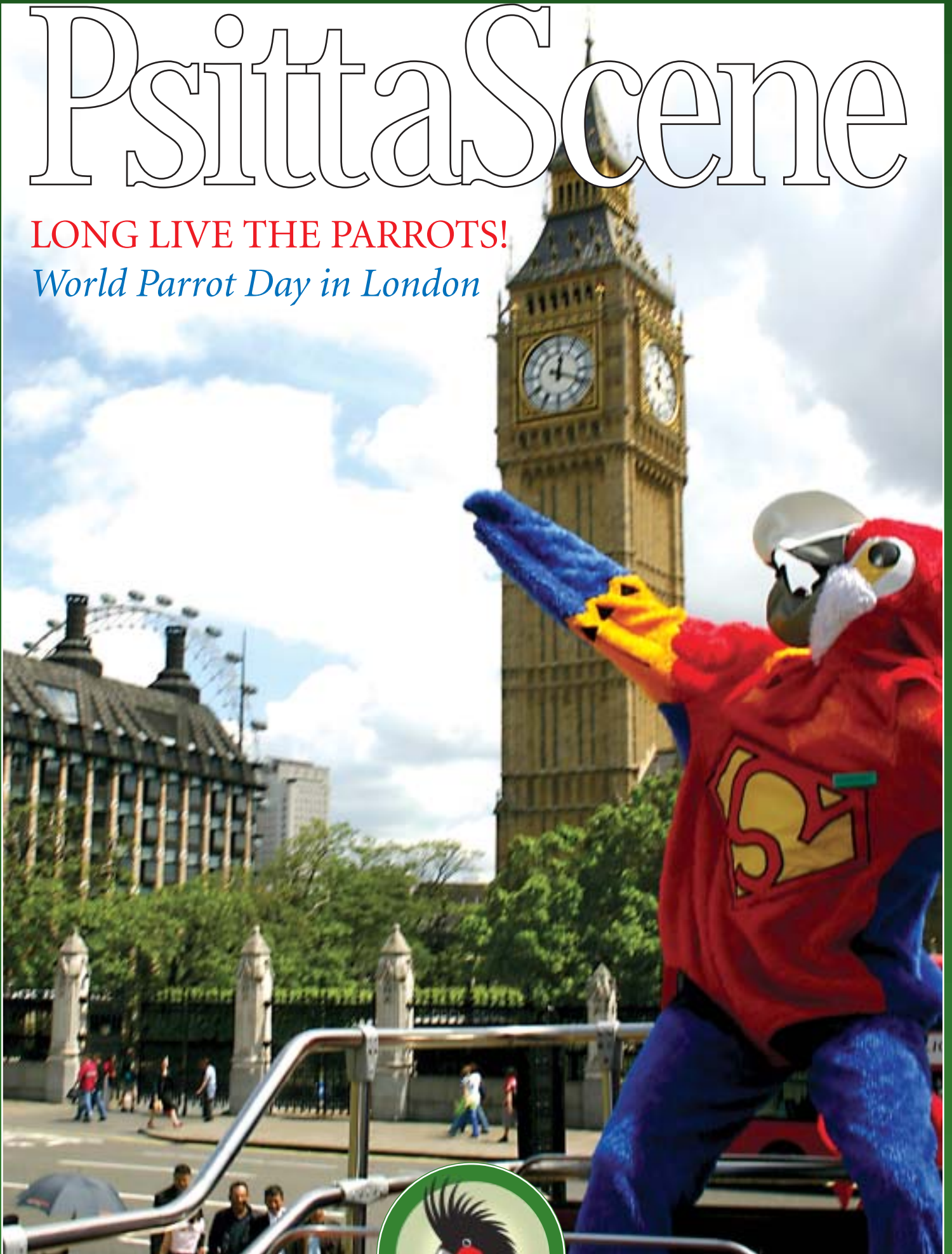


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Conservation of the Ultramarine Lory in the Marquesas Islands

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Scattered across the South Pacific seas on palm tree covered islands surrounded by tropical, turquoise blue waters are a group of lorikeets fittingly as spectacular as their surroundings. Described by numerous adventurers and naturalists to this part of the world as amongst the most beautiful of all birds, the *Vini* genus consists of five charismatic, colourful species.

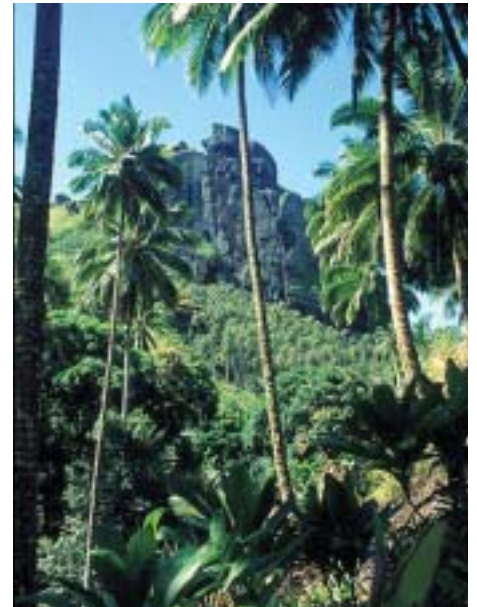
Beneath the veneer of their tropical island paradise, however, lies an environmental crisis. In historic times the Pacific islands claim the highest rate of bird extinction as a proportion of total species of any region on the planet. So pronounced is this loss that since the arrival of humans to the islands of eastern Polynesia, more landbirds have become extinct than currently exist (Steadman 1989).

Island birds are particularly susceptible to human-induced changes because of their naturally small population sizes, their vulnerability to small environmental changes and their ecological naivety with respect to introduced species. The plight of the South Pacific's birds is highlighted by its parrot species, particularly the *Vini* genus of lorikeets. Four of the five *Vini* species are considered endangered or vulnerable to extinction (IUCN 2000) while two species, *V. sinotoi* and *V. vidivici* have become extinct since human occupation of the region began (Steadman 1989).

Threatening processes

The threats the lorikeets face are familiar: habitat loss and degradation due to overgrazing, logging, agriculture and weed infestation, hunting for food, feathers and the pet trade and the introduction of alien species that compete with or prey on the native fauna.

Of all introduced species the main threat to *Vini* populations is from rats, particularly as nest predators. Black rats (*Rattus rattus*) in particular, owing to their agility and arboreal nature, have decimated populations of various birds on many islands throughout the Pacific and beyond (Atkinson 1985; Martin *et al.* 2000). The decline of many *Vini* lorikeet populations in the recent past has closely paralleled the progressive establishment of black rats on islands within their range. Lorikeets are particularly susceptible to nest predation because they nest in tree hollows which black rats also readily use as nesting and



Coconut and mango plantation in Hanavave valley, Fatu Iva

Photo: Mark Ziembicki.

roosting sites. The effects of rats are especially pervasive in areas where nesting hollows are limited, where rat numbers are high and where habitat fragmentation amplifies the effects of predation and competition in remaining favourable habitats.

A spectacular bird

Endemic to the Marquesas Islands of French Polynesia, where it is known locally as the pihiti, the Ultramarine Lorikeet (*Vini ultramarina*), is arguably amongst the most spectacular of birds. Few species so vibrantly reflect their tropical island settings as this little gem with hues of blue so vivid and dazzling, to borrow the words of Michael Parfit, they "bring the essence of the sea right into the treetops". However, like all gems the pihiti is rare, so much so that it is considered one of the most endangered of lorikeets.

In the mid 1970s the species occurred on three Marquesan Islands, Ua Pou, Nuku Hiva and Ua Huka. Coinciding with the establishment of black rats, populations on Ua Pou and Nuku Hiva underwent a catastrophic decline such that by the late 1990s only a few individuals survived on the two islands, with only one relatively healthy population on the small rat-free island of Ua Huka remaining. To stay ahead of the threat posed by rats, between 1992 and 1994 a translocation of 29 birds was conducted from Ua Huka to Fatu Iva, the southern most island in the Marquesas (Kuehler *et al.* 1997). Although by 1997 numbers had increased (Liebermann *et al.*



Ultramarine lorikeet feeding on the fruits of *Pometia pinnata*.

Photo: Tim Laman

1997), black rats became established in the mid-late 1990s and the population has subsequently declined and is now on the brink of local extinction (Ziembicki et al. 2003).

There have been no detailed studies of the biology or conservation requirements of the Ultramarine lorikeet. The species has been reported predominantly in montane forests, though is also common in banana, coconut and mango plantations in coastal areas (Holyoak and Thibault 1984). Like most lorikeets its diet consists predominantly of pollen, fruit and nectar, though there is no information on the relative importance of food types or seasonal preferences. Nesting is reported between June and August though they quite likely breed all year round, with young being sighted in January and February (R.Sulpice, pers. comm.). They use tree hollows or holes in old coconuts for nests and usually lay two eggs.

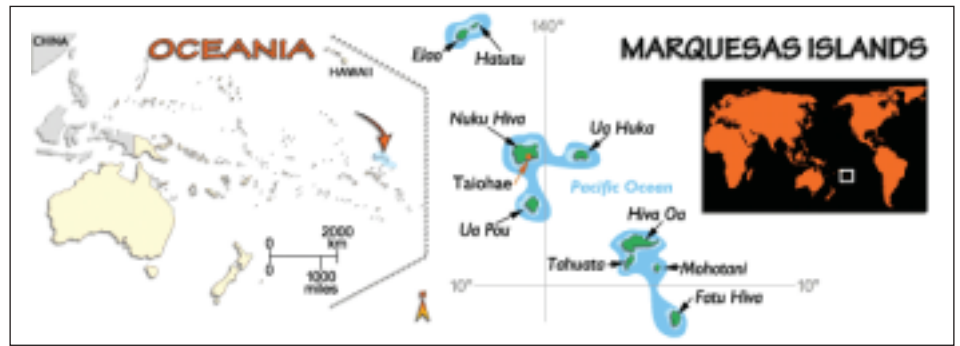
Research and conservation efforts

In an effort to establish the current status of Ultramarine Lorikeet populations and to address the threat posed by introduced rats in the Marquesas Islands we initiated the first stage in a research and conservation program designed to increase our understanding of the species' biology and conservation requirements and to reverse or at least stabilise the species' population decline.

Accordingly, our project's main aims were to:

- determine the current status and distribution of the species' populations on each island within its range;
- gather basic information on habitat use and ecology of lorikeets with particular emphasis on feeding and nesting requirements;
- confirm the rat-free status of Ua Huka and introduce measures to prevent the introduction of rats to the island;
- determine the distribution and density of rats on Fatu Iva and evaluate the feasibility of a rat eradication program on the island;
- introduce measures to counter the threat posed by nest predation by black rats on Fatu Iva and assess the feasibility of such measures on Ua Pou and Nuku Hiva;
- raise awareness amongst the community of the status, plight and threats to the Ultramarine Lorikeet and other birds of the Marquesas Islands.

The study was conducted on the four islands within the pihiti's contemporary range; Nuku Hiva, Ua Pou, Ua Huka and



Fatu Iva in the Marquesas archipelago of French Polynesia. The Marquesas Islands are amongst the most geographically isolated groups of oceanic islands, situated in the south-east Pacific Ocean about 4,850km from Mexico, the nearest continental region, and 1,400 km from the French Polynesian capital of Papeete. There are twelve islands in the group stretching 350 km from north-west to south-east, of which six are inhabited with a total population of 7,500 people. The islands are small, volcanic outcrops characterised by rugged, irregular relief, and variable climate that has resulted in diverse microhabitats on the islands with vegetation varying from low altitude dry shrubland, grasslands and forest to rainforest and cloud forest on the upper windward slopes and summits. Many of the islands are intensively grazed by introduced herbivores (goats, cattle, sheep and horses) and are subject to sporadic fires and cyclones resulting in large areas of grassland and weed infestation. Villages have extensive cultivated gardens that include many introduced fruiting and flowering plants and most village families have additional small plots nearby that consist predominantly of coconut palms, banana, papaya, breadfruit and mango plantations.

Distribution and population estimates

To estimate the population size of lorikeet on the island of Ua Huka lorikeets were surveyed by establishing fixed line transects in each of six broad habitat associations on the island and then relating density estimates in each habitat to the availability of that habitat type as determined by vegetation mapping and aerial photography. We estimate that the island currently supports a population of approximately 2,375 individuals with a minimum of 1,763 and maximum of 2,987. Highest densities occurred in the botanic gardens and in coconut and fruit tree plantations. Although the population on Ua Huka is still relatively robust it is nonetheless highly vulnerable should rats ever reach the island with similar populations on islands in the past crashing within 20 years of a rat introduction.

The low numbers of lorikeets on the islands of Nuku Hiva, Ua Pou and Fatu Iva precluded the employment of line transects as used on Ua Huka. Instead, extensive searches were conducted through most likely habitats on these islands. Interviews with locals were conducted and proved an effective means of gathering information on likely sighting locations and patterns of decline in pihiti numbers over time. Despite intensive efforts no lorikeets were observed on Nuku Hiva while in a week of searching only one individual was located in the upper reaches of a valley on Ua Pou. In a three week period on Fatu Iva only eight observations of lorikeets were made of either single individuals or pairs. All observations were in the same general vicinity on the island, therefore, it is quite likely that the same birds were repeatedly sighted. According to our observations we estimate that less than ten and possibly as few as three individuals remain on Fatu Iva.

Aspects of the feeding and nesting ecology

To understand more about the biology of the pihiti we also studied aspects of its feeding and nesting preferences. Foraging observations were made during transect surveys and opportunistically whenever possible. Consumption of a total of 29 food items was observed with four food resources accounting for more than half of all feeding observations including mango fruit and pollen and nectar from coconut



The Tahiti Blue Lory has disappeared from 15 of the 23 islands from which it was known.

Photo: Rosemary Low

palm, banana and native *Hibiscus tileaceus* flowers.

Potential nest sites of lorikeets on Ua Huka were located by searches, opportunistic sightings and consultation with local landowners. Since the main aim was to determine the lorikeet's potential preferences for tree types so that artificial nests could be strategically deployed in favoured nesting trees we defined nest use broadly as an observation of one or two individuals actively exploring or using a tree hollow even though actual nesting may not have occurred. Lorikeets were observed on eight occasions using or exploring nest cavities in four species of trees, namely, *Artocarpus altilis*, *Pometia pinnata*, *Pandanus tectorius*, and *Hibiscus tileaceus*.

Rat surveys

On Ua Huka rat surveys were conducted to confirm the rat free status of the island and focussed on the island's main villages on the premise that should rats occur on the island they would most likely first be established in a populated centre. Only Pacific rats (*Rattus exulans*) and domestic house mice (*Mus musculus*) were trapped.

In the Punahitahi valley on Fatu Iva we trapped rats as part of a collaborative program with the Fatu Iva Monarch Conservation Project, a project also run by the *Société d'Ornithologie de Polynésie* to help conserve this critically endangered Fatu Iva endemic (Blanvillain and Ziembicki 2002). In total four rats were trapped on Fatu Iva; two Pacific rats and two Black rats. The date of the arrival and establishment of the black rat population on the island believed to have occurred in the mid-late 1990s. Although the extent of their distribution over the island is not known it is likely that it by now extends over the entire island. The size and rugged topography of Fatu Iva prohibit a rat eradication program for the island. However, concerted and strategically deployed rat control programs maybe an effective means of controlling rat numbers in specific areas. The greatest potential and need for such programs are in areas favoured by pihiti and the Fatu Iva monarch and those areas where it is in the interests of locals to control rat populations (e.g. coconut plantations). It is in such an area that our control efforts in the Punahitahi valley were made.

Conservation efforts

Conservation actions were concentrated on the islands of Fatu Iva and Ua Huka. The highest conservation priority for the pihiti is preventing the introduction of black rats to Ua Huka owing to the island's robust pihiti population and current rat-free status.



Photo: Tim Lamun

Installing an artificial nest box in the botanic gardens, Ua Huka.

The greatest chance of accidental introduction of rats to Ua Huka is through stowaways in cargo that arrive by ship to the island. To minimise this possibility we provided the local council with live rat traps that are deployed around the wharf area.

Our efforts on the island of Fatu Iva focussed on eradicating rats from the Punahitahi valley - site of repeated pihiti observations and favourable nesting trees, by deploying bait stations at regular lengths along the upper reaches of the valley. We also aimed to provide safe nesting areas by deploying artificial rat proof nest boxes and rendering potential nest trees inaccessible to rats. Nests consisted of PVC pipe and were placed at heights ranging from 8-20 metres in trees identified as preferred for nesting by the pihiti. Searches were made for nesting trees on the island of Fatu Iva within the region where lorikeets were most commonly observed. Although no active nest trees were found, potential trees with nest hollows that might be favoured by lorikeets and that were relatively isolated from other trees were protected using tree guards consisting of a 50cm wide strip of thin metal sheeting placed at least 2 metres above the base of the tree. Where trees were within close proximity to other vegetation, branches were removed to ensure rats could not climb or jump across to them.

Unfortunately, because of time constraints and the difficulties and expense associated with regularly returning to the Marquesas Islands, we have not had a chance to adequately assess the progress of our conservation actions to date. Of particular interest is whether lorikeets have come to use the artificial nest boxes that were provided on Ua Huka and Fatu Iva and whether rat densities have decreased

significantly and pihiti breeding success increased in Punahitahi valley on Fatu Iva following rat control efforts.

Community involvement and education

We profited greatly through consultation and collaboration with locals and collected valuable information regarding the distribution, historical status and feeding and nesting biology of the species through conversations and interviews with a range of local inhabitants. Several individuals were more closely involved with the project by acting as guides and sharing their knowledge of the natural history of the islands and one was employed to conduct rat control on Fatu Iva. Involvement of locals also allowed for raising awareness among the islanders of the plight of the pihiti and other Marquesan birds on their islands as well as the health, agricultural and environmental problems posed by rats. Distribution of posters of the pihiti and other local birds to schools and community centres, and discussions in the course of our work with community leaders, including teachers, police, government employees and landowners, also contributed to the community education campaign.

Future research and conservation

Our efforts represent the first stage in a research and conservation program required for the pihiti. Future research priorities will require examining the habitat requirements, nesting biology and foraging ecology of the Ultramarine Lorikeet over broader time periods. Similarly, a more thorough understanding of the distribution

and biology of black rats and their effects on *Vini* lorikeets and other birds in the Marquesas is required.

The simplest, most cost-effective and urgent conservation priority for the Ultramarine Lorikeet is preventing the introduction of black rats to the island of Ua Huka. The apparent failure of the Fatu Iva translocation and the vulnerability of the Ua Huka population suggests serious consideration should be given to initiating a translocation of pihiti to another island, most suitably Mohotani. This island is uninhabited, is believed to be rat-free and has apparently suitable habitat. However, before any such undertaking more research into the species' biology, habitat requirements and the suitability of Mohotani is required. Conservation efforts for the remaining lorikeet populations on Ua Pou, Fatu Iva and Nuku Hiva will require long term, labour intensive and expensive action if these populations are to be saved from the threat of rats. Such efforts will rely on sustained funding and involvement and training of locals. There is some scope and interest for such programs on Ua Pou and Fatu Iva. Significantly, there are currently very few opportunities for involving and training of locals in wildlife management and conservation issues in the Marquesas Islands and the Pacific islands more generally. Local capacity building is vital for the long term conservation and management of the fragile paradise of the tropical Pacific islands and its birds.

Acknowledgements

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Photo: Rosemary Low

The feathers of Kuhl's Lorikeet (*Vini kuhlii*) were once prized by islanders for costume adornments.

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Photo: Katherine Renton

Lilac-crowned Parrot.

Two more parrot species proposed for inclusion in CITES Appendix I

In preparation to the forthcoming Thirteenth Meeting of the Conference of the Parties (CITES) two endangered parrot species and their subspecies have been proposed for the inclusion in Appendix I:

Sulphur-crested Cockatoo (*Cacatua sulphurea*) and the Lilac-crowned Amazon (*Amazona finschi*) whose wild populations have been greatly reduced from extensive

trapping and loss of habitat.

We would like to thank the governments of Indonesia and Mexico for recognizing the need for the highest level of international protection for these species, and a special thank you goes to

BirdLife-Indonesia, ProFauna Indonesia and Defenders of Wildlife for providing a strong scientific support to these proposals.

