



Société d'Ornithologie de Polynésie



## Fatu Hiva Monarch Action Plan (*Pomarea whitneyi*) 2013-2017

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Published by  
Société d'Ornithologie de Polynésie, SOP Manu  
BP 7023, Taravao, Tahiti, French Polynesia

March 2013

1<sup>st</sup> Draft



# Fatu Hiva Monarch Action Plan (*Pomarea whitneyi*) 2013-2017

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**Family** Monarchidae

**Scientific name** *Pomarea whitneyi* (Murphy & Mathews, 1928)

**Common name** Fatu Hiva monarch – Marquesan : ‘oma’o ke’eke’e

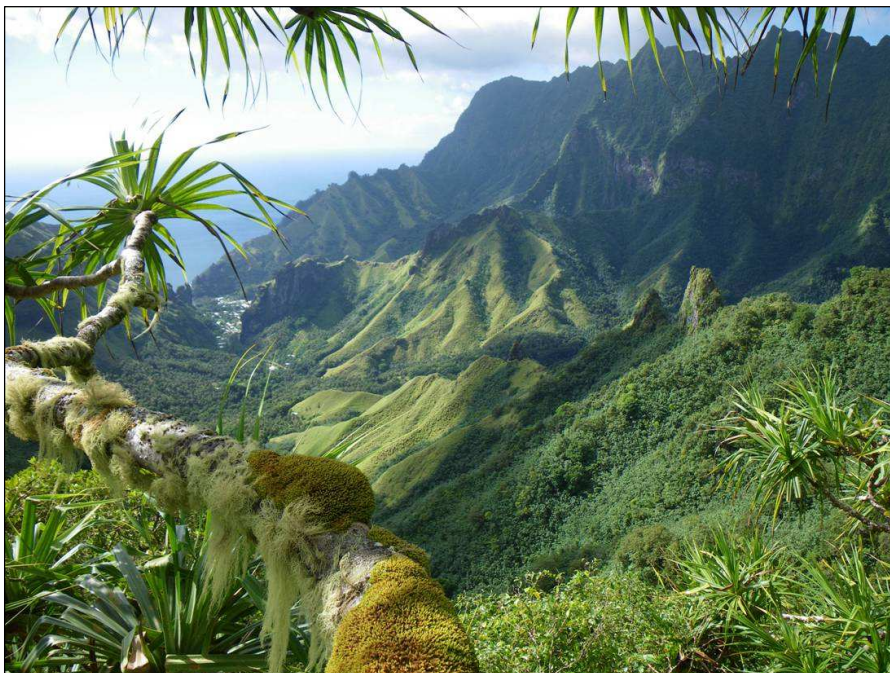
**Conservation status** Critically Endangered : A2b,e; A4b,e; B1a+b(v); C2a(ii)

**Intraspecific taxa** None described

## ABSTRACT

Fatu Hiva monarch (*Pomarea whitneyi*) population has been in decline since the arrival of ship rats on the island around the end of 80's, resulting in species currently being close to extinction. This is the first complete recovery plan for Fatu hiva Monarch and has a term of 5 years (2013–2017). Four year after the beginning of the recovery program initiated by the SOP-Manu, the strategy must be reviewed. This recovery plan provides a brief overview of the species, its status and population trend, and agents of decline and current threats to them. It outlines the strategic framework underlying Fatu hiva Monarch recovery and community involvement. The long-term goal for Fatu hiva Monarch recovery is : To recover the FHM population by increasing the numbers of pairs that are protected against predators and by increasing involvement of islanders. The plan has three plan-period goals, recovering management, community relations and engagement, and research.

**Keywords:** *Pomarea*, Monarch, threatened species recovery, monarch sanctuaries, predation, rats, community engagement.



# 1. Introduction

Fatu Hiva monarch (*Pomarea whitneyi*) is the most endangered bird in French Polynesia. Endemic to Fatu hiva island in Marquesas archipelago, and previously common all around the island, the bird vanished in twenty years, restricted to few valleys since. The species is well known by islanders above 40 years and SOP try to raise awareness for it and transform it as a (treasure) species of strong significance for Maori. The recovery work started really in 2008 even if some work has been done since 2003.

Over the last decade, the total population has undertaken a severe decline, leading to its current IUCN Red List status as 'Critically Endangered' (criteria A2b,e; A4b,e; B1a+b(v); C2a(ii)). The rate of decline equates to 97-99% over 21 years (three generations), BLI 2010. The decline of the population is projected to continue unless conservation action, through large-scale rat control and/or eradication is undertaken.

During population counts in 1975, and later in 1990, it was found that the birds were still common. The arrival of Ship rat or Black rat from boats early in the 90's however initiated a decline: only 274 individuals were estimated in 2006; a decline of 31.5% from 2000. Worse still 60% of the known territories were lost between 2007 and 2009.

The most recent surveys (2011) indicate :

- 1) the decline rate is lower between 2009 and 2011 : 30 %,
- 2) that the total population of FHM is now estimated at less than 50 individuals
- 3) only 3 pairs can produce young for the population in 2012.
- 4) 5 pairs are known to be sterile probably because of the age of one of the mates.

This means that, without intervention on the remaining pairs, this unique bird species can be functionally extinct within 3-5 years.

20 young were produced between 2008 and 2012 by 2 to 4 pairs each year. At least 10 new young birds are about to colonize the protected area in the last 15 months (compared to only 1 colonization in 2010, and none in 2008 and 2009). This follows intensive rat and cat control within the valleys. These young birds are crucial for the relaunch of a viable breeding population and the increase of funding need to be scaled up very quickly following the observation of new birds.

The main focus for Fatu hiva Monarch recovery was species management. It was progressively extended, including also raising awareness of the species' status and involving the islanders in the protection of the species, particularly since 2010 with the creation and animation of a Site Support Group. Yet, even with these extraordinary achievements, the fight for Fatu hiva Monarch is far from won. Even though the decline has been reversed in managed populations, the birds are still at such precariously low numbers that they remain vulnerable to catastrophic events, disease or population processes such as inbreeding depression

The focus for this plan has shifted towards increasing our management efforts by using the knowledge and tools over a greater area to halt the overall decline of species.

Such an increase in effort cannot be undertaken by SOP alone. Community groups (such as Takitimu Conservation Areas in Cook Island) and funds from outside French Polynesia, which are already an integral part of Fatu hiva monarch recovery, will need to play an even stronger role to reach the challenging goals of this plan. Despite the scale of the issues, there are many positive signs that we can be successful: there is growing public awareness and engagement in the plight of the Fatu hiva monarch; advances have been made through critical research findings guiding recovery planning; and population trends are now positives.

This plan aims to provide a platform for the recovery of Fatu hiva monarch over the next 5 years, its ambitious goals setting out a challenge that needs to be met with joint effort.

## 2. Plan term and review date

Term of the plan: 5 years, from 2013 to 2017.

Review dates: 2017.

## 3. Context

### 3.1 Overview of species

(Except citations, all data presented are from Ghestemme et. al in prep.)

(Pictures are from T. Ghestemme/SOP)

#### 3.1.1 Taxonomy

*Fatu hiva Monarch Pomarea whitneyi* (Murphy & Mathews, 1928), Monarchidae, noted FHM in the text.

Among forest birds, monarchs (Monarchidae), a group of passerines widespread in Africa and Australasia<sup>26</sup>, have been very successful in colonizing isolated islands, especially in the Pacific archipelagos from Melanesia to southeastern Polynesia. The *Pomarea* genus, is endemic to southeastern Polynesia, with several taxa distributed on the high volcanic islands of the Cook Islands (one taxon), Society (two taxa), and Marquesas archipelagos (seven taxa). This current patchy distribution strongly suggests that unrecorded taxa have disappeared from several other islands, for instance in the Society Islands.

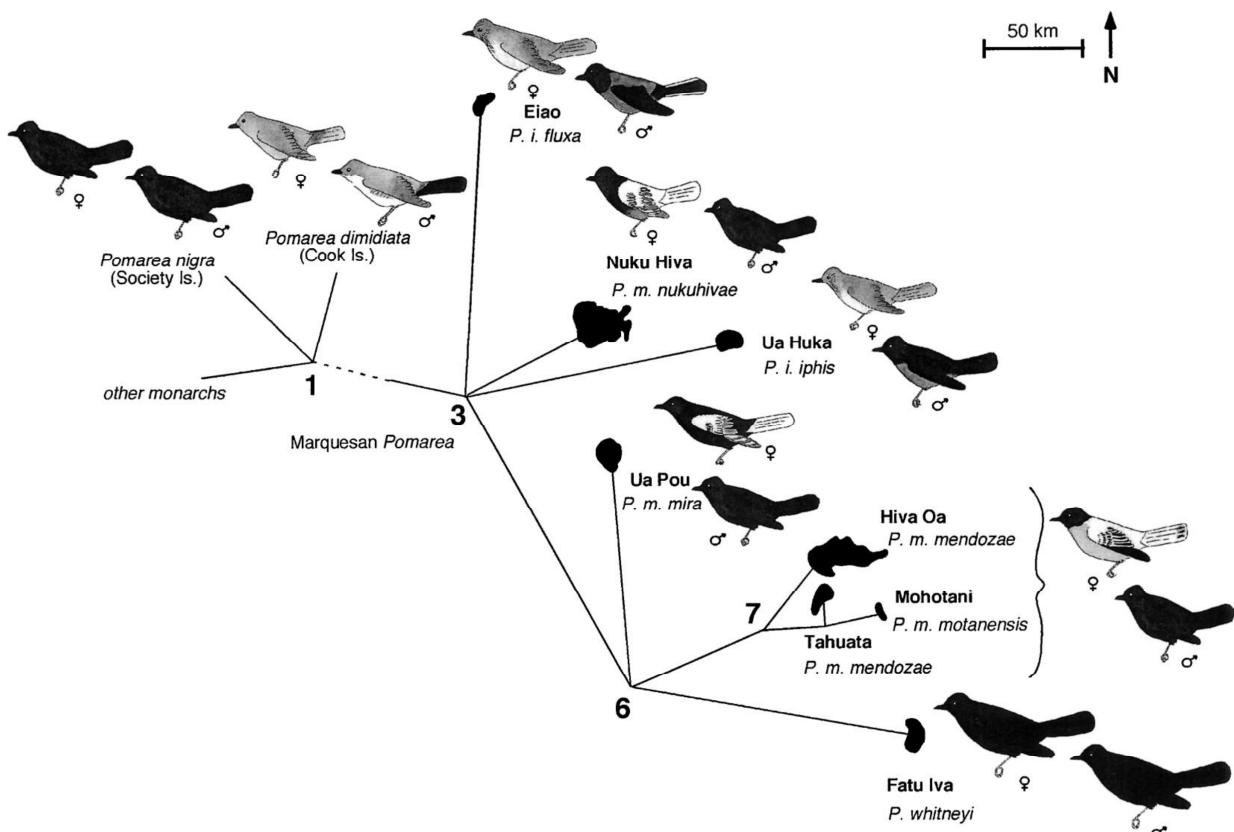


Fig 1 : From Cibois et al 2004 : Phylogenetic tree for the *Pomarea* monarchs mapped on the Marquesas Islands. Branch lengths are not proportional to sequence evolution.

### 3.1.2 Species ecology and biology

The largest *Pomarea* flycatcher (20 cm) has plush-like feathers on forehead. Adult plumage is glossy purplish-black, immature plumage are dull brown above, redder on wings, buffy-white below with ginger tinges to face, neck, and sides of breast. Before the black plumage, the sub adult plumage is a mix of black and light brown (see photos below). Typical calls are various, similar to the shrill meow of a cat whose tail has been stepped on. Alarm call is a nervous ki ki ki. Calls are used for territorial behaviour and to keep the contact between mates in the dense forest. Both males and females sing, but males are more vigorous.



Fledgling, Sub-adult and Adult plumage.

It occurred in dense forest from 50 m to 700 m, with some non-breeding birds found up to 775 m in native cloud forest. Currently, the species is restricted to lowland valleys between 100 and 400 m and use a mixed habitat dominated by the native *Fau Hibiscus tiliaceus* and the introduced *Mape Inocarpus fagifer*. It forages both in the canopy and the undergrowth for insects, spiders and occasionally gecko's tails (Le Barh 2010).

Fatu hiva monarchs are monogamous, forming persistent pair bonds, although occasional divorces do occur. Sexes co-operate to incubate and raise nestlings.

A clutch always consists of 1 young (n=24), and re-nesting after successful breeding in a season is possible. The reproduction is no seasonal (no season in Marquesas) but seems depend on weather conditions and the fitness of the female. Some pairs can breed each 4,5 months (maximum of 3 times and after at least 6 months before a new nest).

FHM nests are constructed in a fork of native *Fau Hibiscus tiliaceus*, introduced *Mape Inocarpus fagifer*, and occasionally of native *Hotu Barringtonia asiatica*, under an umbrella of leaves which protects the nests from rain and sun. Pieces of old dried leaves of ki'eki'e *Freyrcinetia impavida* is the material used inside of the nest (see photos). The outside is lined with moss and fern roots (*Asplenium sp.*). Scattered over the outer surface are white spiders' nests which camouflage the nests and help its cohesion.

As other species of *Pomarea* genus, nests are mostly built near a stream, even a dry stream, maybe for wind protection.



Inside of the nest and leaf of ki'eki'e, outside of the nest,

and young fed at nest.

The incubation period is around two weeks, with incubation shared between the male and female. Chick remains feed by parents around two months. Dispersal of juveniles is sometime local, although some young disappeared several months or forever after independence.

### 3.1.3 Range and abundance

In 1975, the population was estimated at several hundred pairs and, in 1990, the species was still common (Holyoak and Thibault 1984, Seitre and Seitre 1991). In February 2000, the total population was estimated at 400-1,000 individuals (Thibault and Meyer 2001). Unlike in 1975, no birds were observed on the slopes and ridges up the Omoa Valley, and the lack of immature indicated low breeding success. Furthermore, the encounter rate during surveys declined from 0.35 individuals per point count in 2003 to 0.23 individuals in 2006, a decline of 35% in the number of monarchs detected during that period (Gouni 2006). These catastrophic fast declines have continued, with a five-month survey in 2009 finding only 0.11 individuals per point count (Le Barh 2010). Only 41 birds were found in 2009 during intensive surveys, and only 13 of the 32 territories known in 2007 were present in 2009, a 60 % decline ! (Le Barh 2010, T. Ghestemme *et.al* 2010), see Tab. 1.

There has been an extremely rapid population decline (see Tab. 1), even given some overestimation in some years (bias due to visits in areas where the presence of bird was certain).

Tab.1 : Estimations of the population between 2000 and 2009

Year	Number of monarchs	Author
2000	200 à 500 pairs	Thibault J.C., Meyer J.Y., 2001
2002	919 birds	Blanvillain C., Ziembicki M. 2002
2003	749 birds	Gouni A. 2003
2005	816 birds	Salducci J.M., 2005
2006	274 birds	Gouni A. 2006
2009	Estimation of 67 fixed birds (41 known on the island)	Le Barh M. 2010 / Ghestemme T. <i>et al</i> . 2010

The total population in 2009 was estimated to be as low as 67 individuals (Le Barh 2010, T. Ghestemme *et.al* 2010). In 2011, an estimated 65% of the birds were restricted to a region of 2 km<sup>2</sup> in the managed Omoa valley (Ghestemme *et al* 2011). In 2012, 34 fixed birds were known and managed on the island, see Tab. 2 and Map 1.

## CARTE 2012

### 3.1.4 Threats

Fatu Hiva is a relatively well preserved, well forested island (with few overgrazing or destruction of vegetation by fire). Black rat *Rattus rattus* was observed for the first time on the island in February 2000 (Thibault and Meyer 2000). His arrival on the island is strongly correlated with the decline and extinction of monarch populations (Thibault *et al* 2002), and Black rats appear to have caused this extremely rapid population decline and represent the principal threat (Gouni 2006). Successful breeding has never been noted since 2000 except in areas controlled for rats (since 2008); elsewhere the lack of juveniles indicates a rapidly aging population, with at least 4 of the 10 protected pairs confirmed as sterile in 2011 (Ghestemme *et al* 2011). FHM nest are built on horizontal branches, and are very vulnerable to rat predation. Black rats are particularly numerous in the habitat dominated by *Hibiscus tiliaceus*, main habitat of the FHM.

Feral cats also appear to be a significant threat to the species as 2 out of 20 birds were sighted without tails in 2009, typically a sign of a cat predation attempt (Ghestemme 2010). Before awareness campaign, cats were released in agricultural areas near to where the monarch is found (T. Ghestemme *et al* 2010), and have been found in every part of the island (T. Ghestemme *et al* 2012).

Bush fires during the dry season, riparian forest clearance and the establishment of non-regulated agricultural roads in the species's habitat are also increasing threats (Raust 2010, T. Ghestemme *et al.* 2012).

### 3.1.5 Conservation status and past species recovery

The species is Critically Endangered: A2b,e; A4b,e; B1a+b(v); C2a(ii) (IUCN 2012).

34 birds and 2 fledgling were known in 2012 (see Tab. 2 and annex 1). For the same area, number of individuals increased from 20 in 2008 to 34 in 2012.

FHM pairs can produce 3 young in 3 successive broods in the year (see appendix 1): that's why 20 young can be produced by only 2 to 4 pairs each year, and this biology helped to recover the species.

Tab. 2 : Demographic parameters and conservation outcomes of the monitored population (T. Ghestemme in prep)

	2007	2008	2009	2010	2011	2012	TOTAL
Nb of pairs known	8	8	8	9	10	12	
Nb of singles	4	6	8	9	9	10	
Nb of individuals (without fledglings)	20	22	24	27	29	34	
Nb of banded birds monitored	0	0	0	5	9	14	
Nb of pairs protected against rats	4	8	8	10	10	12	
Nb of pairs with known breeding outcome	?	3	5	8	8	12	
Minimum number of sterile pairs	?	2	2	4	4	5	
Nb of pairs who produced fledglings	0	2	3	3	4	2	
Nb of young produced	0	2	3	6	7	2	20
Breeding success (nb of young produced/ pairs with breeding monitored)	-	0,67	0,60	0,75	0,88	0,17	0,58
Nb of young per pair with breeding attempts	-	1	1	1,50	1,75	1	1,24
Nb of young adults fixed on a territory	0	0	0	1	5	7	
Nb of birds under 3 years old observed	2,60%	0%	16%	34%	33%	29%	
Nb of ind. disappeared from their territory	-	3	6	6	3	3	
Nb of valleys with rat control	3	5	4	8	12	8	
Nb of traps for cat control on the island	0	0	0	12	34	30	

Only 2 to 4 pairs produced young each year (see Fig. 2) and high level of sterility occurs in the population, probably due to the age of the birds. The number of young produced by pairs with breeding attempts is good (1 to 1,75; mean of 1,24 on 4 years) but the breeding success for all pair managed is lower (0,17 to 0,88; mean of 0,58), see Tab. 2.

The population is getting younger since the beginning of nest protection : from 0 % of young bird observed in 2008 to 29 % of young observed in 2012 (see Fig. 3).

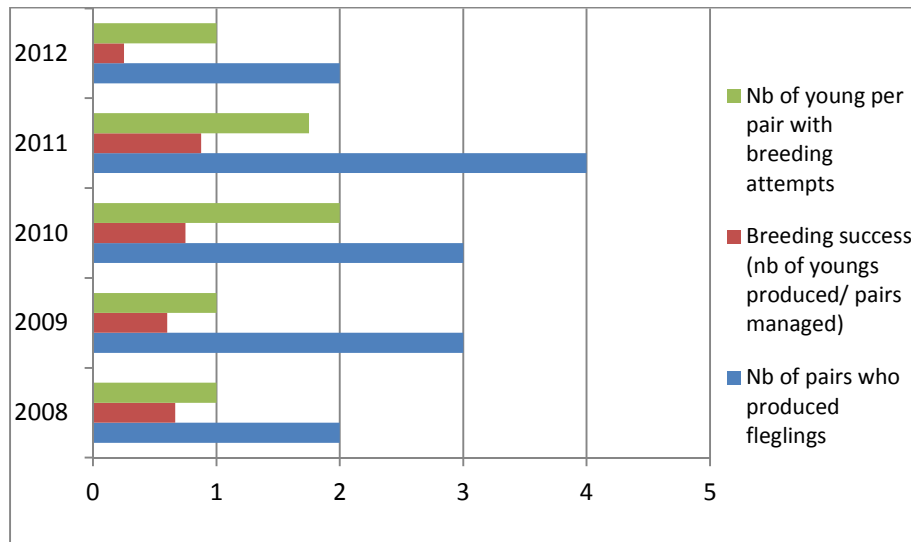


Fig 2 : Breeding success and number of breeding pairs in the managed population (T. Ghestemme in prep)

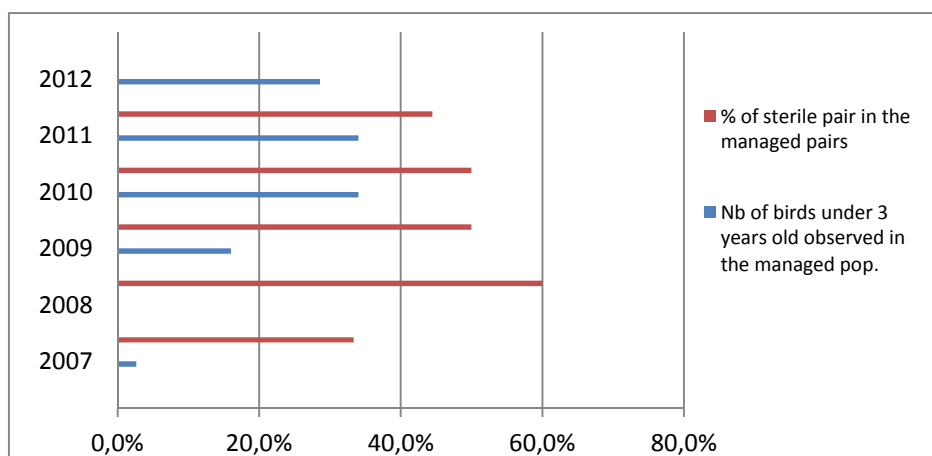


Fig. 3 : Number of young birds (6 months to 3 years) and proportion of sterile pairs in the managed population (T. Ghestemme in prep)

### 3.1.6 Past management

The population has been regularly checked since the 1970s (Holyoak and Thibault 1984, Thibault and Meyer 2001). Conservation efforts have increased owing to the recent rapid decline in the population. Rat control has been on-going at accessible territories since 2008. It focused on the remaining pairs found on the island but the Omoa valley appeared to hold the last pairs which can produce young. Work has been extended gradually to additional area (from 12 territories in 2008 to 21 territories protected in 2012), with significant improvements in baiting efficiency (Ghestemme et al. 2011). No nest predation has been recorded in rat controlled areas since January 2010 (Ghestemme et al. 2011). Feral cat control has been underway since August 2010 (17 cats removed in the first year, with kill traps).

All the known territories were monitored and their annual breeding success were recorded for most of the pair. 20 fledglings (alive 2 months after fledgling) were produced in 4 years by 2-4 pairs, always the same pairs (see Tab. 2). In 2011, the first young adults were able to establish themselves in the rat control area, close to pre-existent pairs. Population banding began in late 2009, with 14 birds colour-banded by the end of 2012.

A recovery group, shared with *P. nigra*, has been established to formulate a conservation strategy.

Other actions were :

1. **Survey** for new territories, with low success for finding new birds



2. **Test of translocation** of a pair from a rough valley to an accessible one: the pair went back to his territory (April 2012)
3. **Data acquisition** on breeding/habitat requirements (data on nest position and forest structure) and data on feeding rates at nest.
4. **Feasibility study** for species introduction in a rat-free island in 2010, on the basis of *Pomarea dimidiata* project : No suitable island found that would not require an eradication project (Portier 2010) in French Polynesia
5. **Assessment of predator control/eradication** by Alan Saunder from LandCare Research in Dec. 2012 (see appendix 3).
6. **Authorities and public awareness** run, targeted at local people, with an aim to educate about the status of the species, posters (see appendix 4) and t-shirt have been produced as part of the process (T. Ghestemme in litt. 2010). Regularly presentation and events happened in the 2 schools of the island. First SSG meeting in Aug. 2010 and 3 SSG meetings have already been organized.. Road project in the last monarch's valley opposed successfully, after 3 years of lobbying.
7. Rat control and bird monitoring on the island is **conducted by local workers** (part time until full time employee in 2012). Also a temporary worker paid by the local government. Some islanders help hugely the program for logistic aspects (Simone and Roberto Maraetaata even gave an old car for the project). But the involvement of the city council of the island is still low.
8. Since 2012, we initiated projects for involve the landowners in the program for **sustainable development** to give incomes to the islanders as well as protect the habitat.
9. **Since August 2012 a program of sterilisation of cat female is on-going** (10 cats sterilized) in the village of Omoa, principal source for cat colonisation.

### 3.1.7 Options for recovery

There are four main options for recovery of Tahiti monarch :

1. **Do nothing:** This would result in the extinction of the species
2. **Protect FHM in captivity only:** This would lead to similar losses in the wild as doing nothing. Outcomes in captivity are uncertain, as for many taxa and moreover insectivorous birds, captive management has not yet proven a successful tool for maintaining healthy populations.
3. **Protect FHM in all valleys where pairs remain and face all threats** until the eradication of rats on Fatu Hiva is performed.
4. **Translocate some pairs in an island free from predator's** and suitable for receive it.
5. **Translocate some pairs in other Fatu hiva valleys**, more easy to manage for creating other populations.

Option 5 is not feasible using the hard release method as one pair caught in 2012 and transferred to the other side of the island, established back in their previous territory few days/weeks later. For option 4, no suitable island (free of ship rat and with a suitable forest) exists for the moment in French Polynesia<sup>29</sup>. For the medium term, this plan needs to find an island to secure the species. Eradication of rats seems possible on Fatu hiva (see appendix 3).

Option 3 was the one selected for the recovery of the close Rarotonga Monarch *Pomarea* in dimidiata, which fall under 30 birds in 1989 (Robertson et al. 1994).

**Therefore, the preferred option for recovery is to manage Fatu Hiva monarch in its natural range by reducing its exposure to predators and improving its habitat protection. In a longer term, habitat quality and presence of predators force to introduce this species on a ship rat free island (option 5). The eradication of rats on Fatu Hiva, technically feasible, helps to be confident with the survival of the species.**

### 3.1.8 Recovery principles for Tahiti monarch

The selection of goals, objectives and actions in this plan has been directed by a number of underlying principles for FHM recovery, namely:

- **22 birds in 2008 to 34 birds in 2012, in the managed area (without yearlings). We can think the increasing rate (35 % in 4 years) can be improved by new adults found in the population but not breeding yet.**
- **The monitoring of birds is perfectible but it seems the increase of bird numbers is due to productivity in the managed area instead of movement of birds previously outside rat control area.**
- **As no suitable island allows an introduction, the long term goal will be to implement the eradication of rodents on Fatu hiva. If a suitable island is eradicated during the plan duration, the feasibility of introduction on the species will be studied.**
- **The current area of control area is about 80 ha, for 12 pairs (but only 4 pairs producing young), 10 singles and some sites for colonisation of non-fixed birds. Theoretically, if we want to reach 20 fertile pairs protected, the area needed for control is about 300 ha. In fact, the area would be lower because number of sterile pairs would decrease with the time (population is getting younger).**

## 3.2 Strategic directives

### 3.2.1 French Polynesia (DIREN) Biodiversity Strategy<sup>28</sup>

This plan support 3 of 4 plans of the DIREN strategy: (the following is an extract of DIREN part 2-4)

#### 2) Protect endangered species and fight against the invasive species

1. Assure the funding of the protection of the species
2. Assure the protection of the most threatened species
3. Draw up a plan of preservation of the most threatened species and implement it
4. Prevent the introduction of invasive species (dogs, cats, birds, rats, plants, insects) in particular on the protected islands
5. Fight against the invasive species and manage the wandering cattle (goats, horses, cattle)
6. Rehabilitate sites (control or eradication of the intrusive species) and favor the native and endemic species
7. Multiply the native or endemic species, among which the most threatened first and foremost

8. To establish populations of help in adequate sites notices: the theme 8 " to communicate, to inform and to educate " is priority and transverse in the other themes.

#### 3) Mobilize all the actors

1. Give responsibilities the public sphere
2. Manage and spread the information
3. Develop the key stakeholders (planner, association)
3. Use the " tapu " and the "rahui" (traditional site/species protections)
4. Learn on the local population and more particularly on the person's resources

#### 4) Develop the scientific knowledge

Objectives: Inventories/Monitoring/Bio-security (diseases/ invasive species)

### 3.2.2 SOP and BirdLife International Strategic Direction

SOP Manu's strategic work programme is based on guidelines and strategies of BirdLife International and IUCN. SOP Manu's programmes focus on safeguarding French Polynesia's most threatened land birds, according to the IUCN Red List criteria (CR status and EN essentially), on protection of seabirds, on restoration of important sites for birds (Important Bird Areas / Key Biodiversity Areas) and on prevention of invasive species introductions into IAS-free islands. SOP Manu implements its programmes in partnership with local communities, decision-makers and other NGOs, as well as with national and international experts in research and biodiversity conservation.

### 3.3 Cultural importance

The bird is well-known from islanders above 40 and it has the reputation of a messenger (mostly for bad news but not only) and people understand Marquesan words when the bird sings.

### 3.4 Public awareness

There is now a better level of community awareness and concern about FHM. Some people start to feel a strong association with FHM and place great importance on the survival of the species. FHM is becoming flagship species: in 2012, a soccer team chose the name "Sporting Black Monarch". SOP helped to buy the first equipment of the team.

### 3.5 Partnerships and key associates

Fatu hiva monarch protection is now including a variety of organizations, agencies, groups and individuals outside SOP. Key actors include mayor of the island, landowners, school, local government (Ministry of Environment in French Polynesia, DIREN, Service du Développement Rural/Agricultural Public Service SDR). Recently, the European Community, the CEPF and the French Government supported projects for the recovery of the species.

The relationship between landowners and their monarch and their involvement in its management will be hopefully formally recognized at the end of the BEST programs. An exchange between them and the Maori families of the Takitimu Conservation Areas of Cook islands as a model of development will be of a primary importance for their future implication.

## 4. Goals

### 4.1 Long - term recovery goal

**Recover** the FHM population by increasing the numbers of pairs that are protected against predators and **Make the species wait** for a rat eradication on Fatu hiva.

### 4.2 Recovery plan - period goals

#### 4.2.1 Management

**Goal 1.1: 20 pairs producing young for the species in the next 5 years.**

#### 4.2.2 Community relations and engagement

**Goal 2.1:** Implement sustainable development projects based on Fatu hiva monarch recovery for the benefit of the local population of valley owners

**Goal 2.2:** Establish a protected area for the last sanctuary of the monarch

**Goal 2.3:** To secure regular and increasing funding for Fatu hiva monarch recovery

**Goal 2.4:** To improve advocacy and statutory texts

#### 4.2.3 Research and innovation

**Goal 3.1:** To conduct further assessment and feasibility study for rat eradication on Fatu hiva

**Goal 3.2:** To undertake robust population modeling for the species

**Goal 3.3:** Pest management and research into tools for efficient then sustainable landscape scale pest control and monitoring

## 5. Implementation

3 themes with a number of topics have been prepared, corresponding to each Goal of the recovery plan. Each topic outlines issue(s) and objective(s), and presents an action table showing how to resolve the issue(s).

All actions have been prioritized and time lined (see Appendix 2). Priorities are marked as follows:

- **Essential:** Needs to be carried out within the timeframe. Highest risk for Fatu hiva monarch recovery if not carried out within the timeframe (and/or at the frequency specified).

- **High:** Necessary to achieve long-term goals. To be progressed and ideally completed within the term of the plan, with moderate risk if not carried out within the timeframe and/or at the frequency specified.
- **Medium:** Necessary to achieve long-term goals. To be progressed within the term of the plan, but least risk if not completed within the term of the plan or within the timeframe and/or at the frequency specified.

No actions are 'extras'; a medium priority does not mean that there are no reasons to do it. Priorities are given to assist with choice if required. Actions are time lined until 2018.

## 5.1. Management

### 5.1.1 Topic 1—To obtain a minimum of 20 FH pairs producing chicks in 2018.

#### Issues

Issue 1.1: FHM is critically endangered due to its small population size and low numbers of populations

Issue 1.2: Very low number of pairs are producing young (only 3 breeding pairs in 2012, 6 in early 2013), in localized areas / High number of sterile pairs in the remaining population

Issue 1.3: Manage only rat is efficient for recover the species but cat control is essential

Issue 1.4: Cats are numerous and difficult to control

Issue 1.5: New pairs/young adults are present since 2011 but are difficult to localize

Issue 1.6: Staff and funding are limited for setting new actions like protecting new pairs

Issue 1.7: Monarch breeding area is not always safe regarding to fire, forest clearance or catastrophic event.

#### Objectives

Objective 1.1: To continue to produce more young by protecting efficiently all pairs, all year round

Objective 1.2: To continue and improve predators' control to reach 0 rat and cat predation in the next 5 years.

Objective 1.3: To find and secure new pairs and secure them regarding to the predation risk

Objective 1.4: Continue and improve the monitoring of birds, by frequent fieldtrips from biologists as well as more training of the permanent staff on the island (1 SOP employee and 1 worker paid by the government); notably differentiate bird recruitment linked with conservation actions from bird immigration coming from non-protected areas.

#### Actions

Action/Accountability	Priority
1.1 Monitor bird population in each valley, including banding and monitor the success of reproduction for each pair	Essential
1.2 Perform rat control in all territories all year round	Essential
1.3 Perform cat control in the Omoa valleys, as necessary to has a predation risk close to zero in the monarch area	Essential
1.4 Continue the sterilization of cat females in the village of Omoa	High
1.5 Perform rat control in some suitable areas for the establishment of new pairs	Medium
1.6 Survey for new birds inside and around the managed area	Essential
1.7 Assess whether any increase of bird numbers is due to productivity or movement of birds previously outside rat control area or a combination of the two.	Medium
1.8 Protect the habitat of the managed area (see topic 2)	High

## 5.2. Community relation and engagement

Recovery and protection of FHM relies on the interest, understanding and engagement of inhabitants of Fatu hiva island. We need a strong association between islanders and FHM.

### 5.2.1 Topic 2—Increase and sustain community-led project in FHM recovery via sustainable activities

#### Issues

Issue 2.1: Most adults know well the species but show little interest for his conservation

Issue 2.2: Most children know well the monarch since the awareness campaign but we need to powerful the activities with children

Issue 2.3: SOP must be perceived positively by valleys owners because some of them can stop the control program with fear of environmental consequences of poisoning

Issue 2.4: Land is owned by several owners' families that multiply the risk of access denied for the SOP if the program is not perceived positively

### **Objectives**

Objective 2.1: Engage adults through Site Support Group (SSG), for monarch and habitat preservation

Objective 2.2: To ensure that owner's involvement in FHM protection is optimized, sustained and follows best practice

Objective 2.3: Continue and develop awareness for children

Objective 2.4: Help owners to develop honey production

Objective 2.5: Help owners to develop sandalwood production

### **Actions**

Action/Accountability	Priority
2.1 Put signs in the village and in the entrance of the managed area	High
2.2 Involve islanders through SSG	Medium
2.2 Involve owners in the program for habitat protection by planting rare fruits to restore the vegetation (activities for the benefit of landowners)	High
2.3 Set-up scholar's program on the island	Medium
2.4 Bring regularly scholar visits to FHM territories	Medium
2.5 Make the Monarch becoming the emblem of the island	Medium
2.6 Help islanders to build honey project through SSG	Medium
2.7 Help islanders to build sandalwood production through SSG	Medium

### **5.2.3 Topic 3—Establish sanctuaries/protected areas for the last population**

One monarch sanctuary must be established in 2014 with the entire collaboration and agreement of the local people.

### **Issues**

Issue 3.1: The territories where the monarchs live belong to several marquesan families

Issue 3.2: Non-division of land lead to land-use confusion and only one owner can stop SOP progression in the valley if he is afraid by the creation of protected areas

Issue 3.3: Even law cannot protect FHM if owner feel unhappy and stolen from their land by the creation of the sanctuary

### **Objectives**

Objective 3.1: Send Tahiti owners to TCA in Cook Islands for its exemplarities in sharing the earth and its benefits all together: bird and hundreds of owners

Objective 3.2: Send TCA owners to Tahiti for owners awareness of those that didn't participated to the trip presented in 5.1

Objective 3.3: Formalize protected area

### **Actions**

Action/Accountability	Priority
3.1 Send Fatu hiva owners to TCA in 2013	High
3.2 Hold a SSG for discuss of the trip with all owners in 2013	High
3.3 Hold a SSG with all owners in 2014	High
3.4 Redact and sign the declaration of intention for the creation of protected areas on the model of TCA	High
3.5 Continue contact in the project for UNESCO label in Marquesas	Medium
3.6 Try to raise fund for international collaboration between SSG and TCA	Medium

### **5.2.4 Topic 4—Secure regular and increasing funding for FHM recovery**

FHM recovery is regularly funded by the Government on French Polynesia through DIREN grant to SOP since 2007. This funding is not sufficient to cover all the expenses necessary for the program and SOP staff has to complete the expenses by international grants.

### **Issues**

Issue 4.1: funding for FHM recovery has no multi-annual contract from DIREN

Issue 4.2: funding for FHM recovery needs to increase to allow for the necessary expansion of projects

### **Objectives**

Objective 4.1: obtain from government a multi-annual engagement

Objective 4.2: give to the FHM recovery a local high public profile and interest

Objective 4.3: continue the fundraising near international foundations according complementary needs for the project for priority actions

### **Actions**

Action/Accountability	Priority
4.1 identify stakeholder for conduct the negotiation at a politic level	High
4.2 initiate negotiation at soon as the politic profile of French Polynesia is fix in medium term	High
4.3 prepare and sign a multi annual engagement between SOP and DIREN	High
4.4 continue public awareness in local press, TV and radio	Medium
4.5 build a fund-raising plan with the help of BirdLife International Pacific	Medium
4.6 prepare as much demands as necessary for implements actions detailed in the FHM recovery plan	Essential

### **5.2.5 Topic 5—Improve advocacy and statuaries texts**

Advocacy is an important component of FHM recovery, helping to ensure broader public acceptance and buy-in, as well as creating actual support and resources. It includes sharing information, promoting specific issues and solutions, and generally raising awareness about FHM protection.

### **Issues**

Issue 5.1: Advocacy is not always considered as an integral part of recovery planning

Issue 5.2: Advocacy material is sometimes of poor quality or outdated, underutilizing opportunities or even creating negative advocacy

### **Objectives**

Objective 5.1: To increase awareness and support for FHM protection through the provision of high-quality advocacy for FHM projects at all levels

Objective 5.2: To avoid, remedy or mitigate threats to FHM and their habitat by promoting legislative and policy changes to statutory authorities

### **Actions**

Action/Accountability	Priority
5.1 Develop an advocacy section	Medium
5.2 Produce correct material for advocacy and identify people ready to imply themselves in this topic	Medium
5.3 Promote the inclusion of statutory protection of FHM sanctuary	Medium
5.4 Provide local authorities with information on FHM sanctuary	Medium

### **5.3 Research and innovation**

The recovery of FHM will continue to be dependent on good scientific understanding and adequate tools.

#### **5.3.1 Topic 6—Sexing birds and provide robust information guiding management of genetic diversity**

The current FHM population appears old, except the young produced during the last 4 years. The limited number of breeders (2 to 4) may induce inbreeding depression. The decline of FHM populations has probably lost genetic diversity; the current dynamic population is only in one area of the island. Sexing bird will also help managers and biologists.

### **Issues**

Issue 6.1: Inbreeding depression might increase the risk of population failure due to the small number of breeders

Issue 6.2: Translocation between valleys is not realistic as the test on a pair in 2012 proven to go back to its initial territory when translocated on the same island.

Issue 6.3: Behavioral sexing is useful but need to be confirmed

### **Objectives**

Objective 6.1: To Identify/confirm the sex of all banded birds

Objective 6.2: To establish bird filiation in order to understand juvenile dispersion and the structure of the population

### **Actions**

Action/Accountability	Priority
6.1 Genetic sample of a maximum of individuals	Medium
6.2 Bird sexing	Medium
6.3 Pedigree research	Medium

## **5.3.2 Topic 7—To improve monitoring, understanding of the species biology and undertake robust population modeling for the species**

### **Issues**

Issue 7.1: Detailed population monitoring is cost- and labor-intensive

Issue 7.2: Some isolated birds may persist on the island and attract young whereas they are unprotected.

### **Objectives**

Objective 7.1: To ensure that sufficient and robust information is available to assess the status and trends of FHM key populations

Objective 7.2: To survey more place in order to find eventual birds

### **Actions**

Action/Accountability	Priority
7.1 Improve collection of baseline data for research and population modeling	Medium
7.2 Initiate population modeling and disseminate results from available data	Medium
7.3 Liaise with research providers to initiate/support research on the ecology and behavior of TM, throughout the plan	Medium
7.4 Survey the whole island for some isolated birds	Medium

## **5.3.3 Topic 8—Pest management and research for efficient then sustainable landscape scale pest control and monitoring**

It is of primary importance to find best way to control each threat and to improve the cost-effectiveness of each pest control management.

### **Issues**

Issue 8.1: Existing technologies for pest control to protect FHM are labour intensive

Issue 8.2: Rats will represent a medium to long term threat

Issue 8.3: Cat predation represents a serious threat

### **Objectives**

Objective 8.1: To reduce in a sustainable way the impact of rats on FHM populations

Objective 8.2: To reduce in a sustainable way the impact of feral cats on FHM populations

Action/Accountability	Priority
8.1 Compare cost-effectiveness of chemical versus physical control for rats	High
8.2 Study the possibility to shift to first generation toxin (for rats)	High
8.3 Compare cost-effectiveness of chemical (PAPP) versus physical (kill traps) control for cats	High
8.4 Study the colonization of managed area by rats to improve the effectiveness of the control	High
8.5 Monitor and study wild cat population in valley to establish the risk on FHM populations	High

## 5.4 Cost estimation for the recovery of the species during the plan

<b>Staff resources required 2013-2017 (in Euros)</b>	<b>First year</b>	<b>5 years</b>
1 Full time local technician (rat and cat control)	22 000	110 000
1 Half time programme manager	26 400	132 000
1 Full time local worker or volunteers expenses	18 000	90 000
Fee for account manager	3000	15 000
<b>Total</b>	<b>69 400</b>	<b>347 000</b>
<b>Financial resources required 2013-2017 for actions without staff (in Euros)</b>	<b>First year</b>	<b>5 years</b>
Predator control (Topic 1)	20 000	100 000
Bird monitoring (Topic 1)	10 000	50 000
Involvement of owners and protected area (Topic 2&3)	10 000	50 000
Public and scholarship awareness	5 000	25 000
Advocacy and funding (Topics 4 & 5)	1 000	5 000
Research and innovation (Topics 6,7,8)	8 000	40 000
Total	54 000	270 000
<b>Total Staff + Actions</b>	<b>123 400</b>	<b>617 000</b>

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## APPENDIX 1: Results of Fatu hiva Monarch Recovery Programme 2007–2012

Valley	Territory	2007		2008 (july-dec)			2009			2010			2011			2012			TOTAL
		Nb pairs	Nb single	Nb pairs	Nb single	Nb fledgling produced	Nb pairs	Nb single	Nb fledgling produced	Nb pairs	Nb single	Nb fledgling produced	Nb pairs	Nb single	Nb fledgling produced	Nb pairs	Nb single	Nb fledgling produced	
Hanapuoo	Ancien	1	2	1	1	?	1	1	?	0	1	?	0	1	?	0	1	?	
	Nouveau	?			1		0	1		1	1		0	1		0	1		
Otohamama		1	1	1	1	0	1	0	0	1	0	0	1	0		1	0	0	
Otomoto		1		0	0		0	0		0	0		0	0		0	0		
Otomaha	Mitikerie	?		?			1		?	1	0	0	0	1		0	1		
	Tetoana 1	?		1	0	1	1	1	1	1	1	2	1	0	1	1	0	1	
	Tetoana 2	?		0	0		0	1		0	1		0	1		0	1		
	Faapu	0		0			0			0	1		0	1		1	0	0*	
Taiu	Manguiers	0		0	1		0	1		1		0	1		0	1	0	0*	
	Captage	0		1		?	1		1		1			1			1		
	Mape bagué	1		1		1	1		1	0	3	1	0	1	1	1	1	0*	
	Gué	1		1		?	1		?	1	0	0	1	0		1	0	0*	
	Cascade	?		0			1		?	1	0	1	1	0	3	1	0	1	
	Turia			0			0			0			0			1		0*	
	Barrière cheval	1		1	0	?	0	0		0	0		0	0		0	0		
	Metro	0		0	0		0	0		0	1?		1		2	1		2 échecs	
	Tuhuna (Y)	?		?	?		?	?		0	0		0	0		0	1		
	Metro-Pua-Banian	?		?	?		1			0	1		1	0		1	1	0*	
	Punaitai	2	1	1	2	?				0	0		0	0		0	0		
Oto'oi	?	?	?	?		?	?		1	0	?	0	1		0	1			
Papaoa	?	?	?	?		0	1		0	1		0	1		0	1			
Hanau	?	?	?	?		0	1		0	1	?	0	1		0	0			
Hanahepu												1	0		1	0	0		
Hanamoe												1	0		1	0	0		
		2007		2008			2009			2010			2011			2012			
Nb of pairs known		8		8			8			9			10			12			
Nb of singles		4		6			8			9			9			10			
Nb of individuals (without fledglings)		20		22			24			27			29			34			
Nb of banded birds monitored		0		0			0			5			9			14			
Nb of pairs protected against rats		4		8			8			10			10			12			
Nb of pairs with known breeding outcome		?		3			5			8			8			12			
Minimum number of sterile pairs		?		2			2			4			4			5			
Nb of pairs who produced fledglings		0		2			3			3			4			2			
Nb of young produced		0		2			3			6			7			2		20	
Breeding success (nb of young produced/pairs with breeding monitored)		-		0,67			0,60			0,75			0,88			0,17		0,58	
Nb of young per pair with breeding attempts		-		1			1			1,50			1,75			1		1,24	
Nb of young adults fixed on a territory		0		0			0			1			5			7			
Nb of birds under 3 years old observed		2,60%		0%			16%			34%			33%			29%			
Nb of ind. disappeared from their territory		-		3			6			6			3			3			
Nb of valleys with rat control		3		5			4			8			12			8			
Nb of traps for cat control on the island		0		0			0			12			34			30			
Légende :		Optimum rat control (more than 50 stations)																	
		Medium rat control (25 to 50 stations)																	
		Light rat control (10 to 25 stations)																	
		Very light rat control (less than 10 stations)																	

\* : new pairs with young adults

## APPENDIX 2 :Timeline and priorities for recovery actions for Fatu hiva Monarch

Action/Accountability	Priority	2013	2014	2015	2016	2017
<b>Topic 1—To pass over 20 Fatu hiva Monarch (FHM) pairs</b>						
1.1 Monitor bird population in each valley, including banding and monitor the success of reproduction for each pair	Essential					
1.2 Perform rat control in all territories all year round	Essential					
1.3 Perform cat control in all territories, as necessary to has a predation risk close to zero in the monarch area	Essential					
1.4 Continue the sterilization of cat females in the village of Omoa	High					
1.5 Perform rat control in some suitable areas for the establishment of new pairs	High					
1.6 Survey for new birds inside and around the managed area	Essential					
1.7 Assess whether any increase of bird numbers is due to productivity or movement of birds previously outside rat control area or a combination of the two.	Medium					
1.8 Protect the habitat of the managed area (see topic 2)	High					
<b>Topic 2—Increase and sustain community-led project in FHM recovery via sustainable activities</b>						
2.1 Put signs in the village and in the entrance of the managed area	High					
2.2 Involve islanders through SSG	Medium					
2.2 Involve owners in the program for habitat protection by planting rare fruits to restore the vegetation (activities for the benefit of landowners)	High					
2.3 Set-up scholar's program on the island	Medium					
2.4 Bring regularly scholar visits to FHM territories	Medium					
2.5 Make the Monarch becoming the emblem of the island	Medium					
2.6 Help islanders to build honey project through SSG	Medium					
2.7 Help islanders to build sandalwood production through SSG	Medium					
<b>Topic 3—Establish sanctuaries/protected areas for the last population</b>						
3.1 Send Fatu hiva owners to TCA	High					
3.2 Hold a SSG for discuss of the trip with all owners	High					
3.3 Hold a SSG with all owners in 2014	High					
3.4 Redact and sign the declaration of intention for the creation of protected areas on the model of TCA	High					
3.5 Continue contact in the project for UNESCO label in Marquesas	Medium					
3.6 Try to raise fund for international collaboration between SSG and TCA	Medium					
<b>Topic 4—Secure regular and increasing funding for FHM recovery</b>						
4.1 Identify stakeholder for conduct the negotiation at a politic level	High					
4.2 Initiate negotiation at soon as the politic profile of French Polynesia is fix in medium term	High					
4.3 Prepare and sign a multi annual engagement SOP / DIREN	High					
4.4 Continue public awareness in local press, TV and radio	Medium					
4.5 Build a fund-raising plan with the help of BirdLife International Pacific	Medium					
4.6 Prepare as much demands as necessary for implements actions detailed in the FHM recovery plan	Essential					
<b>Topic 5—Improve advocacy and statuaries texts</b>						
5.1 Develop an advocacy section	Medium					
5.2 Produce correct material for advocacy and identify people ready to imply themselves in this topic	Medium					
5.3 Promote the inclusion of statutory protection of FHM sanctuary	Medium					
5.4 Provide local authorities with information on FHM sanctuary	Medium					
<b>Topic 6—Sexing birds and provide robust information guiding management of genetic diversity</b>						
6.1 Genetic sample of a maximum of individuals	Medium					
6.2 Bird sexing	Medium					
6.3 Pedigree research	Medium					
<b>Topic 7—To improve monitoring, understanding of the species biology and undertake population modeling for the species</b>						
7.1 Improve collection of baseline data for research and population modeling	Medium					
7.2 Initiate population modeling and disseminate results from available data	Medium					
7.3 Liaise with research providers to initiate/support research on the ecology and behavior of TM, throughout the plan	Medium					
7.4 Survey the whole island for some isolated birds	Medium					
<b>Topic 8—Pest management and research for efficient then sustainable landscape scale pest control and monitoring</b>						
8.1 Compare cost-effectiveness of chemical versus physical control for rats	High					
8.2 Study the possibility to shift to first generation toxin (for rats)	High					
8.3 Compare cost-effectiveness of chemical (PAPP) versus physical (kill traps) control for cats	High					
8.4 Study the colonization of managed area by rats to improve the effectiveness of the control	High					
8.5 Monitor and study wild cat population in the valleys to establish the risk on FHM populations and improving the control	High					

## APPENDIX 3 : From Alan Saunders, Managing invasive species to recover Polynesian monarchs; achievements and future directions. DRAFT version 11 February 2013

### 1. The feasibility of eradicating rodents from Fatu Hiva

'Eradication' involves the removal of every individual of a targeted pest population from a defined site within a prescribed timeframe. 'Control' is an alternative pest management strategy involving either limiting the number or density of a targeted pest, or containing a pest population to a defined area – or both. Important differences between eradication and control are summarised in Table 1.

Table 1: Key features of eradication versus control strategies

<b>Eradication</b>	<b>Control</b>
Generally involves a "one-off" operation, with on-going biosecurity measures to prevent re-invasion of the targeted pest.	On-going control regimes must be sustained, perhaps with some improvements in efficiency, over time.
An "All-or-nothing" strategy resulting in no individuals of the targeted pest remaining.	Populations of the targeted pest remain, albeit at lower densities and/or in confined areas.
Threats posed by targeted pests are removed. Significant environmental responses can be anticipated.	Targeted pests continue to have negative impacts – albeit at lower levels, if control is effective. Environmental responses may be less pronounced than for eradication.
Unexpected and undesired responses to eradication may occur. Careful planning and detailed monitoring is required so that responses can be interpreted and better-anticipated in the future.	Unexpected and undesired responses are less likely to occur. Responses may be more subtle and, perhaps, difficult to interpret.
Risks to non-target species may require mitigation efforts that could add significant costs to an eradication operation.	Non-target risks are generally easier to manage, and less costly.
Securing funds for eradication operations can be challenging for small organisations, especially where there are few precedents.	While control is generally cheaper than eradication in the short term, sustaining control year after year can be a major challenge.
The relative cost/benefit ratios of eradication can be better than those for sustained control.	The benefits of control are often difficult to quantify in relation to costs.
While public and stakeholder perceptions of the costs and risks of eradication are changing, they are generally seen as too difficult, risky and expensive.	Control operations can usually be adjusted to minimise any negative impacts on stakeholders.

Howald et al. 2007 reported a 90% global success rate for recorded rodent eradications, involving more than 330 islands. Rodenticides, mainly brodifacoum, were used in most operations, typically involving aerial broadcast techniques. As a result of these successes, and resultant conservation outcomes, eradicating invasive rodents from islands has emerged as a powerful tool to prevent extinctions and restore ecosystems. In many cases aerial bait distribution is the only way that baits can be distributed across an island in a way that all rats are put at risk.

Black rats have been successfully eradicated from 159 islands worldwide to date. With an area of about 85 km<sup>2</sup> (8,500 hectares) Fatu Hiva is about eight times larger than the largest island from which Black rats have been confirmed as being eradicated to date (Hermite Island, Western Australia. 1,022 hectares). However, an operation to eradicate Black rats, along with House mice (*Mus musculus*) and European rabbits (*Oryctolagus cuniculus*) is well-advanced on 12,400 hectare Macquarie Island, Australia. While efforts to eradicate the rabbits continue, as planned, neither rats nor mice have been found on Macquarie since the aerial rodent eradication operation in June 2011. The largest island from which Pacific rats (*Rattus exulans*) have been eradicated is Raoul, New Zealand, at 2 939 hectares. In their summary of eradications Howald et al. (2007) concluded that island size is no longer a key constraint to eradication. Rather, it is economic and social factors that are likely to be the key determinants of success.

## **Initial assessment**

In addition to considering relevant precedents from elsewhere, assessing the feasibility of eradicating the rodents from Fatu Hiva will require a detailed investigation in relation to criteria that have been developed and refined over recent years (Cromarty et al, 2002, Veitch et al, 2011). Because there are often significant costs and risks involved, feasibility studies are increasingly undertaken by agencies that are independent of the funders and management agencies. An initial assessment of the feasibility of eradicating the rodents from Fatu Hiva is summarised below in relation to criteria used by Landcare Research ([www.isinz.com](http://www.isinz.com)). It should be noted that this is an initial assessment only, based on a brief visit and limited consultation. It is presented here because Manu requested an initial assessment. A number of questions are identified which will require further consideration.

*All individuals of the targeted pest population can be put at risk by the available techniques.*

- While Black rats are likely to be the main predator of wildlife on Fatu Hiva, Pacific rats are also present, and are likely to be having significant impacts. There would be merit in eradicating both rodents as part of a single operation. There are precedents which may be used as models for a multiple rodent eradication. It is not clear whether House mice are also present on Fatu Hiva. If so consideration may be given to also eradicating mice, although there would be significant additional risks and costs. Not eradicating the mice, but removing the rats could lead to an increase in mouse numbers that might have negative consequences.
- The only way that all rodents could be put at risk on Fatu Hiva would be by the aerial distribution of toxic baits as part of a single operation. The island is too large and steep for bait to be distributed to every rodent using ground-based techniques.
- The costs and logistics of mounting an aerial eradication operation on Fatu Hiva would be significant, due to its remote location. While helicopters would be able to fly from Hiva Oa to Fatu Hiva, a support vessel would probably be required for the duration of the operation. As an initial comparison the eradication of Norway rats (*Rattus norvegicus*) from Campbell Island, New Zealand – a similarly remote island of a comparable size cost NZ\$220 per hectare. If a Fatu Hiva eradication were to cost the same this would equate to roughly 130 million XPF. Ship-based aerial eradication operations have been undertaken at a number of locations in recent years, including Palmyra Atoll (US Pacific), Phoenix Islands (Kiribati) and Henderson Island (UK Pacific). Important benefits, including improved effectiveness and reduced costs can be anticipated as multiple island eradication approaches continue to be refined.

*Mortality will exceed recruitment, at all densities*

- Based on the high success rate of aerial rodent eradications to date, provided established best practice aerial bait distribution procedures are applied there is a high probability that this criterion can be satisfied. An important advantage of aerial bait distribution is that the entire island can be covered in just a few days, meaning all rodents have access to baits virtually simultaneously. Trials may be required to confirm that Fatu Hiva rodents will consume baits in the presence of other foods.
- If it is determined that a less persistent 'first-generation' anticoagulant, such as diphacinone, is to be used, instead of brodifacoum, trials will be required to determine baiting regimes to ensure this criterion can be met (Parkes et al. 2011).

The risk of re-invasion is near-zero

- The relative isolation of Fatu Hiva and limited access points to the island probably makes maintaining biosecurity measures more achievable than at many other islands. Provided there is strong local support for biosecurity it is likely that the risks of rodents re-invading following an eradication operation could be managed to acceptable levels. Biosecurity would also need to focus on other risk species, such as mynas and bulbuls, invasive tramp ants and weeds.
- There have been few successful rodent eradications to date on inhabited islands. Even small island communities may involve people with different perspectives and potentially conflicting values and interests. Securing enough political support to proceed with an eradication involving the aerial distribution of toxic baits across an island probably represents "several steps too far" for many communities today. While there is probably a multitude of reasons for this, concerns about environmental risks and other implications for local residents of an eradication operation, and the constraints and costs associated with undertaking an operation and on-going biosecurity measures are probably paramount. If there was a shared vision for a rat-free island and strong

local support for an eradication operation on Fatu Hiva it is possible there may also be support for on-going biosecurity measures. Benefits in relation to reduced rat impacts on crops, and improved food security may reinforce local support. The potential for locally-driven biosecurity programmes to protect livelihoods and lifestyles, as well as the island's biodiversity, deserves further investigation. Critical measures will be to ensure local residents and other stakeholders are well-informed about ecological complexities, logistical risks and operational costs, as well as about potential (ecological, social and financial) outcomes.

#### *Institutional and donor support is declared*

- Because they involve high risks and costs eradications generally require declarations of support from the highest levels in appropriate government organisations and management agencies. Consistent support from these organisations through all phases of planning and implementation, and for on-going biosecurity will be critical.
- The early engagement of donor agencies, perhaps beyond French Polynesia, is likely to be required. Donors generally require detailed information about how costs and risks will be managed, and outcomes sustained.
- It was beyond the scope of this assessment to determine the level of potential institutional and donor support for rodent eradication on Fatu Hiva. It is worth noting, however, that Fatu Hiva is an Important Bird Area for 5 species of bird in addition to the Monarch. It is classed as one of the top 60 Key Biodiversity Areas in the Polynesia Micronesia Hotspot (CEPF 2007). It is also classed as an Alliance for Zero Extinction site as it is the sole location for the Critically-Endangered Fatu Hiva Monarch. There is little doubt that most organisations with interests in conserving biodiversity at national, regional or international scales would rate the restoration of Fatu Hiva very highly.

#### *Local support is assured*

- Conservation is essentially a social activity. The key roles that local people must play, and the fundamental importance in facilitating their support is evident in relation to eradications where, by their very nature, everyone is affected, and where there can be a fine line between success and failure.
- In addition to their impacts in biodiversity rodents can also have negative effects on island economies and lifestyles through their predation of crops, consumption and fouling of stored food, damage to wiring and electrical equipment, direct and indirect health effects (eg as vectors of Leptospirosis), amongst others. Given the reliance of Fatu Hiva residents on local produce such as pawpaw and banana, and the reported impacts rats are currently having on these and other crops, evaluating the economic and social implications of rodent eradication would be timely, to inform these discussions.
- While few people would not support the concept of a rat-free Fatu Hiva, a range of concerns are likely to be expressed which will need to be acknowledged and appropriately addressed. Challenges involving eradication technologies and approaches, non-target and environmental effects, possible perverse outcomes, implications for lifestyles and livelihoods and financial risks and costs will need to be clearly set out and objectively assessed in an open process. If a feasibility study were to be commissioned an important early step would be to consult with local residents to ensure local perspectives, interests and concerns are identified, and that communication lines and decision-making mechanisms are in place. Because there are few precedents for rodent eradications on inhabited islands much has still to be learned about stakeholder interests and concerns in relation to eradications, and how these might be addressed, or not.

No conclusions about the feasibility of eradicating rodents from Fatu Hiva can be drawn from this initial assessment. While the costs and logistics of undertaking an eradication operation on Fatu Hiva would be impressive, it could well be technically achievable using established techniques. If there was a large measure of stakeholder support for the concept of a rat-free Fatu Hiva the next step would be to undertake a feasibility study where the full range of challenges and opportunities could be examined.

APPENDIX 4 : Awareness poster produced for FHM

avec le soutien de :



Monarque de Fatuiva



# Aidez les O'ma'o !

Le Monarque de Fatuiva, ou 'oma'o ke'eke'e, existe seulement à Fatuiva, aux Marquises, et il est en train de disparaître ! Seuls 4 couples fertiles subsistent en 2012.

L'association **Manu** protège l'espèce en contrôlant les rats et les chats sauvages, responsables de cette situation. 20 petits sont nés au cours des 4 dernières années et l'espoir est encore de mise pour sauver le Monarque de Fatuiva.

« A kaituto ite nei,  
u moi e tiaki o ioi ! »



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Jeune monarque de Fatuiva      Jeune adulte      Vallée d'Hanavave      Contrôle des prédateurs



photos : T. Chazotte, Madlen Le Barh