Pacific Invasive Species
Battler Series

MANAGE MYNA BIRDS IN THE PACIFIC

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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

Cover Photo: Daniel Ramirez, Wiki Commons

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Dear Invasive Species Battler,

We are a diverse bunch of people in the Pacific region, which spans a third of the earth's surface and encompasses about half of the global sea surface. We have ~2,000 different languages and ~30,000 islands. Pacific ecosystems are one of the world's biodiversity hotspots, with a large number of species found only in the Pacific and nowhere else. In fact, there are 2,189 single-country endemic species recorded to date. Of these species, 5.8 per cent are already extinct or exist only in captivity. A further 45 per cent are at risk of extinction. We face some of the highest extinction rates in the world.

The largest cause of extinction of single-country endemic species in the Pacific is the impact of invasive species. Invasives also severely impact our economies, ability to trade, sustainable development, health, ecosystem services, and the resilience of our ecosystems to respond to natural disasters. Fortunately, we can do something about it.

Even in our diverse region, we share many things in common. We are island people, we are self-reliant, and we rely heavily on our environment to support our livelihoods. We also share many common invasive species issues as we are ultimately connected. Sharing what we learn regionally benefits us and our families economically, culturally, and in our daily lives. The "Invasive Species Battler" series has been developed to share what we have learned about common invasive species issues in the region, with information and case studies that can assist you to make a decision about what to do next or where to go for further information.

The SPREP Invasive Species Programme aims to provide technical, institutional, and financial support to regional invasive species programmes in coordination with other regional bodies. We coordinate the Pacific Invasive Learning Network (PILN), a network of practitioners battling invasive species, and the Pacific Invasives Partnership (PIP), the umbrella regional coordinating body for agencies working on invasive species in more than one Pacific country.

For knowledge resources, outreach tools, and more information on SPREP, the Invasive Species Programme, PILN, and PIP, please visit the SPREP website: www.sprep.org

Thank you for your efforts,
SPREP Invasive Species Team

About this Guide

Experience shows that you can get rid of myna while their population is small, but once the population becomes widespread, ongoing management will be required if the impacts of myna are to be reduced. This guide offers solutions and advice on how to decide what to do if myna are an issue in your country and was prepared by David Butler and Bill Nagle, who have assisted Pacific countries with myna solutions for both goals of eradication and control.

What are Myna birds?

Myna birds were deliberately introduced to some countries as biological control agents for ticks on cattle or to control other insects. However, the myna rapidly spread and became troublesome. There is no evidence that they were, or are, effective at controlling cattle ticks or any other pest insect, nor were myna successful in controlling locusts on Reunion or Mauritius Islands in the Indian Ocean.

Myna have become a nuisance at best and a serious problem at worst in some Pacific islands and have been targeted for control or eradication programmes on several islands in recent years. Some countries have both species of myna.

Myna most likely reached other countries as hitchhikers or stowaways on passenger or cargo ships because biosecurity procedures did not detect them. There are also stories in some countries (e.g. Kiribati and Tokelau) of myna being kept as pets and moved around between islands.

Did you know?

Myna are alert and clever birds that learn fast and communicate well with each other.

They are used to living near or in human settlements and are not afraid of people.

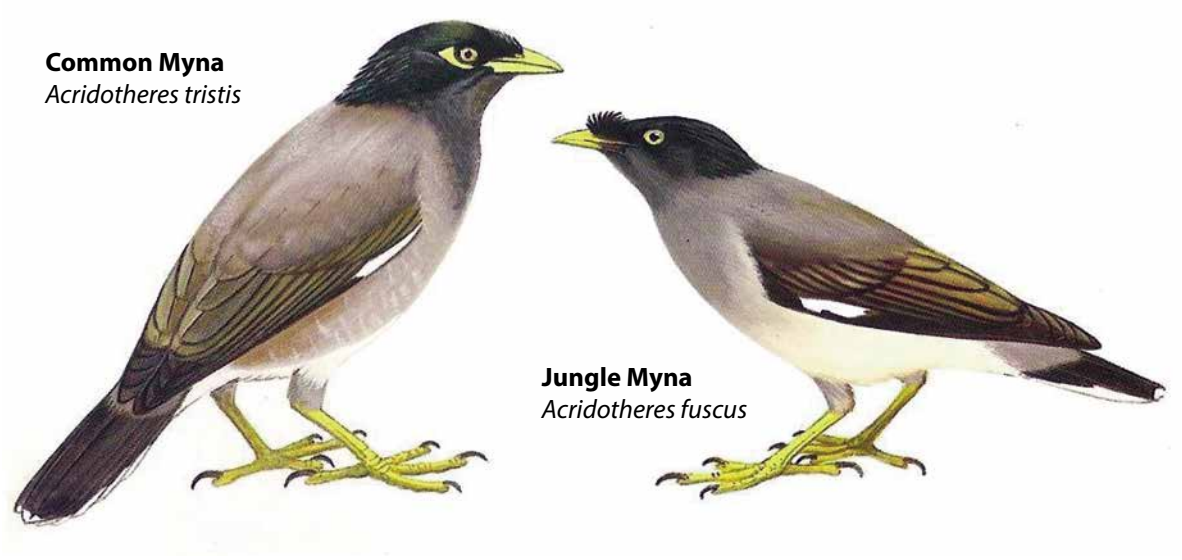
The two species of myna found in the Pacific region, the jungle myna (*Acridotheres fuscus*) and common myna (*Acridotheres tristis*), are native to Asia and are recognised as serious invasive species problems both globally and in some Pacific countries.

Photo : Greg Schechter, Wiki Commons

Species description

The jungle myna (JM) and common myna (CM) are similar in appearance and not easy to tell apart (Figure 1). The key distinguishing features are that CM have a yellow patch of skin around the eye, and JM have a distinctive tuft of feathers forming a small crest on the forehead and no yellow eye patch. If seen together, CM are larger (23–26 cm long) and the upper sides of the body are a cocoa brown colour, whereas the JM is 22–24 cm long and is greyer. It is not possible to tell the sexes of the birds apart in the field, and both species have very similar calls.

There are some differences in the behaviour of the two species, which may affect how they can be managed. For example, JM are reported to always be first to take bait and to enter traps, while CM observe the situation before taking any action.



What are some of the impacts caused by myna?

The main impacts of myna are on native birds and on people, by feeding on food crops such as papaya and tomato, nesting in buildings, and roosting in large, noisy night-time gatherings.

Few studies have looked at the effects of myna on native biodiversity. However, myna are very territorial birds and attack other birds that come into their area. There is a growing number of observations that show myna attack native birds on Pacific islands (e.g. Rimatara lorikeet in the Cook Islands and ma'oma'o in Samoa). In French Polynesia, myna attacked nesting Tahiti monarch flycatchers during the breeding season and reduced the number of chicks that survived, and in Kiribati, myna displaced nesting black noddy from trees.

Myna are also seen as a social problem. They are used to living close to people and will nest in the ceilings of houses, where their noise, smell, and droppings can upset people. They will come into a house to steal food off a table and can carry diseases that may affect people. Myna damage crops, and extra work is required to protect soft fruits, such as tomato, papaya, and banana.

Have myna ever been successfully eradicated?

There have been several recent international reviews of myna management that document a small number of successful eradications, but only when myna are in very low numbers and/or on very small islands or atolls. Most reports are from work with common myna, not jungle myna.

The most recently reported myna eradication was on Tarawa in Kiribati. This project started in an uncoordinated way in 2003 and ended with a well-resourced effort in 2014/15 (see case study below).

Another recent eradication was on Denis Island, a 131 hectare island in the Seychelles. Common myna eradication began there in 2010, and 1,100 birds had been removed by July 2015, 95% by trapping. An expert conservation hunter was brought in to shoot the 66 remaining myna birds that had become trap-shy. An informative video of that project has been made (see information sources).

Information on long-term control operations is limited. A community trapping programme in the city of Canberra (Australia) by the Canberra Indian Myna Action Group reduced common myna from the 3rd most common bird counted in surveys to the 20th most common. However, the Group considered that achieving similar results in areas where common myna were in higher numbers and well established would be difficult. Elsewhere, populations have been temporarily reduced by various methods, but soon recovered to original numbers.

Case Study: Cook Islands

Eradicating common myna from Atiu, Cook Islands

Myna were well established, and eradication was considered necessary to assist the successful re-establishment in the Cook Islands of a threatened bird species, the Kura lorikeet. The lorikeet chicks were attacked by myna. A USD 100,000 programme using a combination of poisoning, trapping, and shooting over five years brought myna numbers down from about 6,000 initially to 200 by January 2014 and to less than five by November 2015.

By March 2016, there had been no public reports of wild myna since November, and the shooter was searching for the very few that might still remain. A successful eradication is thus very close, representing a very significant achievement.

Photo : A.K. Woods. Wiki Commons

How can myna be managed?

Reducing the threat to the biodiversity and people of the Pacific from myna will involve all three strategies of invasive species management: prevention, eradication, and control. In some situations where populations are well established and widely dispersed, the choice to do nothing may be the only decision possible.

Prevention

Preventing myna from reaching an island is always more cost effective than dealing with them after they arrive. The key to prevention is to identify the different pathways through which myna may reach an island (myna appear to have reached new islands on boats) and to take on-going steps to block such transfers.

Early Detection and Rapid Response

Regular surveillance is important. If myna do reach an island, it is important that they are detected early as part of a regular surveillance programme. If myna are seen, a quick response is essential before they have a chance to breed, increase their numbers, and spread over a large area.

Methods of management once they are established

The main methods of eradicating or controlling those birds that get past biosecurity are trapping, use of toxic bait, and shooting. The methods to be used will depend on the chosen management strategy: eradication or control. A period of days or weeks of pre-feeding will be necessary for either trapping or toxic baiting programmes so that myna are attracted to the traps or baits.

Photo: Placing assembled myna traps in the field.

Trapping has been used to control populations as a community effort with some success, as in Canberra and Tahiti, and trapping has been an important technique in eradications. Several designs of traps have been used, with the 'PeeGees' trap being the most effective on the east coast of Australia. It is possible to modify trap designs to suit local conditions.

Some areas of Australia are investigating walk-in, aviary-style traps for areas where the myna numbers are high. The use of decoy birds greatly improves the success of trapping. These birds need to be well cared for so they remain healthy and effective.

Nest-box traps and fishing line nooses on nests have been used for small populations and to target the last individual birds that have become trap or bait shy.

Shooting by professionals who are trained in myna behaviour and use specialised firearms has reduced numbers in some areas and completed several eradications. Shooting is most likely to be useful in targeting the last individual birds that have become trap or bait shy.

Photo: Keith Marshall taking at aim at a bird beside the Betio landfill, Kiribati.

Disruption may slow the rate of increase of a myna population and is likely to be an effective method for local communities:

- Reducing feeding habitat suitability by allowing grass on open areas to grow long has deterred myna in places.
- Reducing available food sources, at both small and large scale, is essential. It is difficult to protect all crops from myna, but food scraps that are not fed to pigs should be buried. Pigs, dogs, and other pets should be fed in containers that are myna-proof. In particular, thought needs to be given to eliminating and excluding myna from landfills, waste treatment plants, and any other large-scale sources of food.
- Nest and egg identification and destruction can help reduce population growth. Myna will nest in buildings as well as palms, bamboo groves, and trees. Communities, especially children, should be alert to nesting behaviour.
- Roost site identification and disruption may be critical to the success of any project. Myna do not always stay at the same roost. During the breeding season, usually only the male is in the roost while the female is on the nest, and disturbing roosting behaviour should be part of the management effort.

How do I determine the best approach for myna in my area?

These decision tools are designed to assist you in pursuing your desired approach. By using the checklist, you can determine what would work best in your situation.

Decision Tool 1

Will an eradication attempt be successful?

1. Can these three key technical requirements be met?

- Can all myna be put at risk of being killed over a short time period?
- Can myna be killed faster than they can increase in number through breeding?
- Can you ensure that no new myna will arrive?

If you can answer 'Yes' to all three questions, proceed to 2.

2. Are the necessary resources and support available?

- Is there sufficient local expertise available or the necessary funds to secure the involvement of outside experts?
- Can sufficient operational funds be obtained?
- Is there sufficient political and community support?

If you can answer 'Yes' to all three questions, continue to 3.

3. Do the likely benefits justify the likely cost?

If birds have recently arrived at an island and are still in low numbers, the answer is always likely to be 'yes', even though the damage they will cause if established is not clear. However, non-target species must be considered. You still need to be sure that the techniques you will use will not put people or important native biodiversity at risk.

If birds are well established, eradication will be difficult and expensive, and you need to be sure it will bring important benefits. Possible benefits may include:

- Improved conditions for native biodiversity, particularly rare species (see Atiu example on page 5);
- Improved yields of commercial or subsistence food crops; and
- Improved living conditions for people.

A hidden cost may be problems caused by other species (e.g. bulbuls or stick insects) if myna are removed.

Decision Tool 2

If eradication is not likely to be successful, or is too expensive, should control be attempted, or is it better to do nothing?

Answer some of the following questions to assist in your decision.

- What are the damaging myna impacts that you wish to reduce?
- Where are those impacts taking place?
- How many myna have to be removed from those sites to reduce the impacts to a level where they are not serious?
- Do you have the skill, labour, and financial resources to reduce myna numbers to that level at those sites for as long as it is necessary?
- What consequences could there be to controlling myna numbers to low levels (e.g. impacts on non-target species or increase in other invasives, such as bulbul)?

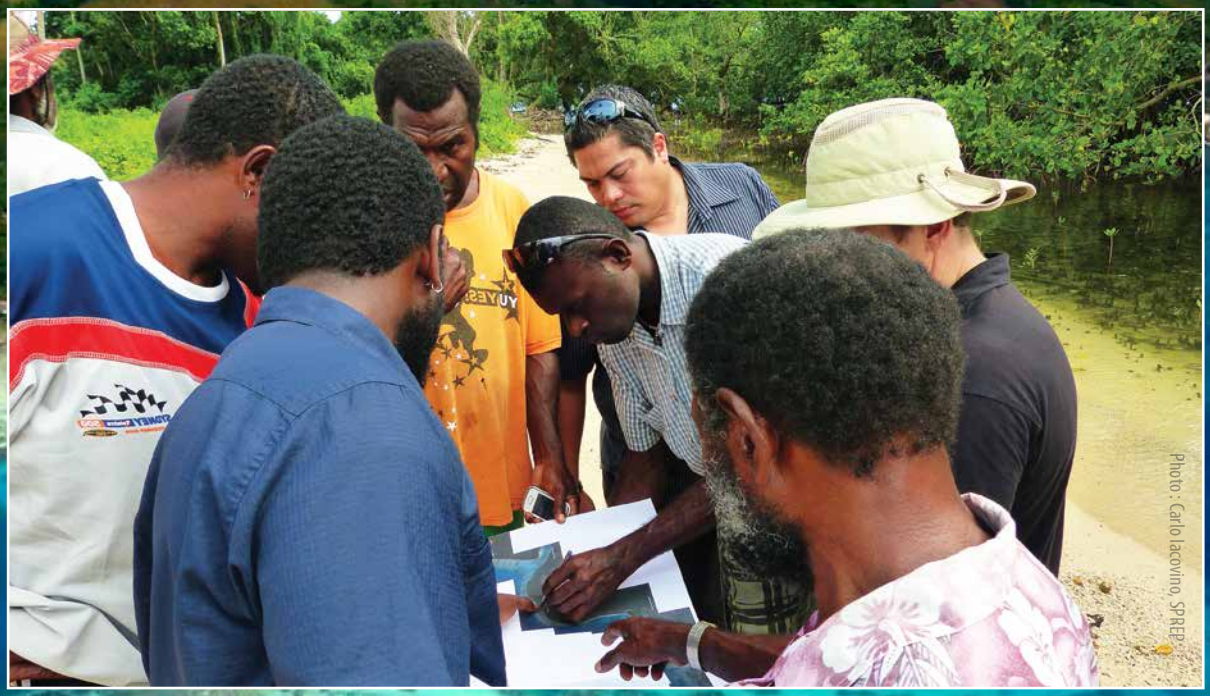


Photo : Carlo Iacovino, SPREP

Remember

You need to be sure that the techniques you will use will not put people or important native biodiversity at risk.

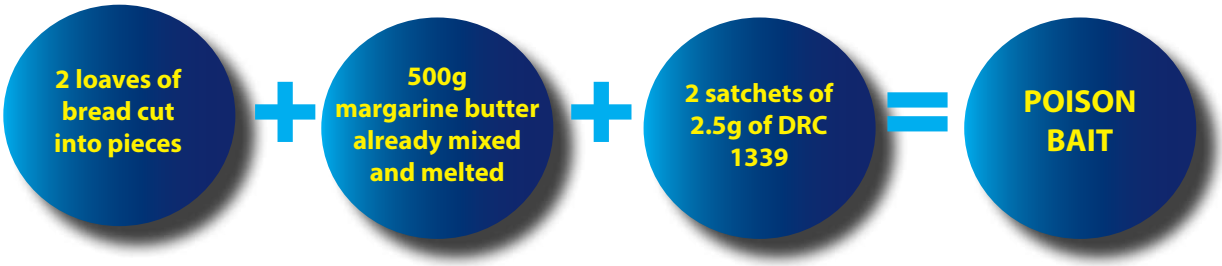
Photo : Samuel Etienne, Wiki Commons

How do I decide what method to use?

Are experienced trappers available? Further work is required on trapping methods, in particular use of large, walk-in traps or designs that community members can easily use as well as detailed trapping protocols worked out with the community.

Toxic baiting using a bird-specific toxin (particularly DRC-1339, Starlicide®) requires specialist training but has been used with some success in Samoa, the Cook Islands, and Tahiti. Operations against common myna on islands in the Atlantic Ocean led to a conclusion that baiting with DRC-1339 may not be fully effective, and baiting is best used as one of several techniques alongside trapping and shooting.

Issues that may affect the effectiveness of poisoning include bait aversion, individual bird susceptibilities, and competition between birds for baits. This may be further complicated in the Pacific by the presence of both jungle and common myna (and bulbul), and more work is required to refine the solution. A lethal dose for each species of myna has not been determined (jungle myna are only 75% of the size of common myna), so one species may not get enough toxin and the other may get too much, wasting resources.



One of the useful qualities of DRC-1339 is that it does not kill immediately, so, in theory, target species do not associate the bait with its result. However, this means that the body count of myna does not equal the number of birds seen taking the bait, so the effectiveness of any programme can only be resolved by pre- and post-baiting monitoring and surveillance. Alternative bait(s) should also be tested. Rice could be used instead of bread as the carrier for DRC-1339. Smaller particles (grains vs. chunks) mean birds should eat a lethal dose rather than fly away with it.


Photo : Awais Ali Sheikh, Wiki Commons

Case Study: Samoa

Considerations for managing myna in Samoa

Photo : Neil, Wiki Commons

A myna population transect survey gave a conservative estimate of a myna population between 129,407 and 188,583 birds (both common and jungle myna) in Samoa in May 2015.

This means that at least 1,775 to 2,580 myna will need to be removed every week for one year just to stop the population increasing further.

A long-term control operation may succeed in reducing the myna population if more birds can be culled than are fledged each year.

However, there are no reliable data on which to base an estimate of the rate of population increase of each myna species in Samoa and to use in calculating a culling rate.

A conservative assumption of 30% of the population of myna (both species) just on Upolu (130,030 birds) being of breeding age and each pair fledging two chicks a year means 39,000 juvenile birds need to be culled each year (750/week) to stop the population from increasing.

Any programme to control the myna would require accurate information, significant resources, and a commitment to long-term action.

Who is involved in managing myna?

Myna are a visible, obvious species, and management actions will need to take into account the public awareness of the birds and any control actions.

Public outreach is vital when eradication or control is planned, particularly with the use of poisons or controlled shooting, which can be easily misunderstood by the local community. A unified public effort will greatly increase the success of eradication or control efforts.

What must I have to successfully manage myna?

Adequate information: A successful myna management programme will rely on detailed information about the birds to assist with planning.

- **Breeding season:** When are myna breeding? Do they follow the seasonal pattern(s) of native birds? Are brood patches obvious on female myna?
- **Rate of population increase:** How many times a year does a pair lay eggs? How many eggs are laid each time? How many chicks fledge from each clutch of eggs?
- **Moulting season:** When are birds moulting? Do they show any unusual behaviour during the moulting time?
- **Times of hardship:** Is there any time of the year that food is short for myna?
- **Locations of roost sites:** Compass bearings of large groups of birds arriving, or leaving, major feeding sites should be mapped, and these flight paths can be plotted on a map to help locate roost sites.
- **Other species effects:** Will a reduction in the numbers of one species result in an increase in the population of the other as they take over the newly-available habitat?

Information is also required about non-target species, and this need can be a serious constraint to management programmes. Use of a humane trap means that any non-target species caught can be let free, but precautions are necessary if toxic bait is used. Any birds in the myna family may be very susceptible to DRC-1339, and other birds such as banded rails and Polynesian trillers were observed eating toxic bait in Samoa, with carcasses also found.

This issue is also complicated by the presence of other invasive birds, such as bulbul, feral pigeon, and jungle fowl. Little is known about the behaviour of bulbul in the presence of myna. A reduction in myna populations might result in an increase in the bulbul population and even more damage to food crops.

Non-target species in the Samoa myna control programme

In Samoa, as well as jungle and common myna taking bait, both invasive birds (red-vented bulbuls *Pycnonotus cafer,* feral pigeon *Columba liva*, and jungle fowl *Gallus gallus)* and native birds (banded rails *Gallirallus* philippensis, cardinal honeyeaters *Myzomela cardinalis,* Samoan starlings *Aplonis atrifusca*, and Polynesian trillers *Lalage maculosa*) were present during baiting.

Banded rails and Polynesian trillers were observed eating toxic bait, and carcasses were found. The Polynesian starling (*Aplonis tabuensis*) is in the Sturnidae family with myna and may be very susceptible to DRC-1339, but starlings were not observed to feed on the ground with myna.

Adequate resourcing

Adequate and long-term resourcing and logistical support will be essential for any effort. In particular, lack of vehicles and insufficient workers can limit operations and the monitoring needed to determine success.

Community support

The support of the community will be essential for the success of any programme because they can provide information and contribute to the programme by trapping and disrupting the myna life-cycle by locating and destroying nests. The community can also reduce food sources for the birds and make grassy areas unsuitable for myna feeding.

Access

It will be important to be able to carry out operations on both public and private property.

Appropriate methods

Methods must be used in ways that do not teach lessons to survivors. If the bird knowledge spreads, any methods can quickly become ineffective. Common myna are particularly alert birds and learn quickly.

Case study: Kiribati

Eradication of myna from the Gilbert Island group

Myna were first recorded in Kiribati in 2003 and were considered to have arrived from Fiji by boat in the port of Betio on Tarawa. Over the next ten years, small numbers were reported on four atolls. In 2014, the Environment and Conservation Division (ECD) began an eradication programme within the GEF-PAS Regional IAS Project.

Initial surveys in 2014 suggested that the birds were restricted to Betio and that populations on three outer atolls had died out, partly a result of some community efforts destroying nests and killing individuals.

Betio is a very busy port village with many people, factories, open yards, and a large landfill for rubbish disposal. The Betio population of myna had fluctuated from at least ten birds in 2012 (six jungle myna and four common myna to only four in 2014 and 2015 (one jungle myna and three common myna).

The surveys identified the night-time roost of three birds (a large, disused port crane) and a treed area used to rest during the day. The birds were active and could be followed for about two hours after leaving the roost at dawn. In that time, they usually fed in the landfill and several open yards.

Eradication plans included the use of several techniques: trapping, poisoning with DRC1339 (Starlicide®), and shooting. Shooting was adopted as the key technique because the number of birds was small, and interference from people, dogs, and pigeons made it difficult to draw the myna in to traps or poisoned baits.

Approvals were obtained to bring in an experienced hunter from New Zealand with a shotgun and air rifle with telescopic sight, and the Police Department provided an escort to manage site access and public safety. Biosecurity Division staff were also available to assist.

An ECD team assisted by an adviser spent a week in Betio before the shooter arrived, following the four birds to identify possible shooting locations. On the first morning of shooting, a pair of CM were killed together on a shipping container using the shotgun, and the JM was shot from a tree in the daytime roost area using the air rifle. The last CM was shot using the air rifle the next evening when on the crane.

The key factors behind the success of the shooting operation were:

- a committed team who worked very hard to follow birds within a very complex port environment to create opportunities for the hunter;
- support from a variety of government agencies and from companies and individuals working in the port;
- an environment in which the myna were very used to encountering people at close quarters;
- an experienced, committed hunter who had practiced taking many shots at small targets prior to the operation; and
- having a choice of appropriate firearms available.

The Global Environment Facility - Pacific Alliance for Sustainability: Prevention, control and management of invasive alien species in the Pacific Islands (GEF-PAS IAS) project includes activities to develop biosecurity protocols, which should assist in preventing the re-establishment of myna in Kiribati.

Photo : Carlo Iacovino, SPREP

Case Study: French Polynesia

Myna and bulbul control to protect the Tahiti monarch flycatcher

A combination of trapping by a network of more than 30 individuals, poisoning, and shooting were successfully used to reduce myna populations at the entrances to the valleys in which the monarchs nested.

In 2012 and 2013, almost 2500 myna were killed, and nesting success of monarchs increased to 100%.

However, the removal of 1,900 bulbuls failed to reduce their numbers in some monarch territories, and it was thought that bulbuls were benefiting from the reduction in myna and from rat trapping that was intensified from 2011. Continuing efforts saw the monarchs fledging 10–12 chicks in the 2012–2014 breeding seasons, and the population now numbers 53 birds from an estimated low of 19 birds before the programme started.

Follow this programme through the website of the Société d'Ornithologie de Polynésie (MANU) at www.manu.pf.

Photo : TerraMar Project, Wiki Commons

For More Information

The Battler Resource Base contains information materials and resources for battling invasive species: www.sprep.org/piln/resource-base

You can contact the Invasive Species Programme through the SPREP website: www.sprep.org/Invasive-Species/bem-invasive-species

Reports

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https://www.youtube.com/watch?v=MFAXJDyWIBs Video of the successful eradication on Dennis Island, Seychelles.

Websites

Canberra Indian Myna Action Group (CIMAG) – this site also contains information from projects in other countries. www.indianmynaaction.org.au/

Société d'Ornithologie de Polynésie (MANU) www.manu.pf – for myna control to protect Tahiti monarch.

Cook Islands Natural Heritage Trust - http://cookislands.bishopmuseum.org/ - for myna eradication on Atiu.

Join the Fight

Protect our islands from invasive species