

RAPID BIODIVERSITY ASSESSMENT (BIORAP) VAVA'U GROUP – KINGDOM OF TONGA

FEBRUARY 2014

SYNTHESIS REPORT KEY FINDINGS AND RECOMMENDATIONS



SPREP
Secretariat of the Pacific Regional
Environment Programme



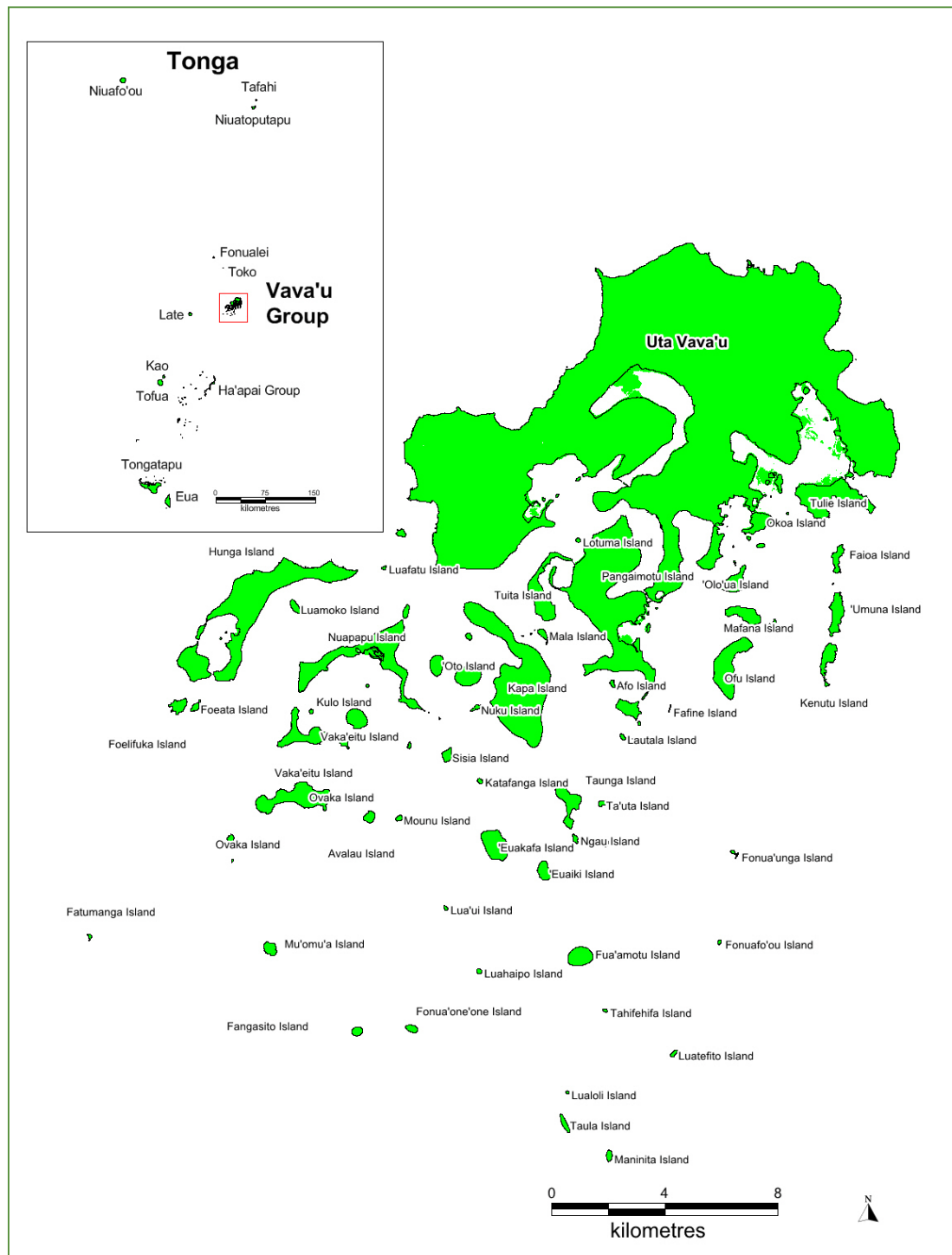


Figure 1: The Vava'u Group in the Kingdom of Tonga.

The BIORAP

What

A BIORAP is a biological inventory programme undertaken in marine and terrestrial environments, and is designed to rapidly assess the biodiversity of highly diverse areas. Options to manage threats and protect biodiversity of national or international significance are recommended to governing communities.

Where and When

The BIORAP took place in selected terrestrial and marine areas across 14 islands of the Vava'u Group in the Kingdom of Tonga during 13–28 February, 2014.

Who

The Secretariat of the Pacific Regional Environment Programme (SPREP) recruited a team of 17 conservation specialists from a diverse range of international institutions to work in partnership with Tongan Government staff and Vava'u Environmental Protection Association, to participate in the survey.

Why

The information gathered provides a scientific basis for empowering communities, relevant government departments, and other partners to make informed

The Vava'u Island Group

Vava'u is the most northern of three main island groups in the Kingdom of Tonga. It comprises the main island of Uta Vava'u (96 square kilometres), a cluster of smaller islands to the south, and three outlying islands to the west (Late Island) and north (Fonualei and Toku Islands). The highest point on Uta Vava'u is 215 metres above sea level, whereas some of the smaller islands are very low and sand-formed. Much of the original forest has been cleared off Uta Vava'u and nearby islands and what remains is largely on steep coastal slopes or inland escarpments. The three volcanic islands of Late, Fonualei and Toku are uninhabited and largely untouched. The Vava'u group forms a beautiful mosaic of islands and reefs and is a significant marine-based tourist destination, particularly when migrating humpback whales are present.

conservation management and planning decisions to ensure the long-term conservation of biodiversity, and the essential ecological services it provides.

During the BIORAP, community involvement and participation in conservation management was strengthened and local staff and scientists were trained in biodiversity survey techniques.

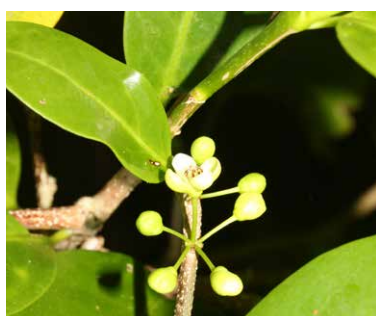
KEY FINDINGS

PLANTS

The survey found 262 native vascular plants including eight species endemic to Tonga, two of which are restricted to Vava'u – *Atractocarpus crosbyi* and *Casearia buelowii* (both pictured below). A total of 12 new species were recorded for Vava'u, and one species (*Boerhavia albiflora*) was a new record for Tonga.



Photos: A. Whistler.



INSECTS

This was the most extensive insect survey conducted in Vava'u. It concentrated on moths, butterflies, dragonflies and ants while other invertebrates were collected for later analysis and reporting. Some of the moths were new records for Tonga and four species of newly-arrived exotic ants were found.



Photo: M.O'Brien.

LAND SNAILS

Forty one land snail species were found including three that are endemic to Tonga. Two of these species *Sinployea paucicosta* and *Sturanya culminans* are only found in Vava'u and were assessed as critically endangered.

REPTILES

Eleven species of lizard were recorded, including the recently arrived invasive common house gecko (*Hemidactylus frenatus*), with the highest diversity found on the main island of 'Uta Vava'u. Only a single individual of the endangered Lau banded iguana (*Brachylophus fasciatus*) was located.

BIRDS

Thirty eight bird species were found including the Tongan whistler (*Pachycephala lajacquiniti*) that is endemic to Vava'u and was found at most sites. The blue-crowned lory (*Vini australis*) located at two sites had not been recorded there for over 100 years. Southern islands in the group support tens of thousands of nesting seabirds.

CORAL REEFS

The Vava'u reefs have a good diversity of hard corals with similar numbers of species recorded per dive as found in Fiji, New Caledonia and American Samoa. The survey identified 95 species of coral that had not previously been reported from Tonga. There was little evidence of coral predation or disease, though a bleaching event was starting to occur.

MARINE INVERTEBRATES

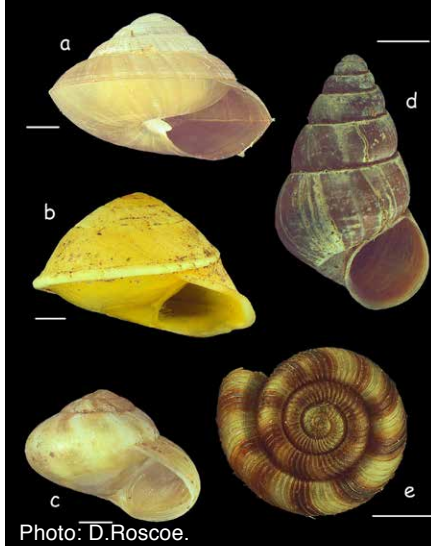
A relatively diverse suite of macro invertebrates was found including new species for Tonga. There was strong evidence of over-harvesting of commercially valuable sea cucumbers and clams.

FISH

Four hundred and six species of reef fish were recorded including 226 species that are targeted by people for harvest. Low numbers of predatory fish species at most sites indicated strong signs of overfishing.

CETACEANS AND MARINE TURTLES

The Vava'u group is well known as a site for humpback whale (*Megaptera novaeangliae*) watching, although the whales were on their Antarctic summer feeding grounds at the time of the BIORAP. The survey located groups of three smaller cetaceans, spinner dolphin (*Stenella longirostris*), short-finned pilot whale (*Globicephala macrorhynchus*) and bottlenose dolphin (*Tursiops* sp.), that had already been reported from Tonga, and recorded two further species – Cuvier's beaked whale (*Ziphius cavirostris*) and rough-toothed dolphin (*Steno bredanensis*) that had not been previously recorded there. A small number of turtles were seen, and these were mostly green turtles (*Chelonia mydas*). The island group has important nesting sites for hawksbill turtles (*Eretmochelys imbricata*).



RECOMMENDATIONS

The findings of this BIORAP survey have identified or re-confirmed the critical importance of the biodiversity and terrestrial and marine ecosystems of Vava'u, and the urgent need for follow-up activities to manage and mitigate threats.

Key recommendations included:

CONSERVATION OF SITES OF SIGNIFICANT VALUE

Many areas on 'Uta Vava'u and the outlying islands retain significant natural values, and 22 sites were identified as priorities (refer to figure 2). These are detailed further on in this document. These can be grouped into six sites important for terrestrial conservation, 12 important for marine conservation, and four for both. These sites are supported by the Governor of Vava'u and the Government of Tonga for follow up actions .

CONSERVATION OF THREATENED SPECIES

- **Conserve rare plants.** Collect seeds and propagate *Casearia buelowii* found only on Mt Talau. The endemic *Atractocarpus crosbyi*, *Serianthes melanisca* and *Syzygium crosbyi* should also be propagated.
- **Protect critically endangered land snails.** Conserve the habitats of *Sinployea paucicosta* and *Sturanya culminans* and undertake surveys to determine if *Lamprocystis vavauensis*, *Thaumatodon vavauensis* and *Tuimalila infundibulus* are still extant.
- **Survey for threatened butterflies and their host plants.** The Tongan leafwing butterfly (*Doleschallia tongana tongana*) was not found during the survey and the Fiji glasswing butterfly (*Acraea andromacha polynesiaca*) is considered possibly extinct.
- **Survey for the Lau banded iguana** to identify their distribution and abundance. Only a single individual was found during the survey and this species is considered endangered with a declining population.
- **Protect Maori wrasse (*Cheilinus undulatus*), humphead parrotfish (*Bolbometopon muricatum*) and all sharks.** These require legal protection as they are vital for ecosystem function and are an important element for the dive tourism industry.

- **Study and protect endemic fish species.** The BIORAP identified nine species endemic to Tonga that require further study, population monitoring and protection.
- **Improve protection for humpback whale critical habitat.** Work commissioned for the BIORAP identified key areas for humpback whale mothers and calves and other social groupings.

MANAGEMENT OF MARINE RESOURCES

- **Support continued closure of fishery for commercially valuable sea cucumbers.**
- **Assess stocks of giant clams, sea cucumbers and trochus.**
- **Introduce new fishery regulations and improve compliance.** Regulations that should be considered include: banning spearfishing with scuba and at night; prohibiting the use of small-sized mesh (under 45mm) gillnets and introducing length and width restrictions; regulating the quantity of fish caught per person or per boat per trip; adding maximum sizes of fish to be taken, as well as minimum sizes. Compliance with regulations needs to be improved through education and enforcement.

INVASIVE SPECIES

- **Conduct baseline assessment of priority species, then monitor any spread.** Species to be targeted include rats, goats, pigs, yellow crazy ants and weeds with an emphasis on the priority sites for conservation.
- **Increase community awareness and support for invasive species management.** Training on biosecurity should alert landowners, resource owners and tourism operators to the risks posed by invasive species and the need to prevent their spread.
- **Manage rats at key sites.** Surveys are needed to confirm if Maninita, Taula and Lualoli – sites of previous eradication work – remain free of rats. If not, a further eradication should be carried out. Management of rats through sustained control could be carried out at Mt Talau or other sites if there is support for this from communities and landowners.

PUBLIC AWARENESS

- **Raise awareness of the conservation values and threats to the biodiversity of Vava'u** through discussions and awareness and education programmes with landowners, communities, resource owners and tourism operators on the management of significant sites.
- **Gain knowledge on cetaceans other than humpback whales** by encouraging whale-watch operators and regular sea users to record observations.
- **Develop Mt Talau as a site for education and public awareness** through interpretation and nature trails.

LEGISLATION

- **Raise awareness of environmental laws and regulations and increase enforcement.** Key examples include those covering the harvesting of birds, fish, flying foxes and turtles; managing extraction of resources; and regulating developments such as new resorts (including requirements for Environmental Impact Assessments).

INCREASE KNOWLEDGE OF BIODIVERSITY

- **Survey sites and habitats not visited.** These include the three distant offshore islands Late, Fonualei and Toku that were not visited by one or more teams, and wetlands including mangroves. Forest at the northern tips of Kapa and Nuapapu Islands could be checked to see whether there was continuity between the birds at Mo'ungalafa and those at A'a and Oto Islands (eg for the friendly ground dove).
- **Carry out research on priority species.** These include blue-crowned lory and friendly ground dove; endangered land snails; the Lau banded iguana; and plants (61 species) found in Vava'u in the past but not during the BIORAP. More comprehensive marine macro invertebrate species surveys by specialised taxonomists are needed.
- **Monitor coral bleaching events.**
- **Conduct surveys of traditional knowledge** of local people on their relationships with the environment and natural resources.

ECOTOURISM

- **Prepare and implement a sustainable development plan for ecotourism** through a partnership between Tonga Visitors Bureau, Tongan Government Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication (MECCDMMIC), Vava'u Environment Protection Association (VEPA), resource owners, tour operators and communities.
- **Manage ecotourism** to ensure vulnerable and special island values are not damaged – e.g. large seabird colonies such as Maninita.
- **Protect humpback whale critical habitat** by ensuring that whale-watching activities comply with the regulations and are conducted in a responsible manner, especially in areas critical for mothers and calves.

LAND-BASE SOURCES OF POLLUTION

- **Reduce runoff of sediments, nutrients and pollutants** by appropriate management of land.
- **Retain and replant mangroves** to reduce runoff from coastal developments.
- **Monitor runoff from developments** as covered by EIA regulations.



Southern coast of 'Uta Vava'u showing mangrove areas not surveyed. Photo: D. Butler.

PRIORITY SITES FOR PROTECTING THE BIODIVERSITY OF VAVA'U

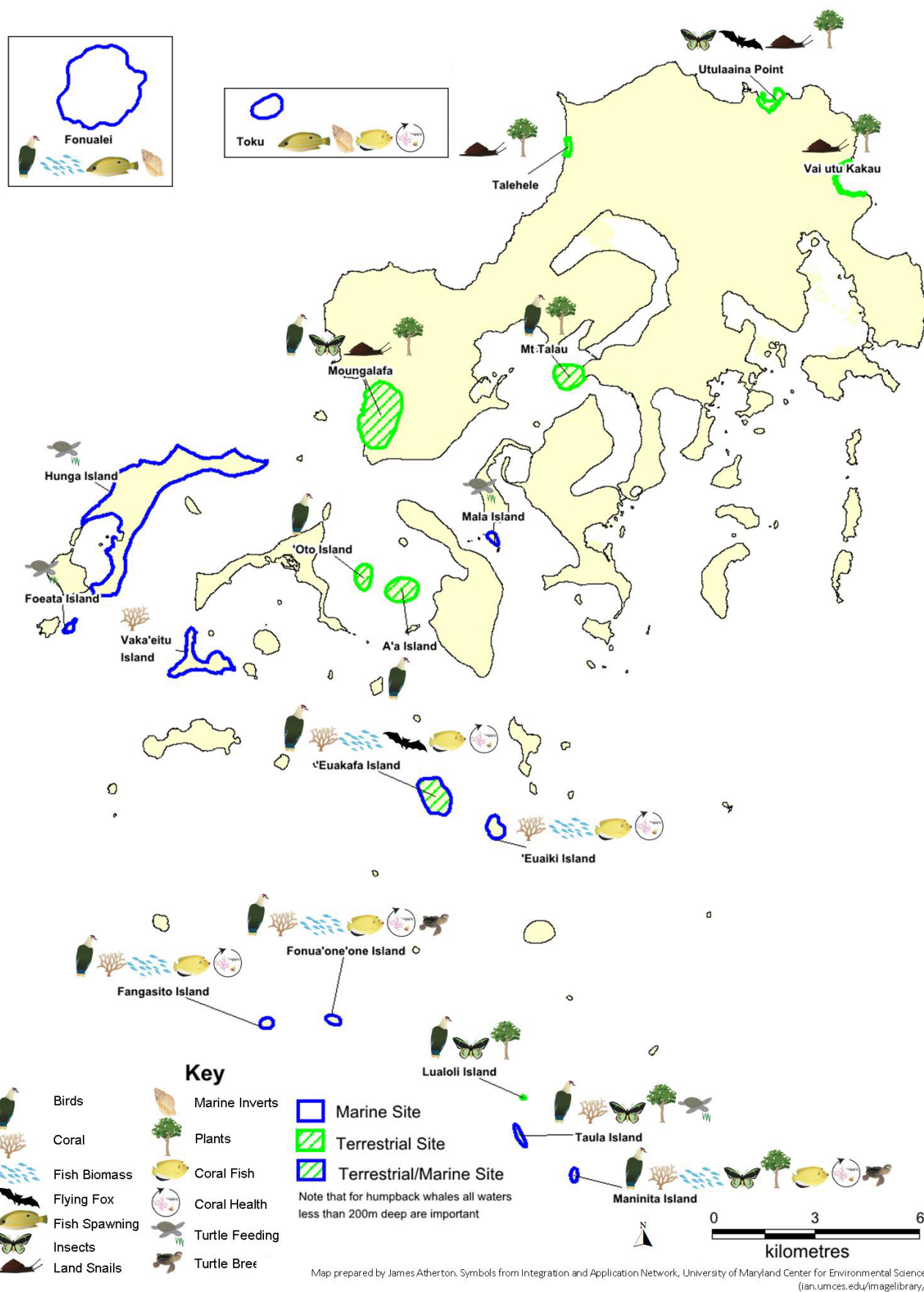


Figure 2: Recommended sites for marine and terrestrial conservation in Vava'u.
Details for these priority sites are presented on the following pages.

PRIORITY SITES: BOTH TERRESTRIAL AND MARINE

'Euakafa Island

Key values to be protected:

Terrestrial values – 'Euakafa was rated as one of two islands with the best vegetation. The slopes and upper areas are covered with relatively undisturbed forest; and the sheltered coastal forest is rich in butterflies; and the rare blue-crowned lory is present. The island is apparently free of ship rats (*Rattus rattus*).

Marine values – This site had the highest richness of marine non-cryptic macro invertebrates; a fringing reef with complex habitats; high coral and reef fish diversity and biomass; and was one of four sites with the most threatened (IUCN-red listed) fish species.

Recommended Actions:

The key threats that need to be managed are forest clearance for resort and housing development, the introduction of invasive species, and over-harvesting of marine resources.

Maninita, Taula and Lualoli Islands

Key values to be protected:

Terrestrial values – These islands are listed as an Important Bird Area (IBA) providing nesting habitat for colonies composed of thousands of noddies and terns. They may be free of rats following eradication programmes in 2002 but this needs to be confirmed. The native *Pisonia* forest has distinctive insect associations which are likely to be associated with both its abundance of seabirds and current lack of rodents. Several plants found on Maninita are rare elsewhere in Tonga, including *Sesbania coccinea* (ohai), *Boerhavia albiflora* (a new record for Tonga), *Portula calutea* (tamole; a new record for Vava'u), *Sesuvium portulacastrum* (a new record for Vava'u), and *Suriana maritima* (rare in Vava'u).



Marine values – The islands' beaches are used by nesting turtles. Maninita had one of the four best reef areas with high coral diversity, coral cover and reef fish diversity including more larger fish. It was the third richest site for macro invertebrates; and the only site where the threatened fish, *Plectropomus leopardus*, was found.

Recommended Actions:

These islands are good candidates for a combined terrestrial and marine conservation area in which two key threats are managed in cooperation with resource users and tourism operators: the over-harvesting of resources (marine life, turtles and their eggs, seabirds) and the accidental introduction of invasive species particularly rats, ants and weeds.

Other Southern Islands

Key values to be protected:

The marine survey identified Fangasito and Fonua'one'one Islands as priorities – the former for its biomass of marine invertebrates, fish and fish breeding spawning aggregations, and the latter for corals, reef health, fish biomass, whales and turtle nesting. The terrestrial team only visited Maninita, Taula and Lualoli, however, observations from a boat identified that Fangasito and Fonua'one'one held hundreds of nesting noddies and terns. Other southern islands like Lua'ui and Luahaipo appeared to hold thousands of these birds.

Recommended Actions:

The values of these islands may be protected through the establishment of a wider conservation area to form a buffer around key sites centred on Maninita, Taula and Lualoli. Surveys are recommended to confirm whether or not rats are present on the different islands and to implement control or eradication programmes.



Maninita, Taula and Lualoli from the air (top right to bottom left).
Photo: D. Butler.

Fonualei Island

Key values to be protected:

This relatively inaccessible island was identified as an important site for marine conservation based on high numbers of marine invertebrates and fish, and fish breeding and spawning associations. It was not visited by the terrestrial BIORAP team, however it has been previously identified as an Important Bird Area, and a survey in 2013 confirmed its significance as one of only two sites for the endangered Polynesian megapode (*Megapodius pritchardi*). It also supports many nesting seabirds.

Recommended Actions:

It is recommended to assess the benefits of giving the island and surrounding marine area protected area status e.g. a reserve with landing by permit only. The emphasis of management needs to be to prevent the arrival of invasive species.

PRIORITY SITES: TERRESTRIAL

Mt Mo'ungalafa

Key values to be protected:

This site had the highest all-round value to a range of terrestrial plants and animals. It has native forest with a high diversity of tree species; the bluffs were identified as one of four key sites for land snails, including two critically endangered species; the raised limestone platforms are important for invertebrates; and two rare birds were present including the blue-crowned lory (one of two sites) and friendly ground dove (*Gallicolumba stairii*) (one of three sites).

Recommended Actions:

- Seek to negotiate some form of protection for the remaining forests.
- Discuss the feasibility of fencing cattle out of the forests.
- Assess and implement invasive species management to protect biodiversity, for example rat control.

Protected Areas protect people

'Protected Areas' are not about locking up and excessively controlling resource use. They can be sustainable-use areas. Protected Area management has at its core national and local circumstances with the view to securing both biodiversity, and a healthy island with food and water security, incomes and livelihoods into the future.



Fonualei Island from the air. Photo: D. Butler.

Mt Talau

Key values to be protected:

This is a very accessible site that has been named, but not gazetted as a National Park. A significant area of native forest exists and includes the only known location for the rarest and most threatened plant species in Tonga, *Casearia buelowii*. It also hosts a good range of forest animals including the endemic Tongan whistler.

Recommended Actions:

- Formally designate the National Park listing within Tongan legislation.
- Develop a National Park management plan.
- Prevent any further forest clearance.
- Work with VEPA to utilise the area for education and awareness raising purposes.
- Assess options for implementing a tree planting programme.
- Assess community support for a rat control programme.
- Implement suitable invasive species control measures so as to protect biodiversity values.

Utula'aina Point

Key values to be protected:

This is the highest quality, most extensive area of undisturbed lowland coastal forest on 'Uta Vava'u, and is largely free of weeds. It is one of four priority sites for land snails including two critically endangered species; has good invertebrate diversity; a range of forest birds; and a flying fox colony.

Recommended Actions:

- Seek protection for forests through designation of a conservation area with a management agreement.
- Investigate possible links to a marine conservation area.

Vai Utu Kakau

Key values to be protected:

This area contains relatively unmodified native forest and was one of four priority sites for land snails, forest birds and invertebrates.

Recommended Action:

Seek protection for the forest through designation of a conservation area with a management agreement.

Talehele

Key values to be protected:

This area of forest on the coastal cliffs contained the highest number of native land-snail species. It was not visited by other teams.

Recommended Actions:

- Seek protection for forests here and on adjacent bluffs.
- Assess the site's values for other species groups.
- Assess and implement invasive species management to protect the biodiversity values as required.

Oto and A'a Islands

Key values to be protected: The raised limestone islands that are difficult to access hold relatively undisturbed examples of lowland forest, and includes two of the three sites where friendly ground doves were found.

Recommended Actions:

- Hold discussions with the local community who use the islands to raise pigs and goats to see if it could be negotiated to remove these animals from the islands, so as to protect biodiversity.
- Assess whether rats are present on the islands and consider if their eradication would be feasible to benefit the friendly ground doves.



Aerial view of Utula'aina coast of Uta Vava'u, a significant site for conservation. Photo: S.Chape.

PRIORITY SITES: MARINE

Toku Island (including exposed oceanic pinnacle at Joe's Spit)

Key values to be protected:

This was one of four priority sites identified for coral reef conservation. It had the highest diversity and abundance of reef fish; highest numbers of commercial fish; highest density of clams; good numbers of other macro invertebrates; and was an important fish spawning area.

Recommended Actions:

- Include within a system of marine managed or protected areas.
- Carry out a survey of its terrestrial values (not visited by the terrestrial team during the BIORAP).



Toku Island from the air. Photo: D. Butler.

‘Euaiki Island

This island had similar values to ‘Euakafa Island and these could be considered together as a marine managed or protected area.

Foelifuka, Foeata, Hunga, Lape, Lua’ui, Mala Islands

The waters off these islands were all identified as important foraging areas for turtles or for humpback whale mothers with calves. Most shallow waters within the Vava’u group should be considered in strategies to protect whales and foster a sustainable whale-watching industry, including allowing less disturbance during resting, nursing and mating; reducing risks of damage by boats (for example through speed reductions) or entanglement in nets (for example by seasonal gill net bans within humpback whale habitat); and minimise habitat modification.

Managing threats to marine sites

The following management practices were suggested for priority marine sites: reduce fishing pressure and encourage good practices; further protect reproduction (e.g. spawning areas) to ensure stock recovery; create protected areas that will allow resource recovery while benefitting adjacent fisheries through the spill over effect; implement raising awareness and involving communities in the management of their resources, propose incentives for alternative livelihoods and raising funds for conservation.

Acknowledgements

The Vava'u BIORAP would not have been possible without the help and assistance of many people. Thank you to the resource owners and communities of Vava'u for giving permission for the survey to be conducted on their beautiful islands. The BIORAP was designed, planned and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP).

Other partners who assisted with logistical and technical support included the Waitt Foundation, New Zealand Department of Conservation, Birdlife International – Pacific Islands Programme, US Geological Survey, and Vava'u Environment Protection Association (VEPA).

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Synthesis compiled by R&D Environmental Ltd.

For detailed information and results please refer to the full BIORAP report *Rapid Biodiversity Assessment of the Vava'u Archipelago, Kingdom of Tonga*.

For more information on the BIORAP methods refer to the *Guidelines for Undertaking Rapid Biodiversity Assessments in Terrestrial and Marine Environments in the Pacific* (SPREP & Wildlands, 2014)

www.sprep.org

Front cover images: Tongan whistler (M. Kelly); the rare coral *Echinomorpha nishihirai* (Douglas Fenner); Vava'u islands (Stuart Chape).
Background image: Vava'u islands from the air (Stuart Chape).

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