

# Predator Free Rakiura Halfmoon Bay (HMB) Project

Summary of options for predator removal

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# CONTENTS

Summary	1
Report 1: Predator Free Rakiura Halfmoon Bay Project—methods for predator removal	2
Report 2: Predator Free Rakiura Halfmoon Bay Project—analysis of options for proposed predator fence	3
Report 3: Predator Free Rakiura Halfmoon Bay Project—biosecurity options	4
Your views are important	5
References	5
Acknowledgements	5
Appendix 1	
Species names	5



# Predator Free Rakiura Halfmoon Bay (HMB) Project

## Summary of options for predator removal

Predator Free Rakiura (PFR) Governance Group

### Summary

The idea of making Stewart Island/Rakiura (hereafter Rakiura) free of mammalian predators has been around for years. If this ambitious project were to proceed and be successful then it would be a world first in terms of size, the inclusion of a township and the mix of predator species targeted and would play an important role in protecting Aotearoa New Zealand's unique flora and fauna for years to come.

In 2014, the **Predator Free Rakiura (PFR) Governance Group** was established to evaluate the feasibility of this project and what, if it proceeded, it might look like. The PFR Governance Group is made up of representatives from the communities and organisations that share an interest (be it cultural, legal and/or a personal connection) in this unique place, including Ngāi Tahu, Tītī Islanders and the Rakiura Māori Land Trust; local residents, fishers, hunters and business owners; Southland District Council; Department of Conservation (DOC); Environment Southland; and potential project funders.

The PFR Governance Group asked DOC to investigate the ways that a predator-free Rakiura could be achieved. This request resulted in the production of three detailed technical reports on the options for removing predators from a smaller (but still significantly challenging) area around Halfmoon Bay (**The Predator Free Rakiura Halfmoon Bay (HMB) Project**) and preventing reinvasion. These reports accompany this summary. With this information in hand, it is now timely to re-engage with our communities, as project ownership by them is essential to ensuring success.

The three technical reports cover:

1. Options (methods) for predator removal
2. Details of the proposed predator fence
3. Biosecurity requirements to maintain a predator-free state

None of the options in these reports are set in stone. Instead, they represent an assessment of the most likely to succeed and realistic options for the removal of predators from the HMB Project area, and are designed to stimulate discussion amongst our communities. Any plan would have to be widely acceptable, likely to succeed, and present good value-for-money to funders before it could proceed. We are also watching ongoing technological advances (e.g. GoodNature® resetting traps, 'virtual fences', new toxin and toxic bait developments, etc.). While the content of the following reports has been limited to what is proven to be effective at present, new technologies can be incorporated into planning for the project at any time (i.e. whenever tools are available to be used reliably and successfully at a large operational scale).

If the HMB Project was to proceed beyond an initial concept stage, the findings of our consultation with communities would be used to prepare a detailed operational plan, including a thorough costing and risk assessment. Any further progress would depend on completing regulatory processes (e.g. consents) and securing sufficient funding (including ongoing costs).

The three technical reports are summarised as follows:

## Report 1: Predator Free Rakiura Halfmoon Bay Project—methods for predator removal

In the predator removal options report, detailed scenarios are presented for the removal of the following predators: Norway rats, ship rats, kiore, possums, feral cats and hedgehogs (Appendix 1). All scenarios addressed in this report are considered to be technically achievable. This report and the other two reports do not include scenarios deemed to be generally unacceptable to the communities with an interest in Rakiura (in particular, aerial application of toxic baits); although it should be noted that use of aerially-applied toxic baits would be significantly cheaper for removing predators than any other method assessed in these reports.

Removing predators from the HMB Project area would be challenging. This project would be a world first, given the large size of the area, the presence of a permanently settled township and the mix of predator species targeted. The presence of domestic cats poses a particular challenge that needs strong community consideration. Methods will either have to be adapted, with the risk of project failure possibly increasing, or pet cats safely contained for the duration of the predator removal work to minimise individual risk to them.

Nowhere in the world has a ground-based predator removal operation been undertaken where Norway rats, ship rats and kiore co-exist; further work will be required to establish the best approach for this task. Risk of re-invasion from rats is also significant. The removal of cats, possums and hedgehogs is more certainly achievable based on previous work, both within New Zealand and internationally, with relatively little risk of future re-introduction of these species (due to their low incidence as stowaways on boats etc.). However, the greatest ecological gains are to be had from removing rats, as they do the most significant amount of damage to native wildlife.

Four scenarios are presented for two different-sized HMB Project areas using trapping and toxins (applied via toxic baits in bait stations) within established grids. None of the options target white-tailed deer, but toxic bait use, even in bait stations, is likely to have some impact on local hunting opportunities.

Under the three bait-station scenarios presented, rats and possums would be removed using the same bait station grid, with possums and rats targeted at different times to avoid competition between them for bait. Feral cats would likely be knocked down via secondary poisoning (eating poisoned rats) and would be further targeted using detection dogs, trapping, hunting and cat-specific toxic baits.

The trapping-only scenario would use a variety of traps to target the various predators, although toxic baits would still be required in areas inaccessible by foot and for ongoing biosecurity measures. The trapping-only scenario would be significantly more expensive than the other (bait station) scenarios due to the increased staff requirements for checking and clearing traps. It is also riskier and considered to have the lowest likelihood of success in terms of the complete removal of rats.

The scenario that uses only brodifacoum baits in bait stations to target rats is most likely to achieve success and is currently also the most cost effective. Using the less-persistent but also less-proven toxin diphacinone would present higher uncertainty in achieving complete predator removal.

The project team would work with residents and other landowners to have action plans developed for each property. Every building, structure, vessel and vehicle on the island would need to be treated during the operation. Buildings may require traps and/or bait stations for six months or more during the predator-removal phase.

The presence of kiore presents a challenge for recommending an appropriate grid spacing size; for Norway and ship rats a 50 m × 50 m grid would be sufficient, but kiore may need a smaller-sized grid (due to their smaller individual home ranges)—we just don't know yet. Research and

pilot trials would be required to establish the minimum home ranges of the three rat species. This information would help determine the optimal grid spacing for the proposed project options which would, in turn, greatly influence the financial resources required to undertake the work and provide the basis for a decision to be made about the viability of the programme. Table 1 provides details of indicative costs for the four predator-removal scenarios that were assessed.

Table 1: Details of indicative costs for the Predator Free Rakiura Halfmoon Bay Project predator removal scenarios assessed in Report 1.

GRID SIZE (m)	PROJECT AREA (ha)	SCENARIO 1 (Brodifacoum baits in bait stations)	SCENARIO 2 (Diphacinone baits in bait stations)	SCENARIO 3 (Mix of toxins applied in baits in bait stations)	SCENARIO 4 (Traps only)
25 x 25	4800	\$18,258,300	\$20,333,300	\$18,560,904	\$25,399,750
50 x 50	4800	\$9,399,500	\$10,120,600	\$9,504,661	\$12,492,350
25 x 25	2150	\$9,919,676	\$10,802,917	\$10,207,109	\$13,248,050
50 x 50	2150	\$6,098,770	\$6,414,127	\$6,201,397	\$7,490,050

## Report 2: Predator Free Rakiura Halfmoon Bay Project—analysis of options for proposed predator fence

A predator fence has been proposed to allow predators to be removed from the Halfmoon Bay area separately from the rest of the island. Pursuing a predator-free Rakiura in this staged manner would allow significant knowledge about issues that may arise to be acquired before the larger portion of the island was tackled. The fence would also provide ongoing security in preventing reinvasion (from the mainland) into either part of the island if the entire Island became predator free.

Without a fence the project would have to rely on riskier experimental ‘buffer’ technology or would become a (costlier) ongoing predator control project rather than a complete predator removal project. Both of these prospects are less likely to be attractive to potential funders due to the associated higher risk and/or lower ecological return.

The original proposal for the fence line for the HMB Project generated an approximate area of 4800 ha around the township of Oban, with the fence situated entirely within Rakiura National Park. In February 2015, the PFR Governance Group requested that a fence line that generated a smaller area around Halfmoon Bay (2150 ha) also be considered. This alternative has the added complexity of the proposed predator fence crossing both public conservation land and private land, but would result in a significant cost saving to the overall project due to the reduced operational area. The location of the smaller area and fence line is indicative only and can be adjusted as required—its main purpose is to demonstrate the relationship between the size of the operational area and cost (both of the fence itself and the predator removal methods).

This report draws on knowledge from existing predator fence projects around New Zealand, and describes the ecological benefits and value of these fenced sanctuaries. Draft locations of the fence are detailed for the two different-sized project areas (4800 ha and 2150 ha). For the larger option, the fence is approximately 8.8 km long; the second option has a shorter fence length of 7.2 km. The larger area provides a significantly higher ratio of protected area for the length of fence required, and will likely involve a simpler planning and consenting process, as it would be entirely within the National Park.

Detailed design specifications are considered for the animal pests the fence will be required to exclude. **Predator fences are not predator proof 100% of the time;** incursions or breaches from predators are possible. There is a high risk of incursion at the ends of the fence and along the

fence when it is damaged by fallen trees etc. Ongoing inspection and maintenance is required to keep predator fences in working order. Table 2 provides details of indicative costs for predator fences for both project options.

Table 2: Details of indicative costs for the Predator Free Rakiura Halfmoon Bay Project predator fence scenarios assessed in Report 2.

	AREA (ha)	FENCE LENGTH (m)	CONSTRUCTION COST	ANNUAL MAINTENANCE
Option A	4800	8800	\$3.53M	\$0.176M
Option B	2150	7250	\$2.96M	\$0.148M

## Report 3: Predator Free Rakiura Halfmoon Bay Project—biosecurity options

Once a predator-free zone is established within the HMB Project area, ongoing systems would need to be set in place to ensure it is maintained. Some of these systems would need to be established prior to commencing the predator removal work as outlined above. Incursion of predators could come from breaches of the predator fence and the arrival of people, luggage, and freight into the area. Experience from similar programmes elsewhere suggests that incursions are inevitable, at the ends of the fence in particular, but that these can be managed successfully.

While there are examples of biosecurity programmes that can be drawn from, there are no projects of this size and complexity with a permanent human population within the protected area. Biosecurity would be a major part of the initial and ongoing success of this project and would require full community support. Open discussion is required to determine processes that are both acceptable to everyone and highly effective.

Most of the biosecurity activities would be undertaken or administered by PFR staff, but would require consultation and input from residents, businesses and local government authorities. An advocacy and education programme would also need to be developed to complement proposed biosecurity activities.

The biosecurity report identifies and groups different methods of incursions according to their likelihood, with rats and mice the most likely to re-invade and the most difficult to remove.

As a starting point for discussion with the community, potential biosecurity measures are proposed to prevent re-invasion. These measures fall into three categories: quarantine, surveillance and response. Some of these activities (quarantine facilities and gear-checking procedures in particular) would need to begin prior to the predator removal.

For the HMB project, these activities would most likely consist of purpose-built facilities at key sites, quarantine and surveillance by trained staff and networks of surveillance devices, traps and bait stations. It is accepted that purpose-built facilities may not be feasible at all of the suggested locations and that further additional changes to operations or best practice will be required.

Table 3 provides details of indicative costs for biosecurity measures for both project options.

Table 3: Details of indicative costs for the Predator Free Rakiura Halfmoon Bay Project biosecurity scenarios assessed in Report 3.

	SETUP	ONGOING ANNUAL COST
Option A (4800ha)	\$1.23M	\$1.87M
Option B (2150ha)	\$0.94M	\$1.24M



## Your views are important

These three reports have been prepared to support public discussion and by no means comprise a final project plan. The options within these documents can be tweaked to take any feedback and priorities of the communities with an interest in Rakiura into account. All of the members of the PFR Governance Group care about this special place and we realise that achieving our vision is only possible if all of the communities involved also commit to making it a reality. For more information, visit [www.predatorfreerakiura.org.nz](http://www.predatorfreerakiura.org.nz)

## References

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## Appendix 1

### Species names

Norway rat (brown rat, water rat, sewer rat) *Rattus norvegicus*

Ship rat (black rat) *Rattus rattus*

Kiore (Pacific rat, Polynesian rat) *Rattus exulans*

Cat *Felis catus*

Possum (brushtail possum) *Trichosurus vulpecula*

Hedgehog *Erinaceus europaeus*