

6.3 MAUREA ISLANDS A RESTORATION JOURNEY

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Nгаа mihi

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Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri

The river of life, each curve more beautiful than the last

Kiingi Taawhiao

Cheri van Schravendijk-Goodman

The Maurea Islands project was developed from an idea to explore different options for the restoration of the Waikato River. One of the key gaps in our overall understanding for river restoration was the best way to approach restoring the many islands that were scattered along the length of the lower river.

These islands form important ecological stepping stones for native birds and fish moving around the catchment. However, their location in the river sits within highly modified landscapes and their edges are encroached on by urban and rural settlement, and associated land use (including the roads and railways that connect them). Impacts can be very pronounced and include changes to native biodiversity (plants, animals, and fish) found on and around them.

Islands can't be ignored as part of the bigger picture for river restoration, because they also create 'sinks' for restoration problems like pest plants, e.g. yellow flag iris, willows, and alligator weed. However, their location within the centre of dynamic and large river systems like Waikato presents a series of challenges that sometimes make you want to bury your head in the sand and ignore them – mainly because of the overwhelming nature of the work required to explore ways to 'fix' them.

In choosing to work on the islands we took a series of risks, namely:

- i. Attempting to find ways to restore river islands and,
- ii. Trying to find ways to do this without chemicals.

Needless to say, there was much to learn, and much to cry about, with some token 'told you so's' for good measure. In hindsight, it was a very ambitious task. But would I change the chance to experience all this? Kao, not on your nelly!

Working on the islands at times felt like a lesson in 'what not to do' and 'I wanna go home now', but actually, it also made us take the time to listen to the awa (river), feel the wind, watch the fish, find time to laugh with each other, as well as shrug shoulders and have to think very quickly on our feet. This is not the ideal recipe for restoration, but it gave us insights that few others would have been able to experience. It presented us with laugh-out-loud moments, shaking-our-head moments, pat-on-the-back moments and what-was-I-thinking moments. Underlying it all was a drive to discover and tease out everything we could (no matter how small), to add to the kete (basket) for wetland and river restoration – mainly because we love the awa, and we loved being on the islands with her.

Too often we focus on the feel-good projects – the ones that ticked all the boxes and did everything right. Sometimes though, it is just as important to hear about the ones that didn't quite go the way that was expected or hoped, so that others can learn from these experiences. But, most important, so that those of us involved in the project also remember and continue to learn from it. So, this is our story about the ambitious project on the Maurea Islands – the ups and downs and in-betweens, but most important, the learnings.



Maurea Islands. Photo: Cheri van Schravendijk-Goodman

As one of the more challenging projects to have been involved in, we could not have done any of it without the tautoko, koorero, and imaginations of these amazing people: the whaanau from Maurea Marae, especially the Brown whaanau, and the marae komiti; Kerry Bodmin and Paul Champion (Taihoro Nukurangi); Bev Clarkson (Manaaki Whenua); Terina Rakena and the team at the Waikato Raupatu River Trust and Waikato Raupatu Lands Trust; Chris Annandale and Lucy Roberts (Te Papa Atawhai); Kev Hutchinson (Waikato Rivercare); Phil Mabin and Wendy Mead (Waikato Regional Council); our 30 tribal members who attended the pilot restoration training programme; staff and crew at Te Rau Aroha House and Raukura Hauora o Tainui; Darcel Rickard and team on 'Project Whenua' (Scottie Productions); Don Scarlet (Meridian Energy); the super whaanau of Barm and Tilly Turner; Rimutere Wharakura and Will Brown for their amazing efforts to help on the islands; and our funders – the Waikato River Authority and the Waikato Catchment Ecological Enhancement Trust.

– Ngaa mihi Cheri, Jaedyn, and John

"Take baby steps with big ideas! One of the biggest learnings from the project was that the experimental design of the project didn't necessarily have to take place on the islands, where logistics were a challenge. The same results could have been achieved on a small land-based plot."

– Jaedyn and John

"The islands looked like a jungle of weeds with no native plants anywhere."

– Jaedyn and John

The team checking out native marsh plants on the bigger island.
Photo: Supplied by Cheri van Schravendijk-Goodman



ABOUT THE MAUREA ISLANDS

The Maurea Islands are a group of small islands in the Waikato River located near Rangiriri, northern Waikato (Fig. 1). The larger, western island is 10.89 ha, and the smaller, eastern island is 5.91 ha. The islands were returned to Waikato-Tainui under the Waikato Raupatu River Settlement (2010) as part of a conglomerate of islands, marginal strips, and small land parcels returned to the iwi (tribe).

But the islands came with a legacy of environmental-related issues. With the return of their land, this all-too-common situation places a contemporary burden on Maaori to seek solutions to the problems they inherit; in particular, how to restore the systems to a state as similar as possible to when they were last under the management of their traditional iwi and hapuu (subtribes) owners.

In the case of the Maurea Islands, these were part of an important marsh wetland area in this part of the lower river providing potential habitat for kaaeo (freshwater mussels), long and shortfin tuna (freshwater eels),



A view to the west across the larger island showing the range of plants (mostly exotic) on the islands. Photo: Cheri van Schravendijk-Goodman

whitebait species, kaae (mullet), and an array of native birds and insects migrating up and down the river.

Today, both islands have small pockets of native plants. But a majority of the vegetation is exotic, with serious invasive and pest plants such as reed sweetgrass, pampas, crack willow, yellow flag iris, and alder (also called 'raakau Paakehaa') dominating much of the island-landscape.

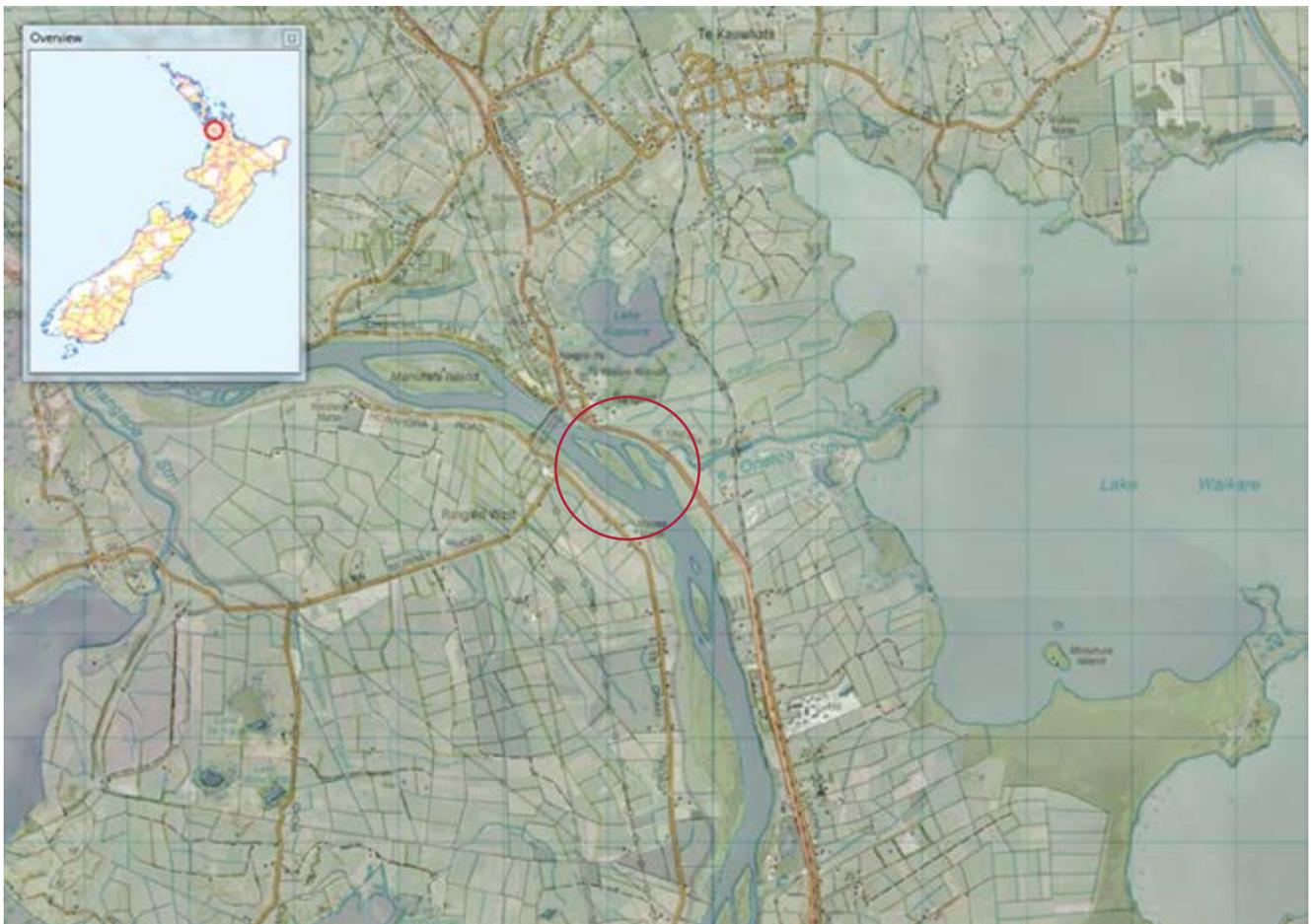


Figure 1. Location of the Maurea Islands (red circle) (Champion et al 2013)

THE CHALLENGE TO SPRAY OR NOT TO SPRAY?

The Maurea Islands project was part of a tribal response to the calls from haukainga (local people) for non-toxic methods for control of aquatic pest plants. This had been brought to the forefront following concerns about the regular need to spray yellow flag iris (*Iris pseudacorus*) in particular, which has become a serious pest along the lower river.

The main goals for this 2-year funded project were:

1. Find ways to restore the marsh wetlands of the islands and re-establish native swamp forest on the drier areas.
2. Investigate how restoration could be done in the absence of herbicidal control (in a small section of the large island), versus herbicidal control on the smaller island.
3. Test native plants as non-herbicidal 'tools' for the bigger island by investigating plant competition, i.e. could harakeke (*Phormium tenax*) outcompete yellow flag iris? **Could purua grass (*Bolboschoenus fluviatillis*) outcompete reed sweetgrass (*Glyceria maxima*)? Could alders (*Alnus glutinosa*) be manipulated as a nursery for kahikatea (*Dacrycarpus dacrydioides*) establishment?**

Restoration in general is incredibly tough. When a decision is made to add a component focused purely on non-herbicidal control, it increases the level of work ten-fold because it relies solely on 'people power' and mechanical control. This goal is complicated even further when the plants to be controlled are on an island. The counter challenge though, was a lack of good data about non-herbicidal rather than herbicidal control; and there were even bigger gaps in our collective understanding of river island restoration in general.

Vegetation survey on the smaller island. Photo: Cheri van Schravendijk-Goodman

INITIAL STEPS SETTING THE SCENE

Step 1:

As all good restoration projects should, work was done to understand the vegetation types. This involved vegetation surveys along several transect lines running across both of the islands (1-day each island) (Fig. 2). More than 30 tribal members on a pilot restoration course were brought in to survey the big island with scientists, and to learn about ecological survey techniques. The smaller island was surveyed by a science team on the second day.

The surveys highlighted major populations of key invasive plants like the reed sweetgrass, wandering willy, and yellow flag iris. But we also found unexpected populations of native grass-like sedges; marsh plants such our native waatakirihi (watercress), and the stunning marsh wetland plant, naahui; the maahoe (our native 'firestick'); and lace-like water ferns.

Step 2:

Our tribal GIS (mapping) expert was engaged to generate maps of the flooding potential on the islands (Fig. 3).

Step 3:

Hui (meetings) were held with Maurea Marae members to explore their memories of the islands, and the native animal and plant species they would like to see on them. This included long-term aspirations for a paa harakeke (harakeke gardens) and rongoa (medicinal plants), for the return of native birds, and to enhance habitat for important fisheries. These aspirations were drafted into a long-term vision for the whaanau (family) and a colouring-in picture was also drawn up. Each part of the picture could then be coloured-in as each of the aspirations were met (Fig. 4).



Step 4:

Taihoru Nukurangi (NIWA) and Manaaki Whenua – Landcare Research scientists were engaged to draft a restoration plan to help guide the vision, and the methods for the herbicide versus non-herbicide control. This included:

- identifying small discrete areas to undertake the trials (up to 1 ha on each island), and
- guidance for establishing different kinds of planting trials to test the competition of native species – purua grass and harakeke – against reed sweetgrass and yellow flag iris, respectively.

Step 5:

A 2-year work plan was developed, and work began on the big island to clear out pest plants according to non-herbicide methods. Discussions also began with Waikato Regional Council staff and contractors to spray the smaller island as an in-kind contribution to the project.

"Whaanau need to have knowledge of the mahi, and a good relationship with the partner agencies. The whaanau also need a long-term 5–10 year commitment by the funders, agencies, and kaimahi to enable successful outputs and build strong relationships with each other..."

The key to project planning is organising logistics, budgets, and project teams."

– Jaedyn and John



Figure 2. Maurea and Eastern Island. Marks out key vegetation types and lines and orange dots show the transects and plots used in the surveying

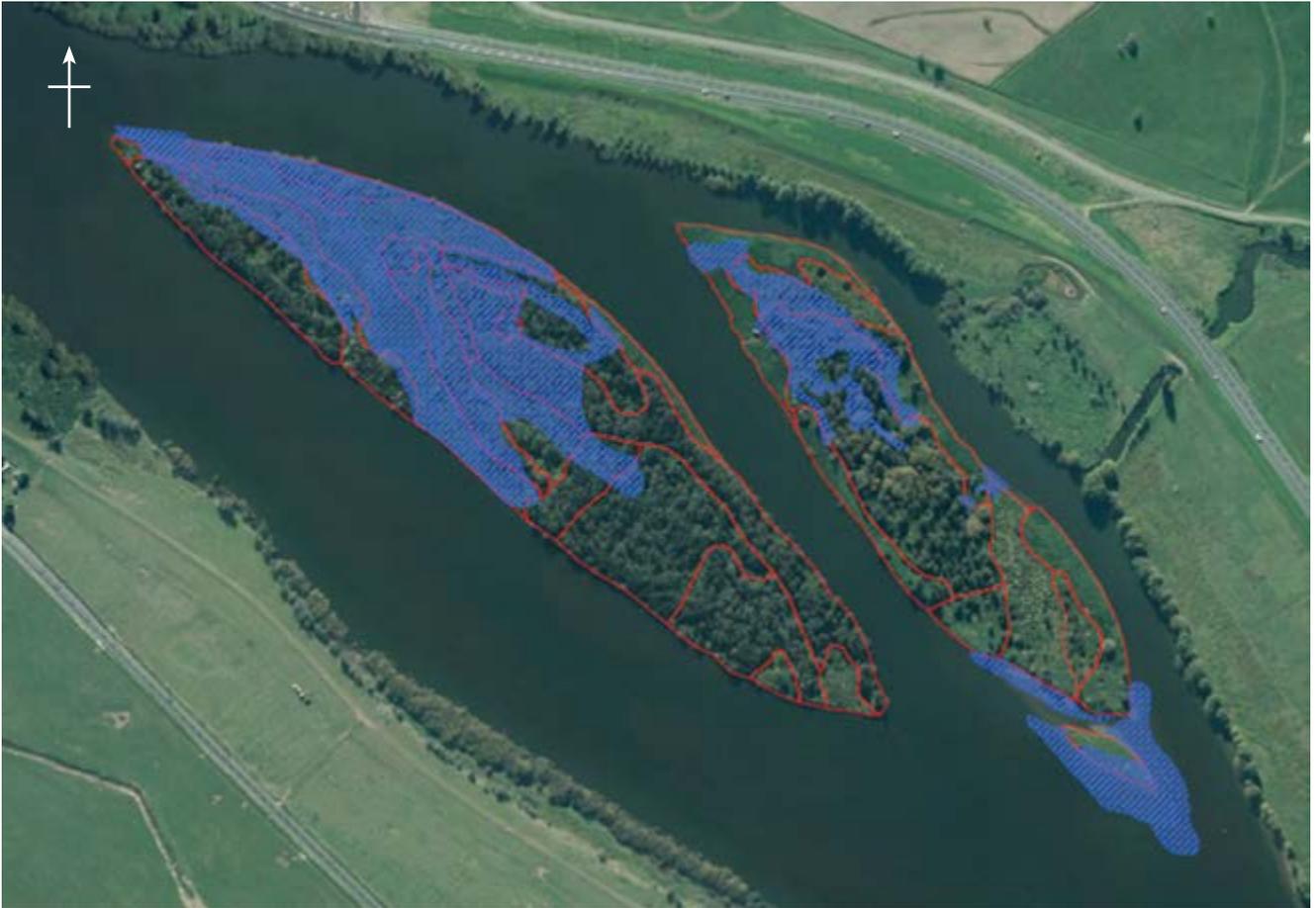


Figure 3. Map showing the main areas where flooding can occur (blue hatched lines)



Artist: Chrissy Morehu

Figure 4. A colouring-in picture designed to capture and monitor the aspirations of Maurea Marae for the islands

KEY PROJECT LEARNINGS THE HARD LESSONS

Considering we did everything right in the initial set-up of the project, why did things not eventuate exactly the way we had hoped?

- The workload of non-herbicidal versus herbicidal control became overwhelming. This meant monitoring was well below par with what had been planned
- We discovered that river island restoration requires a range of administrative factors of which we had not been aware and had not considered. For example, the types of boat licences our crew needed, clashes with other activities on the islands such as the hunting season, which required extensive conversations to resolve, and the need for permissions to get water for irrigation on the island
- Having to shift from the normal planting season in autumn and spring to the more unusual planting time of summer (see later)
- A very small team, with members being stretched across too many roles
- Large periods of downtime created by flood and bad weather events, which sapped valuable restoration time.

"[River islands] present an unpredictable environment: nature does her own thing that is out of our control; river levels change where the river is too low to get to island by boat or flooding, which washes out the islands and creates a safety hazard...realistically, the nature of conservation includes a hard month and then an easy month."

– Jaedyn and John

The daunting prospect of invasive plant removal on a river island. The target plants are the longer leaved grass-like plants – reed sweetgrass, yellow-flag iris, and alder (raakau Paakehaa).
Photo: Cheri van Schravendijk-Goodman



Key factors that tested the outcomes of the project (and the project team) therefore, revolved around:

- A. The complexity of the environments within which island restoration groups must work**
- B. Project management and personnel changes**
- C. The overwhelming nature of non-herbicidal control method.**

A. Environment:

- i. Restoring river islands is very different from restoring land-based habitats. First, the timing for planting may be different. Unlike land-based restoration, where plantings should occur during the cooler/wetter seasons (autumn, spring), planting on a river island can be affected by flooding over the areas that you want to plant. Some river islands act like sponges, and when wet, low-lying parts become saturated, creating boggy holes that can trap machinery, spades, and gumboots. There is also the risk of autumn and spring river flows disturbing the new plantings and potentially lifting out the plants (and tools!) and carrying them downstream. For the Maurea Islands, the best time for planting was in late spring to mid-summer (Nov–Feb), when the soil was dry and exposed and there was no risk of flooding. This, however, increased the risk of plants dying from low soil moisture, which was made harder by a lack of any form of irrigation infrastructure. Identifying the appropriate planting season and the issues this involved were major learning curves.
- ii. A second factor was access to the islands, which is via boat. As simple as this sounds, movement across a river system is dictated by the amount of water flowing through the system. Because planting needed to happen in summer, this coincided with lower river levels. Low river levels can expose 'rubbish' like old trees, and other dumped items, which create navigational hazards. Additionally, sand bars can appear, causing issues for boat engines; particularly for bigger boats, which can suck up debris or are too big to navigate over shallower parts of the river. This made transportation of plants and people to plant them, very difficult.

B. Project management and personnel changes:

We often get distracted with the outcome of restoration projects being about 'planting trees' and 'bringing our taonga (treasures) back'. But the most overlooked and underappreciated components of a restoration project actually concern administration. Some of the greatest learnings in this area included the following:

- i. Project management is a huge task, particularly for a complex project like this. Although contractors are on hand to undertake much of the work, it is vital that the project manager is also on site regularly to deal with unexpected issues as they arise (and they do!), and to provide the relevant guidance when needed. Regularly getting on site makes the reality of the challenges easier to understand.
- ii. Projects as complex as this one require very tight communication. Fortnightly meetings (as a minimum) among the wider team are advisable. Challenges can be dealt with faster by the collective brains and experience at the table, and such meetings also give the project manager and contractors an additional level of support.
- iii. Restoration projects are sometimes developed with too little attention paid to the 'sitting-at-the-desk' stuff; and many community groups can fall into this often overlooked and underappreciated trap. It is important that the expertise on hand is apportioned correctly to the right focus areas, i.e. administrators to focus on admin, scientists to focus on science, restoration contractors to focus on restoration.
- iv. During the project there were shifts in project management. For the contractors, this was a particularly difficult situation as they had to adapt to a new project leader as the project team pushed to complete milestones to meet the finish date for funding.

"Keep everyone in the loop, ensure that everyone is on board with decisions and deviations around key milestones and stick to those milestones."

– Jaedyn and John

C. Manual labour is tough!

- i. Initial clearance of pest plants using non-herbicidal control is a fairly straight forward approach. The team actually developed new approaches to the removal of the yellow flag iris that had not been recorded before – cutting down the leaves, burning off the area to damage and expose the rhizomes, and then mowing over the area with an industrial lawnmower. This slowed down regrowth enough to get the native plants in the ground and give them some time to establish before reinvasion from the yellow flag.

But without the herbicide, it can be very tough to stay on top of regenerating invasives over time, and this is where a lot of the manual labour hours were dedicated.

- ii. Manual labour, without a doubt, is incredibly tough. For every 5 ha (approx.) that were sprayed to control pest plants like yellow flag iris on the small island, only 1.32 ha here was able to be controlled successfully (i.e. low pest plant return) by hand and tool removal on the big island. In total, 6,041 hours were spent trying non-herbicidal techniques compared with only 177 hours using herbicides.

Key considerations for the manual labour aspects of the project:

- i. Don't underestimate the value of having some form of herbicidal control to bring down restoration time and labour costs.
- ii. However, it should not put you off exploring non-herbicidal techniques, just make sure you:
- pick the right sites, i.e. river islands may not be the best place to start practising
 - start small to get your experience up regarding when to use herbicides and when you can restore without them, and
 - build up some reliable/useful information about the plants you want to target (their flowering times, and seed production are important things to know), and the types of techniques that could be applied, including the selection of the right tools. **Remember that the key is keeping on top of the control of the invasive and pest plants so that your native plants have a chance to outcompete them and survive.**



A carpet of the serious forest invasive, wandering willy, covers the higher areas of the bigger island. Photo: Cheri van Schravendijk-Goodman



Rolling up the wandering willy as a non-chemical control technique – it took ages! Photo: Cheri van Schravendijk-Goodman

KEY PROJECT LEARNINGS OBSERVATIONS UNIQUE TO RIVER ISLANDS AND NON-HERBICIDAL CONTROL

Key observations that we may not have made if we had used chemicals.

Despite the hard lessons, situations arose that we would not have been seen if we had done things the 'normal' way:

- i. **Yellow flag iris vs reed sweetgrass and wandering willy.** Perhaps one of the most surprising observations was the competition between the invasive plants themselves. We often think restoration is as simple as getting rid of something unwanted, so that something we want can be put in its place. What we took for granted was that in removing something that we didn't want (e.g. wandering willy or reed sweetgrass), we opened the door for something else we didn't want (e.g. yellow flag iris), which had been held back by the greater competitiveness of the other weeds.
- ii. **Yellow flag iris rhizome sizes.** Across the two islands we noted some big differences in the sizes of the rhizomes of the yellow flag iris. These 'underground food bunkers' are part of the reason why this plant is so invasive, along with its pods full of hundreds of buoyant seeds. It's difficult to fully understand why the rhizome sizes were different across the two islands, but the lack of herbicide gave us a chance to look at them more closely, which would not have been possible if they were all sprayed and killed.
- iii. **The surprising native plant seedbanks being opened up to the sunlight.** It's difficult to say with confidence that this was the result of no spraying. But it did make us pay closer attention to what was growing back after the invasive plants were removed through mechanical control and burn off. We were pleasantly surprised to see a burst of native marsh plants like our native waatakirihi and the beautiful naahui crawling into areas where yellow flag iris had been burnt off.



Yellow flag iris rhizomes uncovered after removing reed sweetgrass. Photo: Cheri van Schravendijk-Goodman



Yellow flag iris seeds. Photo: Cheri van Schravendijk-Goodman



Waatakirihi/watercress amongst the grasses on the big island. Photo: Cheri van Schravendijk-Goodman

Key observations that we may not have made if we had worked on the mainland.

One of the biggest take-home messages from the project was that we could have done our trials on the mainland instead of a river island. While in hindsight that is a very sensible suggestion, there are several things we were able to experience thanks to the time that we were forced to spend on the islands. If we had been on the mainland, we would not have been able to travel the journey in the same way:

- i. **Juvenile kanae (mullet) 'playing' in the island cove.** At the northern tip of the big island is an area that periodically goes under water and then dries and shrinks into a small 'cove'. In this area, we got to watch a small school of juvenile kanae appearing to chase, and then jump over each other. This kept members of the team (especially those who had an affiliation with them) very entertained.
- ii. **Adult kanae grazing over and hiding in oxygen weed.** On the same day we watched the juvenile kanae, we also saw three adult kanae grazing over a large clump of oxygen weed – a major invasive plant in the main stem of the awa. This showed us that life in the awa still ticked along, despite the presence of exotic plants that we didn't want.
The ultimate goal must always be to return our natives, but this particular event made it very clear that we also needed to be careful in how things are restored, so as not to disrupt the delicate balance that currently exists for our native fish.

The big western island after the first clearance of wandering willy and native plantings. Photo: Cheri van Schravendijk-Goodman

- iii. **Discovery of a kaaeo bed.** This was an unexpected surprise and made it very clear that there was so much more to our river islands than we had originally appreciated. Unfortunately, the bed we found was covered in sediment, but it raised our hopes that such beds could be restored again.
- iv. **The extent of native plants on the islands.** Despite the overwhelming coverage of exotic plants, pockets of natives were maintaining a stronghold, highlighting the value of the islands as areas of ecological value for restoration.
- v. **The diversity of insects on the islands attracted to the diversity of plants.** Our almost daily presence on the islands meant we got to see a small range of native parasitoids (wasp-like insects), spiders, and butterflies that we would have taken for granted on the mainland.
- vi. **The surprising extent, and diversity of exotic noke (earthworms) that have invaded the islands.** We didn't appreciate the ability of noke to move through a river system, but it does happen! The work on the islands has now been added to a slowly growing database of exotic noke densities in degrading wetlands (see section 5.1 Noke: Engineering our soils).
- vii. **The real impact of human influences on the river; rubbish regularly landing on the islands from upstream.** You can't appreciate the impact we have as humans on the awa until you get to see first-hand the amount of rubbish that moves through the system: gates, ladders, letterboxes, street signs, plastic bottles, food wrappers, shoes, clothing, electronics, plastic bags, and alcohol containers were only a small sample of what we saw and attempted to remove.



CONCLUDING THOUGHTS

As tangata whenua (indigenous people), we have a strong connection and desire to do what we can to make our rivers better, so that we, in turn, can make the future better for our people. This passion and exuberance is what makes these types of projects worth exploring. In hindsight, the concern about herbicide use, coupled with frustration at the state of the lands that had been returned (and the associated costs both to the tribe and the Council to manage the issues), generated a level of impatience. While this resulted in a well-intentioned and very innovative set of ideas, it would have been more important to have instigated a slightly longer pause, and to have taken a few more deep breaths before we dived in.

"I was happy to do the mahi because it was for the tribe and for the river"

– Jaedyn and John

We do not necessarily want to change what we experienced in this incredible journey, but there are definitely elements that we would like to avoid. So here are the take home messages:

- i. Keep your horizons wide, but take baby steps.
- ii. Build solid networks with a range of others in restoration (see the 'Make a ripple' and biodiversity websites for new potential friends), but also be prepared to be the first ones to give it a go.
- iii. Communication is important for managing 'talking past each other' and ensuring you don't take each other's experiences and loyalties for granted.
- iv. Focus on your strengths, don't lose your optimism, enjoy the sun on your back, and remember to take a big breath before diving in.



WANT TO LEARN MORE?

Note: If you are having problems with the hyperlinks below, try copying and pasting the web address into your browser search bar.

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Useful websites

For building your networks in restoration:

New Zealand Plant Conservation Network: www.nzpcn.org.nz/page.aspx?conservation_restoration_find_a_group

Make a Ripple (Waikato): <http://makearipple.co.nz/Waikato-River-story>

NZ Landcare Trust: www.landcare.org.nz

Ngā Whenua Rāhui: www.doc.govt.nz/ngawhenuarahui

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