Project Island Song
Ipipiri (Eastern Bay of Islands)

Weed Management Strategy

Updated: March 2017

Contents

Introduction

The following document sets out the inaugural Weed Management Strategy for the Ipipiri area of the Bay of Islands. This strategy and the work plans that flow from the initiative serve to complete the balanced restoration approach sought for the islands by setting out the associated principles, objectives, priorities and approaches for weed management while providing links to the corresponding replanting, species and fauna re-introduction plans.

The opportunity to continue and to enhance progress towards seeing the islands restored is developing thanks to the support of stakeholders, the public of New Zealand, increased visitors and the interested community. In particular the mandate provided by tangata whenua, the Department of Conservation and the Guardians of the Bay of Islands, strengthened by agencies, sponsors and volunteers, has enabled Project Island Song to prepare and present this document to enable interested parties to view, comment on and contribute to the long term management goals.

In publishing this document and the associated detailed plans that follow, a baseline has been created against which future reviews and iterations of the strategy can continue to evolve.

Background

Project Island Song is the ecological restoration of the islands of the eastern Bay of Islands (Ipipiri). It came about in 2003 when community concern for the ecological health of the islands brought people together at Te Rawhiti marae, after which a combined approach was made from community and tangata whenua to the Department of Conservation (DOC) for the protection of the islands. In 2006 the Guardians of the Bay of Islands (the Guardians) became an Incorporated Society and the Project Island Song partnership was formed between the Guardians, hapu from Te Rawhiti and DOC. In 2009 DOC eradicated mammalian pests from the islands and a mainland buffer zone of pest control was set up. At the same time the Project Island Song Weedbusters formed and have been working ever since to control weeds on the islands.

Concurrently and for a number of years, individual landowners have been planting the islands, boosting biodiversity alongside the Project Island Song habitat restoration programme that was started in 2003 on Waewaetorea Island. It now incorporates Urupukapuka and Moturua Islands with over 31,000 trees, shrubs and vines planted to provide food and shelter for reintroduced native fauna. Plantings are including threatened species such as kakabeak (*Clianthus puniceus*).

The Project Island Song translocation programme has identified twenty threatened or at risk species to be reintroduced to the islands. So far, pateke (brown teal) were returned to Urupukapuka Island in 2012; toutouwai (North Island robin) to Moturua in 2014 and to Urupukapuka in 2016; tieke (North Island saddleback) to Moturua and Urupukapuka in 2015; popokotea (whitehead) to Motuarohia in 2015 and to Moturua and Urupukapuka in 2016. Further species will be reintroduced as the programme is implemented.

DOC leads an extensive island biosecurity programme, which is supported by Project Island Song partners. This involves regular monitoring for animal pest incursions, and should any pests be detected on the islands, an active incursion response team is dispatched including pest detection dogs. Project Island Song partners run a biosecurity advocacy and education programme 'Stop, Check and Go' delivered by volunteers, including a summer boatie bag programme and also through the Floating Classroom education programme.

Weed management is an integral part of the ecological restoration programme. In addition to over 250 native species, 273 non-native species plus 130 non-native planted species (in homestead gardens etc) have recently been recorded on the islands of Ipipiri [1]. A large number of these are regarded as weeds by DOC, the National Pest Plant Authority (NPPA), the Northland Regional Council (NRC) and/or the Weedbusters (see **Appendix A**). Control is currently undertaken by the Project Island Song Weedbusters team supported by the Project Island Song volunteer programme (see **Appendix B**) and national Weedbusters.

In recognition of this it has been identified that weed management on Ipipiri needs a comprehensive long-term strategy that takes into account the associated resourcing, planning and funding. This strategy outlines the current weed distribution on the islands of Ipipiri and sets out clear guidelines, actions, and responsibilities to prevent new weed incursions and limit and/or reduce the extent of weeds already present on the islands. It builds upon the considerable work done to date and seeks to manage threats to the islands in the best way possible with the available resources.

Agreed Scope and Priorities

This strategy combines a site-led and species-led approach to weed management, with consideration for threats from adjacent mainland and departure points for visitors to the islands. Weeds have been prioritised according to the risk they present to island ecosystems, based on factors such as their dispersal mechanisms, seed viability and biology.

The scope of this strategy is the seven main islands of Ipipiri – Motuarohia, Moturua, Motukiekie, Poroporo, Urupukapuka, Waewaetorea and Okahu. An island by island approach has been taken for the Project Island Song ecological restoration plan, so a similar approach is being taken for this strategy with consideration for a prioritising process that identifies where species-led weed management will be more appropriate. From this flows a work plan for each island that can be agreed and acted upon.

Governance

Project Island Song is a partnership between the Guardians of the Bay of Islands, hapu from Te Rawhiti, Ngati Kuta and Patukeha and the Department of Conservation. The partners have worked together for over ten years – each with clear roles and responsibilities. Significant conservation gains have been made to protect and enhance the natural values across the entire rohe of Ipipiri. The Project Island Song partners work with landowners, agencies, schools, tourism and local businesses, other community conservation groups, the wider community and visitors to the area to engage everyone in the restoration of the islands of Ipipiri and the adjacent mainland.

The Guardians of the Bay of Islands are an Incorporated Society whose objectives are to;

a) Promote, support and encourage the conservation, protection and enhancement of native biodiversity of the Bay of Islands.
b) Promote, support and encourage education, research and public awareness and enjoyment of New Zealand's native biodiversity.
c) Carry out the foregoing objects while respecting the natural, recreational, historical and cultural features and values of the Bay of Islands.
d) Strive to work cooperatively with landowners, whanau, hapu and iwi, local and national government authorities and with community groups sharing similar objectives.
e) Provide financial, material and physical support for the foregoing objects or any of them.
f) Do all such other lawful things as are incidental or conducive to the foregoing objects or any of them.

[1] Parris 2016, Auckland Botanical Society Journal 70 (2):155-178

The Guardians work collaboratively with funders as well as private donors and sponsors to secure Project Island Song's future and to protect the significant investment made to date. Long established relationships with tertiary institutions ensure research and technology is kept at the forefront of the project and outcomes are regularly monitored for effectiveness and success of the restoration of Ipipiri.

Vision

The overarching vision for Project Island Song is to sustain and enhance the Ipipiri archipelago of island sanctuaries for all to enjoy.

Specifically, our vision for this Weed Strategy is:

Successful management of the weeds of Ipipiri in order to complement the animal pest free status of the islands and enhance the habitat restoration process.

Guiding Principles

All weed management actions in Ipipiri will be guided by the following principles:

- This strategy acknowledges our partnership with tangata whenua (Ngati Kuta and Patukeha hapu from Te Rawhiti) and their mana whenua as kaitiaki. The appropriate tikanga will be given around any archaeological or culturally sensitive sites.
- Weed management is an essential and integral part of the ecological restoration programme for Ipipiri and for the sustainable management of the natural values of the islands in the future; it requires an integrated, multidisciplinary and long-term approach.
- Resources for weed management are limited and need to be directed to the agreed priorities of the Strategy and associated action plan(s) so as to make best use of them.
- Avoiding the introduction of new weed species via bio-security measures is a cornerstone for successful weed management.
- New or isolated and emerging weeds must be treated quickly to prevent them from becoming established; they are a priority for control.
- Low incidence, high threat weeds (including those listed by DOC, NPPA, NRC and Weedbusters) will be subjected to high priority control with the ultimate goal of eradication.
- A key priority of weed management is environmental protection and protection of the restoration work carried out so far.
- Areas which have been treated must be revisited regularly so that re-seeding does not take place, whatever the species. This revisiting must take priority over tackling new sites/species. Labour and transport must be made available at the optimum time(s).
- In the preparation of a strategy for priority weed species, site- or area-led priorities are developed as well as species-specific priorities.
- Barriers to effective weed management are to be identified and overcome.
- Weed control is just one part of the 'whole-of-landscape' approach to land management and must be integrated with other land management programs such as grazing, fire management, track maintenance, habitat regeneration and restoration.

In addition, all weed management activities undertaken on the islands will conform to the Health and Safety at Work Act 2015 and other relevant requirements as set out under the New Zealand's legislative framework.

Best Practice Weed Management for Ipipiri

In order to deliver on its vision, the goals and objectives which follow and the ensuing work plans, the following are presented as the best practice guidelines to be adopted in the Ipipiri weed management situation:

- Weeds must be managed in the context of their location, land management objectives, and any environmental benefit the weed(s) may possess (e.g. weed species providing temporary habitat for rare or threatened native species).
- Control priorities are ordered so that non-infested areas are kept free of weeds, small outlying satellite infestations are controlled before core infestations, upstream sites are worked before downstream and ridgelines downslope to valley floors.
- Control techniques should be determined through a thorough analysis of the area to be treated (e.g. low impact manual techniques where there are important natural or cultural features, cf. large scale spraying, disturbance or clearance where such features are absent).
- Specific species-led control or eradication is considered best when infestations are small and/or widely distributed in isolated patches; site-led control is more appropriate near valuable sites and where all weeds can be controlled or all species with a similar growth-form can be controlled.
- Rehabilitation/revegetation of the treated area must be incorporated into weed control operations.
- Weed control operations are to minimise potential impacts on the environment through appropriate procedures that minimise ground disturbance, waterway pollution, and spraying/damaging non-target species.
- Follow-up treatment and monitoring are to be undertaken to control regrowth and reinvasion and to evaluate the success of each operation. Sustained control is required where persistent invasion occurs or where there is a long-term seed bank.
- Weeds are to be disposed of in a manner that prevents re-infestation.

Determining Priority Weeds and Sites

Identifying priority weeds increases their significance for funding and directs resources into the management of these weeds. The priority weeds for the region were determined based on the most up-to-date and relevant information available. They include:

1. Smothering vines with long distance wind dispersed seed.
2. Fast-growing and maturing woody species that can form dense stands and produce well-dispersed and long-lived seeds.
3. Herbaceous species that form extensive thickets, dense swathes or mats that replace or smother native species and inhibit native seedling establishment.

Priority Weeds to be Managed

Table 1 below lists the weeds of highest priority for management by Project Island Song and Weedbusters volunteers. It also indicates their Island Distribution and whether a site or species led control strategy should be adopted. In addition, **Appendix A** provides further information on their impacts, biology and dispersal methods, level

of control possible, best basis for control and agreed control methods.

Table 1: Priority Weeds of Ipipiri

Common name	Botanical name	Island Distribution	Site or species led control
VINES			
Moth plant	*Araujia hortorum*	Moturua, Motuarohia, Urupukapuka, Okahu	Species
Climbing Dock	*Rumex sagittatus*	Moturua, Motuarohia, Urupukapuka, Motukiekie	Site
Jasmine	*Jasminum polyanthum*	Moturua, Motuarohia, Urupukapuka, Poroporo	Species
TREES			
Pines [3]	*Pinus radiata*	Moturua, Motukiekie, Motuarohia	Species and site (seedlings)
	Pinus pinaster	Moturua, Motukiekie, Motuarohia	
Brush Wattle [1]	*Paraserianthes lophantha*	Moturua, Urupukapuka, Poroporo	Species and site (seedlings)
Other Wattles [1]	*Acacia longifolia*	Moturua, Motukiekie	Species and site (seedlings)
	Acacia mearnsii	Moturua, Motukiekie	
Tobacco Weed	*Solanum mauritianum*	Moturua, Motukiekie, Motuarohia, Urupukapuka, Waewaetorea	Species
SHRUBS			
Boneseed	*Chrysanthemoides monilifera*	Moturua	Species
Gorse [1, 2]	*Ulex europeus*	Moturua, Motukiekie, Motuarohia, Urupukapuka, Waewaetorea, Poroporo, Okahu	Site
Sweet Pea bush	*Polygala myrtifolia*	Moturua, Motukiekie, Motuarohia, Urupukapuka, Poroporo, Okahu	Site
GROUND COVER			
Ink weed	*Phytolacca octandra*	Moturua, Motuarohia, Urupukapuka, Waewaetorea, Okahu	Site
Kahili ginger	*Hedychium gardnerianum*	Urupukapuka, Poroporo	Species
Mexican devil	*Ageratina adenophora*	Moturua, Motuarohia, Urupukapuka, Waewaetorea	Site
Mistflower	*Ageratina riparia*	Moturua, Motukiekie, Motuarohia, Urupukapuka, Waewaetorea	Site
Pampas Grass	*Cortaderia selloana*	Moturua, Motukiekie, Urupukapuka, Waewaetorea, Poroporo, Okahu	Species

1. Gorse and wattles are legumes, able to fix atmospheric nitrogen through the action of bacteria in their root nodules. In controlled numbers wattles also provide nectar for birds. Stands of wattles are now being controlled on Moturua Island where they occupy a significant circa 12% of the total land area (cf. 2% on Tiritiri Matangi Island where they are also used as an interim nectar source). Wattles are out-competing the native regrowth in some areas. Seedlings are the main target in sites being cleared of other weeds.

2. Gorse needs to be managed near tracks and infrastructure where it creates a negative impact to recreation and activity but on occasion may be left to harbour regeneration where appropriate.
3. Historically, pines have been planted on Motuarohia and Motukiekie, possibly also on Urupukapuka and have dispersed to Moturua. Populations of mature wilding trees are now targeted for eradication on Moturua and seedlings are cleared at other control sites.

Note that a key aim of this strategic plan is to pursue the eradication of these priority weed species, particularly moth plant, ginger, tobacco weed and climbing dock. In order to expedite this outcome additional focus should be applied in the form of all sites being revisited **twice a year** for inspection and weeding (N.B. Moth plant and ginger are easier to detect when flowering). Anticipated timelines for eradication to be achieved will be included in future versions of this plan.

Other Priority Weeds (Gardens and Former House Sites)

Other weeds currently recorded on the islands can be categorised according to their level of impact or threat. This acknowledges the different management approaches required due to the differing level of infestation.

a) Weeds present within residential gardens or on abandoned house-sites that have the potential to spread rapidly into open areas and regenerating bushland. These need to be targeted for control and monitored for re-emergence. **Table 2** lists the priority species included in this category.

Table 2: Weeds present in gardens or on former house sites that are major threats and require management

Common Name	Botanical Name	Island Distribution
VINES		
German Ivy	*Delairea odorata*	Urupukapuka
Ivy	*Hedera helix*	Urupukapuka, Poroporo
Grape vine	*Vitis vinifera*	Motukiekie, Poroporo, Urupukapuka
Jasmine	*Jasminum polyanthum*	Motuarohia, Urupukapuka, Moturua, Poroporo
TREES		
Bangalow palm	*Archontophoenix cunninghamii*	Motukiekie
Canary Island date palm	*Phoenix canariensis*	Motuarohia
Loquat	*Eriobotrya japonica*	Motukiekie, Okahu, Poroporo
Monkey apple	*Syzygium smithii*	Motuarohia
GROUND COVER		
African club moss	*Selaginella kraussiana*	Moturua, Urupukapuka
Agapanthus	*Agapanthus praecox*	Moturua, Urupukapuka, Poroporo, Motuarohia, Motukiekie
Tuber Ladder fern	*Nephrolepis cordifolia*	Urupukapuka, Poroporo

b) Weeds present within residential gardens or on abandoned house-sites that have the potential to spread but are considered to be a minor threat compared with the species listed in **Table 2** are listed in **Appendix A.**

c) Priority weeds formerly present, currently regarded as eradicated, that would present a threat if they re-occurred form part of an 'Alert List'. Their return needs to be monitored through regular inspection. They are Banana Passionfruit (*Passiflora sp*.), Bushy asparagus (*Asparagus aethiopicus*), Climbing asparagus

(*Asparagus scandens*), Lantana (*Lantana camara*), Taiwan Cherry (*Prunus campanulatus*) and Tree Privet (*Ligustrum lucidum*) – all are spread by birds and are common on the Bay of Islands mainland. Weeds not currently present but would present a threat if they occurred also form part of the Alert List. The arrival of such species needs to be monitored through regular inspections particularly of the islands nearest to the mainland. The main weed species included in this category are African olive (*Olea europaea* subspecies *cuspidata*), Chinese Privet (*Ligustrum sinense*), Cotoneaster (*Cotoneaster franchetii*), Japanese honeysuckle (*Lonicera japonica*) and Queensland poplar (*Homalanthus populifolius*) – all are spread by birds and are common on the Bay of Islands mainland. Other species that could threaten the native ecosystems are on the National Pest Plant Accord (NPPA) and the Northland Regional Council (NRC) lists and a watch should be kept for them (see **Appendix A**).

Priority Sites

The identification of high value (conservation, social and cultural) sites for protection against new and existing weed infestations is important for prioritising investment. Priority sites include those with good natural regeneration potential, such as the valley bottoms where there are seasonal water courses and some soil moisture for much of the year, former (and current) garden sites that are centres of weed dispersal, and those with isolated stands of weeds that can be readily controlled or eradicated. Note that special consideration will be given to archeologically and culturally sensitive sites wherever they are identified. **Table 3** lists the priority sites for each Island.

Table 3: Priority sites of Ipipiri

Island	Priority Sites
Urupukapuka	Otehei Bay – resort and cottage gardens; Cable Bay; Urupukapuka Bay; Entico Bay; Paradise Bay
Moturua	Mangahawea Creek; Otupoho (Homestead) Bay & garden site; Waipao (Frenchmans) Bay; Waiiti Bay; Army Bay
Motuarohia	Lagoon Bay; W end of Island; garden sites
Waewaetorea	Stockyard Bay; Otawake Beach creek & garden site
Motukiekie	Above Kiekie Cove; above Sunset Bay, northeast corner, central high ground
Poroporo	Former garden
Okahu	Valley behind beach

Goals / Objectives

The following section sets out the six core goals and the associated objectives of this weed management strategic plan and identifies at a high level the key actions to be taken against each. The detail of the latter will be provided and communicated via annual plans and any materials provided, developed or managed by and through Project Island Song.

GOAL 1: Create clear guidelines for identification, monitoring, control and eradication of weeds on the islands of Ipipiri.

Objective 1: Facilitate identification of weed species through provision of information and expert advice.

Distinguishing between native plant species and weed species is not always easy. Correct identification of the weed species is essential so native species are not destroyed by mistake and so that the most appropriate and cost-effective control methods are applied.

Actions:

1. Provide a list of useful sources of information on weeds.
2. Prepare an identification kit of the main weed species targeted on the islands for use by volunteers and others involved in surveillance and control activities.
3. Arrange access to expert advice for identification of weed species.

Objective 2: Prevent new weed incursions by increasing awareness of the threats and how they can be addressed.

Prevention and treatment of new weed infestations is the most successful, cost effective and least environmentally damaging means of control. After introduction of a new invasive plant, there is a short period of opportunity for eradication and containment. Once permanently established, a new invader becomes a long-term management problem.

Actions:

1. Establish collaboration with relevant land managers to assist with resources (knowledge, advice).
2. Identify and document high risk pathways (e.g. footwear or livestock) and develop and implement effective management protocols.
3. Distribute information to the public intending to visit the Islands (and more widely) about the adverse impacts of weeds.
4. Assist in preventing weeds being carried to the islands by applying quarantine protocols at entry points.
5. Brief residents about the need for surveillance and encourage them to be involved in surveillance activities.

Objective 3: Make available guidelines on the best control methods for weed species.

A range of control methods may be available for a particular weed species but not all may be appropriate or possible to use on the Islands. The most cost-effective and sustainable methods need to be used wherever possible.

Actions:

1. Assess the best/most appropriate methods to be used on the Islands for control of priority weeds and others of concern.
2. Prepare a set of best practice guidelines for use in control work.
3. Train personnel in the use of the methods to ensure health and safety requirements are met.

Objective 4: Create a set of maps, photos and forms to facilitate recording and monitoring of progress on weed control.

Monitoring is a key component of weed management programmes. Monitoring the outcome of an action provides the information required for evaluating the success of that action and the planning of future goals and targets.

Actions:

1. Prepare base maps for each Island so location of major weed infestations can be documented.
2. Outline principles for setting up appropriate photo points to record progress over time.

3. Develop methods of recording simple density data (e.g. line transects) to support photo point observations.
4. Prepare a chart to record location and type of management works carried out, methods used, weed species involved, numbers of volunteers, hours worked, level of control achieved, ongoing work required, financial costs, etc.

Note that this objective will be greatly facilitated by the use of technology. To help locate, monitor and pinpoint weed infestations and their extent over time the following should be investigated:

- GPS to pinpoint precise location of weeds and to assist the sharing of information amongst agencies
- Drones photography to provide baseline and progress snapshots against the strategy and to help seek out hidden seed sources
- Two-way radios to enable spotters to guide others from vantage points and to enhance safety.

GOAL 2: Improve and enhance the island ecosystems, and protect all the restoration work done to date by removal and management of weeds.

Objective 5: Eradicate, control and minimise the spread of existing weeds.

Rapid detection of the weed and use of best management practices to control or eradicate the outbreak is the desired outcome. Once weed spread is controlled, the areas can regenerate naturally, or be revegetated (subject to DOC permission to plant them) and restored to a healthy, sustainable condition.

Actions:

1. Establish and document the current distribution and density of weeds on the Islands
2. Undertake regular inspection of high risk areas (beaches, tracks, open/bare ground) during routine weedbusting, trapping and planting.
3. Encourage residents to be involved in surveillance activities.
4. Develop and implement a rapid response programme for new incursions and ensure residents are informed about it.
5. Develop and implement annual weed management programmes for each Island.
6. Carry out appropriate control of priority weeds and others of concern, focussing on order of control priorities.
7. Survey regularly for weed regrowth and re-infestations.
8. Monitor, review and report on implementation of management programmes.

Objective 6: Integrate closely with the annual planting programme.

Close collaboration with the replanting programme enhances natural regeneration potential and ecosystem rehabilitation.

Actions:

1. Identify priority sites for linking weed management and replanting.
2. Integrate weed management activities with proposed planting sites where appropriate (e.g. within regenerating vegetation with partially closed canopy).
3. Research the value of using seed balls or broadcasting appropriate seed mixtures in cleared sites.

GOAL 3: Plan for ongoing resourcing and the future sustainability of the weed programme as part of the wider island restoration.

Objective 7: Ensure funds are available to support all aspects of the Ipipiri Weed Strategy so that the rate of progress enables positive outcomes to be achieved.

Eradication of weeds is not always possible, and control of their spread is time-consuming and long-term. In order to manage weeds effectively and efficiently, adequate funds must be available over time to support the level of management required (see **Appendix B**), to ensure annual weed reduction is achieved and the native ecosystems are restored and become fully functioning.

Actions:

1. Develop a database of possible funding sources that includes criteria for funding, frequency and timing for applications, amounts available, reporting requirements, etc.
2. Evaluate priority actions within annual work plans and seek appropriate funds for implementation within clear time-frames.
3. Monitor progress of the work plans funded to ensure completion within allocated time-frames.
4. Ensure all reporting requirements are met by due dates.

Objective 8: Ensure the Weed Management Strategy is reviewed annually in July-August and revised regularly to make certain it remains a relevant working document.

Reviewing the Strategy should include an assessment by all stakeholders regarding the efficiency and the effectiveness of achieving the vision and goals of the strategy, noting main successes and analysing barriers to progress, and revising actions where necessary. Reports should be made available to all relevant groups involved and to the public. The Strategy should be updated also as weed management techniques, knowledge and ability advance in the area.

Actions:

1. Organise workshops for all those involved in implementing the Strategy to report on overall progress on each Island; monitoring the results for individual species and for sites; identification of barriers to effective management (overcome or not); and consideration of future needs and priorities.
2. Revise and up-date the Strategy based on the island reports.
3. Prepare a concise report on the Strategy's progress (achievements, what still needs to be done, etc.) and distribute to all involved (supporting organisations, funders, volunteers) and the public.

GOAL 4: To educate and engage people in the importance of weed management as part of ecological restoration.

Objective 9: Involve a well-informed, well resourced, wide network of people in weed management.

The public generally is not aware of the environmental and economic impacts of weeds. There is a need to improve awareness of weeds and to provide educational information to the public (see **Appendix B**). As people become more aware of weeds, the probability of detecting them is greatly increased which allows for more effective and timely control. Education and awareness assists weed identification and in reporting new infestations, prevention and control, and fosters cooperation and partnerships.

Actions:

1. Develop a database of contacts/networks for exchange of information.
2. Include weed identification and management information on relevant web sites.

3. Provide regular updates to the general public on Island weed management programmes using media outlets (good news stories).
4. Inform the community on how they can assist and contribute to weed management.
5. Provide opportunities for public or specific groups to become involved in weed management activities on the Islands (target specific highly visible weeds, school weed buster week).
6. Providing resources and training to volunteers to increase their skills.

GOAL 5: To work collaboratively with mainland communities to prevent reinvasion of weeds from the mainland, and to share information, ideas and resources.

Objective 10: Maintain a network of community groups and supporting organisations working together to restore and enhance the biodiversity and ecological health of the Ipipiri region.

There is ongoing community interest in the Project Island Song volunteer weed programme, however coordination of this needs considerable supervision and resourcing, including transport and Health and Safety. The input of programme coordination needs to be balanced with conservation outcomes gained from volunteer weed busting. A tiered approach is proposed for coordinating volunteers (see **Appendix B** for details). Close co-operation with mainland community groups is already in place but further exchange of ideas and consistency in approaches, monitoring and reporting could be worthwhile and lead to enhanced habitat restoration outcomes.

Actions:

1. Identify community groups active in ecological restoration and weed management in relevant mainland areas and seek their cooperation.
2. Organise meetings and/or workshops to consider the relationship between islands and mainland (and the threats this poses e.g. Kerikeri Inlet, Long Beach, Rawhiti coastline), identify the main weed issues for each area, and find ways to address them through collaborative efforts.
3. Develop and promote consistent and complementary weed management plans and priorities.
4. Maintain regular information exchange on weed management issues, progress and future plans.

GOAL 6: Provide strong governance that will ensure the weeds programme is sustainably funded into the future.

Objective 11: Address weed management as an integral part of the ecological restoration of Ipipiri.

For weed management to become an integral part of the Project Island Song ecological restoration process, pest management and island biosecurity requires identification of the resources required and funding priorities to be set 3 – 5 years in advance to ensure seamless delivery of the programme. Alignment with regional and national strategies (Regional Pest Management Strategy, DOC's Dirty Dozen) and integration of communications (including engagement, education and advocacy), will assist to ensure positive outcomes across the region.

Actions:

1. Implement the Strategy, led and co-ordinated by the Guardians of the Bay of Islands.
2. Maintain and enhance partnerships with many different community sectors through information exchange, promotion of impacts of weeds, and involvement in weed control activities.

Monitoring the Results and Evaluation

Documenting and reporting on the full range of activities outlined in the weed management strategy together with observations of changes occurring in the plant communities and habitats will allow for assessment of the outcomes of the programme.

For weeds, key indicators of success over time would include:

- The eradication and/or control of weed species.
- Decreases in weed density.
- Decreases in weed recruitment.

For plant communities, key indicators of success would include:

- Increases in natural regeneration and spread into weed control sites.
- Increased native species density and species diversity.
- Complexity of community structure and habitat.
- Increased seedling production.

Collation and analysis of the monitoring data at regular intervals (annual, biennial or 5-yearly) both on-ground and aerially via drones and/or helicopters, is essential in order to assess progress. The data will show whether targets have been met or not and will allow barriers to success to be identified. Management decisions can then be made about the efficacy of the procedures being followed and usefulness of the information being gathered. The strategy can then be revised where necessary.

Conclusion

This document has set out the opportunity on a strategic basis for the management of the weeds of Ipipiri by way of the three key options available:

1. **Control by exclusion and prevention**
2. **Control by eradication**
3. **Control by containment or suppression.**

Thanks to the support of key stakeholders, funders and the community those options can be pursued over the long term in order to deliver progress towards achieving the Vision for the restoration of the archipelago.
Feedback and input to future iterations of this document and contribution to the detailed annual plans that arise is always welcome. For input and comment please send communications to:

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Appendix A

Specific Weeds and Control Strategies

Specific Weeds:

Tables 1a to 3a below provide additional detailed information on dispersal mechanisms, flowering times and the assessed level of threat of specific weed species:

- Table 1a includes species that are a major threat and must be given high priority for control.
- Table 2a lists species occurring on the islands that are considered to be somewhat less of a threat (a minor threat) and should be controlled as time and resources permit.
- Table 3a is the 'Alert List'; it includes species that have been recorded on the Islands and been eliminated together with others listed as threats by DOC, NPPA, NRC and Weedbusters.

Table 1a: Weeds of highest priority for control based on level of threat

Common Name	Botanical Name	Dispersal	Flowering time	Priority/Threat
VINES				
Moth plant	*Araujia hortorum*	Wind	Dec-May	High priority
Climbing Dock	*Rumex sagittatus*	Wind, water	Nov-Mar	Major
German ivy	*Delairea odorata*	Wind, vegetative	May-Oct	Major
Grape vine	*Vitis vinifera*	Bird	Oct-Dec	Major
Ivy	*Hedera helix*	Bird	Mar-May	Major
Jasmine	*Jasminum polyanthum*	Bird, vegetative	All year	High priority
TREES				
Brush wattle	*Paraserianthes lophantha*	Wind	May-Aug	Major
Maritime pine	*Pinus pinaster*	Wind	?	Major
Bangalow palm	*Archontophoenix cunninghamii*	Bird	Sep-Feb	Major
Canary Island date palm	*Phoenix canariensis*	Bird	Oct-Nov	Major, females only
Loquat	*Eriobotrya japonica*	Bird	Apr-Aug	Major
Monkey apple	*Syzygium smithii*	Bird	Oct-Jan	Major
Tobacco weed	*Solanum mauritianum*	Bird	All year	Major
SHRUBS				
Boneseed	*Chrysanthemoides monilifera*	Bird, water	Sep-Feb	Highest priority (new weed)
GROUND COVER				
African clubmoss	*Selaginella kraussiana*	Wind, vegetative	?	High priority (small pop. high impact)
Agapanthus	*Agapanthus praecox*	Wind	Dec-Feb	Major
Mexican Devil	*Ageratina adenophora*	Wind, vegetative	Aug-Dec	Major
Mistflower	*Ageratina riparia*	Wind, vegetative	Aug-Jan	Major
Pampas grass	*Cortaderia selloana*	Wind	Jan-Jun	Major
Tuber ladder fern	*Nephrolepis cordifolia*	Wind, vegetative	?	Major

Common Name	Botanical Name	Dispersal	Flowering time	Priority/Threat
Ink weed	*Phytolacca octandra*	Bird	Nov-Aug	Major
Kahili ginger	*Hedychium gardnerianum*	Bird	Jan-Mar	Major
Periwinkle	*Vinca major*	Vegetative	All year	Major
Kikuyu	*Cenchrus clandestinus*	Vegetative, water, livestock, wind	Oct-Mar	Major

Table 2a: Weeds of lower priority or minor threat

Common Name	Botanical Name	Dispersal	Flowering time	Priority/ Threat
VINES				
Giant Burmese honeysuckle	*Lonicera hildebrandiana*	Vegetative	Summer	Minor
Railway creeper	*Ipomoea cairica*	Vegetative	Oct-May	Minor
Trumpet vine	*Campsis x tagliabuana*	Vegetative	Summer	Minor
Wisteria	*Wisteria sp.*	Vegetative	Oct-Feb	Minor
TREES				
Black wattle	*Acacia mearnsii*	Wind	July-Sep	Minor
Radiata pine	*Pinus radiata*	Wind	Sep-Nov	Minor
Sydney Golden wattle	*Acacia longifolia*	Wind	July-Aug	Minor
Willow-leaved Hakea	*Hakea salicina*	Wind	Aug-Nov	Minor
Coral tree	*Erythrina x sykesii*	Vegetative	Aug-Oct	Minor
SHRUBS				
Prickly Hakea	*Hakea sericea*	Wind	Jun-Nov	Minor
Apple of Sodom	*Solanum linnaeanum*	Bird, water	Sep-May	Minor
Blackberry	*Rubus ulmifolius*	Bird	Nov-Apr	Minor
Firethorn	*Pyracantha angustifolia*	Bird	Dec-Jan	Minor
Gorse	*Ulex europaeus*	Explosive pod	May-Nov	Minor
Black bamboo	*Phyllostachys nigra*	Vegetative	?	Minor
Cape honey flower	*Melianthus major*	Vegetative, water, wind	Jul-Apr	Minor
Giant reed	*Arundo donax*	Vegetative	Apr	Minor
Golden bamboo	*Phyllostachys aurea*	Vegetative	?	Minor
GROUND COVER				
Mexican daisy	*Erigeron karvinskianus*	Wind	All year	Minor
Onion weed	*Allium triquetrum*	Wind, Vegetative	Oct-Nov	Minor
Pink pampas grass	*Cortaderia jubata*	Wind	Jan-Mar	Minor
Ragwort	*Jacobaea vulgaris*	Wind	Nov-Apr	Minor
Spanish heath	*Erica lusitanica*	Wind	Mar-Dec	Minor
Arum lily	*Zantedeschia aethiopica*	Bird	Oct-Dec	Minor
Cape gooseberry	*Physalis peruviana*	Bird	All year	Minor
Elephant Ear	*Alocasia brisbanensis*	Bird, vegetative	?	Minor
Fruit salad plant	*Monstera deliciosa*	Bird, vegetative		Minor
Italian Arum	*Arum italicum*	Bird, vegetative,	Oct-Nov	Minor
Red Hot Poker	*Kniphofia uvaria*	Bird	?	Minor
Small-flowered nightshade	*Solanum nodiflorum*	Bird	All year	Minor
Spider plant	*Chlorophytum comosum*	Bird, vegetative	Summer	Minor
Stinking Iris	*Iris foetidissima*	Bird	Nov-Dec	Minor
Osteospermum	*Osteospermum fruticosum*	Water	Aug-Jan	Minor
Osteospermum	*Osteospermum jucundum*	Water	All year	Minor
Blue vervain	*Verbena littoralis*	Explosive pod	All year	Minor
Nasturtium	*Tropaeolum majus*	Explosive pod	Oct-May	Minor

Common Name	Botanical Name	Dispersal	Flowering time	Priority/ Threat
Shrub Balsam	*Impatiens sodenii*	Explosive pod	All year	Minor
Violet	*Viola odorata*	Explosive pod, vegetative	Jul-Oct	Minor
Blue spur flower	*Plectranthus grandis*	Vegetative	All year	Minor
Bulbil Watsonia	*Watsonia meriana var. bulbillifera*	Vegetative, water	Oct-Nov	Minor
Buffalo grass	*Stenotaphrum secundatum*	Vegetative		Minor
Bugle	*Ajuga reptans*	Vegetative	All year	Minor
Century plant	*Agave americana*	Vegetative	Feb-Mar	Minor
Fairy crassula	*Crassula multicava*	Vegetative	Aug-Feb	Minor
Montbretia	*Crocosmia x crocosmiifolia*	Vegetative, water	Jan-Feb	Minor
Self-heal	*Prunella vulgaris*	Vegetative	Nov-Apr	Minor
Soap aloe	*Aloe maculata*	Vegetative	Nov-Dec	Minor
Wandering Jew	*Tradescantia fluminensis*	Vegetative	Dec-Jan	Minor

Table 3a: Alert List – weeds that have been eradicated but may re-establish and those that could be expected to appear

Common Name	Botanical Name	Dispersal	Flowering time	Level of Threat
VINES				
Banana passion-fruit	*Passiflora* sp.	Bird	All year	Eradicated 2009
Black passionfruit	*Passiflora edulis*	Bird	Jul-Mar	Eradicated 2012
Climbing asparagus	*Asparagus scandens*	Bird	Sep-Dec	Eradicated 2010
Japanese Honeysuckle	*Lonicera japonica*	Bird	Sep-May	Expected
Smilax	*Asparagus asparagoides*	Bird	Jul-Aug	Expected
TREES				
African olive	*Olea europaea subsp. cuspidata*	Bird	Spring	Expected
Queensland poplar	*Homalanthus populifolius*	Bird	Sep-Nov	Expected
Taiwan cherry	*Prunus campanulata*	Bird	July-Sep	Eradicated 2016
Tree privet	*Ligustrum lucidum*	Bird	Nov-Mar	Eradicated 2014
SHRUBS				
Lantana	*Lantana camera*	Bird	All year	Eradicated 2009
Chinese privet	*Ligustrum sinense*	Bird	Jul-Mar	Expected
Purple guava	*Psidium cattleianum*	Bird	Jan-Mar	Eradicated 2016?
Castor Oil Plant	*Ricinus communis*	Explosive pod	Dec-Feb	Eradicated 2016
GROUND COVER				
Bushy asparagus	*Asparagus aethiopicus*	Bird	Oct-Mar	Eradicated 2010
Umbrella sedge	*Cyperus eragrostis*	Bird	?	Eradicated 2013
Ice plant	*Carpobotus edulis*	Vegetative, water	Oct-Feb	Expected

Common Name	Botanical Name	Dispersal	Flowering time	Level of Threat
Aluminium plant	*Galeobdolen luteum*	Vegetative	Dec-May	Eradicated 2016
Carnation grass	*Carex flacca*	Vegetative	?	Eradicated 2016?

Specific Control Strategies and Tactical Planning:

In order to be most effective this weed strategy needs to be able to be adopted readily by those seeking to implement the control activities within the bounds of an annual work plan. Supplementary to this document Annual Weed Management Plans will be completed for each island, including prepared information for each of the known problem weed species. These will provide specific guidance in the form of control priorities and tactics island-by-island and by site where needed.

As set out above, typical considerations for assessing the weeds on a case by case basis include:

- Whether they are on NPPA and/or NRC alert lists for exclusion, eradication, control by containment or suppression, or surveillance of classified weed species.
- Early detection of threats will prevent new weed species establishing. Therefore where a species such as Chinese privet may not yet be established on the islands, it is a known and local high risk requiring high vigilance.
- The invasiveness of the species and the associated harm they may cause in the Ipipiri context (e.g. moth plant is highly invasive and overwhelms native species quickly, so it is a high priority for control).
- The interim value of the weed within the food chain or as a shelter species (e.g. pre-existing wattle trees in controlled numbers may provide an alternative nectar source until native species mature sufficiently).
- The impacts of the weeds on the amenity value of the archipelago, including visual effects (e.g. tobacco weed and gorse).
- Other priorities that may be set by DOC and the governance group in which care of the islands is vested.

To improve the usability of the information, consideration has been given to the range of options available for control, ranging from prevention through to eradication. These take into account the potential feasibility of exercising control, which in turn is dependent on such factors as cost, risk and likelihood of success.

There is a wide range of established and approved weed control methods available to groups and volunteers seeking to deliver upon this plan. As well as the experience available directly, in particular this plan seeks to draw upon the information provided by Weedbusters NZ, DOC, local councils, specialised groups (such as those dealing with wilding pines), and others.

Specific approaches are in place and established for most species within the Ipipiri catchment. These range across:

- Initiatives to prevent weeds arriving by way of biosecurity measures (such as the cleaning of footwear and equipment).
- Undertaking weeding activities integrated with planting programmes.
- Monitoring and observing of species not considered high risk or are of interim biodiversity value (such as Willow Leafed Hakea), with no immediate action to be taken.
- Opportunistic removal of weed specimens which are relatively low risk of rapid spread but play no part in the ecosystem outside of private gardens (such as Stinking Iris).
- Targeted removal on an occasional basis when a species reaches a threshold of visibility or nuisance (such as pampas grass) and resources become available to address it.
- Control and management of highly invasive species on a considered and planned basis with trade-offs being evaluated (such as wattle and gorse).

- Programme based removal of species that are targeted for eradication or maximum control (such as moth plant and ginger).
- Outright removal of a species where such control can be readily exercised and eradication is consistent with the policies of the stakeholders (such as wilding pines on selected islands).

The ranges of methods of control which can be deployed against each (in no particular order) include:

- Prevention/exclusion via quarantine, being the highest opportunity.
- Do nothing.
- Hand weeding, digging or pulling out of specimens.
- Sawing or cutting and chemical pasting of plants (including such plants as ginger) and stumps.
- Ringbarking.
- Drilling and filling or similar treatments of large trees (in preference to sawing down which would potentially damage surrounding native (re)vegetation).
- Chemical spraying, where no satisfactory alternative is available.

Generally there is no occasion where chain-sawing or clear-felling of species on public land has been identified as a preferred control option. This is in large measure due to the collateral damage that tree felling inflicts on regenerating native species in the immediate vicinity.

For the use of chemical controls there are pre-existing guidelines set out by DOC and Weedbusters as to their acceptability for use within set circumstances. Only a specified selection of chemicals is suitable for use and all applications must be approved before use. On the islands, some species will have more than one treatment approach deployed against them depending on such factors as maturity of the plant, difficulty of access or interim food-source value, varying by site/location.

For clarity the following are the definitions used for control strategy terms used within this document:

- **"Control by Exclusion"** refers to potential weed pests which are not known to have established in Ipipiri or have previously established and all known sites have been eradicated. These pests all have the potential to (re)establish in the region, and are capable of causing adverse effects.
- **"Control by Eradication"** refers to weed pests that are present in low numbers or limited distribution within the Ipipiri region, and have the potential to have serious negative impacts on the environment. The intention is to remove all individuals of these weeds from the region, and eliminate the possibility of any further reproduction or propagation within the region. Eradication is only likely to be possible if the infestation is populations are very small and the distribution is limited.
- **"Control by Containment or Suppression"** refers to weeds that are established in the region that may be controlled by:
    - Containment: These weeds are present on Ipipiri islands at numbers and distributions that mean eradication is not possible or cost effective. The intention is to prevent the spread of these species beyond a defined containment area.
    - Suppression: These weeds are widespread in suitable habitat on Ipipiri islands. The intention is to reduce densities so that impacts on the environment are decreased.

Appendix B

Resourcing the Strategies – Personnel, Skills and Funding

Availability of Volunteers and Skills

There is ongoing community interest in the Project Island Song volunteer weed programme; however coordination of this needs considerable supervision and resourcing, including transport and the management of Health and Safety. The input of programme coordination needs to be balanced with conservation outcomes gained from volunteer weedbusting. A tiered approach is proposed for coordinating volunteers as follows:

Tier	Group	Target/Method	Frequency	Group Size
Tier One	Project Island Song Weedbusters	• Priority/high risk weeds using best practise control techniques	Weekly Wednesday and/or Friday	Up to 9
Tier Two	Extended weedbuster group	• Priority/high risk weeds using larger group approach • Weeding integrated with planting programme	Quarterly/as required and as transport available	Up to 30
Tier Three	Northtec or other specific interest groups	• Survey • Larger scale weed control • Specific weeds and control method • Clear instruction	Monthly/as available	Up to 15
Tier Four	Schools, community or corporate groups	• Low risk/low priority weeds • Specific weeds and control method • Clear instruction	Monthly/as requested and if supervisions and transport available	Up to 30
Tier Five	Individual volunteers	• Low risk/low priority weeds • Specific weeds and control method • Clear instruction	Monthly/as requested and if supervision and transport available	Up to 10

Note that for the purposes of achieving this strategic plan's goals and objectives some of the activities required will need more, young and fit people to be applied along with input from weed control professionals. These resources can complete difficult and breakthrough initiatives which can then be followed up by long term maintenance actions using regular volunteer teams.

Information for Current and Active Volunteers

- Volunteer coordinator will keep regular volunteers updated through the volunteer database of dates, transport arrangements, weather postponement or cancellation.
- Weedbusting schedule will be posted on the website.
- All Project Island Song weedbusters will receive regular updates of all aspects of Project Island Song though e-newsletter 'On the Ground with Project Island Song' and through quarterly newsletter 'Project Island Song Quarterly'.
- Weed strategy and annual plans will be posted on website.
- Monitoring (including successes) will be shared.

Education and Awareness

- Weed identification sites and control methods will be linked to the Project Island Song website.
- Weed identification/information sheets included as part of volunteer instructions including priority weeds and alert list.
- Weed information and awareness will be included as part of the Project Island Song education programme.

Advocacy and Engagement

- Encourage new volunteers to participate/make a regular commitment to the Project Island Song weedbuster programme.
- Awareness programme for mainland weed threats to the islands, their identification and control methods.
- Engagement with wider community to manage weeds on their own properties.
- Engagement with and involvement of other agencies to maximise information sharing as to the location of weed infestations. This is likely to require a centralised reporting system so rangers doing track maintenance and farming work, trappers, caretakers, etc can report priority weeds and their exact locations, to be dealt with by weed busters.
- Engagement/network with other community conservation groups to share resources and information and to extend the coverage of weed control.
- Align with DOC's Dirty Dozen and other local, regional, national weed strategies and priorities.

Funding and Sustainability

- Recognise weed management as an integral part of the Project Island Song programme for ecological restoration, pest management and island biosecurity.
- Identify funding priorities 3 – 5 years in advance as per wider weed management strategy and annual operating plans.
- Identify resourcing including the materials required to ensure seamless delivery of weed management programme.
- Engagement with both public and private funding sources and options.
- Integrate communications (including engagement, education and advocacy), Health and Safety, programme coordination and resourcing into any funding applications.
- Align with regional and national strategies e.g. Regional Pest Management Strategy, DOC's Dirty Dozen.