Report on Polynesian Capacity Building Restoration Study Tour to Auckland, New Zealand

March 20-27, 2015

Restoration study tour group at Tawharanui Open Sanctuary on March 25, 2015. Photo taken by James Atherton

Prepared by James Atherton, Posa Skelton and David Moverley

March 31, 2015

1. Introduction

A study tour of restoration projects was conducted for seven participants from four Polynesian countries (American Samoa, Niue, Samoa and Tonga) between March 20 and 27, 2015 to Auckland, New Zealand. All participants are involved in restoration projects in their home country, most funded under the GEF-PAS "Prevention, control and management of invasive alien species in the Pacific Islands" Project. Seven restoration sites were visited, including 3 island sites and 4 mainland sites. The sites provide a range of available management options including isolated open sanctuary islands, predator-proof fenced peninsulas, virtual "fenced" reserves and urban parklands.

The tour was considered a great success due to the large number of lessons learned and because participant expectations were met. The participants left NZ with many ideas for new restoration activities and projects and with renewed motivation for invasive species management and site restoration. Participants also agreed to maintain regular communication and sharing of ideas and experiences with each other under the PILN network as part of a nascent "Restoration Learning Group".

1.1 Tour Purpose

Participants to be familiar with proven forest restoration techniques used in the management of conservation areas through observation, hands on training and in-depth discussions with experts in New Zealand.

1.2 Tour Leader

David Moverley (SPREP Invasive Species Adviser).

1.3 Technical and Logistical Assistants

Posa Skelton (Pacific Invasive Learning Network Coordinator), James Atherton (Consultant)

1.4 Tour Participants

TONGA: Viliami Hakaumotu, Hoifua Aholahi; NIUE - Huggard Tongatule; SAMOA -Suemalo Talie Foliga, Taupau Maturo Paniani, Joe Pisi. AMERICAN SAMOA - Tavita Togia

1.5 Tour Objectives

1. Familiarise restoration team members with a range of restoration projects including island restoration, mainland and urban restoration projects.
2. Restoration team to get hands on experience with restoration approaches being applied in NZ including site restoration planning, weeding, use of agrichemicals, tree planting, etc.
3. Restoration team to be able to discuss invasive species management and restoration approaches with NZ experts and to share experiences and expertise.

2. Tour Program and Outcomes

DATE	ACTIVITIES	LOCATION	OUTCOMES
Thursday 19 March	**Participants arrive and check in at accommodation.**	Auckland North Shore Motels	

DATE	ACTIVITIES	LOCATION	OUTCOMES
Friday20 March **7.30am to 3pm**	**Briefing, Ground Rules, Country Presentations and Presentations on restoration in the NZ context** 8:00 am • Welcome & Introduction • Country presentations • Restoration in the NZ context (Dr. David Butler, scientist/author) 10.15-11.15am • Rodent eradications (Dr. James Russell, Auckland University, Island Rat Eradication Expert) 11.15- 2pm • Continue with country presentations PM: visit bank to convert cash	Northcote Bowling Club	Participants to understand the purpose of the study-tour, expectations and q&a. See Annex 1 for the powerpoint presentations
Saturday 21 March 7.30am to 3pm	**Workshop:** The Safe Use of Agrichemicals for Invasive Plant Management in the Pacific.	Educhem, Papakura	Participants to be familiar with the safe use of agrichemicals and its application in their home country. See Annex 2 for the powerpoint presentation
Sunday 22 March	**FREE DAY**		
Monday 23 March **7am to 5pm**	**Study Tour:** Rangitoto and Motutapu islands	Rangitoto and Motutapu	Participants to explore and experience a restored island. The trip also focuses on pest eradication and how the management of the islands is integrated with several stakeholders.
Tuesday 24 March **7am to 5pm**	**Presentation on the Forest Restoration Framework (Dave Moverley)** **Restoration at the Landscape Level (Mel Galbraith). Opportunities for Research at Unitec (Diane Fraser)** **Study Tour of Auckland City Urban Reserves**	Northcote Bowling Club Unitec Jagger's Bush and Lower Kauri Glen Upgrade	Talk on the techniques and phases of the forest restoration framework. See Annex 3 for the powerpoint presentation. Talk on Restoration at the landscape level (Auckland Region). See Annex 3. Urban Restoration Auckland reserves. Long-Term Control/ Canopy Management.
Wednesday 25 March **7am to 5pm**	**Study Tour:** Tawharanui and Wenderholm Regional Parks	Tawharanui and Wenderholm Regional Parks	Participants to be familiar with pest eradication, community partnerships, weed management, wildlife restoration and incursion management in a pest free but "leaky" environment.
Thursday 26 March **7am to 5pm**	**Study Tour:** Tiritiri-Matangi Island	Tiritiri Matangi	Participants to be guided by a volunteer from the Supporters of Tiritiri Matangi group and to explore and experience a restored habitat through removal of invasive species and planting.
Friday 27 March	**Debrief workshop and discussions:**	Northcote Bowling Club	Participants to present on what they have learned during the study tour and application to their home setting. See

DATE	ACTIVITIES	LOCATION	OUTCOMES
7am to 2pm	Review of lessons learned and expectations, application of restoration studies to Polynesia and development of country concepts.		Annex 4 for all presentations given
Saturday 28 March	**DEPART NZ**		

3. Messages from each day

Friday March 20: Briefing, Ground Rules, Country Presentations and Presentations on restoration in the NZ context

Dave Butler Presentation:

- Role of rats and mustelids in bird extinctions in NZ
- Responses- eg site protection starting with Kapiti
- Importance of offshore islands as refuges
- Eradication requirements:
    - Every individual exposed to poison
    - Kill the animal faster than it can breed
    - Stop new arrivals
- Rat territory size= 1/3 ha to 1ha; Mice = smaller; Cats can roam over 100's ha
- Techniques for killing possums/stoats etc
- Costs of predator proof fence = approx 250 NZD/m
- Challenges of "open sanctuaries"
- Huge role of community groups in NZ but mostly elderly people
- Future efforts- join the dots, building on natural advantages (eg headlands), multi-kill traps. Improved aerial poisoning methods, use of cameras and sound recorders, development of "virtual fence"; dog training to sniff out particular pests…

James Russell's Presentation:

- Roles of rats as island conquerors
- Swimming distances of diff rat species
    - Norway rat = 2km
    - Ship rat = 500m
    - Pacific rat < 200m
- Role of "experimental invasions" to determine changes in rat behaviour at low densities
- Importance of genetic assay before eradication to determine genetic provenance of rats
- Read special edition of Biological Conservation on rat eradications on islands

Saturday March 21: Murray Beare (Educhem)

- Understanding toxicity and risk of agrichemicals
- Use of gloves and other safety equipment
- Role of a "stenching agent" eg for gramoxone/paraquat
- Importance of storing agrichemicals away from other materials and equipment
- What to know before using an agrichemical?
- What should you do with a used agrichemical bottle (…wash it three times)
- Use of gloves when mixing agrichemicals
- Importance of accurately calibrating the volume measurements on measuring jugs and backpack sprayers as they are often wrong
- Importance of changing the nozzle on a backpack sprayer and the different kinds of nozzles available
- See NZS 8409 for standards related to the management of agrichemicals

Monday March 23- Rangitoto/Motutapu: Steve and Finn (NZ DOC)

- Importance of ecosourcing of plants (obtain plants from local sources)
- Choose the right trees for the right place and plant at the right time
- Consider plant densities, planting at 1.5m apart for open areas is common
- Consider sequencing of mammal eradications and also weed management first or after rat management?
- Role of sniffer dogs to find pest mammals
- Continual surveillance…
- Spraying grass twice before planting
- Keep some of the island in grass for views and archaeological sites etc

Tuesday March 24

Dave Moverley- Forest Framework concept

- Help the forest heal itself
- Know the values of the site and the threats to it
- Identify the baseline for your species if interest
- Difference between first and second generation poisons
- Understand bird breeding seasons for timing of mammal management operations
- Forest framework concept and measuring success by monitoring effort
- Phases of weed management- IC, FUF, seedbank control, forest protection

Mel Galbraith- Restoration at the landscape level

- History of conservation effort in NZ:
    - Species Conservation- legislation, protected space
    - Ecological restoration: islands, invasive species eradications, species translocations, mainland sites

- Role of islands as “refuges”
- Restoration on Tiritiri and the role of volunteers
- Translocations of birds, tuatara, geckos, weta etc
- Role of iconic species to get people engaged/inspired
- Role of mainland sites now- eg tawharanui etc
- Opportunities for Pacific island students to study or do research at Unitec (Diane Fraser)

Wednesday March 25- Tawharanui- Matt Maitland and Wenderholm- Barry

- Design of the predator proof fence- and features, incl.koru, mesh size, skirt etc
- Ways to trap animals and lead them away from the fence
- Camera at beach to record any animal movements in/out…
- Radio collars on Takahe…
- Birds self introduced-eg bellbirds…
- Look for “blind spots” where rats may be breeding…- make sure you check all areas of your site
- Importance of genetic analysis to work out where animals come from
- Attempts to get seabirds (petrels, gannets etc) to nest using callback recordings and decoys
- Don’t need to always use a regular rat baiting grid (eg 50m x 100m), can develop a grid based on topographic features, and follow the perimeter then fill in the “gaps” later (needs GPS and GIS mapping of baiting sites)
- Island sanctuaries as “holding pattern for the future”

Thursday March 26- Tiritiri Matangi- Brian Chandler (Supporters of Tiritiri Matangi)

- First restoration island in the world?
- Tree planting in 1990s- led by volunteers, supported by WWF
- Many bird re-introductions, plus other animals (eg Tuatara, wetas etc)
- Need for supplementary feeding of eg birds, especially during times when nectar is low
- Strong NGO- mostly elderly retired people
- Great trails and views are important to inspire the public- keep some of the island open for views
- NGO now going into lighthouse conservation…. (ie it is evolving)

4. Tour Debrief and Evaluation

The program for the final day wrap-up on March 27 had four components:

I. Expectations Review: review participant expectations and whether they had been met
II. Lessons Learned from the Week: identify and group all lessons learned from the week
III. Way forward: identify how each country will apply the lessons learned in their country
IV. Study Tour Evaluation: all participants completed a short evaluation of the study tour

I. Assessment of personal expectations

Personal expectations were grouped into three main headings related to: “Learn”, “Understand” and “Share”. These expectations were assessed in plenary as to either they were fully met, partially met, or not met at all. The results are as follows.

Learn

- How things are done in NZ and how they can be applied back home. <MET>
- Learn From Experts <MET>
- Challenges to restoration projects <MET>
- Engaging volunteer groups <MET>
- Success stories on specific invasive species management <MET>
- How to plan invasive species activities (including communication targeting specific groups) < FOR SOME PARTICIPANTS WAS FULLY MET BUT SUCH A HUGE TOPIC SO NOT MET FOR ALL…>

Understand

- Range of restoration projects and techniques <MET>
- Management regime/approaches <MET>
- Restoration techniques (site vs species) <MET>
- Cost of restoration projects including on-going costs <PARTIALLY MET, but costs vary a lot from project to project, place to place, phase to phase…>

Share:

- Experiences with NZ and Pacific <MET>
- Maintain partnership with Pacific colleague. <HOW? Regular email comms? Follow-up tour in 2016? Keeping everyone informed of our work and successes? Have champions/leads for different invasive species/groups… PILN network to coordinate this?
    - Tamaligi/Lopa= Tavita
    - Cordia = Vili/Hoifua
    - African rubber and Panama rubber = Suemalo/Josef
    - Pigs/Wedelia = Huggard

In general the participant's expectations were met. However, some expectations were a bit optimistic and general and difficult to meet in full- eg learning how to plan all invasive species management activities and learning about the costs of restoration projects. These were partially met. Participants will have to contact experts to learn more on these issues over time.

II. Lessons learned from the week

Participants were asked to write "lessons learned" on post-it stickers, with one sticker used for each lesson learned. These lessons were then stuck onto a white-board and grouped into 15 thematic topics with the help of the participants. This activity generated a lot of interest as more than 70 lessons learned were identified (although many lessons learned were similar and overlapping).

An example of the lessons learned related to community motivation and engagement is shown below.

The table below shows all lessons learned by the 15 topics. Note that there are many ways that these lessons can be grouped and that the topics are overlapping and related to each other. For example, funding is needed for sustainability and community engagement is needed to build political will and facilities for visitors are needed to build community engagement and to educate the public.

Table of "Lessons Learned" by topic

Topic	Lessons learned
Biosecurity	• Importance of biosecurity and how it should be a norm with protected area and conservation management • learn how to do biosecurity • learned the importance of biosecurity as a first step and biosecurity awareness campaigns • strong biosecurity in parks and between islands
Building political will, developing enabling legislation and policy	• engaging politicians is critical - including negative (people complaining) to good (release of a bird) • getting political support to assist conservation project • policies and measures to guide restoration work • effective conservation measures, policy and legislation in place for effective conservation and restoration work in NZ
Community and individual motivation and engagement	• community engagement • conservation sites must have community flavour (be driven by what the community wants and not want we want) • having a community flavour (to entice community participation) - integrate community interest in your conservation project • capacity building for young people to take up conservation as a future career • passion for work and commitment is critical • team work and commitment to own responsibilities
Developing facilities for visitors	• demonstration of trails for community engagement • improved facilities within reserve (e.g. trails, interpretive signs, recreational features) valuable in promoting projects and attracting volunteer

Topic	Lessons learned
	• Importance of interpretation materials and information • the need to high standard infrastructures to accommodate tourists (e.g. trails, information facilities)
Education and public awareness	• communication techniques - e.g. information and signage, direction • importance of signs, maps, images and information to understanding the conservation area • educating people and communities • effectiveness of community volunteer groups and support group activities in NZ to conservation and restoration projects • learned the importance of educating people and communities • volunteer to assist tourist instead of Project Officer • volunteers = increased sustainability • strong advocacy of NZ public about parks and conservation projects through support efforts • targeting students (education, awareness
Funding	• securing of funding for maintaining of conservation work and the importance of ongoing funding support
Holistic approach to site management- eg animals and weeds together and multi-sector objectives of projects	• having multi-purpose/objectives park - e.g. farming, recreation, camping, etc. • creating different habitats within conservation areas to attract different species • Work on one site/project/island at a time? • pest control should always be taken into account when carrying out restoration activities that should go hand in hand with weed control/management • removal of invasive animals from restoration sites is very important • holistic land use techniques to accommodate people's needs and values
Importance of translocations	• significance of translocation of birds
Islands as sanctuaries	• restoration is more effective and manageable on isolated islands than on mainland • significance of pest free islands (e.g. recovery of everything native and valuable to community plants, animal, recreation, research, community health, education, etc
Monitoring and research	• monitoring techniques • ongoing monitoring to assess the results of the studies/projects • successful eradication and restoration can be achieved with long-term monitoring
Partnership building	• importance of long-term commitment and partnerships • maintaining synergies and networking with relevant agencies
Project sustainability	• Sustainability of conservation areas by securing public commitment and fund raising
Safe use of Chemicals	• application of herbicides • chemicals - spraying, effectiveness, use effective use of agri-chemicals to control weeds • effective use of different spray nozzles for the weeds • importance of hazard rating assessment process

Topic	Lessons learned
	• learn application of chemicals • mixing of chemicals • spraying of chemicals • safety first - having the correct personal protection equipment (PPE) and resources to use of chemicals • types of chemicals • wise use of pesticides in fragile ecosystems • Importance of understanding basics and procedures when using/applying herbicides and their different impacts to humans and environment.
Technical approaches and safety	• cost and benefits of pest-proof fence • eradication techniques of IAS • how to choose site for restoration • how to grid bait station • How to replant (restore) • importance of nursery to restoration • Pest-proof fence - helps sustain your investment - without it the work would be harder...could use this if available - takes more money to maintain than to build - sanctuaries without pest-proof fence - pros and cons of pest-proof fence • techniques to entice seabirds to new area/island • mammal management techniques-eg traps, poisons, dogs etc
Understanding ecology of invasives and native species	• change of behaviour of pests once other pests are removed • changes in population dynamic • DNA tests to compare and identify IAS • eco-sourcing (local sourcing) of plant materials • importance of using pioneer species for restoration • learned about the changes in population dynamics in the removal of different pest species • learned the importance of species selection for restoration • the role of pioneer species • know more about rats through James Russell's presentation

III. Way Forward/Next Steps

The key part of the debrief session was for participants to consider the ways forward and how they were planning to apply what they learnt in their home projects. Dave Moverley gave a brief outline of the report back to be given by the country groups:

- Your country and site
- Current restoration activities
- How will learnings be applied back home?
    - Weed management
    - Predator management
    - Restoration planting
    - Species translocations
- How will you sustain your project?

- Finances
- Community/public awareness
- Political support

The four country presentations given are shown in Annex 4.

The main points from this session were as follows:

- There were many useful lessons learned from the study tour
- Participants would brief their superiors and colleagues at home on what they learnt and the new approaches/activities they would like to apply in their home countries
- Many participants saw the value of combining mammal management with weed management approaches in a more "holistic" invasive species management approach
- Trial manual weeding as opposed to herbicide application to consider costs/benefits
- Restoration planting: Trial and monitor different planting densities and continue with monitoring of biodiversity and also restoration effort to determine labour costs of the work

The participants agreed to form a "Restoration Learning Group" under the PILN and to remain in close communication with each other and to regularly share experiences on their work

IV. Study Tour Evaluation

All 7 participants completed a simple evaluation form. Overall the participants were very happy with the study tour and all elements of the tour were rated as very good, or excellent. There only issues reported related to the payment for the accommodation, the fact that more time was needed for practical sessions and that the participants were not always clearly briefed in advance what the transport arrangements including pick up and drop off times, were for the following day.

A summary of the evaluation results is shown below. The rankings are shown as the number of respondents recording each answer over all 7 respondents.

1. Comments on the adequacy or otherwise of the logistics and organisation of the study tour including accommodation, travel and location:

- Overwhelmingly positive feedback on the organisation and logistics
- Some minor concerns about the accommodation arrangements and payments and that not enough notice was given of pick up and return trip times

2. Comments on the day to day program in terms of what you learnt. Circle your answer.

1 = Poor 2 = Fair 3 = Average 4 = Very Good 5 = Excellent

Day One: Friday March 20: Study Tour Briefing, History of Restoration in NZ, Rodent Behaviour

Usefulness of the session/tour:	1	2	3	4	5
Ranking =				1/7	6/7

Day Two: Saturday March 21: The safe use of chemicals in the Pacific

Usefulness of the session/tour:	1	2	3	4	5
Ranking=				1/7	6/7

Day Three: Monday March 23: Field Trip to Motutapu and Rangitoto islands

Usefulness of the session/tour:	1	2	3	4	5
Ranking=				1/7	6/7

Day Four: Tuesday March 24: Urban restoration and restoration at the landscape level

Usefulness of the session/tour:	1	2	3	4	5
Ranking=				2/7	5/7

Day Five: Wednesday March 25: Field Trip to Tawharanui and Wendeholm Open Sanctuaries

Usefulness of the session/tour:	1	2	3	4	5
Ranking=				2/7	5/7

Day Six: Thursday March 26: Field Trip to Tiritiri Matangi Open Sanctuary

Usefulness of the session/tour:	1	2	3	4	5
Ranking=				1/7	6/7

3. What did you like most about the study tour?

- Site visits
- Learning from the many experts and other Pacific islanders on site restoration and invasive species management
- Seeing how things are done in NZ
- Visiting beautiful places
- Leaning all the elements needed for successful restoration- incl biosecurity, mammal and predator management and weed management
- Increased my motivation to do conservation in the islands to try and achieve the same success as in NZ
- Learnt about the importance of managing multiple park values at once- eg recreation, education, conservation, research, culture, historic site management and science
- Importance of attracting tourist to sites to view and learn about biodiversity
- Learning about the role that volunteers can play to support restoration projects
- Tiritiri matangi island was the highlight- where the benefits of removing animal pests and replanting with native plants are clear to see. Enjoyed seeing the birds and listening to their calls.

4. What would you like to change about the study tour?

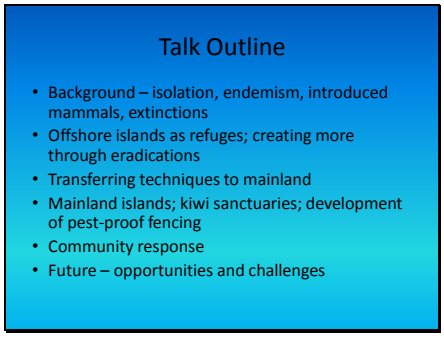
- More information in advance of each day trip eg on pick-up times etc
- Longer visits to other places
- More hands on experience –eg setting rat traps, and systematic bait trapping and monitoring/surveillance
- Next tour should be to Australia to experience the restoration approach used there
- Next time invite decision makers to visit the restoration sites
- Spend more time doing hands-on learning on rat baiting and other conservation techniques etc.

Annex One. Presentations on Friday March 20

1. Conservation and Restoration on Mainland NZ (David Butler)

Slide 1

Slide 2



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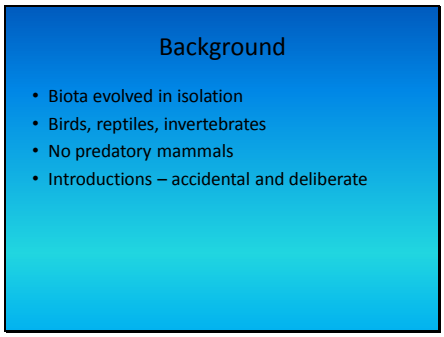

Slide 4

History of Extinctions

- Polynesian rat – 'relatively harmless vegetarian? No!
- Ship rat –
- Mustelids

Slide 5

Early response – site protection

- Island Sanctuaries – Kapiti Island (1897), Little Barrier (1895), Resolution (1893)
- Scenery Preservation Act 1903

Individual Visionaries

- Richard Henry – Resolution Island. 1894-1900
- Val Sanderson – formation of Native Bird Protection Society. 1923.

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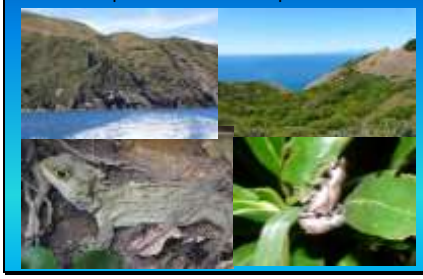
Islands as refuges

Slide 7

Conservation on pest-free islands

Stephens Island - Takapourewa



Slide 8

Island eradications

Rats – ground-based (32ha Titi (1980) to 170ha Breaksea (1988)) to aerial-spreading (to 11,300ha Campbell (1991))

Mice – ground-based (217ha – Mana)

Cats – ground-based (2817ha – Little Barrier)

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Island eradications

Kapiti Island (1965 hectares)

- pigs 1902
- deer 1908
- possums 1950s-1987
- Norway & Pacific rats 1996

Final possum campaign:
4 trappers (& dogs) trapped
19,500 animals
1080 poisoning of cliffs
c1500 animals
Dog teams – a vital 32

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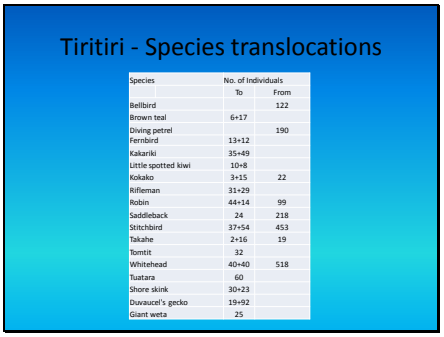
Slide 11



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Slide 13

Forest conservation

- **Deer control** - NZ Forest Service – Nationwide culling 1950's to 1970's.
- **Anti-logging campaigns** – Pureora 1978, West Coast beech ?date
- **Possum control** – Response to forest dieback, carrier of Tb
  - 1858 first introduction; included in Protection of Animals Act 1880; review in 1919 identified negligible damage; 1947 protection removed; 1949 bounty introduced

Slide 14

Mapara – the archetypical 'mainland island'

- 1400ha patch of hardwood/podocarp forest surrounded by pasture – reduced re-invasion
- Retained good numbers of kokako
- Diet studies showed overlap with possum
- Rats considered a key predator (+ possum)
- Research by management – 3 sites

Slide 15

Kokako research by management - Mapara, Rotoehu, Kaharoa

'Recipe one' – possum and rat control using toxin in bait stations

- Intensive grid (100m x 100m)
- Brodifacoum
- Monitoring using trap catch (possums) tracking tunnels (rodents)
- Improved adult female survival and productivity associated with 5% tunnels tracked
- Doubled kokako population in 4 years.

Slide 16

Eglinton, Fiordland – adding stoat control to the mix

- Studies of Yellowhead (mohua) in beech forest up to 1-km wide on river terrace
- Hole-nesters
- Half of the females lost to stoats in beech mast cycle
- Trapping led to 80% nesting success cf. 36% in non-treatment

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Stoat control

'Recipe two' – stoat control using traps

- Traps in tunnels 100-200m apart along lines no more than 1km apart
- Improved traps – more humane and effective
- Bait development – longer-lasting and lured

BUT – not enough to save mohua…

Slide 18

Reversing the decline

- NZ Biodiversity Strategy

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Mainland Islands

- Nationally coordinated experiment across six sites
- 3 Mapara-like forest islands– Trounson, Boundary Stream, Paengeroa (c.100-700ha)
- Intensively-managed core area in huge expanse of National Park forest – Te Urewera 50,000+ha
- High-sided valley in South Island – Hurunui - 12,000ha
- Part 'island', part continuous forest – Rotoiti – 800-5000ha

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Hurunui Valley, Canterbury

Slide 21

Mainland Islands

- Multi-species pest control
- Restoration goals
- Experimental goals – technical development
- Emphasis on monitoring and reporting
- Advocacy – 'Spreading the message by example'
- Catalysts

Slide 22

Rotoiti Nature Recovery Project

- Bait station grid possums & rats – recipe 1
- Widespread stoat trapping – recipe 2
- Wasp control
- Refinement & Extension

Slide 23

Rotoiti Nature Recovery Project

Kaka research

- **Nesting success Rotoiti 80%, Rotoroa (non-treatment) 10%.**
- **No adult female kaka lost Rotoiti.**
- **Fewer stoats, fewer wasps, fewer possums & rats**

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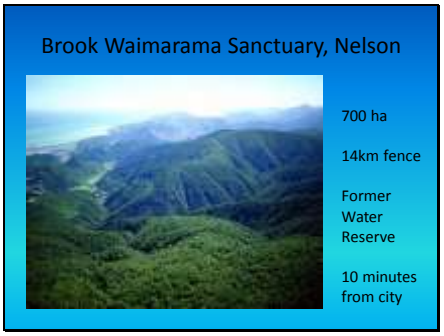
Pest-proof fencing

Slide 25

Slide 26

Slide 27



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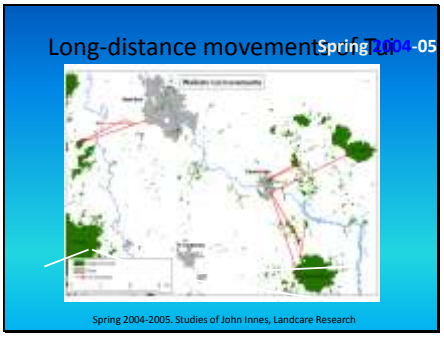
Slide 30

Slide 31

Slide 32



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Slide 34

Open sanctuaries – large & small community efforts

From

'Ark in the Park', Waitakere Ranges, Auckland

2350 ha, 3800 bait stations on 200km of lines, 400 volunteers, 8000 volunteer hours/year.

To

'Friends of…..' – a local patch of bush, few hectares, a couple of trap lines.

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Open Sanctuaries – Local Government & Private

Wainuiomata Mainland Island (Greater Wellington)

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Groups in their thousands!

Formal community groups
Forest & Bird branches
Department of Conservation volunteers
Environmental Care Groups
Landcare Groups
Informal groups

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Everyone is involved

Jean Stanley (81 years) regular bush walk 9 years – Pukawa Wildlife Management Group
400 rat traps
(TVNZ One News' Good Sorts (Nov 2011))

Coal Island coastal trapline, Fiordland. (SW NZ Endangered Species Charitable Trust)

Motivations? Sustaining the effort?

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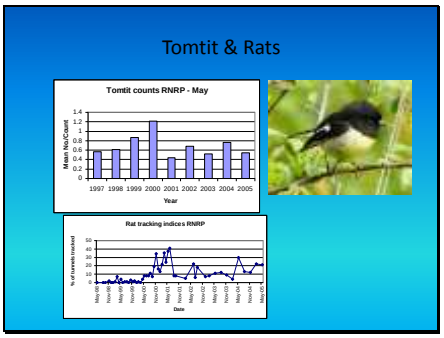
Open Sanctuaries – some challenges

- Rat control
- Feral cat control
- High pest years
- Trapper satisfaction
- Monitoring
- Funding
- Sustaining the effort – a 'grey wave'?

Slide 40



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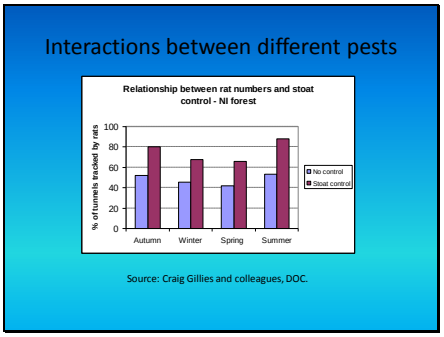

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The Future- opportunities

Building on natural advantages:

- Peninsulas
  - Banks Peninsula
  - Otago Peninsula
- Large islands
  - Stewart Island – 165,000ha – no stoats or mice
  - Great Barrier Island – 28,000ha – no possums, mustelids, Norway rats, deer
- Nearshore islands
  - Fiordland

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Stewart Island

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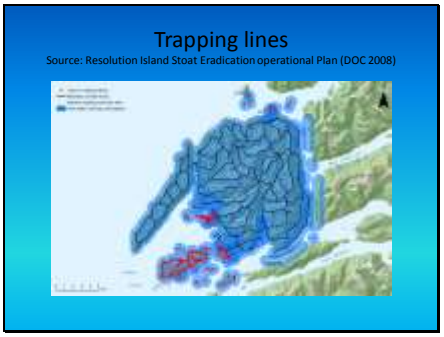
Slide 50



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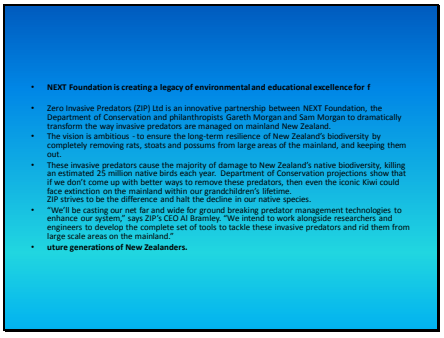

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2. Island Conquerors (James Russell)

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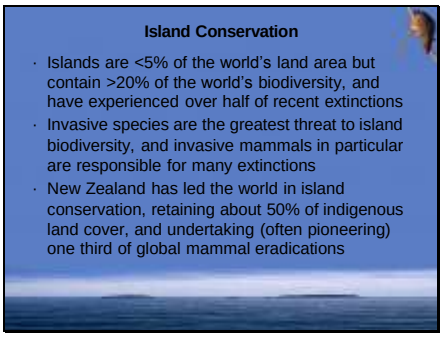

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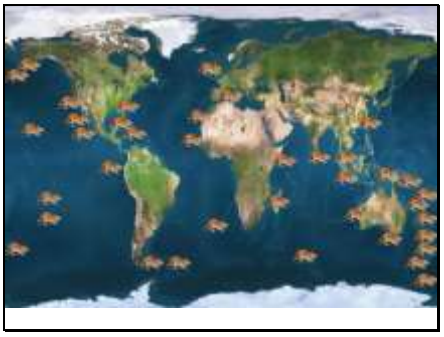

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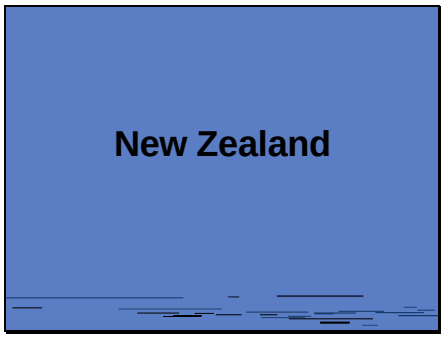

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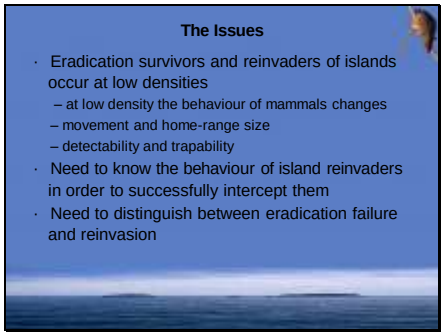

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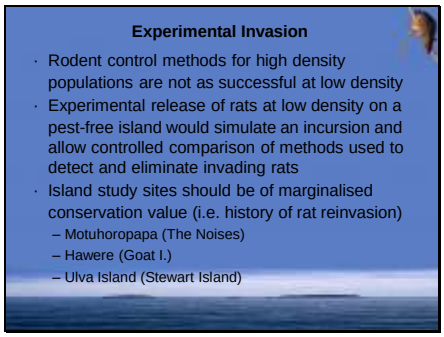

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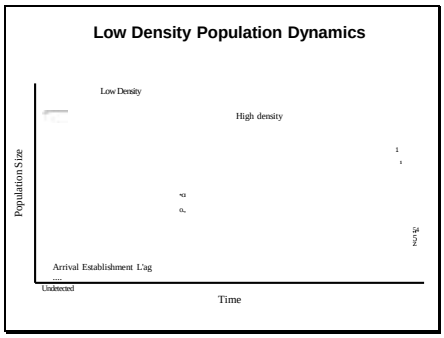

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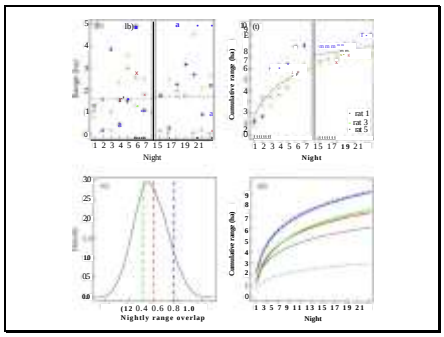
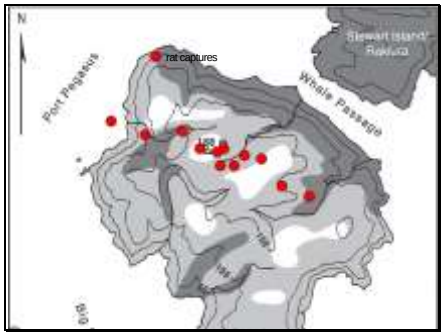


Slide 10

Survivors vs Reinvaders

- Standard operating procedure for confirming rodent eradication is to wait two years at which time failure will be obvious
- However, within two years distinguishing survivors from reinvaders will not be possible
- Pearl Island, off Stewart Island, was the first simultaneous eradication of three rat species
- Within 9 months rats of two species were detected on the island

Slide 11



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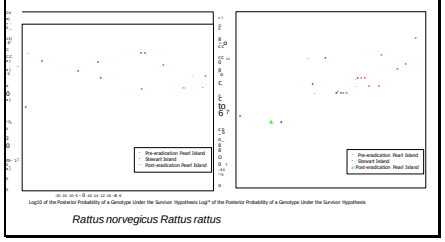
Survivors vs Reinvaders

- Genetic assignment of post-eradication rats (two species) on Pearl Island



Rattus norvegicus Rattus rattus

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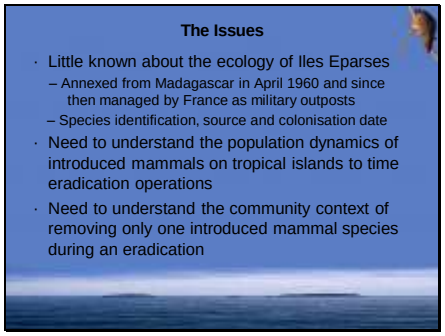

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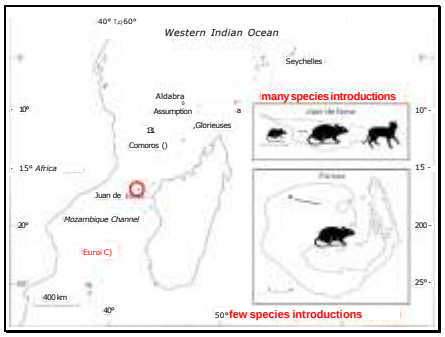
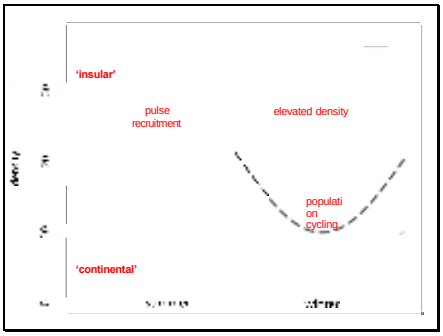


Slide 16

Tropical Population Dynamics

- Eradication must be timed to population dynamics (e.g. winter) but tropical population dynamics are not well known
- Compare introduced mammal population dynamics across two islands in the Mozambique Channel
  - Live-trap cats, rats and mice in two different habitats (forest and grassland) over two different seasons (summer and winter)

Slide 17

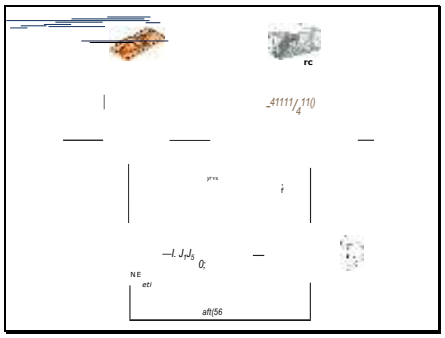


Slide 18

Community Ecology

- The invasion or eradication of invasive mammals on islands alters trophic relationships
- This can create indirect effects of conservation significance, especially where only one species is eradicated leaving other introduced species in the ecosystem
- Use ordinary differential equations to model the three species interactions of cats-rat-seabirds
- Parameterise models with field data on Barau's petrel from Réunion Island

Slide 19



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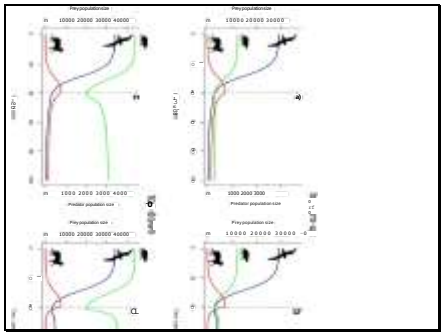

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Slide 22

The Issues

- Three species of rat are widely introduced and considered invasive
  - Black or ship rat (*Rattus rattus*)
  - Brown or Norway rat (*R. norvegicus*)
  - Polynesian or Pacific rat (*R. exulans*)
- All three co-exist in the Pacific, and the arrival of the European rats displaced the Polynesian rat
- Mechanisms of co-existence and displacement among the three species remain poorly known
- Meta-populations must be treated as one 'eradication unit'

Slide 23

Multiple Invasive Species

- Multiple invasive species can interact with one another through predation (hyperpredation, mesopredator release), facilitation (invasional meltdown) and competition (competitor release)
- The conservation outcomes of these interactions are unpredictable, and the role of incumbent advantage, niche-partitioning and dispersal-dominance relationships may be important
- Tetiaroa atoll (12 motu) had *R. exulans* and was invaded by *R. rattus* in the 1960s
- Rat population structure will inform management

Slide 24

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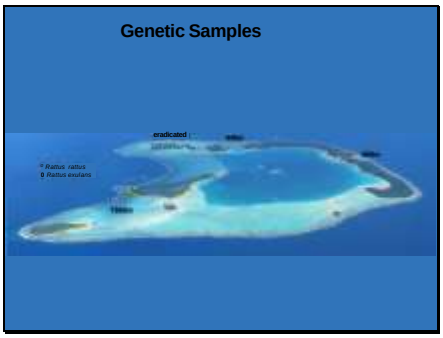

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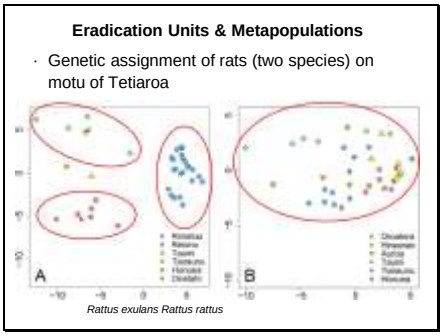

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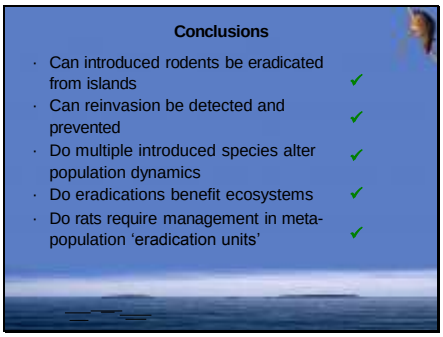

3. Huvalu Conservation Area (Huggard Tongatule)

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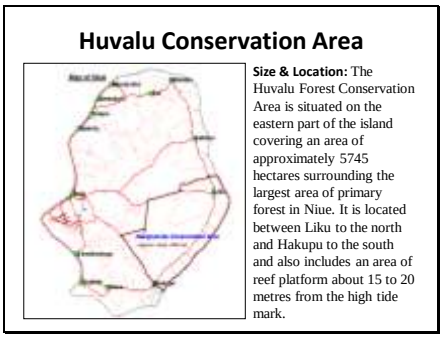

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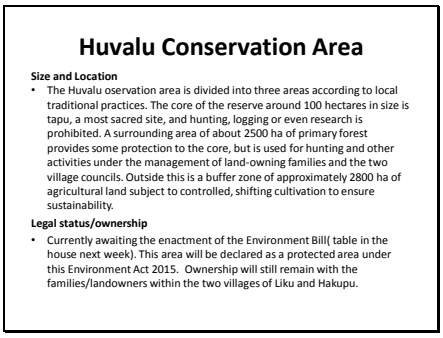

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Huvalu Conservation Area

History

- Area has cultural and historical significant to the people of the two villages, roosts for flying foxes(tauga peka), burial caves in olden times, caves traditionally used by women for weaving purposes only, fortress sites identified as ancestral dwellings and traditional protected area sites (tauga).
- This project was established in 1992 by the Environment Unit in consultation with the villages of Liku and Hakupu, and with financial and technical assistance from the South Pacific Biodiversity Conservation Programme (SPBCP). It aimed to conserve the biodiversity of the Huvalu Forest Area through developing or strengthening traditional conservation activities and ensuring the sustainability of any resource use. It is designed to have the full participation of the village communities and at the same time use modern planning and management techniques.

Slide 5

Huvalu Conservation Area

Biodiversity status

- Largest forest area still remain
- Good bird watching area
- Natural reserves identified for management within the area includes three fresh water caves at the Tuhia Sea Track and blowholes at Mata along the reef. There is a potential to develop income-generating activities, particularly eco-tours, that will provide employment for the communities.
- Tourist attraction sites such as the Togo Chasms
- Contains large percentage of Niue's flora and fauna.

Slide 6

Management Activities

Management Plan to be completed this year!!

Management activities:

- Bird monitoring – Pacific pigeon (lupe) and flying foxes (peka)
- Mapping of Tapu areas within Huvalu Conservation Area
- Formalised arrangement with the two village communities

Donors: Niue is participating in a 4-year (2013 – 2017) Forestry and Protected Area Management project with Fiji, Samoa and Vanuatu (GEFPAS-FPAM). The project's global environmental objective is to strengthen biodiversity conservation and reduce forest and land degradation. The project's development objective is to enhance the sustainable livelihoods of local communities living in and around protected areas. It has six components: (i) policy and legal reform; (ii) extension and consolidation of the protected area network; (iii) strengthening capacity for community-based conservation management; (iv) developing mechanisms for sustainable protected area financing; (v) sustainable use of biodiversity; and (vi) sustainable land management in forest margins. The total funding provided for this project is **$649,000 USD**

Slide 7

Management Activities

Priority activities (next 2 years):

- Review legislations
- Establish new protected areas,
- Training in monitoring and evaluation
- Training and building capacity especially in the communities
- Raise awareness in new laws
- Develop management plans
- Develop Monitoring and Evaluation systems for Biodiversity and Protected Areas
- Produce and disseminate materials about biodiversity of Niue
- Install interpretive facilities on biodiversity conservation
- Establish new eco culture tourism
- Market non wood forest products

Slide 8

Issues & Threats

Invasive species

- Feral Pigs as a main priority

Management

- Community based management

Other issues and threats

- Very few people with too many responsibilities (Government and Communities)
- No special funding for conservation activities done by communities
- Limited capacity in the communities
- Little or no benefits to the families or community
- Land tenure system- land owned by magafaoa (family), reluctance by land owners to give land for project

Slide 9

Priority Invasive Species

Mammals	Plants	Invertebrates
Feral Pig (*Sus scrofa*)	Singapore daisy (*Wedelia trilobata*)	Yellow crazy ant (*Anoplolepis gracilipes*)
Ship Rat (*Rattus rattus*)	Chain of Hearts (*Antigonon leptopus*)	Fruit flies (*Bactocera passiflorae, B.kiriki, B.xanthodes)*
Polynesian Rat (*Rattus exulans*)	Honolulu rose (*Clerodendrum chinense*)	Yellow fever mosquito (*Aedes aegypti*)
Feral Cat (*Felis catus*)	Giant sensitive plant (*Mimosa diplotricha =invisa*)	
	Bronzed leaved Clerodendrum (*Clerodendrum quadriloculare*)	
	Mile a minute (*Mikania micrantha)*	
	Merremia (*Merremia peltata)*	
	Hawaiian wood rose (*Merremia tuberosa)*	
	Taro vine (*Scindapsus aureus*)	

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Slide 12

Feral Pig Pilot Programme

The pilot programme covers a six month period from April - May 2015 to November 2015, with follow up in successive years for whichever options are retained. The programme contains the following key elements:

1. Intensive hunting with dogs. This will build on existing hunting practice by training 4-6 young men and use of better trained dogs.
2. Lured enclosures. This utilises large pens with a trapdoor and automated bait feeders to lure pigs.
3. Snaring. This includes provision of improved steel impregnated cord for existing snare users.
4. Toxin trial. This involves use of encapsulated sodium nitrite in strictly controlled circumstances.

All the above methodologies have advantages and limitations. The situation on Niue is unique in many respects and it is impossible to state with any degree of certainty that any one method will be effective or cost-effective unless they are trialled and compared. This is why a six month programme has been designed. At programme end the four approaches will be compared and recommendations made as to further actions.

Slide 13

Stakeholders and Partners

Currently involved or engaged

- Liku and Hakupu village communities and elected village councils
- Government Departments
  - Ministry of Natural Resources (Department of Agriculture, Forestry and Fisheries, Department of Environment, Department of Justice, Lands and Survey and Crown Law
- GEFPAS-FPAM Project

Needs to be involved or engaged

- Niue Tourism
- Chamber of Commerce
- Landcare Research NZ

Slide 14

Expectations from the Study Tour

What do I need to achieve from this tour?

- Good understanding of how things are applied here in NZ but most importantly how the things that I learn here can be related back to the things we do back home.
- Develop a good understanding on a range of restoration projects and what management plans are in place to ensure their success.
- Learn more about the use of agrichemicals on invasive plants from technical advise and through hands on experience.
- Discuss restoration approaches with NZ experts and to share experiences and expertise.
- Learn enough from this tour to be able to have a significant input into the management plan for the Huvalu Conservation Area.

4. Mt Vaea Restoration Project (Suemalo Talie Foliga, Josef Pisi, Taupau Maturo Paniani and James Atherton)

Slide 1

Slide 2

Presentation Outline

- **Key Features of Mt Vaea Reserve**
- **Management Activities**
- **Issues and Challenges**
- **Partners**
- **Expectations from study tour**

Slide 3

Key Features of Mt Vaea Nature Reserve

Village	Vailima
Landowner	Government of Samoa- Nature Reserve. Est 1958
Area	Approximately 89 ha
Natural Vegetation of Area	Lowland and foothill rainforest, but now highly dominated by invasive plant species
Geology	Extinct Volcano. Highly weathered Fagaloa volcanics (approx. 2 million years old)
Topography	Rugged. Average slope is 22º. Ranges from 0º to 46º. Elevation ranges from 140m to 460m
Hydrology	One river- Loimata o Apaula stream flows through reserve, seasonal flow
Main threats	Invasive species, Cyclones, Agricultural Encroachment (historically)

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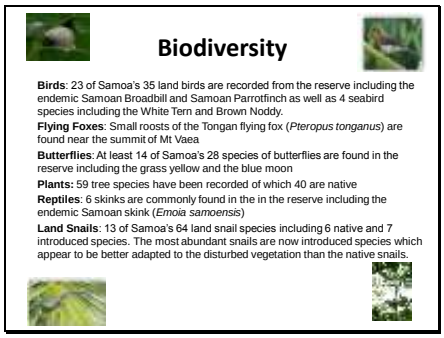

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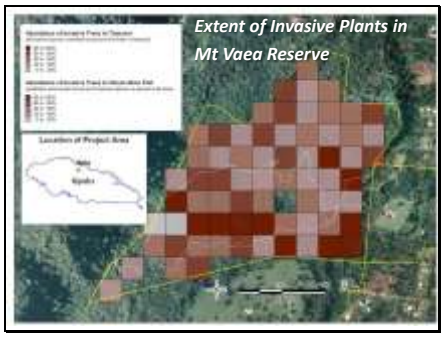
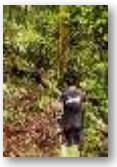


Slide 7

Brief history of restoration activities on Mt Vaea…

Phase I: "Planning" Phase

- Conducted from October 2007 to January 2008
- Funded by the RLS Foundation and CI
- Focus on surveying and mapping invasive weedy trees and preparing an initial restoration plan



Phase II: Research into control techniques phase

- (2005 *Tamaligi* control trial)
- From April 2009 to Sept 2010 focus on weed control research on 2 rubber species- *Pulu Vao* and *Pulu Mamoe*
- From May to December 2012 focus on herbicide efficacy rates and techniques on *Pulu Mamoe*

Phase III: Restoration (Implementation) Phase

- Operational Plan Development 2014-2020 (JICS funded)
- Implementation of restoration 2014-2015 (83k USD- GEF-PAS funded)
- Main Activities= tree planting and weed management…

Slide 8

Main Donors

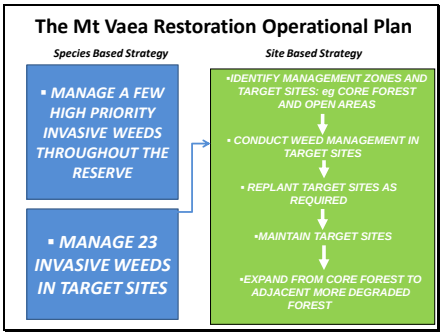
- RLS Foundation 2007-2008
- JICA and JICS 2009-2013
- GEF-PAS Invasive Species Project 2014-2016- 83k USD
- 2016 onwards??

Slide 9

PROJECT TEAM

Slide 10

Slide 11



Slide 12

Slide 13

Recent achievements

- Metsulfuron importation approved by MAF in February
- Local equipment procured – eg axes, spades, bush knives etc plus safety gear for survey team (boots, overalls etc)
- On target for tree planting- 1700 seedlings grown in nursery, 3660 trees planted in MV017 and MV019 since Feb 1, 2015
- Monitoring surveys of birds and plants in the reserve
- Revision of restoration workplan including timing of restoring each management unit
- Survey and report on trail improvements needed to the short trail
- Preparation of draft Mt Vaea brochure for raising awareness on the project (Moeumu)

Slide 14

Main Challenges

- Knowledge of restoration techniques that work in Samoa…
- Capacity- staff, equipment, chemicals…
- Government Procurement Processes…
- Long Term funding…

Slide 15

Past and Current Project Partners

Project implemented by:

Project supported by:

and RLS Foundation…

Future Partners

•Local community: Vailima and other local villages
•Local Environmental NGOs
•Schools/Youth Groups

Slide 16

Future Plans and Priorities…

- **Procure metsulfuron and other agrichemicals from NZ**
- **Construct store room and make repairs to the nursery which was damaged during Cyclone Evan**
- **Continue with restoration team training in weed management techniques**
- **Organise a public open day to promote the project in May and again later this year**
- **Continue restoration work in a phased manner**
- **Secure another major donor…**

Slide 17

Expectations from the Study Tour:

- **Suemalo Talie:**
  - To learn from NZ and Pacific island experts. Discuss approaches and share experiences. To improve understanding of different techniques for restoration eg site versus species approach and determine the best way forward for Samoa. Also consider how we can maintain partnerships with our Pacific colleagues.
- **Joe Pisi:**
  - To learn from the challenges faced by restoration projects in NZ- technical, resources, budgetary etc and what resources are needed and how to manage those resources as well as how they engage volunteer groups
- **James Atherton:**
  - How are forests restored in NZ, how much does it cost and what techniques are used that are relevant to Samoa…

Slide 18

Expectations from the Study Tour:

- **Taupaü Maturo Paniani – GEF PAS IAS Project Coordinator**
  - **To learn from NZ and Pacific island experts not only challenges and mainly success stories of NZ experience on specific invasive species management.**
  - **This will allow me to plan, design, budget, coordinate and implement identified GEF PAS IAS Project activities mainly on eradication of plants invasive species, animals such as rats, birds such as myna, insects like ants and other species at Aleipata island and other islands in Samoa.**
  - **To observe applicable tools used by NZ experts on designing and implementation of any communication strategies on targeting different groups, medias and others.**
  - **To consider any financial mechanisms to support on going activities to manage invasive species in Samoa.**

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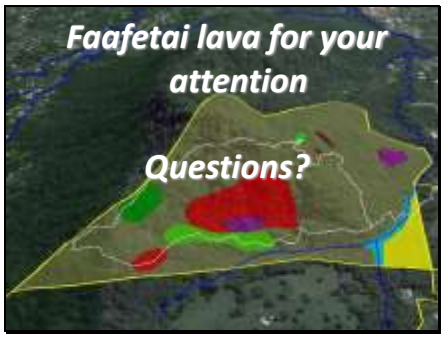

5. National Park of American Samoa (Tavita Togia)

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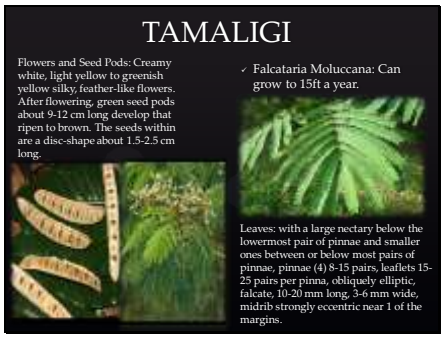

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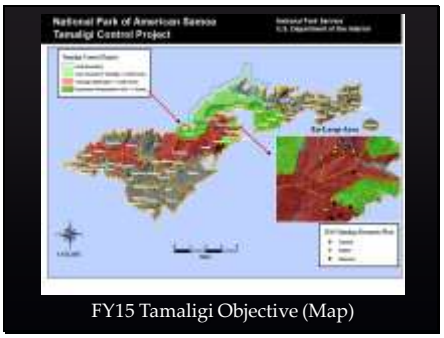

FY15 Tamaligi Objective (Map)

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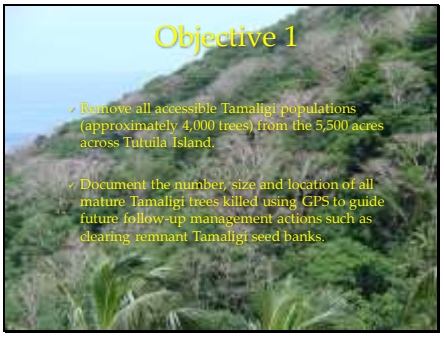

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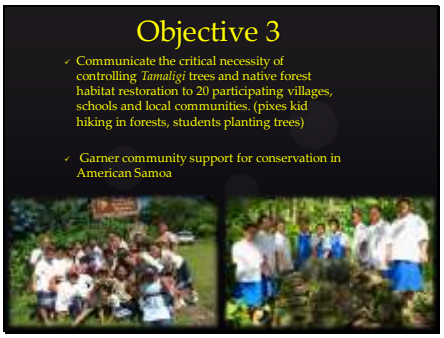

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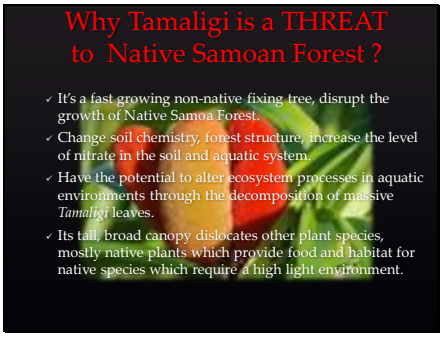

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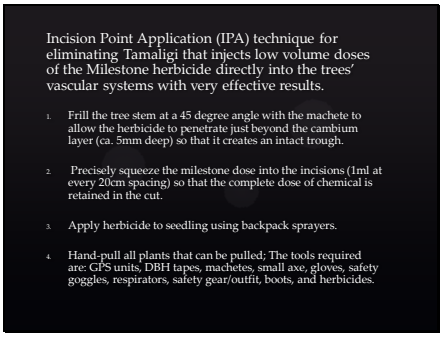

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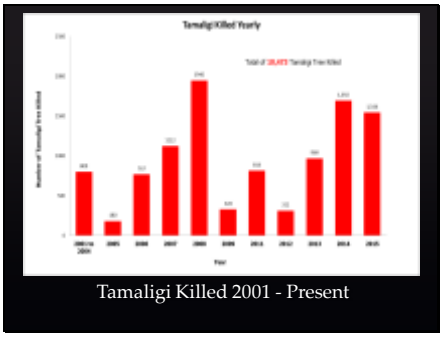

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6. Tonga Restoration Projects (Viliami Hakaumotu)

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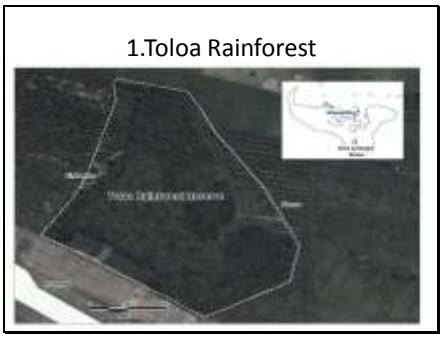

Location : approximately 11km southeast of central Nuku'alofa north to the Fua'amotu International Airport and the rainforest reserve area is 52 acres with an elevation of 30 meters in the North and 35 meters in the South.

Slide 3

Dominated by tavahi (*Rhus taitensis)* ngatata (*Ellatostachys apetala)* and the fekika vao (*Syzygium clusiifolium)* trees apart from a few sub-canopies in the area. Many invasive Species are present too such as the fue a e puaka (*Ipomea indica)* and vaine kai (*Passiflora edulis)I*

Slide 4

2.Mt. Talau

Slide 5

Mt Talau with Bait station

Slide 6

Legal Status/ History

- Toloa rainforest -Land Tenure System recently leased by Tupou College Toloa.
- Mt. Talau – under government owned land.
- Toloa forest is the remaining rainforest in Tonga threatened by the spread of invasive species in the area., mt. Talau threatened by lopa weed and pigs disturbance is too high

Invasive species threats : the overgrown cordia in the area have caused the slowly disappearances of a few native plants inside the forest. They have been outcompeted by the invasive cordia.

Slide 7

Management Activities

- Removal of IAS from the area by reducing the spreading and abundance of invasive plant species from the Toloa Rainforest Reserve.
- Build a Nursery - Expand forest area outwards allowing more area for the native trees to be planted.
- Replanting native tree species that have become rare now and currently under-represented in the forest (Nursery .

Slide 8

cont

- Controlling canopy trees that have a much more effect than the saplings and seed layers inside the forest. Cutting down of Cordia weed from the area.
- Removal of shrubs and seedlings that may have been from neighboring locale.

Slide 9

Management Activities: management of weeds

Cutting down of cordia

Slide 10

Management Activities

- Other than the methods mentioned earlier, removal of IAS includes deep cuts in the sapwoods, and cutting vines at head height to prevent any more growth.
- Hand pulling of seedlings and ground level herbs to avoid breakage.

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Nursery Installment :Nursing native plants

A nursery have been established to nurse native plants that is rare and threaten in the island, to refill the ones that are gone and near extinct.

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Slide 14

Management Priorities

- Ensure that no invasive plants of priority species will be alive in the forest, as they will be removed and managed well reducing the effects of IAS.
- Native plants will be replanted and fill and re-colonized by the native plants rather than the IAS , thus increase the diversity of the forest.

Slide 15

Cordia alliodora dominating the forest reserve while other native plant species die out in lack of competing space to grow

Slide 16

Threats

Vaine ‘a e puaka , curtained most native trees and may as well bring it down.

Slide 17

Other threats

- Open access in to the area by everyone
- Cutting down trees from the college for their other needs like post for their Tongan fence, wood etc.

Slide 18

Restoration Partners

- Toloa Rainforest
  - -The Env. dept
  - -The Tupou college
- Mt. Talau
  - -The env. Dept
  - - Talau community
  - - VEPA (NGO)

Slide 19

Expectations from the Study Tour:

- I expect as much as i can from this trip for my 2 restoration project are now currently implement in the Kingdom

Slide 20

Malo ☺

Annex Two. Presentations on Saturday March 21 (Murray Beare)

Annex Three. Presentations on Tuesday March 24

Forest Restoration Framework (Dave Moverley)

Slide 1

Slide 2

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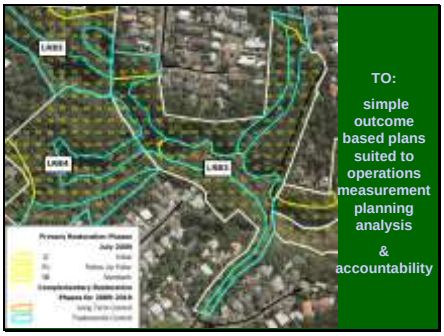

Slide 7

The classification of restoration phases into polygons

Inherent complexities of multi-species pest sites have been simplified into sub-classes based on the current restoration phase, and accounting for application methods, herbicides used, and optimal timing for control.

This approach uses a spatial polygon format that allows a more targeted approach to the work programme and quantitative analysis to monitor and improve performance.

Slide 8

FRAMEWORK OVERVIEW

PRIMARY

INITIAL CONTROL
Year one
↓
FOLLOW UP FOLIAR CONTROL
Year one
↓
SEEDBANK CONTROL
2nd-5th Year
↓
FOREST PROTECTION
Ongoing

SUPPLEMENTARY

TRADESCANTIA CONTROL

LONG TERM CONTROL

Slide 9

This phase targets cut stump applications and the release of vine species. Providing :

-an immediate positive effect on the ecosystem

-improved access

-defined and minimised targets for foliar spraying, resulting in reduced overspray

Slide 10

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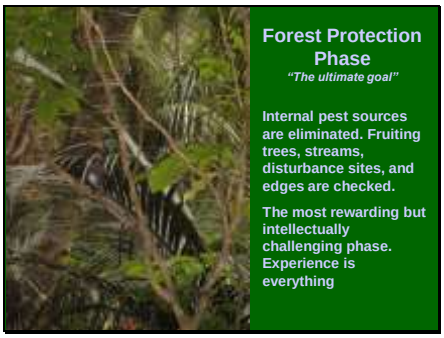


Forest Protection Phase

"The ultimate goal"

Internal pest sources are eliminated. Fruiting trees, streams, disturbance sites, and edges are checked.

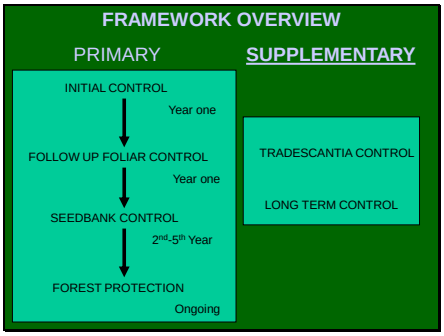
The most rewarding but intellectually challenging phase. Experience is everything

Slide 17

PRIMARY FRAMEWORK

PHASE	DEFINITION	METHODOLOGY	PHASE DURATION	AUDITING / MONITORING
Initial Control	Plant pests that transform the function of the ecosystem are present within the designated area.	Cut stump application of all woody species and releasing of vines etc. from desirable plants in preparation for the next phase. Provides immediate positive effects on the ecosystem, improves access, eliminates mature woody plants, and subdues vines.	Dependent on resources. Commonly a total area is worked through in stages.	All woody pest plants dead. Vines released from native plants and placed on ground for foliar spraying.
Follow Up Control	Plant pests that transform the function of the ecosystem requiring foliar spraying are present within the designated area.	Foliar spraying of vines and herbaceous pest plants. Implemented twice to eliminate all pest plants that have germinated.	One year after initial control.	All initial pest plants dead.
Seedbank Control	All original pest plants that transform the function of the ecosystem are dead. Seedbanks remain in the soil resulting in germination events within the designated area.	Foliar spraying or hand pulling of all plants that have germinated from the seedbank. Best implemented in summer once seeds have germinated and before they set seed.	Generally three to four years, depending on seed viability of the species concerned.	No pest plants reaching maturation.
Protection	All pest plants eliminated and the seedbank exhausted. Pest plants re-enter the designated area from neighbouring locations.	Cut stump, foliar spray, or hand pull recently arrived plants. Sites prone to invasion (edges, streams, tracks, disturbance sites, and beneath fruiting or perch trees) are checked.	Ongoing	New individual incursions only, no communities of pest plants evident. No pest plants reaching maturity.

Slide 18



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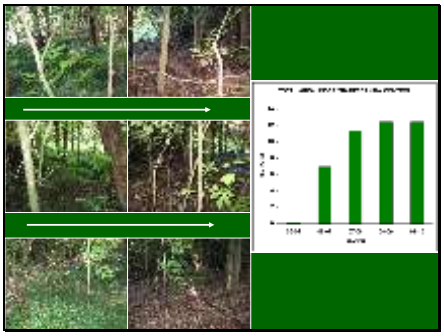

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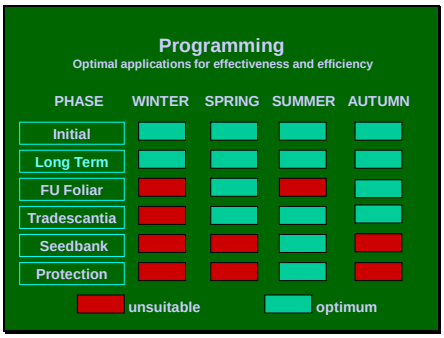

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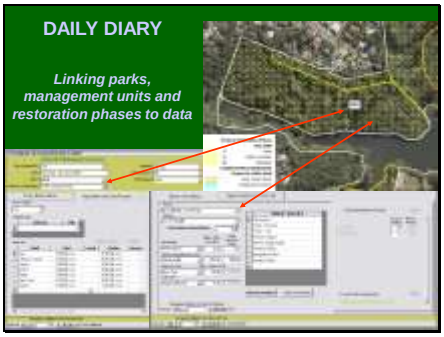

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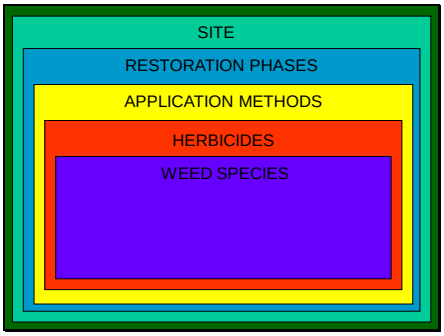

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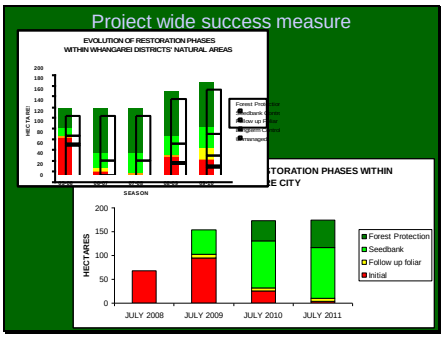

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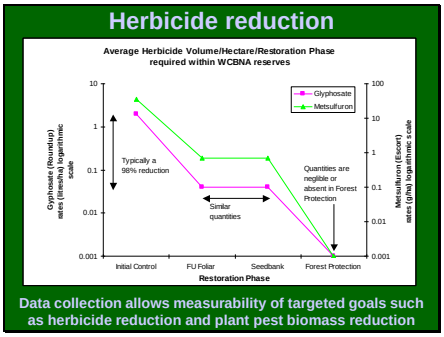

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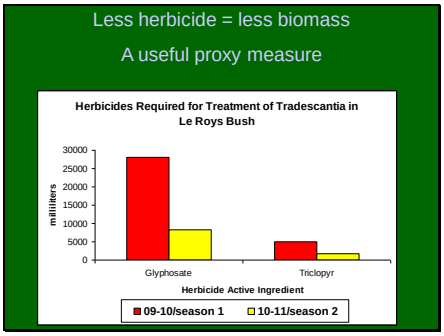

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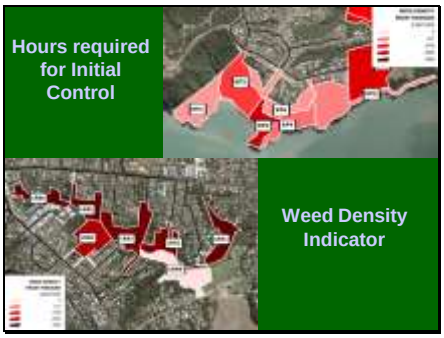

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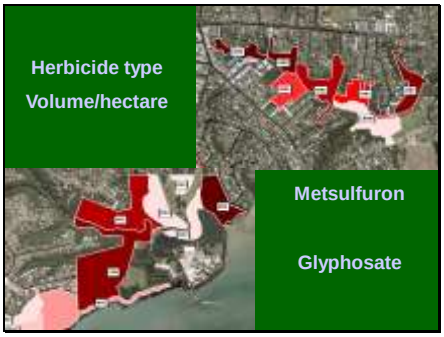

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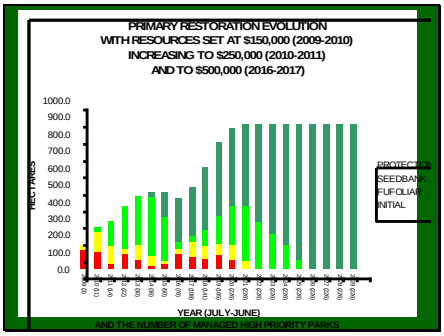

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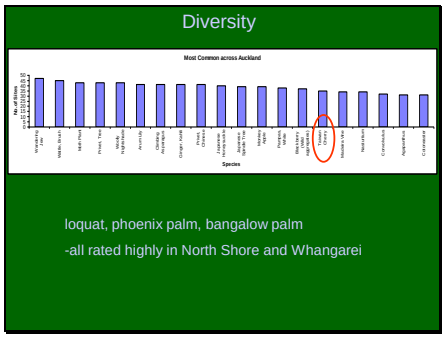

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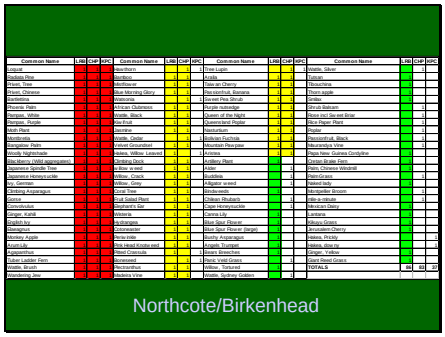

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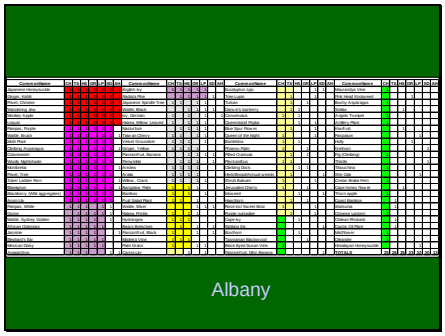

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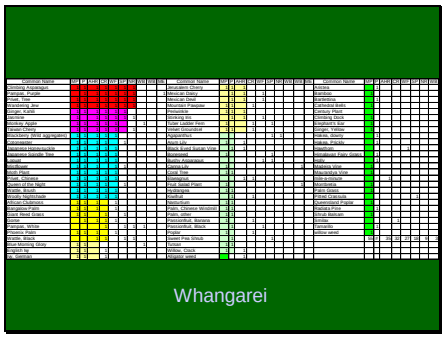

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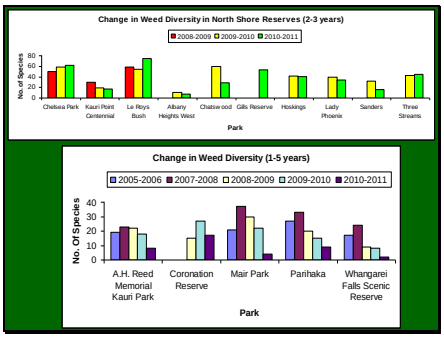

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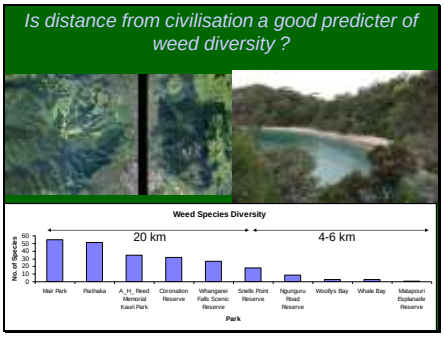

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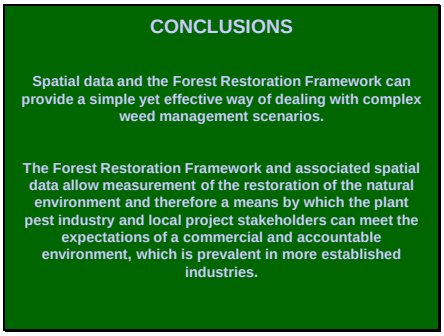

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Restoration at the Landscape Level (Mel Galbraith, Unitec)

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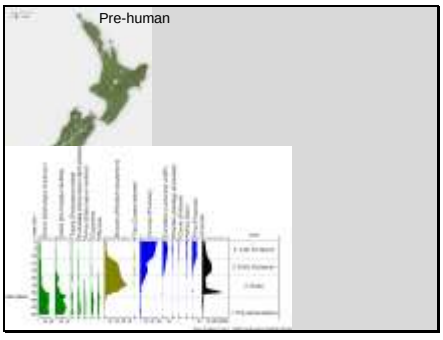

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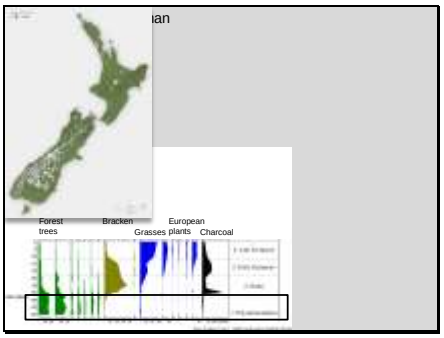

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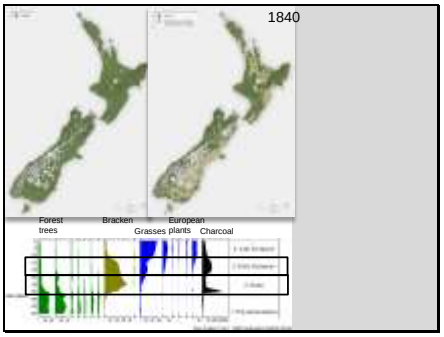

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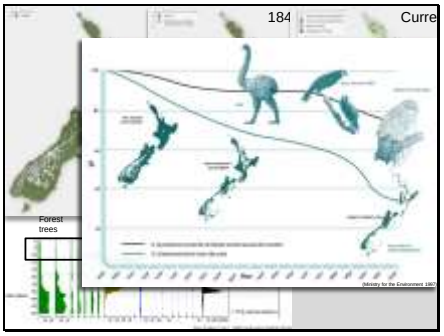

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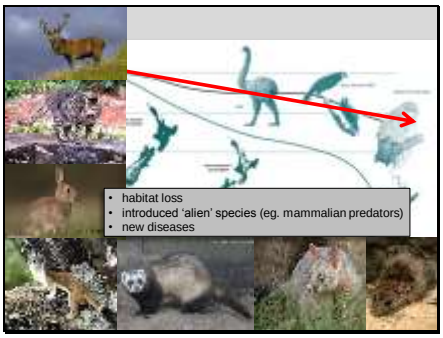

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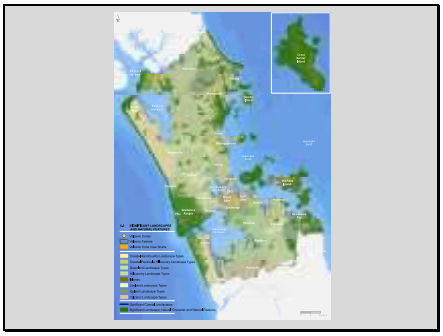

Slide 10

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Slide 13

- Department of Conservation
- Territorial authorities (eg. Auckland Council)

Species conservation - legislation
- protected space

Slide 14

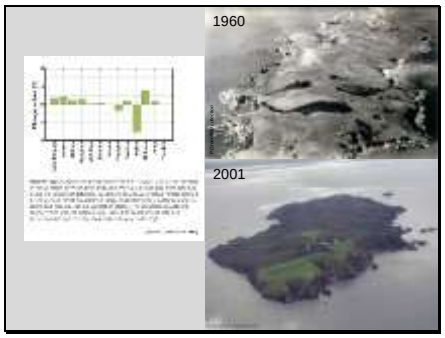
Slide 15

- Department of Conservation
- Territorial authorities (eg. Auckland Council)

Species conservation - legislation
- protected space

Ecological restoration - islands
- invasive species eradication
- species translocations
- mainland sites

Slide 16



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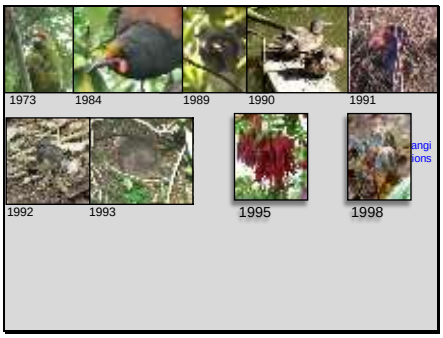

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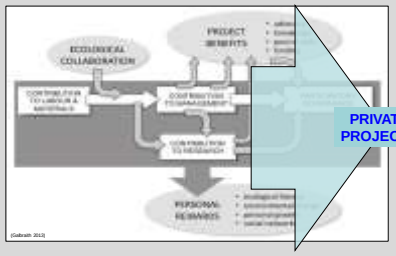
- Department of Conservation
- Territorial authorities (eg. Auckland Council)

Species conservation - legislation
- protected space

Ecological restoration - islands
- invasive species eradication
- mainland sites

Public / volunteers – contributing to restoration / conservation

Slide 23



Slide 24

- Department of Conservation
- Territorial authorities (eg. Auckland Council)

Species conservation - legislation
- protected space

Ecological restoration - islands
- invasive species eradication
- mainland sites

Public / volunteers – contributing to restoration / conservation

Private land – restoration projects / conservation

http://www.sanctuariesnz.org/projects.asp

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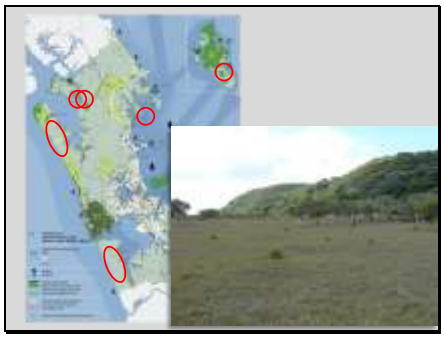

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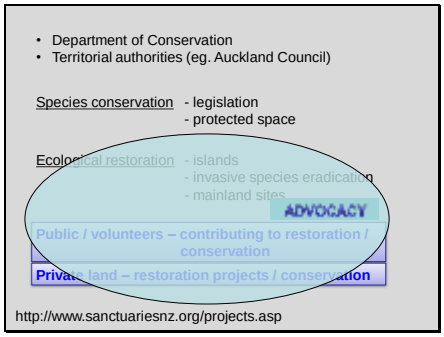

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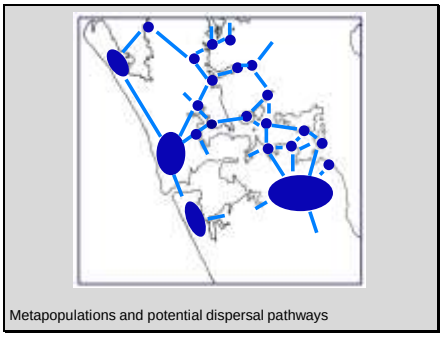

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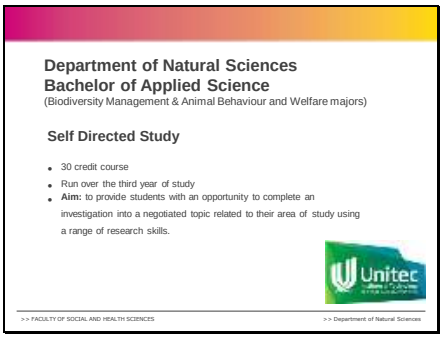
Slide 32

Presentation on Unitec Department of Natural Science Research collaborations (Diane Fraser, Unitec)

Slide 1

Slide 2



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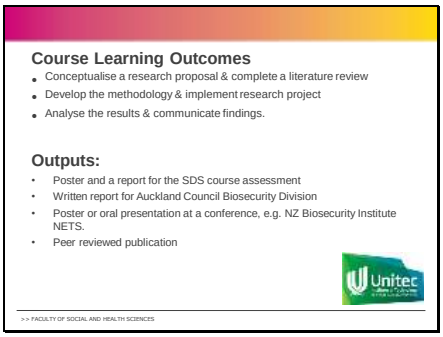

Slide 4

Collaborative Arrangements: a win-win situation

Aim to provide students with opportunities for exposure/collaboration with industry

The student benefits:
- Introduce the student to industry
- Provide a supportive environment where they can learn and grow
- Complete their negotiated study
- Potential employment/study opportunity on completion of degree
- Applied real-world learning
- Presentation at a conference (NZ Biosecurity Institute - NETS)

The collaborator benefits:
- Young, enthusiastic, hard working student
- Completion of small research project
- Publication at NETS
- Potential future employees

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Slide 5

Unitec/Auckland Council Collaboration: Treasure Islands Campaign

Summer studentships 2014:

Shanti Morgan:
An assessment of risk pathways from commercial businesses to pest-free islands of the Hauraki Gulf.
- Oral presentation NETS 2014
- Further work with Auckland Council

Andrew Marshall:
Distribution of the Argentine ant (*Linepithema humile*) and Rainbow skink (*Lampropholis delicata*) in selected locations across the Rodney district of Auckland, New Zealand.
- Poster presentation NETS 2014
- Further work with Auckland Council

Sarah Killock:
Detecting the spread of a known rainbow skink (*Lampropholis delicata*) population over an island
- Poster presentation 2014
- Further work with Auckland Council

>> FACULTY OF SOCIAL AND HEALTH SCIENCES

Slide 6

Unitec/Auckland Council Collaboration: Treasure Islands Campaign

Summer studentships 2015:

Molly Wilson:
Determining the presence of plague skinks *(Lampropholis delicate)* in areas of human disturbance on Great Barrier Island.

Hannah Dabb & Rachel Gibbons:
A survey to determine the risk status of selected eastern Rodney businesses as potential pathways for the spread of Rainbow skink (*Lampropholis delicate)* and Argentine ant (*Linepithema humile) to the islands of the hauraki Gulf.*

Terri Todd:
Treasure Islands ambassador for Biosecurity advocacy aboard Auckland Ferries travelling to the islands of the hauraki Gulf Marine Park.

Output:
- All students have submitted abstracts for poster presentation at NETS 2015

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Slide 7

Unitec/Auckland Uni/Connovations collaboration:

Jared Waters 2014

Novel lures to increase possum detection and decrease rat interference at Chew Cards.

Product: Lure it Spray & Blaze, Connovations Ltd.

Outputs:
- Oral presentation at NETS 2014
- Journal article to be submitted to NZ Journal of Zoology

Slide 8

Unitec/Key Industries collaboration:

Sarah-Jayne Fenwick & Urvashi Lalu, 2013:

Potential Impact of Argentine Ant (*Linepithema humile*) on Beehive Productivity

- Poster presented at NETS 2014

Jo Aley, 2014:

The efficacy of Capsaicin as an equine repellent for chewing wood.

- Accepted for publication in Journal of Veterinary Behaviour 2015
- Marketing video produced

Slide 9

Unitec/Mataia Restoration Project collaboration:

Julie Alach, 2014:

Dispersal pattern of translocated male kiwi, compared to established male kiwi at Mataia Restoration Project, Kaipara, New Zealand

Outputs:
- Poster presentation at OSNZ 2015
- Journal short note to be submitted to Notornis

Slide 10

For more information about our Bachelor of Applied Science please contact:

Graham Jones, Department of Natural Science, Unitec gjones@unitec.ac.nz

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>> FACULTY OF SOCIAL AND HEALTH SCIENCES

Annex Four. Final Presentations on Friday March 27

Niue (Huggard Tongatule)

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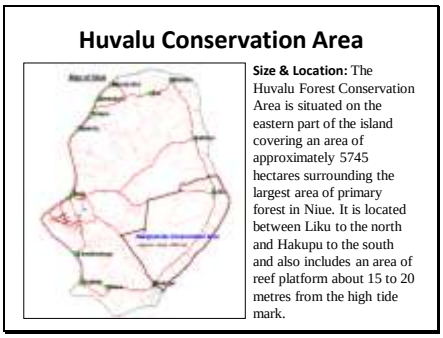

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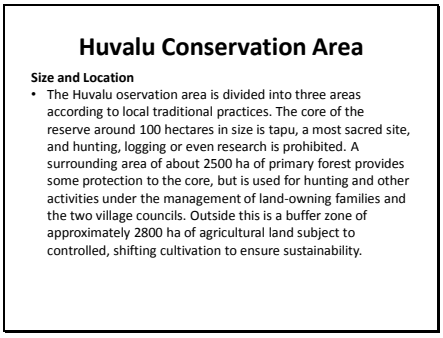

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Overall Restoration Approach

Weed management

- We are very lucky in this regard as invasive weeds are only located around the edges of our conservation area and around bush tracks. Relatively easy to manage so we are going to try and eradicate priority weeds from this area with ongoing monitoring.
- Niue is focused on priority weed species for the whole island including the Huvalu Conservation Area. Following the more detailed survey of weeds around the Conservation Area it may require the forest restoration framework approach for managing multi weed species at one or more sites.

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Predator management

- There is a presence of feral pigs, feral cats and Polynesian and Ship rats in the area.
- Our first priority is to control feral pigs in this area and we will be starting with a pilot programme that we have developed to be implemented over 6 months.
- Survey and develop a plan for managing cats.
- Options for rat management would include:

1. Total eradication of rats
2. Building pest proof fence
3. On-going use of bait stations

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1. Total eradication of rats from Niue Island

- This would prove very difficult because of the size of Niue and the amount of people occupying the island but this can still be achieved through long term management.

2. Building a predator proof fence

- This would also be very difficult due to the terrain on the Huvalu Conservation Area.
- The movement or other animal species such as coconut crabs during their life cycle and reproduction phase would be affected by the fence but this will depend on where the fence will be build.

3. Ongoing rat management though the use of bait stations at priority bird nesting sites

- This is a good option but will require a survey of the area to locate these bird nesting sites. The Tapu area would be a prime location for these bait stations however the access into these areas are strictly prohibited so consultation with land owners from both village communities is needed before further action is taken.

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Restoration Planting

- Not required at this stage but propagation of native species is recommended as it will take time to collect seeds and growing them to a suitable size for transplanting. This will also require the approval of land owners for replanting on their lands.

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Sustaining the Project

Finances

- GEFPAS – FPAM and GEFPAS – IAS project would provide the bulk of the funds needed for the management activities. Government will provide continuous support especially through the use of expertize and labour from the departments of DAFF and Environment.
- Financial support also from the Ridge to Reef project
- 1 million USD from GEF6 for invasive species work

Community and Public Awareness

- Continuous collaboration with the villages of Liku and Hakupu.
- Awareness Programs for the public may include the use of posters and pamphlets. Ongoing radio programs and tv ads would also be useful.
- Designing a tour for the Conservation Area with the building of tracks and informative information boards along the track.

Support

- Building support from Government and also the whole of Niue especially communities from the villages of Liku and Hakupu.

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Action Plan

- Implementation of feral pig pilot programme for six months starting from late April 2015 through the GEFPAS – IAS Project
- Production of a management plan for the Huvalu Conservation Area in 2015
- Management of priority weeds in the Huvalu Conservation Area in 2015

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Tonga (Viliami Hakaumotu and Hoifua Aholahi)

Slide 1

GEF-PAS Invasive Alien Species Project

Viliami Hakaumotu & Hoifua Aholahi

Slide 2

1.Toloa Rainforest

Location : approximately 11km southeast of central Nuku'alofa north to the Fua'amotu International Airport and the rainforest reserve area is 52 acres with an elevation of 30 meters in the North and 35 meters in the South.

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Toloa Rainforest Restoration Site propose plan

Dominated by tavahi (*Rhus taitensis)* ngatata (*Ellatostachys apetala)* and the fekika vao (*Syzygium clusiifolium)* trees apart from a few sub-canopies in the area. Many invasive Species are present too such as the fue a e puaka (*Ipomea indica)* and vaine kai (*Passiflora edulis)I*

Slide 4

About Toloa

- Toloa Rainforest –Leased by Tupou College.
- Toloa Rainforest is the remaining rainforest in Tonga. Threatened by the spread of invasive species in the area.
- GEF-PAS Project
  - Remove IAS
  - Build nursery
  - Replant native species

Invasive species threats : the overgrown cordia in the area have caused the slowly disappearances of a few native plants inside the forest. They have been outcompeted by the invasive cordia.

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Lessons Learned

- Partnership, networking and community engagement
- Prioritizing what needs to be done
- New techniques – totem trees, apply agri-chemicals
- Importance of biosecurity
- Commitment of department staff and volunteers
- Volunteers as important helpers to invasive species management

Slide 6

What can be applied:

- Creating a network and partnerships with different stakeholders
- Re-planting using volunteers
- Awareness raising by including forest management in school syllabus
- Restoration techniques – totem trees
- Nursery management – need to be organised
- Include pioneer species in nursery
- Apply agrichemical techniques
- Signage for visitors and public
- By keeping invasives under control, we can make Toloa attractive to other groups
- Potential of training students to be guide – they can earn money for their school fees

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How it will change your plan

- Start the re-planting earlier (rather than later) – as we don't want to have open space that will take over by invasives
- Will also include monitoring of areas that have invasive trees removed
- Tropical plants are faster growing in the nursery need to plant them soon.
- Train the team (students) to monitor.

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Sustaining the Project

- Continue to work with school and encourage ownership of Toloa (Golden Forest – known by former students)

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Action Plan

- Immediate (5 month timeframe)
  - Create network (high-schools – senior classes work within the existing system)
  - Train the team for the monitoring
  - Implement the replanting plan – plant now during wet season
  - Arrange the fencing of Mt Talau
  - Chemical application during dry season
  - Rat eradication training (July-Aug) with IC/SPREP (logistical arrangements)

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Action Plan

- Long-term (6 months – 10 years +)
  - Put in place biosecurity measures (e.g. People to check their shoes)
  - Create trail/paths for visitors
  - Develop signs and information
  - Develop tree information signs
  - Train tour guides (from college)
  - Secure funding (especially for Mt Talau) – priority ONE
  - Expand the predator control to other islands (less than 10 ha)

Aim: completely remove invasive weeds and control rats

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American Samoa (Tavita Togia)

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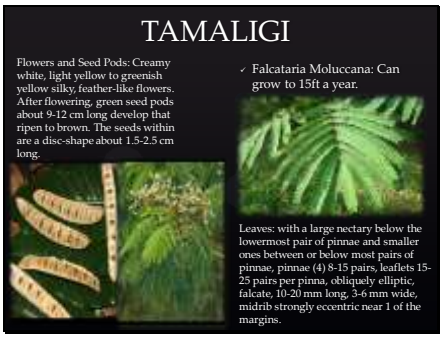

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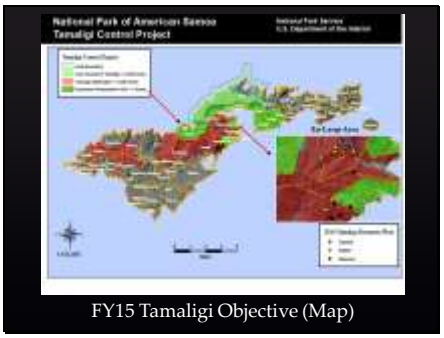

FY15 Tamaligi Objective (Map)

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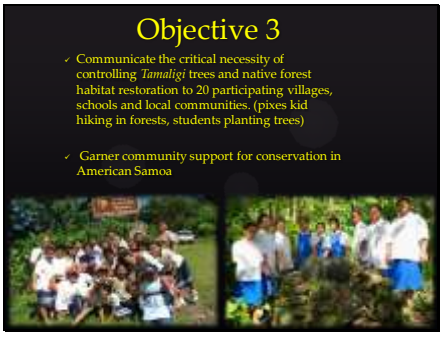
Slide 9



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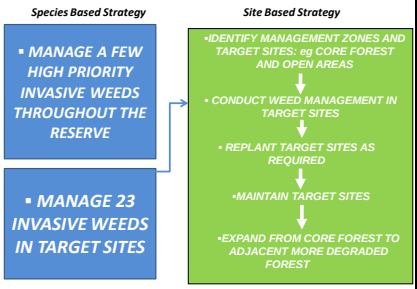
Samoa (Suemalo Talie Foliga)

Current Restoration Approach:

Continues as in the operational plan…

- **Weed management**
  - **Trial manual weeding vs herbicide application to consider costs/benefits**
- **Restoration planting**
  - **Trial different planting densities and monitor**
- **Continue with monitoring of biodiversity and also restoration effort to determine labour costs of the work**

The Mt Vaea Restoration Operational Plan



New projects to investigate

- Invasive mammal management
  - Monitor rat species and densities
  - Monitor pigs
  - Assess feasibility and costs of management

  THEN…
- Possible Species Translocations… for rare plants, swallowtail butterfly and birds etc (captive breeding centre?)

NEEDS INTERNAL MNRE DISCUSSION, SUPPORT AND APPROVAL…

Sustaining the project

- **Finances:** We need to secure more long term funding… build on GEF-PAS, follow up on Life-Web, emphasise climate change linkages etc
- **Community/Public Awareness:** We see the need to improve the promotion of the project amongst the local community…. Public Open day planned for May and later in the year… Trails need improving and interpretive signs added, brochures…
- **Support/Partnerships:** Assess volunteer opportunities…. Discussion with ILO…Involvement of SCS and other groups (eg SPREP social club)… Partnership with STA (have funds for ecotourism)

Action Plan

- **When we return (within the next month):**
  - Prepare a report on the trip
  - Present report to CEO and ACEO,SNITT and restoration technical committee on what we learnt and our ideas for the future
  - Brief the restoration team on the trip and build team spirit and motivation
  - Follow up on Techops order for chemicals with MoF
  - Agrichemicals training when chemicals arrive (Dave M)
  - Follow up with SPREP on trails improvement (Stuart Chape)
  - Meet with STA and ILO and other partners to build support and partnership
- **Longer Term actions (within the next year):**
  - Engage the politicians (invite to public open day)
  - Develop volunteer/support groups
  - Investigate funding options for further work
  - Continue with restoration activities
  - Feasibility of mammal management (eg survey and costings…)
  - Improve quality of the signage about the project
  - Improve biosecurity measures (raise public awareness)