

ACTION PLAN FOR ZINO'S PETREL
(Pterodroma madeira)



Compiled by:

FRANCIS ZINO (Freira Conservation Project, Madeira)
BORJA HEREDIA (BirdLife International, U.K.) and
MANUEL J. BISCOITO (Museu Municipal do Funchal, Madeira)

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MANUEL J. BISCOITO (Museu Municipal do Funchal, Madeira)

With contributions from:

B. Bell (Wildlife Management International, New Zealand)
C. J. Bibby (BirdLife International, U.K.)
W. R. P. Bourne (Aberdeen University, Scotland)
A. Buckle (ICI Public Health, U.K.)
H. Costa Neves (Parque Natural da Madeira)
T. Gerrard (Madeira)
J. P. Granadeiro (Instituto da Conservação da Natureza, Portugal)
R. F. A. Grimmett (BirdLife International, U.K.)
P. Oliveira (Parque Natural da Madeira)
A. Swash (Ministry of Agriculture, Fisheries and Food, U.K.)

Timetable

Workshop: November 1992 - Funchal, Madeira
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Reviews

This document should be reviewed and updated by BirdLife International every two years. An emergency review will be undertaken if sudden major environmental changes, liable to affect the population, occur within the species' range.

Geographical scope

The island of Madeira in the Madeiran archipelago (Portugal).

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SUMMARY

Background

Zino's Petrel or Madeira Freira *Pterodroma madeira* is Europe's rarest breeding seabird. It is endemic to the island of Madeira where it breeds in the central mountain massif. The breeding population is estimated to be down to a precarious 20–30 pairs.

By 1960, there were so few records of this species many believed it to be extinct. It was rediscovered in 1969 by a local ornithologist, P. A. Zino, after some fascinating detective work using the tape-recorded calls of Fea's Petrel. Immediately following the rediscovery the newly found breeding ledges were plundered by a visiting (and accredited) specimen- and egg-collector who took three adult breeding birds and six eggs. At a later date the eggs of Fea's Petrel and Zino's Petrel in the collection of the Museu Municipal do Funchal were also stolen.

The reduced breeding colony remained under discrete study in an attempt not to publicise the breeding location which might again fall foul of collectors. In 1986 the colony was found not to be breeding successfully due to predation by rats. As a result a Freira Conservation Project was set up with outside help to try and contain the rat problem. The situation was further aggravated in 1990 when a cat (or cats) killed 10 adults, possibly breeding birds, on one ledge.

Despite current efforts the position of these beautiful birds is still very precarious and they need all the help available to save them from extinction.

Threats and limiting factors

- * **Predation by rats and cats - critical**
- * **Habitat degradation limiting availability of suitable nest-sites - high**
- * **Human predation and disturbance - high**

Conservation priorities

- * **Continue and increase the rat and cat control programmes - essential**
- * **Establish a management plan for the National Park of Madeira - high**
- * **Seek funds from relevant international organisations, especially the EU - high**
- * **Purchase of the breeding area to ensure its appropriate management- high**
- * **Removal of herbivores from the breeding area - high**
- * **Increase wardening, particularly during the breeding season - high**
- * **Continue research, especially monitoring of the breeding population - high**

INTRODUCTION

Zino's Petrel *Pterodroma madeira*, also known as Madeira Freira, or just as Freira, is one of the most threatened birds in the world. It is classified as Endangered in the African Red Data Book (Collar & Stuart 1985) and in the *IUCN Red List of Threatened Animals* (Groombridge 1993), and as Critical in *Birds to Watch 2* (Collar *et al.* 1994). It is included in Annex I of the EU Wild Birds Directive and in Appendix II of the Bern Convention.

By 1960, there were so few records of the bird that many believed it to be extinct. It was rediscovered in 1969 by P. A. Zino, who played a tape of the Bugio birds to a shepherd from Curral das Freiras; he immediately recognised the call, and led the researchers to the only known breeding area.

Given the species' rarity and the threat posed by cats and rats, the Freira Conservation Project was launched in 1986 and has continued until the present day. Despite the limited funds available, the project has achieved much, with no fewer than eight chicks being reared in 1993 after the failed breeding attempts in the mid-eighties.

This action plan provides a technical framework for future management. Although not a legally binding document, it is hoped that the Madeiran and Portuguese authorities will accept its recommendations, and that it will help to integrate the different institutions and organisations involved, so that effective measures are taken to prevent the extinction of Zino's Petrel.

PART 1. BACKGROUND INFORMATION

Distribution and population

Zino's Petrel is restricted to the island of Madeira, where it breeds in a relatively small area in the high central massif. Breeding has been recorded on three ledges, the "main ledge", the "small ledge" and the "1987 ledge", which can only be reached with the help of climbing equipment. Breeding on the small ledge stopped several years ago. When feeding and throughout the non-breeding period the birds are dispersed at sea, although the distribution is not known.

The breeding population is currently very small and estimated to be no more than 30 pairs (Zino & Zino 1986). Imber (1989) suggested a total population of 250–400 birds, based on the number of birds flying over the colony on three nights in June 1989 and on comparing this with work carried out on the Taiko *P. magentae*. This could be an overestimate and should be treated cautiously.

H. Pieper has found subfossil bones together with those of Fea's Petrel in a cave at a low level in eastern Madeira, so Zino's Petrel was doubtless originally more numerous and widespread (W. R. P. Bourne *in litt.* 1993).

Life history

* **Taxonomic status**

The bird was first discovered by Schmitz in 1903, and described as a race of *P. mollis* by Mathews (1934), together with *P. m. deserta* in the Desertas Islands and *P. m. feae* in the Cape Verde Islands, although most subsequent authors considered *P. m. deserta* and *P. m. feae* to be inseparable. More recently Bourne (1983) suggested that the three subspecies be treated as separate species, *P. mollis*, *P. feae* and *P. madeira*, on the basis of their size and behavioural differences.

Zino & Zino (1986) compared measurements of Fea's and Zino's Petrels and found Fea's to be heavier and larger in all respects, especially bill size and wing length. They concluded that the two should be treated as separate species. Also, there is a difference of about two months in their laying periods, even though their nesting sites are only c.50 km apart.

* **Breeding**

The gadfly-petrels, to which Zino's Petrel belongs, are highly social and when courting tend to congregate at night in one particular area and call repeatedly, although they also call elsewhere. In the case of Zino's Petrel courting occurs over the main breeding area, during the late evening and early morning hours (Zino & Zino 1986).

The birds return from sea to their breeding grounds in late March or early April and laying takes place from mid-May to early June. Nests are located in burrows about 140 cm deep, situated on well vegetated ledges which are generally inaccessible to man, goats and sheep. A single egg is laid, and hatching takes place in late July and early August, with the young usually fledging in late September or early October (Zino & Zino 1986). Breeding performance on the main ledge in previous years is shown in Table 1. Breeding success on the 1987 ledge before the destruction of the colony by a cat is not known.

Table 1. Breeding performance of Zino's Petrel (Zino *et al.* 1993). In 1987 one bird fledged from the “1987 ledge”.

Year	No. of chicks fledged on “main ledge”
1985	0
1986	0
1987	0
1988	0
1989	2
1990	3
1991	4
1992	4
1993	8
1994	5
1995	4

* **Feeding**

Zino's Petrel, as with other *Pterodroma* species, probably feeds on small squid and fish. The vomit of one bird handled in 1987 contained remains of cephalopods, bioluminescent myctophid fish *Electrona rissoi*, and amphipod and isopod crustaceans (Zino *et al.* 1989).

* **Habitat requirements**

The breeding areas are ledges at 1,600 m altitude in the central mountain massif, which are still rich in endemic flora because they are inaccessible to goats. It is essential that there is sufficient earth on the ledges to allow the birds to burrow and make their nests (Zino *et al.* 1994). Little is known about this species location and requirements outside the breeding season.

Threats and limiting factors

* **Mortality caused by predators**

i. Rats

Madeira is severely infested with rats *Rattus rattus* and this problem extends to the high-altitude mountain areas (Zino & Zino 1986). The first evidence of rat predation was obtained in 1985, when the remains of an egg eaten by rats were found. In 1986 a dead chick was found, clearly eaten by rats (Zino 1991). Rats abound in the forest below the bird colonies.

Clearing all the rats from the area is not a practical solution and is probably not even possible. It has therefore been the policy of the Conservation Project to protect the known breeding ledges as much as is possible, using poison (Klerat), and this has met with success. Unfortunately not all the breeding areas are known, but it would no doubt be beneficial if the area protected were to be increased. Poison should certainly be put down around those ledges where the petrels are known to have nested in the past but no longer do.

Importance: critical

ii. Cats

In July 1991 the remains of 10 dead Zino's Petrels were found on the 1987 ledge, all of them apparently killed by cats. Given the small size of the petrel's population and the ability of cats to hunt by both night and day and to reach the most inaccessible places, these predators are now a significant threat.

Importance: critical

* **Habitat degradation limiting availability of suitable nest-sites**

The two known Zino's Petrel colonies are located in places which are totally inaccessible to goats and sheep. Although it may appear that there is plenty of suitable nesting habitat, heavy grazing by these animals has caused large reductions in its availability (Zino *et al.* 1994). Freira burrows are very vulnerable to trampling by goats and sheep, which cause erosion and reduce soil depth (Imber 1989).

Importance: high

* **Human predation and disturbance**

In the past shepherds are known to have taken juveniles to eat. Collectors now pose a much more significant threat and are known to have taken adults and eggs in recent years. Following the discovery of the breeding site in 1969, a visiting ornithologist collected three birds and six eggs, and in 1970 the site was raided again (Zino & Zino 1986). This problem appears to be under control. Limited funds have made it possible to have the area wardened, but more manpower is needed to increase this wardening.

Importance: high

Conservation status and recent conservation measures

This species is classified as Endangered in the Portuguese Red Data Book (Cabral *et al.* 1990). It is also a protected species under Portuguese law (Decreto-Lei 75/91).

Given the species' rarity and the threat posed by rats, the Freira Conservation Project was launched in 1986 with the participation of the Madeira Natural Park, the Funchal Municipal Museum, ICI Agro-Chemicals, Agricultural Development and Advisory Service (ADAS) and the International Council for Bird Preservation (ICBP, now BirdLife International). The project is run by the BirdLife International representative in Madeira, Dr. Francis. Zino, and has been funded by Zeneca Agro in Lisbon and RSPB. The project has concentrated on reducing the threat of predation of eggs and young by rodents, but has also involved wardening, studies of the birds themselves and cat control.

There is also a LIFE-funded project running from October 1994 to December 1996: *Conservação e Recuperação de Espécies e Habitats na Madeira* covering a range of complementary conservation activities in the National Park.

* **Rat control**

Following evidence of predation by rats, a rodent control programme was initiated in 1987, with the aim of reducing the population of rats in the vicinity of the birds' breeding ledges. Bait boxes have been positioned on, above, and below the main ledge. Overall, the rodent control campaign is effective, substantially reducing and controlling the rat population throughout the egg-laying and incubation periods, and during the first weeks after hatching (Swash & Zino 1991).

* **Cat control**

Following the damage caused by cats on the 1987 ledge in 1991, a trapping scheme was started using Fuller cat traps. Up to 1993, four cats had been captured.

* **Site protection**

The breeding site is an Important Bird Area (Grimmett & Jones 1989) which has been designated as a Special Protection Area under the EU Wild Birds Directive by the Portuguese government. The whole area is included in the Madeira Natural Park.

* **Biological studies**

Bird studies include examination of Zino's Petrel nesting burrows, ringing of birds, and observations at night. The birds are captured during the night and ringed with incoloy rings provided specifically for the project. The chicks are also ringed if they can be safely removed from their burrows.

PART 2. AIMS AND OBJECTIVES

AIMS

To increase the breeding population to at least 40 pairs by the year 2000, by eliminating the factors which are adversely affecting the species.

OBJECTIVES

1. POLICY AND LEGISLATIVE

1.1. To ensure an adequate legal and financial framework for the conservation of Zino's Petrel

1.1.1. Incorporate Species Recovery Plans into regional and national legislation

Recovery Plans are included as legal measures in other countries. Consideration should be given to incorporating the Action Plan for Zino's Petrel into appropriate legislation.

Priority: low

Time-scale: medium/long

1.1.2. *Establish the management plan for the Natural Park of Madeira*

A comprehensive management plan should be developed for approval by the regional authorities, and an adequate budget allocated for species and habitat conservation. Ideally, the Zino's Petrel Action Plan would become a part of this management plan as would the Action Plan for the Madeira Laurel Pigeon.

Priority: high

Time-scale: short

1.1.3. *Attract funding from relevant international organisations, especially the EU*

A general application for the conservation and management of the Natural Park of Madeira should be submitted to the EU under the LIFE regulation, including a chapter for financing the Freira Conservation Project in the years to come. This would also benefit the conservation of the endemic flora.

Priority: high

Time-scale: ongoing

1.1.4. *Develop and implement a strategy for addressing the issues affecting this species while at sea*

A Conservation Strategy for Birds of Marine Habitats in Europe is currently being prepared by BirdLife International to be published in 1996. It will identify broad measures for the conservation of birds in their marine habitats including Zino's Petrel in the Macaronesian Seas. This strategy should be used as a basis for additional actions for this species.

Priority: medium

Time-scale: ongoing

2. SPECIES AND HABITAT PROTECTION

2.1. To control mammalian predators

2.1.1. *Prevent predation by rodents*

The program for the control of rats on the breeding ledges and in surrounding areas which started in 1987 should be continued and reinforced. Increased wardening would contribute to the control programme which should be expanded to all known colonies, including the 1987 ledge. The control is carried out with the anticoagulant rodenticide brodifacoum (Klerat), by placing boxes containing 1 kg of the material in 320 g wax blocks on the large ledges. The baits are checked approximately every month, and those on the main ledge are checked whenever visits are made. If new colonies are found, a preventive baiting scheme must be established.

Priority: essential

Time-scale: ongoing

2.1.2. *Maintain the breeding areas free of rats*

To keep the area where Zino's Petrels breed free of rats it is necessary to take action on the likely sources of rats. Most come from the forest below, but one source in the vicinity of the breeding area is likely to be the restaurant at Pico de Areeiro, which is accessible via a tarmac road. The Madeiran authorities should inform this establishment about the potential danger of rats for the surrounding wildlife, prevent random dumping of waste and consider the provision of equipment for adequate waste management. A "take your litter home" policy should be encouraged among hikers on the Areeiro–Pico Ruivo path.

Priority: high

Time-scale: ongoing

2.1.3. *Control predation by feral cats*

The cat control measures implemented to date have proved very effective but the trapping effort should be considerably increased. The use of padded leg-hold traps or kill traps, which are less conspicuous than the traditional traps and could be used more extensively, could be considered if herbivores were removed from the area.

Priority: essential

Time-scale: ongoing

2.2. **To control human access and disturbance**

2.2.1. *Warden the breeding area*

Wardening of the site is thought to have been an effective way of protecting the area in previous years. It is recommended that the employment a full-time warden to patrol the area is continued, particularly during the breeding season (April to October). This person could also check the bait boxes and traps and assist when required during visits to the breeding ledges.

Priority: high

Time-scale: ongoing

2.2.2. *Protect the current breeding area through purchase and management*

The known breeding colonies are located on land which is private property at present, and although the land is within the Parque Natural da Madeira, there can be a conflict of interests. Efforts should be made to acquire the property where the birds breed, which would make it possible to control livestock, carry out habitat management and restrict access where necessary. The ownership of all existing and potential nesting sites should be determined.

Priority: high

Time-scale: medium/long

2.3. To encourage an expansion of the breeding area to other suitable ledges

2.3.1. Create and expand nesting habitat at designated sites

The feasibility of undertaking an experiment to facilitate colonisation of new breeding areas should be explored. This could be done by digging artificial burrows in potentially suitable areas, and monitoring their acceptance by petrels. Recorded calls could be broadcast at night and material from old nests (thus likely to smell of petrels) could be spread around to help attract birds. Prior to any experimentation, a thorough review of such actions for *Pterodroma* species in other parts of the world (e.g. Galapagos, Bermuda, New Zealand) should be undertaken.

Priority: low

Time-scale: medium/long

2.4. To exclude grazing stock from the breeding area

2.4.1. Reduce goat numbers

This would greatly benefit the natural regeneration of vegetation, including the endemic flora, and soil in the breeding area and could be achieved through a compensation scheme to the owners of livestock. Funding for such a scheme should be sought from the EU through the Agri-environment regulation 2078/92. Ideally, the area would be fenced off and all livestock removed.

Priority: high

Time-scale: medium/long

3. MONITORING AND RESEARCH

3.1. To determine population status and distribution

3.1.1. Try to locate new breeding colonies

Surveys should be made for other breeding sites in the vicinity of the known breeding colonies, and other suitable places on the island of Madeira. Extensive listening searches should be carried out in the mountains by people acquainted with the calls of Zino's Petrel, combined with visual searches for likely breeding ledges and followed by verification by climbing parties. The use of automatic recorders to detect and amplify calls should be explored. The advice and experience of the local experts needs to be followed when choosing places to check for breeding colonies. Given the difficulties of the terrain, at least two experienced climbers with adequate equipment are needed. Any search for breeding colonies must be coordinated by the Freira Conservation Project.

Priority: high

Time-scale: ongoing

3.1.2. *Monitor population numbers and trends*

The breeding ledges should be visited once a month, between mid–April and mid–October, to verify the occupation of burrows. Details of the state of activity at each burrow should be recorded on a standard form whenever a visit is made to the ledges. Since the available ground must be a major limiting factor for the population, a great deal of care is needed to avoid physical damage to the burrows when working on the ledges.

Priority: high

Time-scale: ongoing

3.2. To promote scientific investigations that enhance and facilitate recovery effort

3.2.1. *Investigate population dynamics and survival rates*

The capture (with mist-nets) and ringing of birds above the breeding sites, as well as that of chicks in the nest, should continue. When sufficient data are available, the capture/recapture method could be applied to estimate the total number of birds, although there are liable to be many biases affecting this technique. In any case, the existing data on survival rates should be analysed. There is also the possibility of using fibreoptics and miniature TV cameras to study incubation and fledging if funding can be obtained.

Priority: medium

Time-scale: ongoing

3.2.2. *Characterise habitat selection at nest-sites*

A habitat evaluation study should be undertaken to determine the special habitat requirements and to compare habitat selection among colonies. The results of this study should allow the precise identification of the most suitable areas for Zino's Petrel in Madeira.

Priority: low

Time-scale: medium

3.2.3. *Study the diet of predators living around the breeding area*

Faeces of cats should be regularly collected around the breeding area and subsequently analysed for Zino's Petrel remains.

Priority: low

Time-scale: ongoing

3.2.4. *Investigate the birds' feeding and non-breeding range*

The possibility of attaching data-loggers to birds caught at burrows during the breeding season should be explored. Satellite tracking would be another possibility, although the technology for a bird of this size is not yet available. The non-breeding range of this species is currently unknown and these techniques could identify areas to target for more detailed study. Any technique would first have to be tested on a less endangered species.

Priority: medium

Time-scale: long

3.2.5. *Continue research on the taxonomic status of Zino's Petrel*

The research already started to determine the genetic affinities of the *Pterodroma* petrels occurring in Madeiran waters should be continued and finalised, with the help of DNA fingerprinting and mitochondrial DNA analysis.

Priority: low

Time-scale: ongoing

3.2.6. *Initiate a general investigation about rat ecology and population dynamics in Madeira*

Rats in Madeira, as elsewhere, appear subject to population cycles. A more detailed knowledge of the length of these cycles and of the factors triggering population explosions would be helpful in preventing sudden increases in rat numbers in Zino's Petrel breeding areas.

Priority: low

Time-scale: long

4. PUBLIC AWARENESS AND TRAINING

4.1. To increase awareness of the need to protect Zino's Petrel

4.1.1. *Develop and distribute educational material and upgrade the image of Zino's Petrel among the islanders of Madeira*

A leaflet including information about Zino's Petrel should be published (but keeping the breeding areas confidential), in order to raise awareness among the local population about the need to protect this species. The special importance of Zino's Petrel should be promoted as a symbol among the inhabitants of the island of Madeira, with the aim of ensuring that it is adopted as part of the island's cultural identity.

Priority: medium

Time-scale: short/medium

4.1.2. *Provide adequate facilities to the visitors of the Natural Park of Madeira*

An interpretation centre should be built to promote a better understanding of the natural values of the Park, including Zino's Petrel. The breeding season coincides with the period when tourists visit the mountains. Once the area is well controlled and wardened, it may be possible to take tourists to hear the birds at night. This would bring in funds for the continued conservation of the area.

Priority: medium

Time-scale: medium

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