innovative materials you'd never expect — including shoes, leggings, mattresses, and pasta https://www.businessinsider.com/products-made-from-recycled-plastic-and-innovative-materials-2018-7/?r=AU&IR=T
- 8 Companies That Only Sell 100 Percent Recycled Products https://greenbusinessbureau.com/blog/8-companies-that-only-sell-100-percent-recycled-products/
- 5 innovative uses for recycled materials https://www.mfe.govt.nz/wastefreesummer/recycle/5-innovative-uses-recycled-materials
- Construction Products Made From Waste https://goexplorer.org/construction-products-made-from-waste-2/
- 8 Products You Didn't Know Were Made From Recycled Materials https://gearpatrol.com/2018/04/22/recycled-materials-products/
- 10 Amazing Products Made Using Recycled Materials http://zerowastememoirs.com/10-amazing-products-made-using-recycled-materials/
- 10 Sustainable Products Made From Recycled Waste https://www.afar.com/magazine/save-oceans-as-you-shop-10-sustainable-products-made-from-recycled-waste
- Everyday Products Made from Recycled Materials https://blog.arcadiapower.com/everyday-products-made-from-recycled-materials/
- 48 Eco Friendly Products You Can Buy Today to Help Stop Plastic Pollution https://www.onyalife.com/eco-friendly-products/
- How We Solve for Waste https://www.terracycle.com/en-US/about-terracycle/how_we_solve
- Fruit and Vegetable Waste: Bioactive Compounds, Their Extraction, and Possible Utilization https://onlinelibrary.wiley.com/doi/full/10.1111/1541-4337.12330

Upcycling (the concept of increasing rather than decreasing value within the recycling process) Demonstrating high value upcycling

- Shampoo containers used to make prosthetic arms in Sunshine Coast https://www.insidewaste.com.au/index.php/2019/07/08/shampoo-containers-used-to-make-prosthetic-arms-in-sunshine-coast/
- Turning waste plastic into premium car parts https://www.stuff.co.nz/motoring/news/114412465/turning-waste-plastic-into-premium-car-parts
- The Upcycle 'From trash to treasure: The upcycling efforts of clever Kiwis' https://www.stuff.co.nz/life-style/homed/latest/103818707/from-trash-to-treasure-the-upcycling-efforts-of-clever-kiwis and http://www.handymanmagazine.co.nz/upcycling-furniture and Resene https://www.resene.co.nz/upcycling-for-good/index.htm + similar https://www.upcycledandco.com/ Small Business: Upcycling https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11499654 and Upcycling queen of the garden https://good.net.nz/article/Buffie-Mawhinney and the Recreators https://therecreators.co.nz/ + (ref: ewaste http://www.upcycle.co.nz/)

2. MFE LETTER OF COMPLETION

COMMERCIAL

Ministry for the Environment
Manatū Mō Te Taiao

Classification: In-Confidence

EDU-MUL-013

21 June 2021

Dr Heike Schiele
Environment Network Manawatū Incorporated
145 Cuba Street
Palmerston North
Manawatu-Wanganui 4410

Email: coordinator@enm.org.nz

Tēnā koe Heike

Re: Waste Minimisation Fund Project

I write to acknowledge the completion of your Waste Minimisation Fund project as per **Waste Minimisation Fund Deed for Project #23616 Taking Palmy's Plastic Pollution Challenge to the Manawatū.**

Evaluation of the project completion report has determined that you have successfully achieved all five project objectives. The team is to be commended for all their work around plastic pollution of the Manawatū waterways and the engagement, collaboration, and involvement with communities.

With reference to clause 3.9 of the Deed of Funding, I confirm that the agreed deliverables are complete, and that the term of deed is now concluded. No further claims against this Deed of Funding may be made.

Thank you for contributing to the waste minimisation effort and congratulations on your project's success.

Ngā mihi,

Stuart McKay
Manager, Te Pūtea Whakamauru Para – Waste Minimisation Fund
Ministry for the Environment | Manatū Mō Te Taiao

PO Box 10362, Wellington 6143 | **Freephone:** 0800 499 700 | **www.mfe.govt.nz**
COMMERCIAL

AKNOWLEDGEMENTS

THANK YOU FOR YOUR CONTRIBUTIONS TOWARDS PPC

Key Project Partners and Funders

Project partners

- Massey University Zero Waste Academy
- Manawatū River Source to Sea
- Te Ao Turoa Environmental Centre
- Te Kāuru Eastern Manawatū River Hapū Collective
- RECAP - Resilience and Engagement in Ashhurst/Pohangina
- Ngā Kaitiaki o Ngāti Kauwhata

Project funders and supporters

- Palmerston North City Council
- Ministry for the Environment Waste Minimisation Fund
- Manawatū River Leaders' Accord Community Fund
- Horizons Regional Council
- Manawatū District Council
- New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC)
- Massey University PaCE Programme
- Environment Network Manawatu
- Te Manawa
- Wildbase Recovery Centre
- Origin Eight
- Stormwater 360
- City Library
- Te Pātikitiki Library
- Ashhurst Library
- Kaumātua Wiremu Te Awe Awe

OUR MANY AMAZING VOLUNTEERS – WITHOUT YOU, NOTHING HAPPENS!

Participants - ENM

- Te Ao Turoa Environmental Centre
- Te Kāuru Eastern Manawatū River Hapū Collective
- RECAP - Resilience and Engagement i Ashhurst/Pohangina
- Manawatū Food Action Network
- Supergrans
- REACT
- Massey Sustainability Club
- Green Drinks
- Manawatu Estuary Trust
- Wildbase Recovery Centre
- Awahuri Forest Kitchener Park Trust
- Wildlife Foxton Trust
- School Strike 4 Action

Citizen Science, Education and Schools

- Litter Intelligence Data Group
- Universal College of Learning (UCOL)
- Dr Trisia Farelli
- Sustainable Coastlines
- Amanda Valois, Niwa
- Monrad Intermediate
- Parkland School
- Our Lady of Lourdes
- Ross Intermediate
- Riverdale School
- Carncot School – Community Service
- Enviroschools
- PTC – Partnership Through Collaboration
- Manchester Street School
- Colyton School
- Tu Toa Wānanga
- Dannevirke High School
- Dannevirke Kura Kaupapa

Businesses, Councils & Community Organisations

- Central Energy Trust Arena
- Massey Facilities Management
- ANZ Bank
- IPLEX NZ
- Smith & Sons Renovations and Extensions
- Moana NZ
- Massey University Veterinary Students' Association
- UNANZ
- English Language Partners
- Manawatū Multicultural Centre
- Horizons Regional Council
- Palmerston North City Council
- All Saints Anglican Church
- Be Free Grocer
- Wholegrain Organics
- The Rubbish Trip
- Zero Waste Netwotk NZ
- Massey University Wildlife and Conservation Club
- Participating Cafés in refill campaign

Photos and video footage

- Ashhurst: Chris Love, RECAP
- Dannevirke: Te Kāuru

All others: Runnerfilms

MANAWATŪ RIVER SOURCE TO SEA

ZERO WASTE ACADEMY

Photo: Algae colonising plastic wrapping