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This summary of invasive species management activities by people and agencies that the Pacific Invasives Initiative (PII) works with is collated and circulated by the PII Team.

Contributions are welcome. Thanks to all those who contributed to this one! Feedback is also welcomed – contact either the PII Team ([PII@auckland.ac.nz](mailto:PII@auckland.ac.nz)) or the people directly involved in projects. The views expressed by authors are not necessarily those of PII. Visit our [website](#) or find us on [Facebook](#) for further information.

## Introduction to new PII Staff Member



We welcomed John Mather to the PII team in May. John worked for the Bay of Plenty Regional Council for the last 20

years and coordinated Bay of Plenty biosecurity programmes. This work included: reviewing the Regional Pest Management Strategy and associated Cost-Benefit Analyses; overseeing terrestrial, aquatic, marine and biological

control programmes and initiatives to advance biosecurity awareness.

Bay of Plenty Regional Council became a national leader in government-industry collaborative biosecurity programmes with the kiwifruit industry funding the control costs for wild kiwifruit in the Bay of Plenty. John also represented regional councils on several advisory and steering groups; National Pest Plant Accord, Undermining Weeds, Forest Biosecurity and National Biocontrol Collective.

## PII ACTIVITIES

### Provision of Technical Advice and Support

The number of requests for assistance to PII continues to increase. From 1 July 2011 to 30 June 2012, a total of 163 requests were received by PII. These came from 73 agencies in 32 countries in, or working in, the Pacific (American Samoa, Australia, Cook Islands, Fiji, France, French Polynesia, Federated States of Micronesia (Kosrae, Pohnpei, Yap), Guam, Hawaii, Kiribati, Mexico, New Caledonia, New Zealand, Palau,

Papua New Guinea, Saipan-CNMI, Samoa, Tonga, Tuvalu, United Kingdom, Vanuatu, Wallis & Futuna) or wanting to know about invasive species management in other island regions (Anguilla, Aruba, Canada, Ireland, St Lucia, Seychelles, Switzerland, Tanzania). Invasive species requests from Government agencies in the Pacific have doubled since July 2011

### Invasive Plant Management Training Course, Samoa, 15—25 May 2012

PII has successfully completed its fifth training course to strengthen invasive plant management capacity in Pacific countries. The course was held in Samoa from 15-25 May 2012 for five teams: Samoa, Environment and Forestry Divisions of the Ministry of Natural Resources & Environment; Cook Islands, National Environment Service; Fiji, National Trust of Fiji; Niue, Department of Environment and Department of Forestry and Fisheries.

The purpose of the course is to assist agencies to apply informed decision-making in the design, development and implementation of an effective invasive plant management programme using the PII Project Process and the PII Resource Kit for Invasive Plant Management. It is a participatory course based on active learning principles and uses a team approach as sharing of knowledge and skills between programme and project managers and





Participating teams and trainers at the Invasive Plant Management Training Course in Apia, Samoa, May 2012

field workers is more likely to lead to better planned and implemented projects.

Discussions with Pacific agencies identified the need for the scale of the successful previous PII Weed Project Management training courses to be increased to a programme development training course with a section on risk assessment and prioritisation. PII worked with senior NZ DOC officers, SPREP officers, Pacific practitioners and training consultants to develop a new course aimed at strengthening effectiveness and maximising the resources available to the often small and under-funded agencies in Pacific countries.

PII is grateful to the Training Course partners (NZDOC, SPREP) for their input and to the New Zealand Government's Aid Programme and the Critical Ecosystem Partnership Fund for providing funding for the development of the training course and the delivery of the course in Samoa.

**The PII Resource Kit for Invasive Plant Management**

Realisation that the new tools required for invasive plant project prioritisation would best be incorporated with other training material and tools into a CD-based resource kit for invasive plant management led to documentation of the process for invasive plant management and the development of the PII Resource Kit for Invasive Plant Management. The resulting materials mean an increased likelihood of the process remaining within agencies regardless of the issue of staff turnover. Scientists and practitioners reviewed course and resource kit material and the PII Resource Kit for Invasive Plant Management is availa-

ble as a stand-alone resource which we will make available through the internet and in conjunction with the Invasive Plant Management Training Course.

The resource kit contains: a summary table of the Stages and Steps of the PII Project Process for Invasive Plant Management; an overview of each Stage; a description of the Steps in each Stage; templates for project documents; guidelines to assist with many aspects of invasive plant management; a database of plant information; a project management database; a training example of completed project documents, a glossary and list of references.

PII is grateful to the many contributors and reviewers for their input and to the New Zealand Government's Aid Programme and the Critical Ecosystem Partnership



## Island Biosecurity Training Course, Kiribati, 4–11 June 2012

Two 2-day training courses were held in Tarawa, Kiribati, in June. The first course (11 participants) was for Fisheries observers, Maritime Police and ECD/MELAD staff and the second (10 participants) for Quarantine, Environmental Health, Marine Guard and ECD/MELAD staff. The purpose of the workshops was to enable relevant government agencies to implement the Biosecurity Guidelines for the Phoenix Islands Protected Area (PIPA) and prevent the spread of invasive species within the Republic of Kiribati by improving Kiribati capacity to:

- identify the major invasive species threats to PIPA,
- identify risk pathways,
- identify invasive species arriving at PIPA,
- undertake passive and active surveillance for invasive species threats,
- respond appropriately to incursions of invasive species at PIPA.

The training was opened by PIPA Director Tukabu Tero-roko who confirmed that biosecurity in the PIPA will be strengthened by establishing biosecurity/quarantine positions at Kanton Island. PII was assisted by Ray Pierce (Eco Oceania) as an SME and trainers and partici-

pants were welcomed by MELAD Secretary Manikaoti Timeon who formally recognised the work done in the PIPA and on Kiritimati Island (partly funded by MFAT Aid).

The workshops included classroom and practical exercises and activities on the Police patrol vessel (RKV Teanoa) and at Betio port. A planned Sustainability Workshop with senior MELAD/PIPA staff to ensure that support and resources will be available to sustain biosecurity activities and protect the investment and consolidate the progress made in the PIPA could not be held.

As part of the training, participants collected ant samples which are now being identified by MPI and development of management options for the myna population at Betio Port was also discussed. A myna surveillance programme was started in preparation for drafting a myna eradication plan.

The workshops were successful in raising awareness of the values of, and threats to, the PIPA and provided participants with baseline knowledge and skills which PII complemented by providing a number of tools such as binoculars, traps and bait and bait stations. But participants raised a number of issues, including resourcing and further training, which require attention from senior managers.



Participants in a Phoenix Islands Protected Area Biosecurity Training Workshop run by the Pacific Invasives Initiative in Tarawa, Kiribati, carrying out surveillance work (left) and preparing for activities aboard the Police Patrol vessel (RKV Teanoa) at the port of Betio (right).  
(Photos: Rikamati Naare (L), Bill Nagle (R)).

## How to Eradicate Rodents and Cats on Islands Training Course, Tonga, 11–15 June 2012

A five-day training course was held in the Kingdom of Tonga in June to train participants in how to plan and implement projects using the PII Resource Kit for Rodent and Cat Eradication. This training was provided to assist Tonga with the planning and implementation of their GEF-PAS Invasive Species Project. In the lead-up to the training, a meeting was held between PII and the Ministry of Environment and Climate Change (MECC) in Nuku'alofa in April 2012 to establish the relationship

between PII and MECC, discuss the training and how PII may be able to assist Tonga with the GEF-PAS invasive species project.

- Seven participants from the following Government agencies attended:
- Ministry of Environment and Climate Change
- Ministry of Agriculture, Forestry, Food and Fisheries (MAFFF)

- Ministry of Transport

PII also invited the President of Te Ipukarea Society, a local NGO in the Cook Islands, to participate in the training in support of the upcoming rat eradication on Suvarrow Island, a National Park since 1978. The island, a major seabird breeding island, its reef and a six kilometre area around it is under the management of the Cook Islands Government's National Environment Service. Te Ipukarea Society works closely with the National Environment Service and is involved in the implementation of the GEF-PAS invasive species project.

Ms Mafileo Masi, Senior Environment Officer, MECC, welcomed the participants and training team and opened the course on behalf of Mr 'Asipeli Palaki, CEO, MECC. Dr Viliami Kami, Head of Quarantine and Quality Management Division, MAFFF, blessed the training course. They both commented on the timeliness of the training, especially as the Tongan GEF-PAS invasive spe-

cies project was about to start. Our gratitude is extended to both Ms Masi and Dr. Kami.

The course structure was similar to that of the invasive plant training programme; was also highly interactive between the facilitator, PII subject matter experts and participants; and included a field trip to an off-shore island to work through the components of the feasibility study, eradication and monitoring technique components.

As well as strengthening knowledge and skills, the workshop provided the opportunity to establish a long-term working relationship with the participants and provide on-going mentoring when required. Comments from the participants about the PII Resource Kit for Rodent and Cat Eradication included: *"Very useful training; our understanding was enhanced through exercises and examples of case studies"*; *"Very good and easy to use, especially the tools tab and templates"*.



Participants working through the theory of a feasibility study on Manima Island, Nuku'alofa during an Eradicating Rodents and Cats on Islands Training Course run by the Pacific Invasives Initiative in the Kingdom of Tonga. (Photo: John Mather)

### Economics Analyses of Invasive Species in the Pacific Training Course, Fiji, 14–16 May 2012

PII collaborated with Landcare Research-Manaaki Whenua and the Institute of Applied Science at USP on a three-day workshop on undertaking benefit-cost analyses and planning data collection to support those analyses. This report comes from Pike Brown, Landcare Research.

For many, the term "economics" invokes images of Wall Street, Euros, and the Inland Revenue Department. As a discipline, however, economics is primarily concerned with how people allocate scarce assets, whether in the form of dollars, time, or natural resources. That is, economics is the science of decision-making, and the use of economics in making decisions about invasive species in the Pacific Region was the focus of a recent workshop at the University of the South Pacific (USP).

From more than 50 applications, 17 participants representing government agencies, research institutions, and non-governmental advocacy groups were selected to participate in the program. Participants travelled to the workshop in Suva, Fiji from across the Pacific, from French Polynesia in the east to Christmas Island in the west.

The workshop was led by two senior economists at Landcare Research (LCR) New Zealand, Adam Daigneault and Pike Brown. Adam is an economic modeller who developed an intuitive Excel-based tool for choosing among alternative controls in a robust benefit-cost analysis framework specifically for this workshop. Pike is an applied econometrician who specialises in designing data collection protocols such as household



surveys in order to obtain accurate information for populating models. Thus, over the course of the three-day workshop jointly sponsored by PII, LCR, and the Institute of Applied Science at USP, workshop participants learned both how to undertake benefit-cost analyses and how to plan data collection to support those analyses.

For example, *Miconia calvescens* is native to Latin America but was taken to the Pacific as an ornamental in the mid-20<sup>th</sup> century. Finding purchase in the islands' moist, tropical forests, *miconia* grew exponentially, earning the nickname 'green cancer' in French Polynesia and 'purple plague' in Hawaii. Its large leaves create a thick, dark canopy that many native plants cannot tolerate, leaving up to half of Tahiti's native plant species vulnerable to extinction.

Hawaii is estimated to be capable of supporting up to 100 million individual *miconia* shrubs, threatening native plants as well as the birds and other animals that depend on them. Workshop participants thus analysed different responses to *miconia* invasion in Hawaii, including a government-led removal programme, an intensive landholder/volunteer education programme, and introducing biocontrol agents.

A literature review revealed that Hawaiian households would pay \$US 31 per year in higher taxes, on average, to protect each native bird species from extinction. Multiplying by the number of households in the islands, the benefits of controlling *miconia* is at least \$US 12.4 million per species per year. Using such information with the Excel-based tool, students found that the benefit-cost ratio was highest for the government-led removal programme, but that biological controls presented an attractive alternative under some scenarios. In



Participants at the training course (Photo: Landcare)

contrast, education programmes had the lowest benefit per dollar spent. Other case studies focused on Taro Leaf Blight in Samoa and the Brown Tree Snake in Guam.

Course participants will gather data and use the Excel-based tool to conduct benefit-costs analyses of interventions for controlling other species that have invaded the Pacific Region, including fruit flies, the Common Myna, feral pigs and deer, the African Tulip Tree, the Green Iguana, the Moko Virus, Black and Pacific Rats, the Indian Mongoose, the Mahogany tree, the Little Fire Ant, the merremia vine, and the Asian Subterranean Termite. They will present their research findings and policy recommendations at a follow-up workshop in Suva in September.

The workshop was warmly received by all participants, with one calling it "*a revelation to all who attended*". Another participant commented that the workshop "*made benefit-cost analysis easy to grasp and meaningful, rather than just a number-crunching exercise*".

### Invasive Bird Management Training Course Update—From Jamie Copsey, Durrell

The date for this training is 9-18 July in Apia, Samoa. The four main course partners, Durrell Wildlife Conservation Trust, Landcare-Manaaki Whenua, Ministry of Natural Resources and Environment of the Government of Samoa and PII have agreed on using the PII Project Process as the course framework. A review of global invasive bird management work has been completed by Landcare and will be used as a case study for the training and will be made more widely available in the region once the training has been completed.

Selection of participants is in its final stages and it is expected that there will be attendees from American Samoa, Cook Islands, Federated States of Micronesia (Kosrae, Pohnpei), Fiji, French Polynesia, Guam, Kiribati (Kiritimati Island), New Caledonia, Palau, Samoa and

Vanuatu. The focus of the training will be on mynas, but the wider issue of how to plan for, implement and evaluate the impacts of invasive bird management programmes in general will be considered. Basing the course in Samoa provides the opportunity to take advantage of the ongoing myna control project run by MNRE and look at what lessons they have learnt and gain from their experience of dealing with such a problematic species.

As well as adapting the PII Project Process to the training and assisting Landcare with the preparation of resource material, PII is working with Durrell on development of the course and will assist with its delivery.

## Roundtable for Nature Conservation in the Pacific, 23–27 April 2012

Pacific Islands Roundtable for Nature Conservation and Pacific Islands Species Forum were held from 23-27 April 2012 in Honiara, Solomon Islands. PII contributed to the preparatory meeting for the upcoming 9th Pacific Islands Conference on Nature Conservation and Protected Areas. During this meeting an agreement was reached on the conference theme, key topics, pre-conference activities and timetable. PII is a member of the organising group for the conference.

The Pacific Island Species Forum was a great opportunity for PII and its partner the Invasive Species Specialist Group (ISSG) of IUCN's Species Survival Commission to present the devastating impacts of invasive species on Pacific Island fauna and flora and highlight the management efforts over the last decade ("Impacts of Invasive Alien Species on Threatened Species in the Pacific and the management of this threat"). The presentation was well received and was the basis for a press release by IUCN Oceania.

## Pacific Invasives Partnership (PIP), 18–21 June 2012

PIP had a successful annual meeting from 18<sup>th</sup> to 21<sup>st</sup> June 2012 in Suva, Fiji. The meeting was hosted by IUCN Oceania and involved 12 key partners namely, BirdLife Pacific, Conservation International Pacific Islands Programme, Hawaii Invasives Species Council, Invasive Species Specialist Group, IUCN Oceania, Landcare Research, PII, PILN, SPC, SPREP, US National Invasives Species Council and USP. Key outcomes of the meeting include:

- Reports on relevant international and regional invasive species initiatives;
- Reports from each partner on their achievements during the past year;
- Completion of the PIP communication strategy and accompanying implementation plan;

- Review of progress on PIP Action Plan for 2011-2012 and preparation of Action Plan for 2012–2013.

In addition, it was agreed that in the future partners should pursue opportunities for joint fundraising.



Members of the Pacific Invasives Partnership

## Feedback

### Feedback from teams completing the Invasive Plant Management Training Course

**Cook Islands:** From Basilio Kaokao & Elizabeth Munro, National Environment Service

The invasive training was very interesting for the Cook Islands participants that attended. It gave us an understanding of the processes required to achieve successful management of invasive plants as well as what is required and who to consult to achieve your goal on eradicating or controlling invasive plants.

The training also gave us an understanding of the steps or the processes required to manage invasive plants. Although the process seems long and tedious to put together, once these processes are completed implementation of the project will be easy and simple, as all information has been collected.

Lessons learnt out of the training in relation to our country project.

- There were a number of gaps in our country project, such as a well-documented overall project

plan (we had developed a project plan but not documented in a proper process) like the processes learnt from this training, the feasibility study, project design and operational planning.

- Data collection and recording is also important for the project, we found out that it is important to keep a record of data collected from the field and there are different types of data that can be collected to indicate that you are reaching your project outcome.
- Monitoring is also important for the project and that there are different types of monitoring in a project such as budgeting in a project plan, hours spent on the site in an operational plan and achieving the outcome of the project in a monitoring plan.
- Diminishing cost – funding cost can indicate the

progress of your project; when there is less project work, then there should also be less funds required to implement the project.

Next steps for our team:

- Need to finalize the operational plan of the project
- Identify what types of data to collect
- Identify outcome and operational data
- Develop data recording forms so that data can easily be captured
- The site needs to be properly marked and a GIS map developed to show the progress of the project



Cook Islands Team (Photo: Natasha Doherty)

### Fiji: From Savenaca Delai, National Trust of Fiji

The National Trust of Fiji team used the iguana sanctuary of Yadua Tabu as our focus project for the PII training course in invasive plant management, but we each have separate projects to work on - Sigatoka Sand Dunes National Park, Monuriki Island and Yadua Tabu. The key learning points from the training for me are:

- Importance of having a planning process in place for a project.
- Importance of engaging stakeholders in all processes of managing a project.
- Getting as much information as possible about the plants that I'm dealing with. For example; growth habit of the plant, time for plants to mature, seasons for flowering and fruiting, etc. This information contributes a lot towards deciding the time of treatment and also the type of treatment to use on a particular plant.

As follow-up actions from the training I will:

- Make a list of all invasive plants at Sigatoka Sand Dunes National Park (my project site) and at the same time gather as much information as possible that is available on each individual plant to



Team Fiji

enter into our database which was supplied as part of the PII Resource Kit for Invasive Plant Management,

- Set up a list of priority plants that require treatment,
- Work on a project plan for overall weed management at the National Park.

### Niue: From Huggard Tongatule, Department of Environment

PII has shared with us the PII Project Process for Invasive Plant Management that they have developed. It has been extremely helpful in showing us all the relevant and all equally important stages needed to be completed and carried out in the project process. The training has really showed us the importance of planning in the management of invasive plants. Well planned projects have a higher chance of being successful compared to projects that have very poor planning. The whole training was really informative and a lot of knowledge and skills learnt that will help us with our very own invasive management projects.



Team Niue (Photo: Baravi Thaman)



Niue will now use the PII Project Process and the PII Resource Kit for Invasive Plant Management to help us manage invasive plant species that are present here in Niue. Most importantly we will make sure that we plan well to ensure that our invasive plant projects are successful.

Niue is extremely thankful to PII for the very informative and effective training that was provided. It will help to further strengthen our ability to manage invasive plant species on Niue and protect the unique flora and fauna that makes Niue the beautiful country that is today.

### **Samoa:** From Elizabeth Kerstin & Josef Pisi, Division of Environment & Conservation, Ministry of Natural Resources & Environment

Samoa's biodiversity hosts about 550 species of native flowering plants whereby 30% are endemic to the Samoan archipelago. However, the biodiversity of Samoa faces various threats and invasive species is considered as one of the major threats.

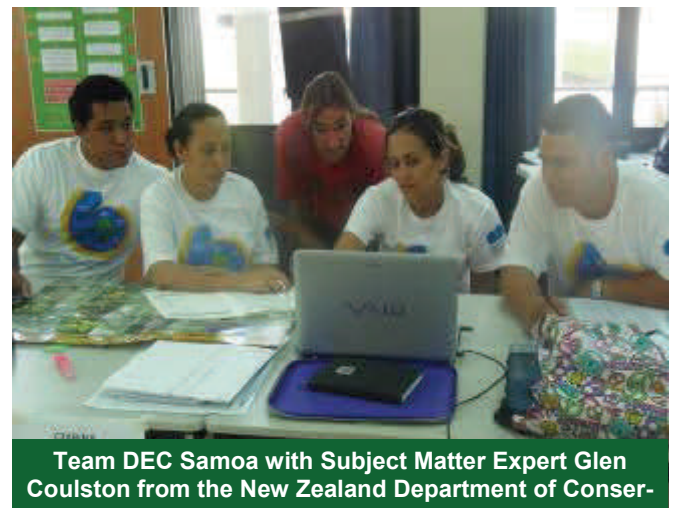
On 15-25 May 2012, the Invasive Plant Management Training Course was held in Samoa in a collaborative effort between PII, NZ DOC, SPREP and MNRE to equip participants from around the region on different ways to manage invasive plants. The course was considered as another important milestone by the four of us from DEC who attended the course and we believe the knowledge and skills gained from the course will greatly contribute to the management of invasive plant species in Samoa.

The training consisted of both theory and practical work. As part of the theory component, a very useful 'PII Resource Kit for Invasive Plant Management' was introduced which contains the 6 Stages of the PII Project Process which can be used for managing invasive species. The 6 stages are: Stage 1: Project Selection; Stage 2: Feasibility Study; Stage 3: Project Design; Stage 4: Operational Planning; Stage 5: Implementation; Stage 6: Sustaining the Project

A one-day field trip was conducted to train participants in the use of GPS, data recording, application of treatment methods and more. Moreover, upon completion of the course, we established a small trial to test six treatment methods to determine the most efficient method to be used for controlling *Castilla elastica*. Next

in our action, we will focus on developing a 'feasibility study' for the project we are currently working on, "Mt Vaea Ecological Restoration Project" and hopefully proceed on developing a 'project plan' and 'operational plan' while at the same time we will monitor the result of our mini-trial operation to be used for the full-scale phase of the project.

In conclusion, the training course was a great opportunity which broadened our knowledge and skills on invasive plant management issues especially with those of high concern. It has also built our professional work ethics and confidence, and extends our network with other conservation professionals around the Pacific. The knowledge and management skills gained from this course will be fully utilized in the management of invasive plant species in Samoa which hopefully for a great success and to save Samoa's biodiversity



Team DEC Samoa with Subject Matter Expert Glen Coulston from the New Zealand Department of Conser-

## PROJECT UPDATE

**French Polynesia:** New Hope for the Most Endangered Bird in French Polynesia—From Thomas Ghestemme, SOP Manu

### **A species which could disappear at a moment's notice**

The critically endangered Fatu Hiva Monarch *Pomarea whitneyi*, locally known *oma'o ke'eke'e* is endemic to Fatu Hiva island in the Marquesas Archipelago. Conservation initiatives by the Ornithological Society of French Polynesia to save the Fatu Hiva Monarch began in 2008 and have since shown promising results.

Activities focus on protecting nesting sites by eliminating the rats which predate on the eggs and chicks, monitoring the birds and their breeding activities, controlling feral cats which predate on the adults and fledglings, and promoting awareness among the islanders.

Recent surveys show that less than 50 Fatu Hiva Mon-



archs are known to survive in the wild, compared to 275 in 2006. The speed of this population decline is alarming, however the speed of the decline has decreased over the last 4 years (60% of pair territories were lost between 2007 and 2009, compared to only 30% between 2009 and 2011).

### **Rats arrive in the 90s: the beginning of the end**

Black Rats (*Rattus rattus*), arrived on Fatu Hiva island hidden in commercial cargo shipments and are to blame for the current situation. They climb tree trunks with ease and attack eggs and birds in their nests. The very high number of rats prevents the Monarchs from successfully raising young, and slowly but surely the population is aging as few young birds survive to become parents themselves. Eradication of rats using anticoagulant bait in specially designed bait stations is the weapon of choice in the struggle to protect the Monarchs in their breeding territories. This method has allowed 17 youngsters to successfully fledge in just 3 years.

### **Promising results from the April 2012 mission**

- at least 3 new fledglings were discovered near breeding pairs living in Ta'i'u Valley in Omoa, bringing a total of 8 new young birds to colonise this sector of the valley in the past 12 months (compared to 1 in 2010, and none in 2008 and 2009)
- the translocation of one pair to a valley only accessible by boat (see further details below)
- the first results of the projects implemented among the landowners of the Monarchs' last stronghold, are very encouraging. Even the most reluctant residents have accepted SOP-Manu's propositions to halt the clearing of habitat in exchange for assistance with their activities (placing rings to rat-proof coconut palms, rat elimination, donations of fruit and sandalwood saplings, training in tree grafting and beekeeping)
- the valley residents have been surveyed in order to evaluate the local change in attitude towards natural heritage and support for the Monarch protection project, by counting the number of female cats owners would be willing to have spayed, and from determining the numbers of people wanting a driveable track into the Ta'i'u valley (56 household opposed, 1 for). The last part of the survey investigates the needs of the local residents to develop certain sustainable activities, which will then be addressed during targeted fundraising efforts.

### **A summary of the translocation of monarchs to Fatu Hiva**

A breeding pair of Monarchs was rediscovered in December 2011, and a team of 4 biologists and technicians translocated them from Hanamo'oe valley, a difficult to access valley. By projecting audio recordings of Monarch vocalisations the female was netted at 16h35, and the male at 17h30. The female was fitted with bands at the time of capture, and as the male was netted at dusk he was rung the next morning. The two birds were placed in specially-designed carrier boxes based on the model used for the Rarotonga Monarch. A boat transfer was arranged for 11am, and reached after an hour-long hike to the coast. The birds were carefully lowered in their carrier boxes to the boat using a long pole, and the team arrived at Hanavave village at 11:45am. After an additional 30 minute hike the long journey was nearly over. Five Hanavave villagers escorted the team to release the Monarchs in their new territory, which had been cleared of rats for several years prior to the operation. The Monarchs endured their 19 hours in the carrier boxes very well, and were released in excellent condition into the Otohama valley.

### **An ongoing concern**

All of these recent successes renew the hope the species can be saved, but the situation remains very critical with only 3 successfully breeding pairs known to exist for the species (the other breeding pairs all appear to be sterile).

A large amount of work still urgently needs to be implemented. Funding granted from Europe and the French Ministry of Environment projects, along with the commitment of local farmers, has allowed a contract field worker to be hired from the local community. This marks the start of a new phase in the efforts to save the Fatu Hiva Monarch. However the hunt for funds to save this species, literally on the edge of extinction, is a never-ending battle. 5 private sponsors came forward following an adoption campaign for the birds rung in 2011. This leaves 9 Fatu Hiva Monarchs still seeking sponsoring (see insert below).

### **Sponsoring a Fatu Hiva Monarch in the Marquesa Islands**

The Fatu Hiva Monarch is a critically endangered passerine bird. Its survival depends entirely on conservation activities, most importantly rat control.

The Ornithological Society of Polynesia (SOP- Manu) is appealing for sponsors for all of the birds presently banded. Each Fatu Hiva Monarch sponsor will receive its biography and an update of its activities in the wild after each field season. (see back page for photograph of Fatu Hiva Monarch)

## Pacific Practitioner Profile



Ian Karika is a very busy man with a long history of championing his country, conservation and the ocean. He is descended from several Chiefly families on Rarotonga and traditional knowledge, genealogies and protocols were a large part of his education and upbringing.

His experiences include travelling Europe as a member of a Cook Islands cultural group and sailing the Pacific in a voyaging canoe. He is President of Te Ipu-karea Society (TIS) an environmental NGO; President of the Cook Islands Voyaging Society; project manager of Takitumu, a native bird sanctuary; Chairman of the Government's Environment Authority; and Councillor on the Convention on Migratory Species.

Although his passion is to voyage the oceans like his ancestor Karika Taraape (circa 1250), Ian is also deeply involved in conservation work and that led him to invasive species management. He is a member of one of the land-owning families, and a former chairman of the landowners' committee, of [Takitumu Conservation Area](#). A visit to the small (roughly 155 ha) but beautiful private reserve, Takitumu Conservation Area in the southeast of Rarotonga is a must for birdwatchers and naturalists alike to enjoy Rarotonga's wealth of natural beauty.

Ian still has a major role managing the Takitumu Conservation Area, a lush tropical forest filled with ferns, shrubs, trees and various flowering plants and home to a variety of orchid species including the rare ground orchid. The conservation area was created to protect the endangered endemic bird species of the island as well as their habitats and is a community-based project managed by local landowners. Procuring land for the reserve posed some problems as land ownership is hereditary among Maoris, and Cook Islands law prohibits

the sale of land. But three families - the Karikas, the Kainukus and the Manavaroas - felt strongly enough to lend their land to the project.

In 1885 Rev.W.W.Gill recorded that the Rarotongan monarch (Kākerōri, or Rarotonga flycatcher, (*Pomarea dimidiata*, EN)), which had formerly been abundant everywhere on the island, had undergone a serious decline and was restricted to remote parts of the inland forest. D.T. Holyoak's survey in 1973 revealed that the population was unlikely to be more than 25. The population began to recover in 1990 with the establishment of predator control and in 2003 the population was 239. The conservation area was established by the landowners in 1996 and with 15 years of intensive management involving predator control and translocation to the nearby rat-free island of Atiu, there are now more than 500 on both Rarotonga and Atiu. The Kākerōri has been downlisted from Critically Endangered to Endangered and now to Vulnerable status in the Cook Islands.

PII, as the Pacific Programme of the Cooperative Initiative on Invasive Species, worked with Ian and others on invasive species management at Takitumu and has continued that relationship with other invasive species management projects that Ian and Te Ipu-karea Society are involved with.

Currently, TIS is preparing for a rodent eradication on Suwarrow Island, a National Park since 1978. The island, a major seabird breeding island, its reef and a six kilometre area around it is under the management of the Cook Islands Government's National Environment Service. The rat eradication project will be carried out in August and early September a relatively dry time of the year and hand-broadcasting of rat bait pellets will be the likely method. The eradication team of five will be Ian as Team Leader, a Technical Advisor from Birdlife International and three local operational personnel.

Ian recently completed PII's Rodent and Cat Eradication Training Course and is now using the PII Resource Kit for Rodent and Cat Eradication to plan, implement and report on this project.

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### **Stakeholder participation:**

Ford-Thompson, A. E. S., Snell, C., Saunders, G. and White, P. C. L. (2012), Stakeholder Participation in Management of Invasive Vertebrates. *Conservation Biology*, 26: 345–356. doi: 10.1111/j.1523-1739.2011.01819.x

Keywords: community-based conservation, invasives, Oceania, participatory conservation

**Abstract:** Stakeholders are increasingly involved in species conservation. We sought to understand what features of a participatory conservation program are associated with its ecological and social outcomes. We conducted a case study of the management of invasive vertebrates in Australia. Invasive vertebrates are a substantial threat to Australia's native species, and stake-



holder participation in their management is often necessary for their control. First, we identified potential influences on the ecological and social outcomes of species conservation programs from the literature. We used this information to devise an interview questionnaire, which we administered to managers of 34 participatory invasive-vertebrate programs. Effects of invasive species were related to program initiator (agency or citizen), reasons for use of a participatory approach, and stakeholder composition. Program initiator was also related to the participation methods used, level of governance (i.e., governed by an agency or citizens), changes in stakeholder interactions, and changes in abundance of invasive species. Ecological and social outcomes were related to changes in abundance of invasive species and stakeholder satisfaction. We identified relations between changes in the number of participants, stakeholder satisfaction, and occurrence of conflict. Potential ways to achieve ecological and social goals include provision of governmental support (e.g., funding) to stakeholders and minimization of gaps in representation of stakeholder groups or individuals to, for example, increase conflict mitigation. Our findings provide guidance for increasing the probability of achieving ecological and social objectives in management of invasive vertebrates and may be applicable to other participatory conservation programs.

#### **Surveillance:**

Epanchin-Niell, R. S., Haight, R. G., Berec, L., Kean, J. M., Liebhold, A. M. (2012), Optimal surveillance and eradication of invasive species in heterogeneous landscapes. *Ecology Letters*, 15: 803-812. doi: 10.1111/j.1461-0248.2012.01800.x

Keywords: Biological invasions; cost efficient; detection; eradication; gypsy moth; *Lymantria dispar*; monitoring; pest management; resource allocation; risk management

**Abstract:** Cost-effective surveillance strategies are needed for efficient responses to biological invasions and must account for the trade-offs between surveillance effort and management costs. Less surveillance may allow greater population growth and spread prior to detection, thereby increasing the costs of damages and control. In addition, surveillance strategies are usually applied in environments under continual invasion pressure where the number, size and location of established populations are unknown prior to detection. We develop a novel modeling framework that accounts for these features of the decision and invasion environment and determines the long term sampling effort that minimises the total expected costs of new invasions. The optimal solution depends on population establishment and growth rates, sample sensitivity, and

sample, eradication, and damage costs. We demonstrate how to optimise surveillance systems under budgetary constraints and find that accounting for spatial heterogeneity in sampling costs and establishment rates can greatly reduce management costs.

#### **Surveillance and monitoring:**

ACERA. 2009. Optimal allocation of resources to emergency response actions for invasive species. Australian Centre of Excellence for Risk Analysis (ACERA), 06/04. (The paper can be accessed at: <http://www.acera.unimelb.edu.au/materials/endorsed/0604-final-report.pdf>)

**Summary:** We apply a cost-benefit decision-theoretic approach to surveillance planning for invasive species. We explore the utility of investment in surveillance through the various phases of invasive species management, answering questions such as:

- How should we target our resources to search for infestations over a heterogeneous landscape?
- When should we prioritise learning about habitat suitability over search and control that is based on current knowledge?
- When should we step down surveillance and declare eradication of the invasive species?
- How can we adapt our decisions to accommodate uncertainty in our parameter estimates and model structures?

We present analytical solutions and rules of thumb where possible, and approximations and numerical solutions where appropriate.

They provide a coherent framework in which to address crucial and urgent management issues relating to the detection, control, containment and eradication of invasive species, as well as a framework in which to assess how successful management has been and how to plan for the future.

#### **Global warming and invasives:**

Eisenhauer, N., Fisichelli, N. A., Frelich, L. E. and Reich, P. B. (2012), Interactive effects of global warming and 'global worming' on the initial establishment of native and exotic herbaceous plant species. *Oikos*, 121: 1121-1133. doi: 10.1111/j.1600-0706.2011.19807.x

The spread of exotic earthworms ('worming') and rising temperatures are expected to alter the biological, chemical and physical properties of many ecosystems, yet little is known about their potential interactive effects. We performed a laboratory microcosm experiment to investigate the effects of earthworms (anecic, endogeic, epigeic, or all three together) and 4°C warming on soil water content, litter turnover and seedling establishment of four native and four exotic herbaceous plant species.

Warming and worming exerted independent as well as interactive effects on soil processes and plant dynamics. Warming reduced the water content of the upper soil layer, but only in the presence of earthworms. Litter removal increased in the presence of earthworms, the effect being most pronounced in the presence of anecic earthworms at ambient temperature. Exotic plant species were most influenced by earthworms (lower seedling number but higher biomass), whereas natives were most sensitive to warming (higher seedling number). This differential response resulted in significant interaction effects of earthworms and warming on abundance and richness of native relative to exotic plants as well as related shifts in plant species composition. Structural

equation modeling allowed us to address possible mechanisms: direct effects of earthworms primarily affected exotic plants, whereas earthworms and warming indirectly and differentially affected native and exotic plants through changes in soil water content and surface litter.

Invasive earthworms and warming are likely to interactively impact abiotic and biotic ecosystem properties. The invasion of epigeic and anecic species could select for plant species able to germinate on bare soil and tolerate drought, with the latter becoming more important in a warmer world. Thus earthworm invasion may result in simplified plant communities of increased susceptibility to the invasion of exotic plants.

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