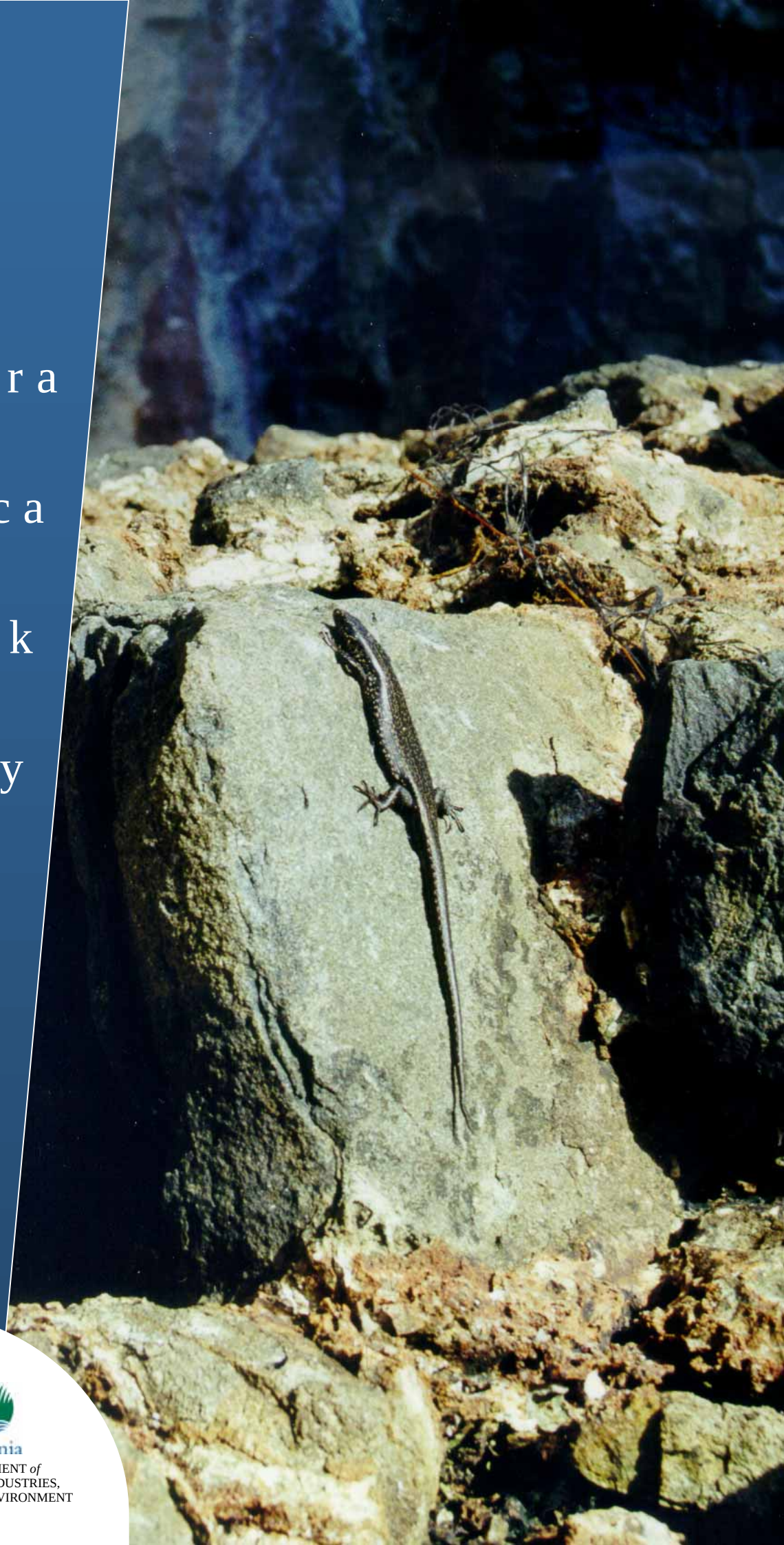
Pedra Branca Skink Recovery Plan



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Tasmania
DEPARTMENT *of* PRIMARY INDUSTRIES, WATER *and* ENVIRONMENT

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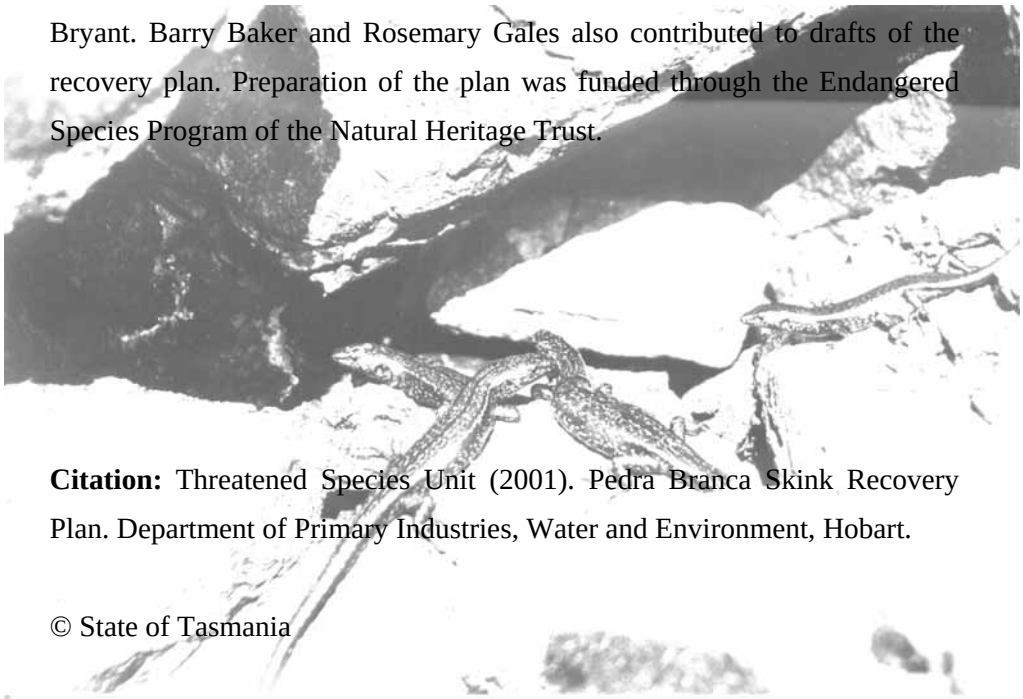

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Contents

Summary

Current species status

The Pedra Branca skink (*Niveoscincus palfreymani*) is listed as **Vulnerable** on the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* and is listed as **Endangered** on the *Tasmanian Threatened Species Protection Act 1995*.

The Pedra Branca skink is endemic to Tasmania and occurs only on Pedra Branca, an isolated island 26 km south east of the Tasmanian mainland. In 2000 the total population was estimated to be 476 individuals. The population appears to have undergone a recovery following a decline of 49% (from 560 to 290 individuals) in the period 1986 (when detailed monitoring of the species first began), to 1996.

Habitat requirements and limiting factors

Pedra Branca comprises an area of 2.5 ha of which 0.14 ha is suitable habitat for the skinks. The Pedra Branca skink occurs in four major and two minor colonies on the island. The colonies vary in height above sea level and aspect, with the lowest colony in a rockpile 14 m above sea level and the highest at 35 m a.s.l. All colonies are subjected to storm conditions. The skinks are dependent on the cracks, jointing, caves and boulders for protection from predators and adverse weather conditions. Before becoming active they need to bask in the sun and during these times are vulnerable to predation by gulls. Adequate availability of suitable habitat is critical to their survival.

Throughout the skink monitoring program (1986-2000) the Australasian Gannet (*Sula serrator*) population on Pedra Branca has increased, whilst the Shy Albatross (*Thalassarche cauta*) population has decreased. The relationship between these seabird populations and the skink population is unclear but skinks occasionally scavenge the dropped fish which the gannets and albatrosses regurgitate for their young.

The Silver Gull population (*Larus novaehollandiae*) breeds at two of the six skink colonies on the island and their nests are situated in the favoured skink basking areas. It is possible that gulls were a factor in the decline of the skinks from 1986 to 1996. The occupation of the skink colonies by the gulls did not occur as a consequence of an overall increase in gull numbers on the island but was due to a shift in location of gull breeding colonies.

Recovery plan objectives

- To ensure a secure, self-sustaining population of Pedra Branca skinks is maintained on Pedra Branca.

- To gain an understanding of the factors influencing fluctuations in the skink population on Pedra Branca

Recovery actions required

Action 1. Protect the ecosystem on Pedra Branca from introduced species and human impacts.

Action 2. Identify and describe the diet and energetic requirements of the Pedra Branca Skink.

Action 3. Monitor skink and seabird populations on Pedra Branca.

Action 4. Investigate ex-situ options for Pedra Branca skink

Action 5. Create community awareness and undertake education.

Action 6. Manage the recovery process through a recovery team

Estimated cost of recovery

(2000 prices in $1000 / year)

Action	1	2	3	4	5	6	Total
Year 1	8.0		17.5	14.0			39.5
Year 2		2.0	18.0	14.0	2.0	0.5	36.5
Year 3		1.0	12.5		1.0	0.5	15.0
Year 4		1.2	13.2		1.0	0.5	15.9
Year 5		1.2	13.2		1.0	0.5	15.9
Total	8.0	5.4	74.4	28.0	5.0	2.0	122.8

Biodiversity benefits

The Pedra Branca skink is an endemic species of the genus *Niveoscincus* which mostly occurs in Tasmania. The species has been isolated for at least 19 000 years but perhaps as long as 100 000 years (Banks 1993). This animal has survived for thousands of years probably in very low numbers on an isolated rock and is thus an evolutionary significant member of the Tasmanian reptile and island fauna. Accordingly the species merits a high conservation priority. Appropriate management and conservation of the skink and its habitat also benefits this remote island, which is possibly the ecosystem with the longest isolation in Tasmania. The protection and management of the Pedra Branca skink also benefits two seabird breeding populations, the Shy Albatross (*Thalassarche cauta*), a Tasmanian endemic species which is nationally listed as Vulnerable and the Australasian Gannet (*Morus serrator*).

Introduction

Description of species

The Pedra Branca skink is a moderately large and strongly built skink with well developed limbs, a stout tail and smooth dorsal scales. The skinks vary in the intensity of colour and patterning. They are generally dark brown to black above but some are pale brown and others a brilliant bronze colour. The head is variegated and spotted. A thin, light-coloured, dorso-lateral stripe exists in some specimens. There is a mid-lateral line apparent from behind the eye to the hind leg and below this the flanks are dark with scattered pale or bronze flecks. The ventral surface is grey with a tan to reddish tone. The adult males and females are similar in size with a mean snout-vent length of 88 mm and a mass of 17.7 g (Brothers & Pemberton 1997).

Taxonomic status

The Pedra Branca skink is endemic to Tasmania where it is restricted to Pedra Branca Island. The first published description of the species was by Rawlinson (1974) from specimens collected by Palfreyman from the island in 1956 and named *Pseudomia palfreymani*. The holotype is housed at the National Museum of Victoria (NMV D8868) and two paratypes at the Tasmanian Museum and Art Gallery (C106, C285). Revision of the taxonomy of Tasmanian Skinks has led to this species to being placed in the largely endemic genus *Niveoscincus* (Hutchinson et. al 1990).

Pedra Branca island

Pedra Branca (43° 52'S, 146° 58'E) is situated 26 km off the south coast of Tasmania, and is the most southerly island on the Australian continental shelf (**map 1**). The island is surrounded by waters approximately 130 m deep. Sea level changes have isolated Pedra Branca from the mainland for at least 19 000 years and possibly as many as 100 000 years (Banks 1993).

The island is a sedimentary sequence about 40 m thick overlain by an intrusive dolerite sheet. The island is 2.5 ha in area, low (52 m elevation), long (270 m) and narrow (100 m) at the base and tapering to the top (**plate 1**). The island has a shore platform that runs into a cliff. This is topped by another platform wider in the north and absent in the south. The cliffs are jointed throughout although the jointing is generally more intensive in the upper cliffs than the lower. The upper sedimentary cliffs are capped by dolerite which forms the double camel hump of the island separated by a narrow saddle that is exposed to waves. The southern hump is the highest (Banks 1993).

The first recorded visit to Pedra Branca was by Palfreyman in 1947 (Rawlinson 1974). Subsequently, brief research visits were made to the island in 1956, 1978, 1981 and 1984. In 1986 an annual skink monitoring study was initiated which continues to the present time (Rounsevell et al. 1985; Brothers & Pemberton 1997).

Approximately 6000-7000 pairs of Australasian Gannets (*Sula serrator*), 250 pairs of Shy Albatrosses (*Thalassarche cauta*), 50 pairs of Silver Gulls (*Larus novaehollandiae*) and small numbers of Kelp Gulls (*L.dominicanus*), Pacific Gulls (*L. pacificus*) and Black faced-Shags (*Phalacrocrax fuscescens*) breed on the island (Brothers et. al. 2000). The number of albatross has declined as the gannet colony

has expanded (N. Brothers pers. comm.). Australian Fur Seals (*Arctocephalus pusillus*) and New Zealand Fur Seals (*A. forsteri*) haul out on the wave platform around the island but do not breed there. The only terrestrial plant on the island is a low samphire *(Sarcocornia quinqueflora)* which is sparse.

Map 1. Location of Pedra Branca

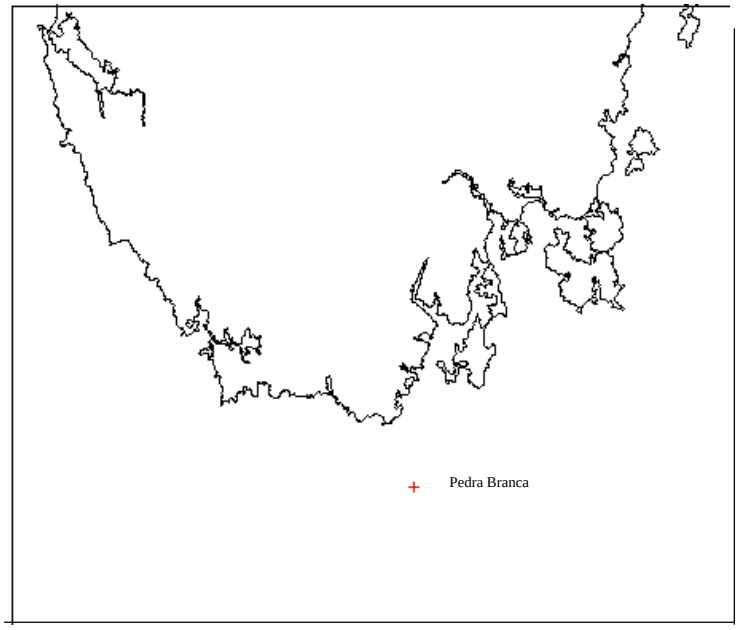

Plate 1. Pedra Branca Island

Skink habitat

The local distribution of Pedra Branca skinks is primarily determined by the availability of habitat. Skinks occupy holes under boulders, deep crevices, or extensive catacombs in weathering sandstone. The species presently occurs in six colonies, another previously known small colony is no longer extant. The combined area of habitat currently used by the skinks is approximately 700 m^2. The total available habitat is approximately 1400 m^2. The area, status, aspect, altitude and population estimate of the colonies for 2000 are shown in Table 1. All colonies are exposed to extreme weather conditions and sea spray.

Table 1. The area, status, aspect, altitude and population estimate for the Pedra Branca Skink colonies for 2000.

Colony	Area (m^2)	Status	Aspect	Altitude	Population estimate (2000)
Rockpile	140	major breeding colony	west	14 m	223
Northwest Cliff	60	major breeding colony	west	20 m	142
South	340	major breeding colony	northeast	30 m	48
Main	120	major breeding colony	northeast	30 m	47
North of Main	10	small colony	south	30 m	9
Southeast	24	small colony	south	20 m	7
West Ridge	0 (was 35ha)	no longer occupied	east	35 m	0
Total	694				476

Population

Skinks have been recorded moving between all colonies. Of the six colonies, four are regarded as substantial in terms of numbers and length of occupancy: 'Rockpile', 'Northwest Cliff', 'Main' and 'South'. The 'Southeast' colony is now regarded as established and surviving well whilst the 'North of Main' colony probably consists of animals dispersing from the 'Main' colony. Prior to 1986 a colony existed on the 'West Ridge', but this colony has since disappeared although individuals possibly still move through this area.

Population size estimates have been calculated using mark-recapture models. Population trends have been assessed using population estimates, minimum numbers known to be alive and capture per unit effort estimates (Brothers and Pemberton 1997). The population estimate for 2000 is 476 individuals.

Data from previous years show that the population decreased from approximately 560 individuals in 1986 to 290 in 1996, an overall decline of 49% (Table 2). The magnitude and rate of decline varied between the colonies with the greatest change in the 'Main' colony, which decreased by 85%. The 'Rockpile' colony remained relatively stable. The decline in the skink population was first detected in the early 1990s and coincided with Silver Gulls moving their breeding sites from non-skink habitat to prime skink habitat. Skink numbers declined dramatically at these locations.

Table 2. Population estimates for Pedra Branca Skinks from 1986 to 2000.

Date	April 1986	March 1994	March 1996	March 1999	March 2000
No.	560	289	290	318	476

Whilst the total number of gulls on the island has not increased, the observations of banded Silver Gulls on the island suggests a link between the Pedra Branca Silver Gull population and immigration or visitation by gulls from mainland Tasmanian populations. Refuse site management and other food sources, such as that provided through the aquaculture industry, affect the abundance of silver gulls. It is possible that changes in silver gull populations may be implicated in the decline of skinks on Pedra Branca. However, since the decline is not ongoing it is likely there are other factors involved.

It is possible that natural changes on the island were responsible for the decline as the population decline of the Pedra Branca skink coincided with a brief but significant decrease in the breeding population of Australasian Gannets on the island. The gannets provide a food source for both skinks and gulls through vomitus spilt when delivering food to their chicks or when they regurgitate as a response to stress. Skinks mainly feed on the invertebrates, which live on the rotting fish however, they will also feed directly on the spilt fish. A decline in gannet numbers could either reduce the chances for feeding by the skinks through a decrease in food source or because the skinks are out competed by the Silver Gulls.

Another factor that may affect population levels is the observation that the rate of tail loss in these skinks is high with all adult males and 65% of females showing signs of tail loss. This may be the result of intraspecific aggression or a sex-biased vulnerability to predation by gulls. The skinks are extremely aggressive to each other on occasions and the possibility of an increase in mortality via intra-specific aggression requires investigation.

Life history and behaviour

The Pedra Branca skink is a shuttling heliotherm, moving between sun and shade to maintain their body temperature at a level that allows them to remain active. They are dependent on the shelter of cracks and crevices in the rock for protection, emerging when the sun shines and basking singly or in groups of up to 20 animals of mixed ages. The skinks become active when the air temperature exceeds 15°C. Observations of marked animals indicate that individuals inhabit specific sites. The animals, when basking in groups can be aggressive towards each other.

Three gravid females held in captivity gave birth to litters of four, four, and six live young respectively. Two litters were born on the 2 March and the other on 15 March. The skinks reach maximum size by six years of age. Animals judged to be newborn neonates were only seen on the island between February and March supporting the captive observations that this period is the birthing season.

The skinks are active predators of invertebrates and opportunistic scavengers of fish. The main invertebrate prey eaten by skinks are diptera, isopods and amphipods (Brothers et al. *in press*). Fish detritus is also part of their diet during the summer months. Fish are sometimes dropped by the gannets and albatrosses on the island whilst feeding their young or regurgitated as a response to stress.

Reasons for conservation status

The Pedra Branca Skink is an endemic species of the genus *Niveoscincus*, with most members of the genus occurring in Tasmania. The species has been isolated from the Tasmanian mainland for at least 19 000 years and as such is an evolutionary significant member of the Tasmanian reptile and island fauna. It therefore merits a high conservation status. It is restricted to just one small island and the population is less than 500 individuals. The status of the skink may be affected by changes in the seabird populations on the island, by extreme weather events or changes in climatic conditions.

Existing conservation measures

The Pedra Branca skink is listed as Vulnerable on the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* and Endangered on Schedule 3 of the Tasmanian *Threatened Species Protection Act 1995*. Pedra Branca is within the Southwest Tasmanian World Heritage Area and management of the island is carried out in accordance with the World Heritage Management Plan (1999). The Tasmanian Parks and Wildlife Service initiated a monitoring program in 1986 to conduct annual surveys of skink and seabird populations on Pedra Branca. The monitoring program is managed by the Nature Conservation Branch of the Department of Primary Industries, Water and Environment (DPIWE) and the Tasmanian Museum and Art Gallery and provides population estimates and information on the effectiveness of the conservation measures currently in place.

Strategy for recovery

The strategy for species recovery focuses on protecting the Pedra Branca skink on Pedra Branca Island and monitoring the population to detect significant population changes.

The strategy is:

- *To protect the Pedra Branca skink population on Pedra Branca from introduced species and human impacts;*
- *Undertake Pedra Branca skink and seabird monitoring on Pedra Branca to obtain an understanding of the processes that cause fluctuations in the numbers of skinks.*

If monitoring detects an ongoing decline in the skink population the recovery effort will be directed at:

- *protecting skinks on the island using artificial habitat;*
- *initiating a captive breeding program;*
- *establishing a new colony of skinks at an alternative site.*

If the threatening process is identified and ameliorated:

- *re-introduce skinks to Pedra Branca to maintain the population at pre-existing numbers.*

The Pedra Branca skink Recovery Team will guide the implementation of the Recovery Plan, evaluate and review progress and direct future actions.

Recovery objectives and criteria

Overall objectives

- To ensure that a secure, self-sustaining population of Pedra Branca skink is maintained on Pedra Branca.

- To gain an understanding of the factors influencing the annual fluctuations in the skink population on Pedra Branca.

Specific objectives

- To protect the ecosystem on Pedra Branca from introduced species and human impacts.

- To gain an understanding of the factors influencing the fluctuations in the skink population on Pedra Branca.

- Investigate ex-situ options for Pedra Branca Skink.

- Increase public awareness about the recovery program and manage the recovery process through a Recovery Team

Recovery criteria

- The diet and energetic requirements have been identified and described.

- Annual population surveys have been carried out.

- Procedures to control access to Pedra Branca have been implemented.

- A captive breeding plan is prepared.

- Translocation sites are identified.

- A booklet/notesheet, display material and a revised listing statement are prepared and published.

Table 3. Relationship between specific objectives, recovery criteria and actions:

SPECIFIC OBJECTIVES	RECOVERY CRITERIA	ACTIONS
To protect the ecosystem on Pedra Branca from introduced species and human impacts.	• Procedures to control access to Pedra Branca have been implemented.	• To protect the ecosystem on Pedra Branca from introduced species and human impacts.
To gain an understanding of the factors influencing the fluctuations in the skink population on Pedra Branca.	• The diet and energetic requirements have been identified and described. • Annual population surveys have been carried out.	• Identify and describe the diet and energetic requirements of the Pedra Branca skink. • Monitor skink and seabird populations on Pedra Branca.
Investigate ex-situ options for Pedra Branca skink.	• A captive breeding plan is prepared. • Translocation sites are identified.	• Investigate the requirements for a captive- breeding program. • Assess possible translocation sites.
Increase public awareness of threatened species.	• A notesheet and public display material are prepared and published.	• Community awareness and education. • Manage the Recovery Process through the Pedra Branca Skink Recovery Team

Recovery actions

Action 1. Protect the ecosystem on Pedra Branca from introduced species and human impacts.

1a) Restrict access to Pedra Branca.

Aims

To reduce the risk of human impacts such as introducing alien species and disturbance to the skink population and breeding seabirds.

Justification

At present there is no restriction on landings on Pedra Branca, how long people should stay or quarantine procedures for landing. Restrictions should be placed on access, mode of access and quarantine procedures to limit the risk of introduction of alien vectors/species which may pose a threat to the skinks (and other island elements). The activities of those permitted to visit the island should be controlled.

Methods

A policy on access to Pedra Branca should be developed and address issues such as timing of visits to the island, mode of travel, size of group, length of stay and quarantine procedures for food and equipment.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	1.0				1.0

1b) Activities in surrounding waters.

Aims

To ensure that no human related activities in the waters surrounding Pedra Branca threaten the survival of the skinks.

Justification

Activities in surrounding waters are not considered to be a threat to the skinks at present. This could change in the future (eg. a new fishery or expansion of existing fishery) and pose a threat to the skinks. Increased fishing activity in the area may provide a local food resource for gulls and an increase in the gull population on the island may have a negative impact on the skink population. In such a scenario, actions would need to be taken to restrict this activity.

Methods

Fishing activities in the region will be monitored in consultation with the Tasmanian Fishing Industry Council. A strategy to manage the impacts of human related activities in the waters surrounding Pedra Branca will be if required.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	2.0	1.0	1.2	1.2	5.4

Action 2. Identify and describe the diet and energetic requirements of the Pedra Branca Skink.

Aims

To gain an understanding of the diet and energetic requirements of Pedra Branca skink.

Justification

Determining the energetic characteristics and dietary requirements of the skinks gives vital information into an understanding of the requirements of skinks in the island ecosystem. Should a captive breeding facility be established, or a population of skinks translocated to another site, this information would be essential.

Methods

Samples of faecal pellets for dietary analysis and blood samples for isotope experiments have been collected. These samples need to analysed and the results interpreted and published in an appropriate format.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
8.0					8.0

Action 3. Monitor skink and seabird populations.

3a) Undertake annual surveys of the abundance and distribution of skink populations on Pedra Branca.

Aims

To undertake annual monitoring of the skink population using repeatable methods to obtain reliable population estimates and to determine population trends.

Justification

Long-term monitoring of skink populations will need to be continued in order to determine their population status and the direction of recovery actions.

Methods

Annual surveys need to be conducted in March or early April to determine the population size and age structure of each colony and to compare the results with previous years in order to identify rates of change. Surveys should incorporate mark-recapture techniques for each of the four major colonies and direct counts on the two smaller colonies. If the smaller colonies increase in size beyond 15 individuals, mark-recapture techniques should be applied. The use of visible external marks or the application of small paint marks to identify individuals is preferable to techniques such as toe clipping or branding. Toe clipping and branding should be avoided as they may reduce survival and increase the risk of predation.

Costs

Funds for the monitoring of both skinks and seabirds are required to cover a boat charter, aeroplane charter (for aerial photography), vehicle costs, field allowances for two Research Officers and miscellaneous research and camping equipment. Funds are also required for a Project Officer to analyse the data and prepare a report to the Threatened Species Unit.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
17.5	10.5	10.5	11.0	11.0	60.5

3b) Undertake surveys to assess the abundance and distribution of seabird populations on Pedra Branca

Aims

To undertake annual surveys of all seabird populations on Pedra Branca using repeatable methods to gain reliable population estimates and distribution of colonies by species.

Justification

Long-term monitoring of both skink and seabird populations should be continued in order to determine the direction of recovery actions. Investigations into the ecology of skinks and seabirds on Pedra Branca will provide further information on the species population dynamics, the island ecology, and a greater understanding of the relationship between the skink and seabird populations.

Methods

Australasian Gannets and Shy Albatrosses inhabit the whole northern face of Pedra Branca and are the dominant species on the island in terms of biomass. Annual surveys of Shy Albatrosses and Silver Gulls will be conducted concurrently with the skink monitoring. Gannets are best surveyed biannually by aerial photography on 1 November. The population size, structure and distribution of the above species will be recorded annually.

Costs ($1,000's)

Yr 1	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Total**
	2.0	2.0	2.2	2.2	8.4

3c) Measure climatic conditions on Pedra Branca Island

Aims

To gain information on the localised climatic parameters at one eastern and one western skink colony on Pedra Branca.

Justification

The monitoring of temperature and relative humidity at two skink colonies will provide vital information on the skinks' environment. This information will aid the successful establishment of a captive-breeding facility and would be a useful tool to help select an appropriate alternative translocation site for captive-bred skinks.

Methods

Temperature and relative humidity data loggers will be placed on Pedra Branca during a skink monitoring trip for a period of 12 months. Loggers will be placed within two different skink colonies and a third placed in a weather screen as a control. This will allow for direct comparisons with weather data collected from Maatsuyker Island and Bruny Island where long-term records are available.

Costs

Funds are required to purchase two temperature data loggers, one temperature/ relative humidity data logger, associated computer software and a weather screen. Funds for a Project Officer to install loggers and analyse data would be covered under Recovery Action 3a.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	1500				1500

3d) Determine changes in the Pedra Branca Skink population.

Aims

To describe changes in the Pedra Branca Skink population for the period 1986 to 2000.

Justification

Successful recovery of the skink population can only be determined via assessment of population status.

Methods

Data on the abundance of skinks has been collected annually since 1986. The results of this survey work need to be analysed and published in an appropriate format. The results of previous surveys and associated studies will also help gain an understanding into further aspects of the Pedra Branca Skink ecology.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	3.0				3.0

3e) Evaluate the use of implanted identification chips (ie. 'transponders') in future population studies.

Aims

To determine if transponders could be used successfully for long-term population monitoring of Pedra Branca Skinks.

Justification

Current skink population estimates are based on mark-recapture techniques with individual skinks identified by external characteristics or marked with a small amount of paint when captured. These methods are satisfactory for annual population estimates but do not provide long term data on individual animals. Methods such as toe-clipping or branding to follow individuals for more than one season are

inappropriate for this species. The use of surgically implanted transponders may be an alternative method to gain long term information on individually identifiable skinks.

Methods

This technology is currently used on a number of endangered species within Australia and is used by both Melbourne and Taronga Zoos to identify some of their reptile populations. Investigation through a literature search, consultation and testing on a similar species is required to determine if it is possible to use this technology on a reptile the size of the Pedra Branca Skink.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	1.0				1.0

Action 4. Investigate ex-situ options for Pedra Branca Skink

4a). Determine the requirements for a captive-breeding program.

Aims

To prepare a captive breeding plan based on the current knowledge and expertise on reptile captive-breeding programs.

Justification

A captive-breeding program may need to be initiated to ensure the long-term survival of the Pedra Branca Skink, should the population reach critically low numbers.

Methods

Government wildlife conservation agencies, zoos and specialised captive-breeding facilities within the Australasian region will be contacted to determine current knowledge of the husbandry techniques and other requirements for a captive-breeding facility. The number and sex of Pedra Branca Skinks to be removed from Pedra Branca to initiate the breeding program will be determined utilising knowledge gained from the Pedra Branca Skinks that were held in captivity in 1987 (N. Brothers pers. comm.) and other pertinent information. A captive-breeding plan will be prepared identifying under what conditions a captive breeding program would be initiated, how it would be carried out and who would be the appropriate organisation to do it.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	12.0				12.0

4b). Evaluate possible translocation sites.

Aims

To identify translocation sites where Pedra Branca Skinks could be introduced ensuring their long-term survival without jeopardising other resident species populations.

Justification

Suitable site(s) must be identified for the establishment of 'new' skink populations should the population on Pedra Branca decline to a critical level. Translocation has proved a successful method for recovery of threatened skinks in New Zealand.

Methods

Assessment of sites will follow the Australian and New Zealand Environment and Conservation Council policy for translocation of threatened animals. Populations of skinks in New Zealand have been successfully translocated and criteria used by the New Zealand Department of Conservation for selecting suitable sites may be able to be applied to sites being considered for the Pedra Branca Skink (Recovery Plan for Whitaker's Skink and Robust Skink 1992). Criteria that need to be considered when assessing translocation sites include: climatic conditions, land tenure, accessibility, potential predators, ease of monitoring the introduced skink population, impact on other species present at site, availability of food resources and shelter.

Costs

Funds are required to identify possible island translocation sites and to undertake invertebrate surveys to assess their suitability as translocation sites.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	14.0				14.0

Action 5. Community awareness and education.

Aims

To increase public awareness of the plight of this species.

Justification

Interest and involvement of the community is a vital component in the ongoing protection of endangered species. Although direct community involvement in the recovery program is not possible with this species because of the isolation and difficulties in accessing Pedra Branca, public education on the plight of this skink will benefit threatened species in general.

Methods

The Tasmanian Museum and Art Gallery plans to have an exhibition on the Pedra Branca skink. Information to advocate the recovery effort and facts about the Pedra Branca skink to the community will be provided via a note sheet and booklet and listing statement.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	2.0	1.0	1.0	1.0	5.0

Action 6. Manage the recovery process through a recovery team

Aims

To guide the implementation of the recovery plan and evaluate and review progress regularly by a team with appropriate expertise, management responsibility, community representation and a concern for the conservation of the species.

Justification

The appropriate body to implement and undertake reviews of the recovery plan is a recovery team, which has members from representatives of conservation and land management agencies, the community and others with relevant expertise.

Methods

The recovery team will aim to meet at least annually to review progress. The team will consist of representatives from the Department of Primary Industries, Water and Environment, community groups and others with relevant expertise. District land management staff and other stakeholders will be invited to participate in recovery team meetings when issues relevant to them are being discussed.

Costs ($1,000's)

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
0.5	0.5	0.5	0.5	0.5	2.5

Implementation Schedule

TASK	DESCRIPTION	PRIORITY	FEASIBILITY	RESPONSIBLE PARTY	YR 1	YR 2	YR 3	YR 4	YR 5	TOTAL ($000)
1	**Identify and describe the diet and energetic requirements.**	1	80 %	DPIWE/ TMAG	8.0					8.0
2	**Protect the ecosystem on Pedra Branca from introduced species and human impacts.**									
2a	**Restrict access to Pedra Branca.**	1	100 %	DPIWE		1.0				1.0
2b	**Activities in surrounding waters.**	2	80 %	DPIWE		1.0	1.0	1.2	1.2	4.4
						2.0	1.0	1.2	1.2	5.4
3	**Monitor skink and seabird populations on Pedra Branca.**									
3a	**Undertake annual surveys of the abundance and distribution of skinks.**	1	100 %	DPIWE/ TMAG	17.5	10.5	10.5	11.0	11.0	60.5
3b	**Undertake surveys of abundance and distribution of seabirds.**	1	100 %	DPIWE/ TMAG		2.0	2.0	2.2	2.2	8.4
3c	**Measure climatic conditions on Pedra Branca.**	2	100 %	DPIWE/ TMAG		1.5				1.5
3d	**Determine changes in the Pedra Branca Skink population.**	1	100 %	DPIWE/ TMAG		3.0				3.0
3e	**Evaluate the use of implanted identification chips (ie.'transponders') for future population dynamic studies.**	3	50 %	DPIWE/ TMAG		1.0				1.0
					17.5	18.0	12.5	13.2	13.2	74.4
4	**Investigate ex-situ options for Pedra Branca Skink**									
4a	**Determine the requirements for a captive-breeding program**	1	100 %	DPIWE/ TMAG		12.0				12.0
4b	**Evaluate possible translocation sites.**	1	80 %	DPIWE/ TMAG	14.0					14.0
					14.0	12.0				26.0
5	**Community awareness and education.**	1	100 %	DPIWE/ TMAG		2.0	1.0	1.0	1.0	5.0
6	**Manage the recovery process through a recovery team**					0.5	0.5	0.5	0.5	2.0
					39.5	34.5	15.0	15.9	15.9	120.8

DPIWE – Department of Primary Industries, water and Environment
TMAG – Tasmanian Museum and Art Gallery

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