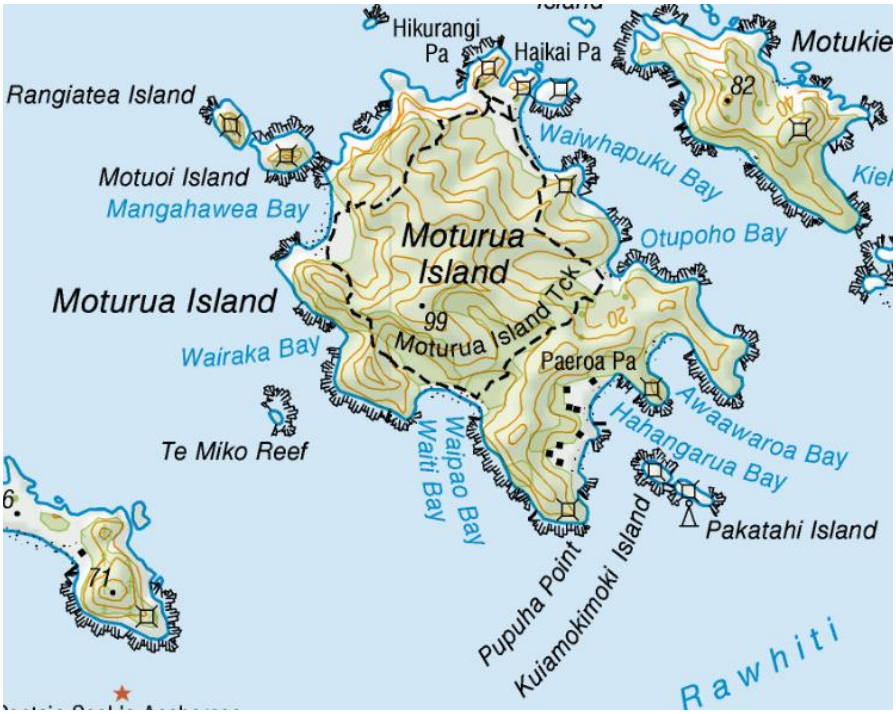
Moturua Island – a Decade of Care

Wattle Control Programme Report

Year 10 – May 2023



Compiled by Tim Armitage

(Distributed Version)

A Decade of Care

This report provides a summary view of the 10th year of wattle, pine and other invasive weed species control undertaken on Moturua Island annually in May since 2014. This marks a decade of care on the motu within this specific programme.

What started out as a 5-year undertaking to provide respite care to the native bush struggling against these vigorous exotic species has extended into this longer-term commitment to suppression of these weeds. The question now is whether this effort has been successful versus its original objectives? These were set out in the initial proposal presented to DOC in Kerikeri late 2013:

- Primarily, the goal was to stem the tide of wattles that were invading and extending their footprint across the island. During stakeholder reviews we added pine species to the high priority target list
- A secondary goal evolved, which was to endeavour to reclaim the public walking track as a native bush experience.

By most measures these goals and objectives have been met, for now:

- Around two-thirds of the island has the wattles significantly controlled. This means that the majority of large trees have been eliminated along with annual removal of small and regrowth trees in these spaces
- Within that area the amount of new wattle seed entering the system has been minimal – it has been quite rare to see seed-pods in these controlled spaces
- The island is free of mature *pinus* species trees (except for a sneaky one on the northern cliffs). These were significantly more extensive in spread than initially estimated and took considerable time and effort to control
- The public track is mainly a native bush experience, aside from significant exceptions such as the Otupoho-Homestead Bay area.

The key measure from my personal perspective is the extent of regrowth of native species in areas where wattles and pines have been taken out of the system. A few photos below show the results of their being cleared and the natives being able to regenerate without competition from these aggressive colonisers for light, moisture and nutrients in the cleared spaces.

However, as indicated above the status has to be read as “for now”. If and when these annual visits are no longer undertaken, without controls the wattles will reassert themselves relatively rapidly – the core objective was “respite care” and when that ceases the bush will have had ten years of reduced competition to better establish itself but it will need to fend for itself. Similarly with the pines, the dozens of adult trees culled are surrounded by cones and seeds that risk regeneration – this year alone around forty seedling pines were removed from around these stumps.

All that said, seeing the fresh growth of the bush on the island this year after months of extreme weather and rainfall is extremely gratifying. Yes, the weeds also leapt ahead but after several years of drought and modest growth conditions around Ipipiri it is a joy to see Moturua steadily regenerating and the motu performing such a key role as a predator free host for so many native fauna and flora species!

Introduction:

This report follows a fairly standard format each year and it will do so again this time around, but some additional observations will be provided given this is a milestone event.

To recap briefly on the programme characteristics:

- Moturua is a nature reserve in Ipipiri (the Bay of Islands) of around 136 hectares.
- The island is predator free (since 2009) with regenerating native bush (since 1968) and has kiwi, tīeke (Saddleback), toutouwai (North Island Robin), pōpokotea (Whitehead), kākāriki , miromiro (Tomtit), banded rail, wētāpunga and other endangered species present.
- However there is a large and virulent infestation of wattle trees (brush, black and golden) which has been outcompeting the re-establishing native bush as well as a non-trivial population of pines alongside other invasive and exotic species.
- All areas of the island are populated by wattles (approximately 12% of the total land area has been heavily infested) but the opportunity exists through control to give the native bush a better chance to re-establish during a respite period.
- This year's control activities are the tenth in what was originally a proposed five year sequence of one-month-per-annum undertakings.
- The current control exercise is being undertaken principally by myself & Helen but with critical assistance, support, encouragement and a determination from others to see it succeed.

Summary

This tenth year of activity was conducted over a 3-4 week period of intensive effort from 2nd-25th May 2022. Total volunteer hours were around **200 hours** across the personnel who contributed various levels of input over that time.

In the runup to this year's work, northern Aotearoa-New Zealand has been hit by a series of extreme weather events including tropical cyclones and "rivers in the sky", due in part to a particularly strong La Niña pattern. Many rainfall records have been set in the past 12 months and Ipipiri has been no exception with heavy rainfall causing localised flooding – even springs and creeks that haven't flowed in decades are putting in an appearance.

This wet season continued during May – a total of 275mm of rain was measured at nearby Otehei Bay during the period, more than double the average experienced during May over the previous decade of work. Averages don't tell the whole story unfortunately and the full story has to take into account that the water tables were already overflowing and that the rain intensity during this May's weather events was extreme.

The good side of the very wet and warm season is clearly to be observed in the explosion of growth in the trees and undergrowth (and weeds) on Moturua. Some species and particularly *Pseudopanax lessonii* (Five finger/Houpara) and akeake have leapt ahead in growth, cover and vigour. The downside is that species such as tobacco weed / woolly nightshade have thrived and regrowth wattles have put on 2-3 metres and more of new growth. On balance it has been the native species time to shine and the bulk of the species present showed good health.

Another downside to mention is that two or three highly invasive plants have made more gains and are either not controlled or insufficiently under control. These are:

- Moth plant. This year there has hardly been a corner of the island where moth plant has not been found and in areas such as Mangahawea where it is firmly established there are major new outbreaks in evidence. Weedbuster teams are working on this problem in specific and known sites but the spread on the island is increasingly extensive.
- Periwinkle is rapidly colonising further into the bush margins at Otupoho-Homestead Bay and no control has been exercised.
- Sweet pea bush is also flush with growth this year and some specimens have achieved heights of 2-3 metres. Its footprint is expanding steadily.

Working on the island this year has been more challenging than usual due to two main factors:

- The wet weather made tracks and work-sites particularly slippery. More caution had to be taken in all situations
- The unmaintained ridge-line track has made the north-south transit of the island difficult – the deteriorating state of it after several years of neglect has left it covered in gorse, fallen manuka and other barriers. Lack of remaining markers means care in navigation is required. This all adds significantly to the time and effort required to undertake work at more remote sites.

This year the work period was boosted again with assistance over and above Helen and myself provided by:

- Nadia spent a long weekend with us on the island again and thanks to her skills and fortunate breaks in the weather we were able to tackle trickier tasks especially around Waiiti.
- Andy and Kris independently took on control efforts on the main Pipi Bay / east-facing peninsula, again working areas that time didn't allow for me to attend to.
- Weedbusters were able, thanks to their new boat, to act swiftly on reports provided on a major moth plant issue in Mangahawea, with more to follow.

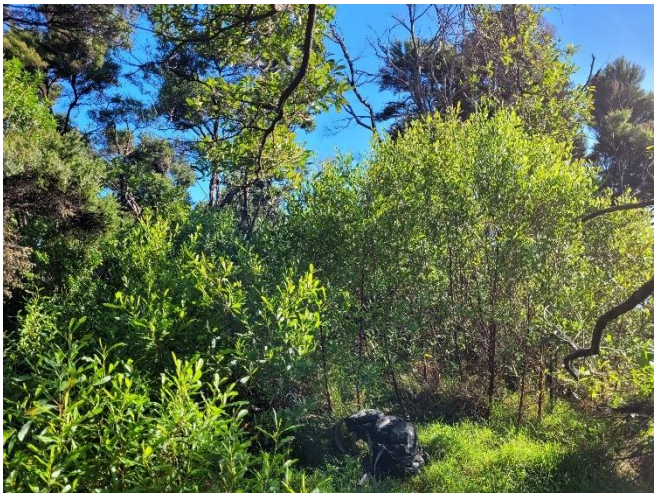
Other planned visits from friends had to be deferred for this year due to bad weather conditions and related factors.

So for the period of this report the main summary statements are:

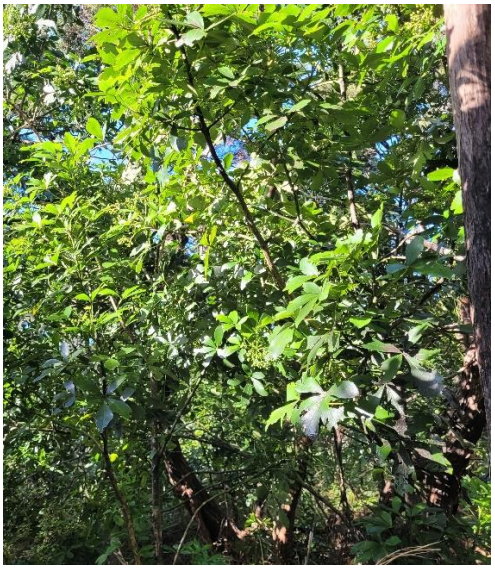
- Extreme weather conditions and ongoing bouts of heavy rain combined with warm temperatures have left the island lush
- Wattle seedlings, tobacco weed, moth plant, pine seedlings and other weed species have leapt ahead alongside strong growth of natives
- After 10 years of preventing fresh wattle seed-load entering the system abundant germination continues, but some native species are better positioned to survive after this many years of care
- Periwinkle remains uncontrolled and is rapidly colonising bush in Otupoho-Homestead Bay
- Working on the island is impacted by loss of key tracks due to non-maintenance.

Impacts of a Decade of Control:

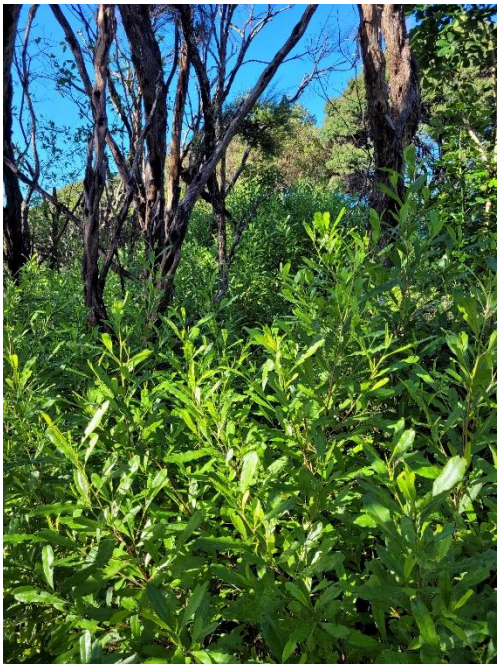
The following photos provide a very small example of the impact of removing wattle trees:



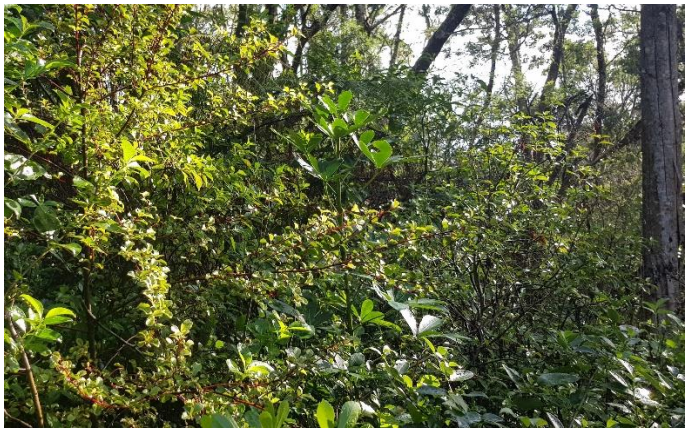
Akeake around 2.5m tall where only wattles prevailed 10 years ago



Pseudopanax around 4m tall where a "wattle desert" prevailed 10 years ago



Akeake now caring for itself having weeded this for wattle regrowth for years



A rich mix of natives where nothing else could grow when a forest of wattles (see dead tree to right) captured all light, moisture and nutrients

Recap on General Approach Adopted

At the outset of the exercise and as described in the original proposal, the broad approach involves segmenting the island into zones as delimited by various tracks and peninsulas and then dealing with each area in a specific way.

The approach this year was:

1. Due to the wet conditions and forecast, the first week to ten days focussed on re-clearing the southern end of the island including Goodfellow's property plus Frenchman's and Otupoho-Homestead Bay
2. Having discovered large outbreaks of tobacco weed a substantial effort of several long days was committed to cutting and pasting many hundreds of these plants especially in the upper Otupoho-Homestead catchments
3. The majority of the balance of time was spent clearing Mangahawea of both wattles and moth plant – around 300 moth plant pods being collected – plus cleaning up Army Bay
4. The main special focus this year was with Nadia's visit and being able to focus on the north end of Wai-iti
5. The main ridge tracks and various off-piste areas were cleared within the time balance.

The net effect of this approach remains to endeavour to:

- Keep the wattle infestations further away from the key beaches and bays, from the public and ridge tracks, and from around the planting areas.
- Eliminate tobacco weed each year, albeit there is always fresh seed germination with the opening of each new light well and corridor (this task was so great this year as to be beyond the time available for thorough clearance)
- Eliminate the pines completely (largely achieved notwithstanding the risk of seedling germination from residual cones).
- Suppress pampas grass spread in more accessible areas.
- Assist the effort to minimise the spread of moth plant on the island.
- Contribute to the macro view of weed management and control across Ipipiri in support of the agreed strategic plan.

Treatment and Progress by each Zone in 2023

In no particular order, the following is the status of treatment and progress achieved by zone:

Army Bay (Waiphapuku and Hikurangi Pa)

Army Bay is infested with all the major weed species that are in play on Moturua. Significant progress has been made over the years on removing mature wattles from this bay alongside other weeds.

This year the major areas of progress and observation in this Bay are:

- The south end ridge was cleared again of wattle regrowth, as was the area at the peak of the track between Army and Otupoho-Homestead
- The two creek/wetland arms (Y-shaped) were checked:
    - The Weedbuster team has made significant progress in the more southerly arm so clearance of tobacco required only a light touch. Carpets of small moth plant seedlings from last year's overlooked pods were observed but no adult vines were in evidence
    - The northern arm was checked and cleared of wattles and tobacco weed. No adult moth plants were identified.
- Wattle growth on Hikurangi pa was relatively light again this year and took modest effort to clear – perhaps due to vigorous kikuyu growth suppressing germination
- Alongside the track up towards the island ridge/seats the traditionally well infested area required only light clearance effort.

Gorse continues to enforce its footprint in the middle of the Bay area up what was the kikuyu slope to the SW across the creek from the old barracks. Some control of large tobacco weed plants had been conducted there by Weedbusters so the main effort expended was clearing smaller tobacco weed and the regrowth wattles.

Frenchman's Bay (Waipao and Wai-iti)

The entire Frenchman's Bay zone has always been heavily infested by wattles. This year saplings were vigorous in most of the zones.

The effort this year included:

- Clearing the waterfall area (rengarenga zone at the base & north side of the track to Otupoho-Homestead). This area was badly re-infested yet again.
- The areas above the rocky point between the two bays was heavily infested – seedlings were mainly around a metre tall due to the growing conditions. A contiguous clearance from the point back through to the rengarenga / waterfall was undertaken.
- Moth plants were found this year but mainly out on the southern point (round past the rock pools). Like many parts of the island moth plant is appearing in multiple locations

- A significant clearance of the slopes and bush at the north west extent of Wai-iti was undertaken thanks to Nadia.
- Time did not allow a check and clear of the key replanting area adjacent to the track above the main waterfall.

Significant erosion was noted at the base of the main waterfall including the presence of a deep tomo.

West Coast (facing Motuarohia Island)

No work was conducted in this zone this year.

Otupoho-Homestead Bay

This year the key outcomes for the Bay were:

- Major infestations of tobacco weed were in evidence right around the upper rims of the catchment. Two full days and more of sawing/clearing dealt with the weed between the Pipi Bay track and around as far as the Frenchman's track
- More work clearing tobacco weed and regrowth wattles was undertaken where the main large-tree poisoning and chain sawing has been undertaken over the years. More work is required to complete this task.
- The south bank area (east of the toilet block) was again cleared of wattle regrowth. Yet again more moth plant seedlings were controlled. The remnant giant reed was again re-treated (one last shoot?)
- A German wasp nest was located and destroyed
- Five Moreton Bay fig saplings of 1-2m height were located and cut/pasted. All were still in their parasitic phase and perched on trees or stumps
- A length of hi-tensile wire with a braid fish net attached was discovered in an open area on upper slopes – probably a remnant of an illegal garden plot. This was flagged to stakeholders for follow up action
- The fast-expanding area of periwinkle infestation that is entering and invading the bush line and replanted area was examined and noted that no action has been taken yet to spray or deal with it. This is a red flag for the bay.

Irrespective of all these efforts over ten years the Otupoho-Homestead Bay catchment and east coast remains heavily populated with many hectares containing adult wattles and wattle deserts. This is largely by agreement as there has been a preference from stakeholders for the area to retain most of its infestation in order to provide a transitional nectar source.

Mangahawea Bay:

For this year:

- Moth plant in the bay has significantly reasserted itself in this bay after years of suppression – many large vines were located across the entire space running from where the track to Army Bay enters, along those slopes and right up to the main bush line, through the central part of the bay and then through the main planting zone and round to the main waterfall / waterfall track. Personally, I collected over 300 pods and removed many vines, but some infestations were beyond my ability to deal with them alone so these were reported back to the Weedbuster team.
- Wattle continues to endeavour to reinfest the area – the scope of control required is relatively light now and the area on the flats was cleared within a few hours
- The main slope to the south of the bay was cleared up to the main ridge – on the ridge itself (around 80m above the bay) there are now significant recovering stands of akeake that are worth visiting
- The ridge track that runs up to the trig station site was also cleared of regrowth wattles – but more work would be required to finish the slopes below and to the north of the track
- Areas adjacent to the main public tracks north and south of the bay were cleared thoroughly.

Ten years on this bay has changed significantly in character as restorative plantings mature and weeds are gradually pushed away. But as mentioned in previous reports worrying developments are at play:

- Moth plant is getting more and more established in the bay and across an increasing footprint
- Existing plantings are at risk of being overwhelmed by kikuyu, moth plant, etc.

Sweet pea bush is insidious and increasingly making its mark up towards the ridges as well as on the flats.

Northern-most end of the Island

The northern-most end of Moturua has a few persistent issues that are being worked through:

- The previously vigorous tobacco weed community on either side of the north track was checked again and any regrowth cleaned away – happily the weed was only present in small quantities this year.

Otherwise, no control of the northern-most end of the island (north of the public track) was completed this year.

Goodfellow's Property (Hahangarua Bay)

The area around Goodfellow's beach property, as has been the case over the past decade, was provided full attention on this trip. The core areas (particularly on the Paeroa pa/peninsula) had fair numbers of wattle saplings this year, limited thanks to Andy and Kris for efforts through the year.

Moth plant was present in several areas again including multiple seedlings. Around 50 pods were collected from various sites, but the real challenge remains how many seedlings are present and generally not in the areas where the mature vines have been located. Blown-in seed is the most likely source given the scattered nature of the plants along the SE facing slopes.

The slope facing Pipi Bay was yet again a significant site for regrowth wattles and took many hours to clear.

As with other parts of the island, where large kanuka have fallen during the storms of the past year there were significant new outbreaks of regrowth wattles needing to be attended to.

Very few pampas plants were located this year (thanks to Andy for dealing with these previously). Control of the extensive area of jasmine in the bay is continuing and is close to completion, again thanks Andy.

Sweet pea bush is very vigorous and extending on slopes around the bay. A large area of velvet groundsel is also present in this bay and would benefit from control.

Heatley's Property (Opunga Bay)

No work was conducted by me at Heatley's property this year but control work has continued independently. Moth plant is present and under control action.

Pipi Bay (Awaawaroa) Peninsula

No work was able to be conducted by me on the peninsula itself this year, however Andy and Kris were able to spend time there and make a significant impact on regrowth wattles and tobacco weed. Over the past decade the *pseudopanax* stands that dominate this zone have extended into Pipi Bay surrounds and are a delight to view – this year in particular their vigour and the extent of their fruit bearing was outstanding.

Public Tracks

The entire public track (4.6km) was checked again this year to remove any wattles and tobacco weed from sight. With the clear exception of the walking tracks within Otupoho-Homestead the other parts of the track are largely a native bush experience – this was a core objective of this project since inception and the results have been gratifying.

Gorse, which is not part of this project's focus, is the main detraction.

Ridge Tracks

The ridge track (or what was the ridge track) has now largely disappeared in the centre/north end of the island. The track is now mainly congested by gorse, fallen manuka and various other weeds including hakea. The loss of this main track has made transit across the island significantly more difficult and detracts from efforts to control weeds in this zone.

The track and sides were checked lightly for wattle seedlings and tobacco weed regrowth and treated accordingly but some large outbreaks of tobacco weed had to be left unattended.

Treatment and Progress by Species in 2023

In no particular order, the following is the status of treatment and progress achieved by weed species this year:

Wattles

As per the reports above, wattles have been constrained in their ability to take over and extend their footprint in most areas for 10 years now. But with seed being so persistent and their vigour being far greater than any native species they will reassert themselves once control is not undertaken. At this stage there is no individual, group or agency that has the will or resources to undertake control on the scale of the past decade once this project ceases. So, the initial objective of this project (to provide a few years of "respite care") is being fulfilled and the native species will in future need to have made the most of their years of reduced competition.

Pine Trees

From a ten-year perspective, the wilding pines on Moturua have been wiped out in terms of the presence of adult trees (aside from one pesky tree on the northern-most cliffs). The main risk now is that pine cones surrounding the stumps of the old dead trees will continue to produce seedling pines for some time and without regular checks present a re-establishment risk. GPS location data for all pines that were on the island is available.

Tobacco Weed / Woolly Nightshade

Tobacco weed has seesawed in scale of presence over the decade of this programme. The adults on the island were removed in so far as possible within the initial years so seed load reduced – but there remains a huge seed distribution around trees where birds have passed it on and each time a tree falls the weed re-emerges.

This year being so favourable to growth the weed was again present in large tranches with some areas containing hundreds of plants requiring to be cut and paste over each hectare. Some areas on the island were unable to be dealt with due to time constraints albeit several days were dedicated to this specific weed/task.

As a result the forecast for this weed remains for it to be persistent and requiring long term attention.

Pampas Grass *(Cortaderia selloana)*

A small number of pampas plants were located this year but most were smaller plants (less than 500mm diameter) and were dealt with by pulling out or cut-and-paste. This weed is significantly controlled now (mainly thanks to Andy's spray work over the years) but with the surrounding islands having significant populations the weed will remain a constant threat.

Moth Plant

As discussed above, moth plant is winning on Moturua and is now present across large areas of the motu – and especially in locations where they are only discovered when undertaking intensive grid-searching well away from key bays and traditional sites. The main long-term prospect for control will be for manual suppression to continue and for a bio-control to take over at some stage in the future.

Other Weed Species

Many other weeds are present on Moturua and the list is long as spelled out in the Ipipiri weed strategy and other documents and reports.

However, it is worth commenting briefly on "others" that pop up on my control radar from time to time:

- This year a Taiwan cherry *(Prunus campanulata)* was spotted and dealt with on Paeroa Pa – this weed will perhaps become more frequent as kererū numbers increase over the years?
- Five Moreton Bay fig saplings *(Ficus macrophylla)* of 1-2metres extent were found and eliminated
- A large cover of climbing dock *(Rumex sagittatus)* was observed this year on the Pipi Bay face of Paeroa Pa – other clumps around the island have been treated or otherwise not reached sufficient extent to be so obvious
- Over the decade several Phoenix Palm trees of no more than 1.5m have been eliminated at several sites – none have been found in the past 2-3 years but will recur from time to time given the island's proximity to known seed sources on Motuarohia and elsewhere.

This list is not comprehensive but is illustrative of the range of threats that are present and/or will reappear and present future challenges if there is not ongoing fine-grain and comprehensive grid searching of the island.

Public Effects

Over the past 10 years every effort has made to avoid public effects from the wattle control work. However, two general impacts are again flagged for completeness:

1. For several years the visual impact of the dying pines was obvious and dying wattles will continue to be present for quite a few more years.
2. Despite extensive chain sawing over the past two years by DoC teams, there may be a future impact on the tracks within Otupoho-Homestead Bay where many large wattles have been treated. The intent has been for them to rot down safely and steadily over time, but from time-to-time DOC reduce their presence by sawing down both live and decomposing trees.

Sawing down trees that have been dead for say 2-3 years will have far less destructive effects on surrounding vegetation than culling green trees.

Hopefully the principal public effect being realised is the return of the majority of the public pathways to a native flora experience, at least for now.

Treatment Methods and their Effectiveness

A recap on the range of treatment methods and their effectiveness over the years is as follows:

- Removal by pulling out – for seedlings up to 1m, fully effective, but may trigger new seeds through soil disruption. Simple and effective.
- Cutting and pasting – for small trees /saplings/juveniles up to around 150mm, fully effective, small visual effects to public. Sawing was completed using Silky & Stihl saws, supplemented for larger trees using an ARS. Again, simple and rapid.
- For tobacco weed, sawing and pasting has been 100% effective. Sawing alone (including right down to ground-flush) without pasting is wholly ineffectual (albeit it may prevent flowering/seeding the short term).
- Drilling and filling – for larger trees, adults, big trees and pines. Tordon Brushkiller is used for filling wattles. This has been highly effective over the years but is time consuming.
- Spraying – of pampas with glyphosate per standard mix recommendations is completely effective. In later years regrowth specimens were able to be simply cut and pasted while still small.
- No chain sawing is permitted – any such control has been carried out by DoC commissioned personnel.

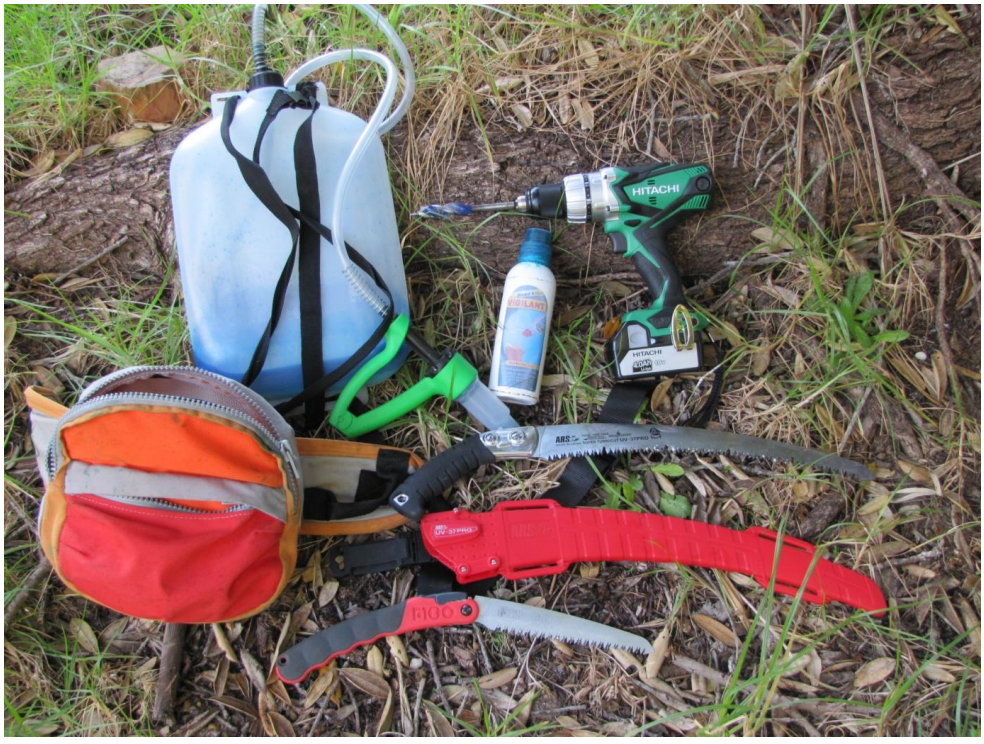


Figure: Typical range of tools used over the years – Drill, front pack, and gun for chemicals. Various saws and gels.

Improving Control Efficiency

Throughout the years of writing these reports I have endeavoured to indicate what could be improved in order to heighten the impact of the control work in future. This is largely for my own consumption but some are of more general application:

1. Improvements could still be realised if some form of electronic reporting exchange could be created so observers of infestations (such as of tobacco weed) could record and relay the information back between participants. The ability to capture weed locations and extent in real time is hampered due to lack of phone coverage and therefore lack of access to real-time ARCGIS solutions but with GPS recording and subsequent transparent sharing the locations of problems both resolved and needing attention would improve the effectiveness of all concerned.
2. Recourse is required to commercial operators if we are to deal with some weeds. For example, the periwinkle clearance in Otupoho-Homestead will require commercial scale intervention (probably in conjunction with volunteer efforts). This also applies to pampas grass on the northern part of the island and on other islands hereabouts.

It should be noted that many small efficiency gains were made during the life of this project to date – including better injection equipment, better drills, even better boots! Carriage and use of quality safety equipment was also an ongoing journey.

Fauna

The daily work conducted on the island during May each year permits observations of fauna on a regular basis.

Taken over a decade the contrast is barely comparable – so many species have been so carefully translocated and restored to the island in that time thanks to Project Island Song that the island fauna is unrecognisable compared to 2014. It is a perpetual highlight of each day, working with toutouwai/ robins at your feet, tīeke, tomtits and kākāriki swirling about your head, pursued by pīwakawaka and flights of pōpokotea… Long may they thrive.

The main species observed now are:

- Kākāriki (reintroduced 2017) were sighted and heard and seen most days in the field, including feeding on the ground and almost within reach.
- Pōpokotea (Whiteheads – reintroduced 2016) are seen and heard in large numbers, in groups and flocks in concentrations.
- Tīeke (Saddlebacks - reintroduced 2015) are very ubiquitous. Numbers increased year on year since translocation and can be seen frequently working in clans closely attended by other species and working through litter on the ground nearby to humans.
- Toutouwai (the North Island robins) were heard and seen in some areas in traditional numbers – but this year more have been seen on the southern area of the island, perhaps due to the weather conditions?
- Miromiro (tomtits) – many seen this year, both male and female.

- Kiwi – plentiful again this year, thankfully after suffering losses in previous years with droughts.
- Grey warblers – seen frequently.
- Banded rail – are relatively common.
- Kererū – several present this year, more so than previously, perhaps with more food on offer?
- Ruru – many seen, night and day.
- Tūī and pīwakawaka (fantails) – ubiquitous as always, with the fantails often following in the wake of the Tīeke.
- Rosellas – seen in flocks
- Pūkeko – seen in the main bays and on tracks. Their numbers have increased this past year.
- Mynas – seen in flocks on grassed spaces and elsewhere on the island. Territorial and aggressive to other species and should be controlled where feasible.
- Reptilia – none observed again this year.
- Invertebrate pests - there are high numbers of Asian and Australian paper wasps present each year. Common/German wasps were observed in greater numbers this year but only one nest was found during the visit.

Other Pest Weeds

Aside from the general exotics (wattles, pine, gorse, etc) that make up the background to the natives on the island the main other pest species observed were largely per previous years:

- Giant reed – the known clumps are fully controlled and the sole remaining plant is close to elimination.
- Climbing dock – as mentioned above this weed asserts itself in various locations and was particularly extensive on Paeroa Pa this year.
- Hakea (willow leaf) – mainly through southern bays and Frenchman's to Mangahawea. Areas are expanding further quite vigorously near the Frenchman's planting area. None were treated.
- Hakea (needle brush) – very wide spread, ubiquitous. A small quantity was treated last year with remarkably good results (no regrowth or new germination observed).
- Sydney golden wattle – Not controlled. Still only seen in Heatley and Goodfellow beach areas and saplings are evident.
- Moth plant – Its footprint is expanding rapidly year on year. Pods and many seedlings found in most bays and tracks. A (future) bio-control applied here and on surrounding mainland will be the only significant option long term.
- Phoenix palm – no new sightings.
- Eucalyptus species – restricted to private land. All regrowth dealt with – these are now essentially eliminated.
- Ginger plant – nil.
- Cherry – One Taiwan cherry found this year, sadly.
- Jasmine – large area at Goodfellow's is under strong control action and close to elimination.
- Velvet groundsel – *(Roldana petasitis)* – there is a large expanse on the south of the island.

- Sweet pea bush – expanding rapidly in many areas, small amount treated but is generally not controlled and is doing more harm now over-running areas of regrowth akeake and kowhai.
- Boneseed – I have not yet observed this weed on Moturua but is present elsewhere and vigilance is always required.
- Mexican devil – pervasive, significant control is applied by Weedbusters and planting teams.
- Periwinkle – one 1,400 sqm area (of two large areas in the Bay) as measured in 2022 is expanding and invading the bush-line at Otupoho-Homestead Bay - it requires urgent control action. The other area of the weed is close to the walking track near the beach and is of similar scale.

Periwinkle is rampant in Otupoho-Homestead Bay

Moth Plant seedlings from many exploded pods in Mangahawea

What has Worked Well (or Not)

Given the range of techniques and tools available to deploy, as commented on over the years, most were simple and generally efficient and effective. The sawing and pulling-out processes remain as basic cornerstones. Drill-and-fill remains the best treatment for killing large trees such as wilding pines and mature wattles – the alternative being to saw them down leads to extensive knock-down of regenerating bush in the fall path and a mass of slash to have to navigate when carrying out regrowth weed control.

The single biggest variable is of course outside of any individual's control – i.e. the weather and this year it caused many hours to be lost and led to slippery track conditions. This year had it in spades.

Time and Cost Spent on Clearing Activities

As commented in the past decade of previously submitted reports, it is difficult to provide any useful metrics as to the number of wattles this project has treated over the years. The explosion of new wattle seedlings every year means that any count runs into thousands per annum so a rate-per-kill is meaningless.

Using time as an approximate metric, this year we spent a further 200 hours of volunteer time on the control programme across the period but the average annual input has been nearer to 300 from this project alone once friends and family are added in.

In addition, over these years, non-costed and major contributions have come from many others, including:

- Andy & Kris helping in many respects via seedling control during the year, pampas spraying, continuing the jasmine battle, and helping with the barge & boat (via Explore), accommodation, and organising and logistics.
- Bruce & Marion Goodfellow in enabling this initiative and also helping with personnel transfer and accommodation and facilities.
- Project Island Song, DoC, Weedbusters, and other stakeholders and partners.
- And especially Helen, working directly with clearing seedlings, drilling related chemical work and other such activities, on top of providing direct logistical / home support.

As reported previously, from an efficiency perspective the fact that the kill-rates on large wattles is so high means that any drilling work completed is essentially as good as it can get.

Direct cost-wise, over the years on most occasions this project required only relatively small but critical investment inputs. The main expenditures outlaid by Project Island Song were for such items as saws, auger bits, gel paste and bulk chemicals on top of initial setup expenses such as for the purchase of the electric drill. This understates the cost incurred on Project Island Song as projects such as these always require support, sponsorship, advocacy and other key time-consuming inputs.

While I do not specify all the costs in these annual reports, suffice to say that the direct cost of the exercise remains relatively small but the wider uncounted cost inputs are significant including contributions from key individuals and sources (leave taken, travel, food, supplies, transport, accommodation, etc).

Approach for Next Year?

The question after 10 years is – is there a next year? What kicked off as a five-year programme has run for a decade so it is absolutely necessary to treat this as both a milestone and a checkpoint.

From my personal perspective as proposer of the project the key objectives set in 2013/14 are being met and the native bush has benefited and rejuvenated where the attention has been applied. Once that attention ceases the wattles will push to recolonise swiftly – that is a simple fact.

The short answer is – hopefully. But it may be in a less extensive form – e.g. perhaps for a two-week period rather than the standard four weeks – and would focus entirely on retaining gains made in key locations. This might also include specific tasks such as a risk assessment of each of the pine tree sites.

In the meantime my ability to undertake this programme has relied on the following and my thanks and gratitude go to all:

- The Goodfellow family who have always indicated generously to allow annual use of the cottage, without which no programme could be undertaken.

- Andy & Kris with similar commitment around use of the cottage, transport and help on the ground.
- Explore, who provide the transport facilities (barge and boat) for transfers of personnel, equipment and supplies to and from the island on our behalf.
- Richard, Fleur and Adrian from a DOC and Project Island Song perspective, again without which no programme would be feasible or possible.
- Weedbusters and especially Barbara, who liaise with and support the programme.
- My wife Helen who helps plan and prepare for then supports this effort each year.
- Many others, including friends and family, who have worked on the island and/or endorsed and indicated the value in the work plan being undertaken.

Thanks and Acknowledgements for 2023

As per all previous reports, this 2023 update would not be complete without noting the significant contributions and thanks that are due this year:

- **Bruce and Marion Goodfellow**, again for their very generous donation of the cottage and facilities and for their ongoing support of the exercise
- My wife **Helen** for being my eternal partner in this ongoing adventure, completing preparations and logistics activities, weeding, photo recording, encouragement etc
- **Andy and Kris Mitchell**, again for all their ongoing help, support and enthusiasm without which this exercise would be very difficult to conduct.
- **Nadia Sosa** who was able to visit for three days to assist with the more challenging aspects of this control exercise.
- **Zane Bray** – we missed you this year buddy 😊**.**
- Likewise for our son **Will** who was scheduled to arrive but unable to due to the weather (and thinking of you Emms).
- **Explore**, for access to the barge for transport to and from the island for the team.
- **Project Island Song** and **DOC**, particularly **Richard Robbins** for ongoing sponsorship, encouragement, liaison, supply of equipment and consumables from the budget, etc.
- **Weedbusters** especially Barbara and Laura, for their support, liaison and action.

End of Report

Thank you to everyone who has assisted in May each year! Too many to fit on the page but here are some of the culprits 😊.