TRANSLOCATION PROPOSAL

Dibbler (*Parantechinus apicalis*)

From Perth Zoo to Escape Island, Jurien Bay.

October 1998

A.N. Start for the Dibbler Recovery Team

Summary

axon	Dibbler (*Parantechinus apicalis*) Gray 1843
Status	Declared by the Minister to be **"Fauna that is likely to become extinct or is rare"** *Western Australian Wildlife Conservation Act 1950.* Ranked as **Endangered** by the WA Threatened Species Scientific Committee Listed as **"Endangered"**: Commonwealth *Endangered Species Protection Act 1992.* ANZECC 1991; Action Plan for Australasian Marsupials and Monotremes (Maxwell *et al.* 1996.); 1996 IUCN Red List (Baillie and Groombridg 1996)
Translocation Type	Introduction
Source Animals	Captive-bred at Perth Zoo. Original stock from Boullanger and Whitlock Islands, Jurien Bay
Destination Site	Escape Island, Jurien Bay.
Planning	In accordance with Draft Interim Recovery Plan
Number of Animals	Approximately 28 (sex ratio not yet known; young are still in the pouch)
Age of Animals	< 1 year (born Summer 1998). The species breeds at one year old)
Proposed Date	3rd Week in October 1998. Corresponds to the natural dispersal time of young dibblers.
Proponent	Dibbler Recovery Team through Dr. A.N. Start (Chairperson)
Funding	CALM, Environment Australia and Perth Zoo
AEEC Approval	Approved by CALM AEEC on 14 Aug 1998 (Approval No CAEC/11/98

1. Name and Affiliation of Proponents

The Dibbler Recovery Team through Tony Start (Chairperson) Department of Conservation and Land Management, Western Australia.

2. Status

The dibbler is listed as **'Endangered'** by:

- ANZECC (1991)
- the Commonwealth *Endangered Species Protection Act 1992*
- the Action Plan for Australasian Marsupials and Monotremes (Maxwell *et al.* 1996)
- the IUCN Red List of threatened animals (Baillie and Groombridg 1996)
- the Western Australian Threatened Species Scientific Committee.

In Western Australia it is declared by the Minister to be **'Fauna that is likely to become extinct or is rare'** under the *Western Australian Wildlife Conservation Act 1950.*

3. Background

The dibbler is a Western Australian endemic dasyurid marsupial. Gray described it in 1843 and many specimens were taken in the 19th century. However, Gilbert was the only collector of those times to record any information on its natural history. His notes to Gould survive in his own hand and in the text of Gould's work *The Mammals of Australia.* The last early collector was Tunney who took one in 1904. The Dibbler was thought to be extinct when Morcombe caught two at Cheyne Beach (= Hassell Beach), east of Albany, on the south coast of WA (Morcombe 1967).

Between 1967 and 1995 dibblers were recorded sporadically on the south coast from Torndirrup National Park near Albany (Smith 1990) to Jerdacuttup near Hopetoun (Woolley 1977, 1980). Most locations were within Fitzgerald River National Park (FRNP) (Chapman and Newby 1995). In 1985 dibblers were found on two small islands, Boullanger (25.9 ha) and Whitlock, (about 5 ha) off Jurien, a fishing and holiday town about 200 km north of Perth (Fuller and Burbidge 1987).

Implementation of a Recovery Research Project commenced in 1995 (with funding support from Environment Australia). In the first year, actions concentrated on re-surveying previous locations and searching for new populations. Dibblers were only found in FRNP. In 1996 actions focused on the biology of a population in FRNP. The animals proved difficult to study, but it was concluded the species was relatively secure in the National Park. CALM's Western Shield (a program to control feral predators in south western Australia, Anon 1996, Bailey 1996), a Management Plan (Moore *et al.* 1991) and research (dieback and cat control) are addressing the perceived threats from feral predators, fire and dieback disease.

Therefore, in the last year of the research plan's life, the emphasis moved to the populations on Boullanger and Whitlock Islands where several potential threats were

identified (Baczocha and Start 1997).

At the conclusion of that work an Interim Recovery Plan (IRP) was written (Start 1998, Attachment 1). Its development and contents have been discussed at three Dibbler Recovery Team meetings and written comments sought from corresponding members living interstate.

The IRP states (p 6) '*It is significant that the island populations occur about 600 km north of the south-coast populations and the two groups are exposed to substantial differences in climate and habitat. The Recovery Team believes it is important to dibbler recovery that both south coast and west coast island populations are recovered....*'.

The IRP also identifies several potential threats to the island populations and considers that they are vulnerable. In particular house mice are present on both islands and there is some data that suggests that burrowing seabirds may be declining on Boullanger Island. Their burrows are probably important to dibblers for shelter and may be a rich foraging resource.

Accordingly, Objective 2.2 of the IRP is '*Breed captive animals and establish a new island population from their progeny*' and Actions 5.4 and 5.5 address this objective: Action 5.4 provides for establishing and maintaining a captive breeding colony at Perth Zoo and Action 5.5 provides for the use of captive-bred progeny from Perth Zoo to establish a new island colony.

A captive colony was established in 1997 with two pairs from each island. Three of the females produced young last year and 19 were raised. They bred again this year and it is anticipated that there will be about 28 animals available for release by October 1998.

4. The Translocation.

Justification

This is a proposal for an **introduction to an island.** The Recovery Team recognises that, generally, introductions are the least desirable category of translocation and that introductions to islands require very careful evaluation because:

- Islands have high intrinsic conservation values of their own and
- The number of islands available and suitable for introductions is limited. They must be used for the most urgent cases.

Thus, assessment of proposals for translocations to islands must be particularly rigorous.

Justification for this proposal has taken into account the following factors.

- It is important that northern (island) populations and south coast (mainland) populations are conserved.
- The northern population is limited to about 100 animals on each of two islands. Both populations are vulnerable for several reasons including:

a) Both islands harbour house mice, which may pose a long-term threat particularly in times of exceptional stress (eg drought or fire)

b) burrowing seabirds are probably important to dibblers, providing shelter, importing nutrient and providing rich foraging sites
c) there is evidence that the seabird population on the larger island, Boullanger, is declining
d) both islands are easily accessible from the fishing/holiday town of Jurien, which has an excellent marina. This increases the risk of fire, weeds or feral predators being introduced

- There is a need to increase the number of sub-populations as a safeguard against catastrophe befalling either of the existing sub-populations.

- **Restocking** is not an available option. There are no populations that would benefit from restocking.
- **Reintroduction** is not an available option to sites on the west coast because we have no knowledge of previous dibbler occurrence in presently uncleared habitat. It is not an available option to sites on the south coast. For health and genetic reasons it would be imprudent to reintroduce dibblers to south coast sites using northern (island) stock
- **Introduction.** There would be significant risks associated with introduction to the west coast mainland. These include increased exposure to feral predators and fire risks. In any case, experience in Fitzgerald River National Park shows that it would be very difficult to monitor the translocated animals on the mainland. The risks are unacceptable.
- Introduction to an island is the only practical and the least risky option available at present. Furthermore the animals are pre-adapted to island environments

The draft IRP identified criteria that a suitable island should meet. Bearing those in mind, we considered all islands between the Abrolhos and Rottnest Islands. Escape Island is the only one that is large enough, has no other mammals (including introduced mammals such as house mice) and, as far as we know, no other significant intrinsic conservation values that might be compromised by the presence of dibblers.

The Recovery Team decided that Escape Island be investigated in more detail. A field survey was carried out by A.N. Start, A.A. Burbidge and P.J. Fuller in late April 1998. A report on the outcome has been prepared. Amongst other things, it addresses the potential impact of dibblers on other conservation values and the suitability of the island for dibblers. It is attached as Appendix 1 and should be referred to for more detail of those topics. The authors considered Escape Island to be suitable.

Since the survey of Escape Island was conducted, concern has been raised about the status of the other native mammal that lives on Boullanger Island. It is a *Sminthopsis* species belonging to the *Sminthopsis murina* complex. *Sminthopsis* species are small insectivorous dasyurid marsupials. This species-complex was revised by Kitchener *et al.* (1984). Although they had specimens from Boullanger Island, and Kitchener has applied various names to specimens in the Western Australian Museum collection, they did not recognise it as a distinct taxon. Lynam (1987), using genetic data, suggested it might represent a new taxon but there has been some doubt about the reliability of his

data as mtDNA data did not support his conclusions. Recently Mathew Crowther[1] (personal communication) has identified morphological and genetic evidence that indicates this is a new species. He proposes naming it. In the meantime it is commonly referred to as the Boullanger Island Dunnart (BID).

There is one mainland specimen in the Western Australian Museum that Crowther considers referrable to the BID on skull characters. It was collected in Mt Lesueur National Park, inland from Jurien. He also thinks that sub-fossil dentary material collected in Hastings Cave, near Jurien, and dated from 11 000 years BP to modern time is consistant with the BID.

This issue is relevant to the Dibbler Translocation Proposal because, if the BID is a valid, new taxon that is endemic to Boullanger Island, it should be considered Critically Endangered. It may be ranked lower if it is confirmed to exist on the mainland, and it may not be threatened at all if it is common on the mainland. It may have been overlooked.

The taxonomic status of this group is still confused and there is still some doubt about the conclusions that can be drawn from the genetic work and so it is premature to accept at face value that the BID is a valid taxon. Work to further clarify the genetic relationship of BIDs to similar species and the status of BIDs on Boullanger Island and on the adjacent mainland is now underway (August 1998). However, if the BID is a valid and Critically Endangered taxon, breeding it in captivity and using the progeny to found a new population may be a desirable recovery action.

For many of the same reasons that an island is required for dibblers, Escape Island would be an obvious translocation site for BIDs. It can reasonably be argued that the potential value of Escape Island for a BID release site could be compromised by the presence of dibblers. However, it should also be noted that:

- Acceptance of the BID as a valid taxon is still subject to peer review and re-evaluation of genetic and morphometric data.
- Even if the BID is a valid taxon, it may not be rare on the mainland.

(We expect to have more information on both these issues before the dibbler translocation is scheduled to take place.)

- BIDs co-habit Boullanger Island with dibblers and there is no reason to think that they cold not co-habit Escape Island, providing it has those environmental resources that are essential to the BID.

Implementation.

The translocation is programmed for the 3rd week in October 1998. Wild young-of-the-year disperse at that time of year. Up to 28 dibblers will be available. The sex ratio is still unknown because the young are still with their mothers. The process will involve the following events.

- Hardening off of the zoo animals. The zoo population was housed in an air-conditioned room. The animals are now being exposed to normal day and night temperatures.
- Radio collars will be attached to twenty of the animals the day before they leave

[1] School of Biological Sciences and Institute of Wildlife Research, University of Sydney.

the zoo and all animals will have Passive Induction Transponders implanted while they are at Perth Zoo.

- Dibblers will be transported from Perth Zoo to Escape Island on the day of release. The actual day will be determined close to the time after considering weather forecasts. We are seeking sponsorship for use of a helicopter to fly them to Boullanger island. If it is unavailable they will be transported by road and boat.
- They will be released at dusk.

5. Monitoring

The dibblers will be monitored daily for one week using radio-telemetry. In the third week they will be monitored using radio-telemetry and Elliott traps. Thereafter they will be monitored by trapping every four to six weeks (or more frequently if circumstances require it) until the onset of breeding. After that, circumstances and logistical issues will determine monitoring frequency, but will be at least once every three months for a year.

The founding animals will have come from a limited genetic base although animals from both Whitlock and Boullanger will have contributed. Genetic variability of the new stock will be monitored and, if necessary, further translocations will be proposed in future years to optimise the genetic variability of the Escape Island sub-population.

6. Funding

Much of the work will be undertaken by CALMScience staff and CALMScience is contributing to the salary of Dr. Dorian Moro who will have a significant role in the translocation, monitoring and genetic assessment. Perth Zoo is managing the captive animals. Additional funds were set aside from a previous Environment Australia dibbler research contract and it is anticipated that EA will contribute to the funding of the IRP for the next three years.

7. References

Anon. 1996. *Western Shield; bringing wildlife back from the brink of extinction.* Department of Conservation and Land Management. Perth.

ANZECC, 1991. *List of Endangered Vertebrate Fauna*. Australian National Parks and Wildlife Service, Canberra.

Archer, M. and Baynes, A. 1973. Prehistoric mammal faunas from two small caves in the extreme south west of Western Australia. *Journal of the Royal Society of Western Australia.* **55:** 80-89.

Baczocha, N. and Start A.N. 1997. *Status and ecology of the dibbler,* (Parantechinus apicalis*) in Western Australia*. 1996 annual report. unpublished report to Environment Australia. Department of Conservation and Land Management. Perth

Bailey, C. 1996. Western Shield; bringing wildlife back from the brink of extinction.

Landscope **11(4) (winter 1996).**

Baillie, J. And Groombridg, B . 1996. 1996 IUCN Red List of threatened animals. The IUCN Species Survival Commission. Gland, Switzerland

Chapman, A. and Newby, K.R., 1995. A biological Survey of the Fitzgerald area, Western Australia. *CALMScience* **Supplement 3:** 1-258.

Fisher, C. 1998. Where are they now? Landscope **13(3):** 40-47.

Fuller, P.J. and Burbidge, A.A. 1987. Discovery of the dibbler, *Parantechinus apicalis,* on islands at Jurien Bay. *The Western Australian Naturalist* **16:** 177-181.

Gray, J.E. 1842. A new species of Tapering-tailed Phascogale in the collection of the British Museum. *Annals and Magazine of Natural History.* **IX:** 518.

Kitchener, D.J., Stoddart, J. And Henry, J. 1984. A taxonomic revision of the Sminthopsis murina complex(Marsupialia, Dasyuridae) in Australia, including descriptions for four new species. *Records of the Western Australian Museum* **11:**201-248.

Lynam, A.J. 1987. *Inbreeding and juvenile dispersal in insular populations of two dasyurid marsupials; the dibbler,* Parantechinus apicalis, *and the Grey-bellied Dunnart,* Sminthopsis griseoventer. Honours Thesis. University of Western Australia.

Maxwell, S., Burbidge, A.A. and Morris, K.D. (Editors) (1996). *The 1996 Action Plan for Australian Marsupials and Monotremes.* Wildlife Australia, Endangered Species Project Number 500. Environment Australia, Canberra.

Moore, S., Cavana, M., Gillen, K., Hart, C., Hopper, S., Orr, K. and Schmidt, W. 1991. *Fitzgerald River National Park Management Plan; 1991 - 2001.* Department of Conservation and Land Management. Perth.

Morcombe, M.K. 1967. The rediscovery after 83 years of the dibbler *Antechinus apicalis* (Marsupialia, Dasyuridae). *The Western Australian Naturalist.* **10(5):** 103-111.

Smith, V. W. 1990. The terrestrial vertebrate fauna of the Torndirrup National Park. *The Western Australian Naturalist* **18(3):** 82-92.

Start, A.N. 1998. *Dibbler,* Parantechinus apicalis, *Interim Recovery Plan: 1998-2000.* Draft submitted to Director of Nature Conservation, Department of Conservation and Land Management. Perth

Woolley, P.A. 1977. In search of the Dibbler, *Antechinus apicalis* (Marsupialia: Dasyuridae). *Journal of the Royal Society of Western Australia.* **59 (4):** 111-117.

Woolley, P.A. 1980. Further searches for the Dibbler, *Antechinus apicalis* (Marsupialia: Dasyuridae). *Journal of the Royal Society of Western Australia.* **63 (2):**

47-52.

8. Attachments

1) Draft Interim Recovery Plan. This plan has been endorsed by the Recovery Team and submitted to Environment Australia in fulfilment of a contract with CALM. It has been submitted to the Director of WATSCU to initiate the process of endorsement by CALM. It is currently being considered by the Director of Nature Conservation.

2) Escape Island: an assessment of its suitability as a recipient location for dibblers. A report by A.N. Start, A.A. Burbidge and P.J. Fuller to the Dibbler Recovery Team.

9. Approvals.

Animal Experimentation Ethics Committee Approval

The translocation was approved by the CALM AEEC on 14 August 1998 (Approval number CAEC 11/98)

Confirmation that adequate CALMScience resources are available.

Signature..... Date.....

Position: Manager, Biodiversty Conservation Group, CALMScience

Endorsement by Proponent's Organisation

Department of Conservation and Land Management

Signature..... Date.....

Position: Director, WATSCU

Approval

Approved / Not approved

Signature..... Date.....

Position: Director of Nature Conservation
Department of Conservation and Land Management, Western Australia

Dibbler Translocation.

Escape Island: an assessment of its suitability as a recipient location for dibblers.

A.N. Start, A.A. Burbidge and P.J. Fuller

Background.

Actions in the Interim Recovery Plan for Dibblers (*Parantechinus apicalis*) include:

- *5.4 Establish and maintain captive breeding colonies*
- *5.5 Use the progeny of the captive colonies to establish a new island population.*

Two pairs from each of Boullanger and Whitlock Islands were taken to Perth Zoo in 1997. Three females gave birth and 19 young were raised to maturity. Many of these animals have bred in the zoo this year (May 1998) and up to 40 dibblers may be available for release by October 1998.

The IRP states that: *Selection of the island will be determined by the Recovery Team in consultation with relevant CALM officers and will be subject to approval of a Translocation Proposal in accordance with CALM Policy Paper No. 29*

Important factors in selection of a suitable island will include:

- *secure tenure controlled by CALM or an agency able to assure long-term management compatible with the presence of dibblers.*
- *accessibility*
- *absence of incompatible uses*
- *absence of conservation values that might be compromised by introducing dibblers*
- *availability of resources used by dibblers on Boullanger and/or Whitlock Islands*
- *similarity of habitat to that on Boullanger and/or Whitlock Islands*
- *absence of threats to dibbler survival (which may require pre-introduction management actions, eg. to remove feral predators)*
- *absence of house mice*

Locating the third population close to Boullanger and Whitlock Islands has obvious logistical and biological advantages. Escape Island (10.5 ha) is another of the islands in the Jurien group. It is smaller than Boullanger Island (25.9 ha) but larger than all the other Islands including Whitlock (5.4 ha) (Keighery and Alford in press). The Recovery Team decided that Escape should be evaluated in more detail.

Information Sources.

- Keighery and Alford (in preparation) have surveyed the flora of islands between Lancelin and Dongara, off the west coast of WA including Escape, Boullanger and Whitlock Islands in the Jurien Group. Their analysis incorporated observations made by Abbott (1980). They made their manuscript available to us.
- Ford (1963) recorded reptiles of islands between Lancelin and Dongara, off the west coast of WA including Escape, Boullanger and Whitlock Islands in the Jurien Group.

- G. Connell (unpublished data) surveyed the reptile faunas of the Jurien islands and made his data available to us.
- On 29 April 1998, A.A. Burbidge, P.J. Fuller and A.N. Start visited Escape Island, collected plants, noted birds and set 25 Elliott traps. We recovered the traps on the morning of 30 April before visiting Boullanger and Whitlock Islands.

Assessment.

The following assessment addresses each of the requirements stipulated in the IRP.

Secure tenure controlled by CALM or an agency able to assure long-term management compatible with the presence of dibblers.

Escape Island is freehold land owned by the Commonwealth through the Australian Maritime Safety Authority (AMSA). There is a lighthouse on it. CALM is negotiating its return to the State for use as a Nature Reserve (Appendix 1). In case the transfer has not been effected by October 1998, the OIC for AMSA in Perth (Mr Glasson) has approved introduction and management of dibblers.

Accessibility.

It is difficult to land any sea-going boat on Escape Island because it has a mostly rocky shore. The few small beaches are steep, exposed to ocean swells and guarded by shallow reefs. Strong winds are common. On 29 April we anchored close to the shore and used a small dhingy to commute between our boat and the island but the next day stronger winds made the anchorage unsafe and we left one person on board. We landed on the north eastern side of the island at a site once used by lighthouse service personnel to land boats. Although shallow rocks are exposed from the shoreline out, on land there are some broken navigation markers and a short cutting through the small foredune. A helicopter is now used to service the light once a year. There is a concrete heli-pad beside the light.

The difficult access dissuades people using the island for leisure and thus reduces the chances of man-made fire and introducing weeds or pests but it also poses problems for the translocation project. However they are manageable. We have successfully used a small inflatable boat (with a tear-resistant outer cover to protect it from barnacles and sharp rocks) to land on the much more inaccessible islands in the Recherche Archipelago. Nevertheless it would be prudent to use a helicopter to ferry the dibblers to the island.

Absence of incompatible uses.

The only structures on the island are an unmanned light on top of a steel tower, a small concrete heli-pad adjacent to the lighthouse and one or two wooden navigation markers at a site used for boat landing. The only formally approved use of the island is maintenance of a lighthouse. Maintenance staff use helicopters to get there. The factors noted under 'accessibility' (above) mean that Escape Island is not often used for leisure: People prefer the more accessible Boullanger Island which is closer to the Jurien Marina.

The lighthouse is compatible with dibblers and we are unaware of any informal uses that would be incompatible with dibblers or pose a substantial threat to them.

Absence of conservation values that might be compromised by introducing dibblers.

Mammals. No terrestrial mammals have been reported from Escape Island.

Birds. There is a large breeding population of burrowing seabirds on the island. Seabird colonies have survived alongside dibblers on Boullanger and Whitlock Islands so dibblers are unlikely to threaten them. We noted many Rock Parrots, *Neophema petrophila*, on Escape and Whitlock Islands. They may breed there and dibblers may prey on eggs or chicks. However this is a common species, which probably breeds on most rocky, off shore islands in the area.

Reptiles. Ford (1963) and Connell[1] (personal communication) have recorded reptiles on the islands. The large, omnivorous skink, *Egernia kingii* is particularly abundant on Escape; we caught ten in 25 Elliott traps set overnight. The species is also present on Boullanger and Whitlock Islands where it co-exists with dibblers. The reptile faunas so far recorded are shown in Table 1.

Table 1. Reptiles recorded from Boullanger (BOU), Whitlock (WHI) and Escape (ESC) Islands by Ford (F) and Connell (C).

Family	Species	BOU	WHI	ESC	Notes
Geckonnidae	Crenadactylus ocellatus	F	F	F C	
	Diplodactylus spinigerus	C			
Scincidae	Ctenotus fallens	C	C	C	
	Ctenotus lesueurii	F C			
	Egernia kingii	F C		F C	
	Egernia pulchra longicauda	F C	C	F C	The subspecies is a Priority 2 taxon.
	Egernia bos	F C		F	
	Lerista elegans			C	
	Lerista lineopunctulata	F	F	C	
	Lerista praededita			C	
	Menetia greyii			C	
	Morethia obscura	C		C	
TOTAL		**9**	**4**	**10**	

Escape appears to have a greater diversity than either of the other islands. However Whitlock and Escape both have extensive areas of limestone, and thus a more diverse array of habitats than Boullanger. Connell searched and trapped systematically on Boullanger and Escape but not Whitlock. This may account for the absence of records of small and fossorial skinks on Whitlock (which is also half the size of Escape). One taxon, *Egernia pulchra longicauda* is on the Priority 2 list of species. However it is on both the islands that presently have dibblers, suggesting that it can persist alongside them. Ford recorded it as plentiful, living in crevices between and under rock, occasionally seabird burrows. Besides these islands, *E. p. longicauda* also occurs on Favourite Island (Ford 1963).

Invertebrates have not been studied although we collected land snails. Interestingly, the common large snail on Escape was the indigenous *Bothriembryon bulla* (Bulimulidae) while those on Whitlock and Boullanger were the introduced *Theba pisana* (Helicidae). (Appendix 2, report by Dr Shirly Slack-Smith of the WA Museum).

Abbott (1980) and Keighery and Alford (in preparation) have recorded flora on Escape,

[1] Garry Connell, *Ecologia* Environmental Consultants, Perth.

Boullanger and Whitlock Islands. We also collected plants on Escape, adding four species to the list (Appendix 3).

No threatened vertebrate animal or plant species have been recorded on Escape Island. Although there are differences in plant, reptile and land-snail species, those recorded on each island comprise sub-sets of the assemblages that occur on the mainland. Given that Escape Island has probably been separated from the mainland for less than 2 000 years, and the presence of the large, omnivorous skink, *Egernia kingi*, it is unlikely that the island supports endemic species which would be threatened by dibblers.

Availability of resources used by dibblers on Boullanger and/or Whitlock Islands.

Little detail is known of the resource requirements of dibblers on Boullanger and Whitlock islands. However the following are probably key issues.

Soils and landform. Escape is similar to Whitlock in having large areas of deep, calcareous sand overlying coastal limestone and large areas of exposed limestone containing numerous, complex pits and crevices caused by solution and containing skeletal soils. They offer abundant shelter for animals. Boullanger lacks the exposed limestone.

Seabirds. On Boullanger and Whitlock, dibblers frequently visit seabird burrows for periods ranging from a few minutes to several hours (McCulloch 1998). They probably obtain food and shelter there. There are numerous, active seabird burrows on Escape Island.

Flora. The flora present on Escape is somewhat richer than on Whitlock and Boullanger and all the plants that are common on the latter are present on Escape. Dibblers are known to feed on the succulent fruit of *Enchylaena tomentosa* (Chenopodiaceae) (McCulloch 1998) and may also eat the succulent fruits of *Threlkeldia diffusa* and *Nitraria billardierei*. *E. tomentosa* is present on Escape and the others are abundant there.

Vegetation. The vegetation on Escape is structurally similar to that on Whitlock and more complex than that on Boullanger. Boullanger's more simple vegetation reflects the absence of exposed limestone surfaces that are extensive on the others. There is a noticeably more extensive ground cover of mosses and herbs (particularly annual grasses; dead at the time of our visit) on Escape compared to Whitlock. This may reflect the effects of house mice in this stratum on Whitlock.

Similarity of habitat to that on Boullanger and/or Whitlock Islands.

See above.

Absence of threats to dibbler survival.

There are no recorded exotic animals on Escape Island. In particular there are no feral house mice , rabbits, cats or foxes. King Skinks, which are abundant, might pose a threat to young dibblers, but they are also present (albeit at lower densities) on Boullanger and Whitlock.

Twenty three exotic plants have been recorded on Escape (Appendix 3). However none of them dominate significant areas (although a few colonies of *Mesembryanthemum crystallinum* (Azioaceae) covered <100 m^2) and none of them are known to be sufficiently aggressive to threaten the island's vegetation.

Absence of house mice.

We found no evidence of house mice (or any other mammal) on Escape Island. The difficult access to the island reduces the risk of their importation.

Conclusion and Recommendation.

Escape Island is structurally and biologically very similar to Whitlock Island but twice that size. It is accessible with some difficulty. That is advantageous as it means we can manage dibblers, but the general public is not inclined to use the island for recreation, reducing associated risks. There are no apparent threats to the survival of dibblers on the island and we are unaware of any conservation values that might be threatened by introducing dibblers.

We recommend to the Recovery Team that we should proceed with plans to introduce dibblers to Escape Island.

References

Abbott, I. 1980. The floras of 37 south-western Australian islands. *Western Australian Herbarium Research Notes*. **3:** 19-36.

Ford, J. 1963. The reptilian fauna of the islands between Dongara and Lancelin, Western Australia. *The Western Australian Naturalist* . **8:** 135-142.

Keighery, G.J. and Alford, J.J. (in preparation). A vegetation survey of the Lancelin to Dongara Islands. Draft manuscript. *CALMScience*.

McCulloch, C. 1998. *The demography and habitat use of the dibbler* (Parantechinus apicalis) *on two islands in Jurien Bay, Western Australia*. Thesis for Graduate Diploma of Natural Resource Management, Faculty of Agriculture, University of Western Australia. 1-60.

Boullanger and Whitlock Islands. We also collected plants on Escape, adding four species to the list (Appendix 3).

No threatened vertebrate animal or plant species have been recorded on Escape Island. Although there are differences in plant, reptile and land-snail species, those recorded on each island comprise sub-sets of the assemblages that occur on the mainland. Given that Escape Island has probably been separated from the mainland for less than 2 000 years, and the presence of the large, omnivorous skink, *Egernia kingi*, it is unlikely that the island supports endemic species which would be threatened by dibblers.

Availability of resources used by dibblers on Boullanger and/or Whitlock Islands.

Little detail is known of the resource requirements of dibblers on Boullanger and Whitlock islands. However the following are probably key issues.

Soils and landform. Escape is similar to Whitlock in having large areas of deep, calcareous sand overlying coastal limestone and large areas of exposed limestone containing numerous, complex pits and crevices caused by solution and containing skeletal soils. They offer abundant shelter for animals. Boullanger lacks the exposed limestone.

Seabirds. On Boullanger and Whitlock, dibblers frequently visit seabird burrows for periods ranging from a few minutes to several hours (McCulloch 1998). They probably obtain food and shelter there. There are numerous, active seabird burrows on Escape Island.

Flora. The flora present on Escape is somewhat richer than on Whitlock and Boullanger and all the plants that are common on the latter are present on Escape. Dibblers are known to feed on the succulent fruit of *Enchylaena tomentosa* (Chenopodiaceae) (McCulloch 1998) and may also eat the succulent fruits of *Threlkeldia diffusa* and *Nitraria billardierei*. *E. tomentosa* is present on Escape and the others are abundant there.

Vegetation. The vegetation on Escape is structurally similar to that on Whitlock and more complex than that on Boullanger. Boullanger's more simple vegetation reflects the absence of exposed limestone surfaces that are extensive on the others. There is a noticeably more extensive ground cover of mosses and herbs (particularly annual grasses; dead at the time of our visit) on Escape compared to Whitlock. This may reflect the effects of house mice in this stratum on Whitlock.

Similarity of habitat to that on Boullanger and/or Whitlock Islands.

See above.

Absence of threats to dibbler survival.

There are no recorded exotic animals on Escape Island. In particular there are no feral house mice , rabbits, cats or foxes. King Skinks, which are abundant, might pose a threat to young dibblers, but they are also present (albeit at lower densities) on Boullanger and Whitlock.

Twenty three exotic plants have been recorded on Escape (Appendix 3). However none of them dominate significant areas (although a few colonies of *Mesembryanthemum crystallinum* (Azioaceae) covered <100 m^2) and none of them are known to be sufficiently aggressive to threaten the island's vegetation.

Appendix 1.

Letter from CALM to AMSA referring to transfer of title of Escape Island and authority to introduce and manage for dibblers in the event that transfer is not effected by the time we need to introduce dibblers to the island.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

HEAD OFFICE
HACKETT DRIVE CRAWLEY
WESTERN AUSTRALIA
Phone (08) 9442 0300
Facsimile (08) 9386 1578

STATE OPERATIONS HEADQUARTERS
50 HAYMAN ROAD COMO
WESTERN AUSTRALIA
Phone (08) 9334 0333
Facsimile (08) 9334 0466
Teletype (08) 9334 0546

Please address all correspondence to Executive Director, Locked Bag 104, Bentley Delivery Centre W.A. 6983

Your Ref:
Our Ref: 016023F3102
Enquiries: D Hampton
Phone: 9334 0214

Mr Maurice Glasson
Navigation Services Depot Manager
Australian Maritime Safety Authority
Mouat Street
FREMANTLE WA 6160

Dear Mr Glasson

As discussed with David Hampton, the Department of Conservation and Land Management seeks approval from your Authority to release a small number of endangered marsupials known as Dibblers, on Escape Island. This Island is one of seven proposed to be transferred to the State and to become a nature reserve when the lighthouse transfer agreement between the Commonwealth and the State is finalised.

The Department would need to access Escape Island to release the tiny Dibblers and to monitor their progress. If significant action is required to protect the Dibblers (feral animal control for example), the Department will consult with your Authority beforehand. I understand that your maintenance workers access the Island once a year by helicopter. I don't anticipate any difficulties to arise with the lighthouse operation as a result of the Department's proposed operations.

Could I have your response to this proposal, agreed to verbally in principle with Mr Hampton, please.

for Syd Shea
EXECUTIVE DIRECTOR

9 June 1998

D- Tony Start – fyi

Woodvale
CALM Science.

Dave Hampton advised NRS by Phone on 17 June 98 that M. Glasson was not replying in writing re translocation. The verbal is sufficient. He is very interested and wants to be kept informed.

NRS 17/6/98

Appendix 2.

Report on some terrestrial molluscs from Escape, Whitlock and Boullanger Islands by Dr S. Slack-Smith..

Western
Australian
museum

Francis Street, Perth
Western Australia 6000
Telephone (08) 9328 4411
Facsimile (08) 9328 8686

3 June, 1998

Dr A.N. Start,
WA Dept of CALM,
PO Box 51,
Wanneroo,
WA, 6065.

Dear Tony,

I have identified your snails from the islands off Jurien as on the attached report. As you will note, those from Whitlock and Boullanger Islands are of the introduced species *Theba pisana*. It is sad to learn that these are present there in abundance.

By contrast, the snail shells from Escape Island belong, as you realised, to the genus *Bothriembryon*, endemic to Australia.

I hope that the introduced species has not displaced the native *Bothriembryon* on the other two islands. I would be very interested to learn if live or dead *Bothriembryon* (or even fossils) are ever found on Whitlock or Boullanger Islands.

As you would realise, there might well be snails of other species (native or introduced) on these islands which have never been surveyed for land molluscs. Some of the snails on the adjacent mainland are much smaller than those in your samples and so take some finding. Would there be any chance of one or two WA Museum staff joining a group from your Department on one of your visits to the islands?

With my regards and best wishes,

S. M. Slack-Smith,
Curator of Molluscs.

Museum of Natural Science
Francis Street, Perth
Western Australia 6000
Telephone (08) 9328 4411
Facsimile (08) 9328 8686

Western Australian
Maritime Museum
Cliff Street, Fremantle
Western Australia 6160
Telephone (08) 9431 8444
Facsimile (08) 9430 5120

Fremantle History Museum
Finnerty Street, Fremantle
Western Australia 6160
Telephone (08) 9430 7399
Facsimile (08) 9430 7458

Geraldton Region Museum
244 Marine Terrace, Geraldton
Western Australia 6530
Telephone (08) 9921 5080
Facsimile (08) 9921 5158

Albany Residency
Museum
Residency Road, Albany
Western Australia 6330
Telephone (08) 9841 4844
Facsimile (08) 9841 4027

Museum of the Goldfields
PO Box 25, Kalgoorlie
Western Australia 6430
Telephone (08) 9021 8533
Facsimile (08) 9091 2791

Appendix 2.

Report on some terrestrial molluscs from Escape, Whitlock and Boullanger Islands by Dr S. Slack-Smith..

SNAILS FROM THE ISLANDS OFF THE JURIEN COAST

collected by A.N. START, WA DEPT OF C.A.L.M.

1. Whitlock Island; 30 April 1998;
Family Helicidae, *Theba pisana* (Müller, 1794)

This species is now widespread in many areas of southern Australia, having originated in the Mediterranean region. It has also spread to many other countries.

It appears to favour habitats with calcareous rocks and soils, and can tolerate extended periods of dry conditions.

2. Boullanger Island; 29 April 1998
Family Helicidae, *Theba pisana* (Müller, 1794)

(see above)

3. Escape Island; 29 April 1998
Family Bulimulidae, Bothriembryon bulla (Menke, 1843)

This species of the Australian endemic genus *Bothriembryon* is distributed along the western coast of Western Australia north and south of Perth. The populations in the Jurien area are at about the northern limit of this species.

The Museum's collections contain specimens from Escape Island but not from the other islands in that area. Any evidence of present or past occupancy by this species of Boullanger or Whitlock Islands would be of great interest.

The snail shells in this sample are all long dead, having no trace of periostracum on the exterior surfaces. Because of the calcareous nature of the soil the shells would disintegrate only slowly so that it is difficult to gain an appreciation of the period over which they have accumulated. As this species is known to bury when the air is dry it is possible that living snails are still present on the island. The status of the population, whether living or extinct, aand if living, whether large or small could be acertained only by a survey.

COMMENTS

A. On the submitted samples

Both of the snail species represented in these samples live on the adjacent mainland coastal plain.

On the basis of the snail specimens submitted to me, the native species *Bothriembryon bulla* appears to be, or to have been, present on Escape Island. On the basis of negative evidence, t would not be sensible to argue that this native snail is not present on Whitlock or Boullanger Island, as I do not know of the rigour with which the collecting was carried out.

The species *B. bulla* is known from a considerable area of the coastal plain and adjacent valleys leading into the Darling Range. However it is not uniformly distributed throughout that geographic range. Variation in the soil type and the vegetation seems to be important in the suitability of an area as a habitat for this species, quite apart from disturbance due to human activity.

The genetic variability of the species has not been investigated. From that point of view, the conservation of a population on one or more islands might well be of particular importance.

Theba pisana has spread along the coastal and near coastal areas between about Shark Bay and Esperance, being much more common near settled areas. It infests the wheat fields around Eneabba.

B. Other snail groups

The snail shell specimens submitted for identification are of a large size compared with that of other species of snail found with them on the adjacent mainland. It is possible that other snail species, native and introduced, are also present on these islands.

CONCLUSIONS

On the basis of the specimens submitted, it would appear that the introduction of snail-eating species onto Whitlock and Boullanger Islands would not have as much impact on the conservation of the native fauna as it would have at Escape Island.

However, it should be noted that, in the absence of a thorough survey of these islands, the doubt must remain that *Bothriembryon bulla* and other native snail species might be living on Whitlock and Boullanger Islands and might be adversely affected by such an introduction.

S.M. Slack-Smith,
Museum of Natural Science,
Western Australian Museum.
June 1998

Appendix 3.

List of plants collected on Escape, Whitlock and Boullanger Islands

Records of Abbott 1980.*W A Herbarium Research Notes* **3:** 19-36; Keighery and Alford (in prep for CALMScience) and collection on Escape only by A.N. Start, P.J. Fuller, A.A. Burbidge on 29 April 1998. * = introduced species

Family	Spp	Es	Wh	Bo
Aizoaceae	Carpobrotus virescens	+	+	+
	*Mesembryanthemum crystallinum	+	+	-
	*Tetragona decumbens	+	+	+
	Tetragona implexicorna	+	+	+
Anthrericeae	Thysanotus pattersonii	-	-	+
Apiaceae	Daucus glochidiatus	-	-	+
Apocynaceae	Alyxia buxifolia	+	-	-
Asphodelaceae	*Trachyandra divaricata	+	-	+
Asteraceae	Angianthus cunninghami	-	+	-
	*Arctotheca populifolia	-	-	+
	Brachyscome ciliaris	+	+	+
	Cotula cotuloides	+	+	-
	Euchiton sphaericus	-	+	-
	Gnaphalum indutium	-	+	-
	*Hypochaeris glabra	+	+	+
	Olearia axillaris	+	+	+
	Ozothamnus cordatus	+	-	+
	Podotheca angustifolia	-	-	+
	*Pseudognaphalum luteo-album	-	+	-
	Senecio lautus	+	+	+
	*Sonchus oleraceus	+	+	+
Brassicaceae	*Brassica tournefortii	-	-	+
	*Cakile maritima	-	+	+
	*Hymenolobus procumbens	-	+	-
	Lepidium linifolium	+	+	+
Caryophyllaceae	*Cerastium glomeratum	+	+	-
	*Sagina apetala	+	+	-
	* Spergularia diandra	+	+	-
Chenopodiaceae	Atriplex cinerea	+	+	+
	Atriplex isatidea	+	+	+
	*Chenopodium murale	+	-	-
	Enchylaena tomentosa	+	+	-
	Rhagodia baccata	+	+	+
	Salsola kali	+	+	+
	Threlkeldia diffusa	+	+	+
Convolvulaceae	Wilsonia humilis	+	+	-
Crassulaceae	Crassula colorata	+	+	+

	Crassula exserta	-	+	+
Cyperaceae	Carex preissii	-	+	-
	Isolepis nodosa	+	-	+
	Lepidosperma gladiatum	-	-	+
Dasypogonaceae	Acanthocarpus preissii	+	+	+
Euphorbiaceae	Phyllanthus calycinus	+	+	-
Frankeniaceae	Frankenia pauciflora	+	+	-
Gegntianaceae	*Centaurium erythraea	+	-	-
Goodeniaceae	Scaevola crassifolia	+	+	+
Haemodoraceae	Conostylis candicans	-	-	+
Juncaginaceae	Triglochin centrocarpum	-	-	+
	Triglochin minutissimum	+	-	-
Lauraceae	Cassytha racemosa	-	-	+
Malvaceae	Lavatera plebela	+	+	-
	*Malva parviflora	-	+	-
Mimosaceae	Acacia cyclops	-	-	+
	Acacia rostellifera	+	-	-
Myoporaceae	Eremophila glabra	+	+	-
	Myoporum insulare	+	+	+
Oxalidaceae	*Oxalis corniculata	-	+	-
	Oxalis perennans	+	+	-
Papilionaceae	*Medicago polymorpha	+	+	-
	Templetonia retusa	+	+	-
Pittosporaceae	Pittosporum phylliraeoides	+	-	-
Plantaginaceae	Plantago debilis	+	+	-
Poaceae	*Aira cariophyliea	+	-	-
	Austrostipa elegantissima	+	-	+
	Austrostipa flavescens	-	-	+
	*Avena barbata	+	+	-
	Bromus arenarius +	+	+	+
	*Bromus diandrus	+	-	-
	*Ehrarta brevifolia	+	+	-
	*Ehrarta longiflora	+	+	+
	Eragrostis dielsii	+	-	-
	*Hordeum leporinum	+	-	-
	*Lolium rigidum	+	-	-
	*Parapholis incurva	+	-	-
	*Phalaris minor	+	-	-
	Poa poiformis	-	+	+
	*Rostraria cristata	+	-	-
	Spinifex longifolius	+	+	+
	Sporobous virginicus	+	+	+
	*Vulpia myuros	+	+	+
Portulacaceae	Calandrinia calyptrata	+	+	-
Primulaceae	Samolus junceus	+	-	-
	Samolus repens	+	-	-