A BASELINE TERRESTRIAL BIOLOGICAL STUDY

of

THEVENARD ISLAND, W.A.

for

WAPET, Perth, W.A.

by

Dinara Pty. Ltd.
(W.H. & M.A. Butler)
Conservation Consultants
Perth, W.A.

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I N D E X

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TABLE 1

THEVENARD ISLAND - BIRDS

Nature Reserve C 33174 544 HA

Mackerel Island lease
Vacant Crown Land proposed WAPET lease
Surrounding areas

COMPILED FROM - Whitley Sept 1945
Buller Sept 1958
F&W June 1976
F&W June 1978
F&W June 1979
Butler Nov 1985
KDM CALM 1983-1987

* = breeding record

	ERMP	Nov 1987
NOMENCLATURE FOLLOWS STORR (1984)		
PROCELLARIIDAE		
Wedge-tailed Shearwater	x	-
PELECANIDAE		
Australian Pelican	x	2 birds
PHALACROCORACIDAE		
Pied Cormorant	x	7 birds
ARDEIDAE		
Eastern Reef Heron	x	8 noted per day
ACCIPITRIDAE		
Black-shouldered Kite	x	-
Brahminy Kite	-	-
White-breasted Sea Eagle	x	-
* Spotted Harrier	x	2 pair
* Osprey	x	4 pair
FALCONIDAE		
Australian Kestrel	x	x
PHASIANIDAE		
* Brown Quail	x	x
HAEMATOPODIDAE		
* Pied Oystercatcher	x	x
Sooty Oystercatcher	x	-
CHARADIIDAE		
* Red-capped Plover	x	x
Grey Plover	x	x
Large Sand Plover	x	x
Eastern Golden Plover	-	x
SCOLOPACIDAE		
Bar-tailed Godwit	x	x
Common Sandpiper	x	-
Terek Sandpiper	x	-
Grey-tailed Tattler	x	x
Ruddy Turnstone	x	x
Sanderling	-	x
Greenshank	-	x
Knot	-	x
Eastern Curlew	-	x
Sharptailed Sandpiper	-	x
BURHINIDAE		
Beach Stone-curlew	x	x 2 pair
LARIDAE		
Silver Gull	x	x
* Caspian Tern	x	x
Crested Tern	x	x
Lesser Crested Tern	-	x
* Fairy Tern	x	x
Roseate Terb	-	-
COLUMBIDAE		
* Bar-shouldered Dove	x	x
Crested Pigeon	x	-
PSITTACIDAE		
Little Corella	x	-
CUCULIDAE		
Horsfield's Bronze Cuckoo	x	x
APODIDAE		
Sacred Kingfisher	-	x
HIRUNDINIDAE		
Welcome Swallow	x	x
Tree Martin	-	-
MOTACILLIDAE		
* Richard's Pipit	x	x
CAMPEPHAGIDAE		
Black-faced Cuckoo-shrike	x	-
MONARCHIDAE		
Willie Wagtail	x	-
SYLVIIDAE		
Spinifex-bird	x -	x
ZOSTEROPIDAE		
Yellow White-eye	x	x
MELIPHAGIDAE		
* Spiny-cheeked Honeyeater	x	-
PLOCEIDAE		
Zebra Finch	x	-
GRALLINIDAE		
Australian Magpie-lark	-	-
ARTAMIDAE		
White-breasted Wood-swallow	x	x
Masked Wood-swallow	x	-
CRACTICIDAE		
Pied Butcherbird	-	-
CORVIDAE		
Little Crow	x	-

REPORT ON THEVENARD ISLAND BASELINE FIELD STUDIES

1.0 PREAMBLE

Baseline terrestrial studies were carried out on Thevenard Island by Messrs. Langdon and Butler in the period November 26-30th, (Scientific Licence No. 1320, Fauna Permit No. 87/102.)

The updated results of CALM records for the island were passed to us through the good offices of Mr. K. Morris. These were, as far as possible, verified in the field.

Some flora records have not been verified by us. Some new fauna records have been added. We recognise that because of seasonal activity in both fauna and flora, review at other times of the year could give different results.

Records supplied by Mr. Morris are for the nature reserve but our studies include Mackerel Islands lease, vacant Crown land and the surrounding areas.

The following activities were undertaken.

2.0 FAUNA SURVEY

2.1 Methods

(a) Visual observations were undertaken using foot traverses across the entire island, but particularly on the proposed development site; plus helicopter overflying to get some estimate of turtle numbers.

(b) Pit traps were run in permanent position for comparative repeats.

(c) Track and scat areas were established.

2.2 Results

2.2.1 Birds

This survey did not record a number of species but added three new birds to the list - Knot, Eastern Curlew and Sharptailed Sandpiper.

Seabirds were sparse, the biggest number being 40 Crested Terns. Waders were in small mixed flocks of up to 50 birds. The hot, dry conditions, the lack of rainfall for the past four months and the lack of surface freshwater ensure that only those bird species not dependent on constant supplies of freshwater are present on the island at this time.

No land bird could be said to be common and all were very sparse in their island distribution.

See Table 1 for all bird records.

TABLE 2

THEVENARD ISLAND - MAMMALS

Nature Reserve C 33174 544 HA leases and surrounding seas

			ERMP	Nov. 1987
MURIDAE				
Forrest's Mouse	-	Leggadina forresti (*)	x	x
House Mouse	-	Mus musculus - introduced 1986/87 (reported)	-	x
BOVIDAE				
Goat	-	Capra hircus sighted 1968 not since - removed from the island 1969	-	-
FELIDAE				
Cat	-	Feral cat on island for at least 7 years prior to 1976 - not sighted since	x	-
Dog	-	small dog tracks at West End boat landing area. Possibly on visitor's boat	-	x
(*) The taxonomy of this species is presently under review.				
DUGON DUGONG	-	Sighted from air	x	x
WHALE (unidentified)	-	Bones of a large ceteen on south beach	-	x
TURSIOPS TRUNCATUS			x	x

2.2.2 Mammals

The presence of Mus musculus in large numbers over the entire island was established by CALM research earlier this year. The species was reportedly introduced in 1986-87 but the range of distribution seems extreme over such a short period when one considers the competitive nature of Leggadina (Pseudomys) forresti and the predatory factor of raptors and goannas on Thevenard.

Certainly the "plague" numbers were recorded by Mackerel Island resident manager 1986-87.

All Mus captured were destroyed.

Four Leggadina were taken alive and delivered to CALM Karratha as per the letter of approval (reference 025536F3102).

A dead Leggadina was found on the beach and presented to WAM.

No other mammals were taken.

Fresh small dog tracks were noted with human tracks at the west end of the island and it is presumed that it was aboard a recreation vessel.

Whale bones were found on the southern beach.

Other tracks in test grids were sparse, possibly due to the high winds and dry conditions. Mus and Leggadina occurred at approximately one set of tracks per 1 square metre.

Marine mammals Tursiops truncatus and Dugon dugong were observed from the air.

Table 2 gives all mammal records to date.

2.2.3 Reptiles

Reptiles were surprisingly low in observed or trapped numbers, which is possibly due to the extremely high wind conditions and generally harsh conditions on the island, both day and night. Trapped reptile numbers were low in both actual numbers and species. Surprisingly, Lerista bipes was not observed or trapped.

Although we note the collection of a Delma by Mr. Morris, we found no evidence of this animal in traplines or tracks.

Single specimens of Ctenotus saxatilis and Lerista muelleri was taken to the W.A. Museum for verification.

Green and Hawksbill Turtles were were both recorded with three hundred Green Turtles being counted on the afternoon of the 29th November off the north west of the island. A further count of animals that had come on to the beach on the morning of the 30th showed that very few of these (approximately 51) had beached during the night.

TABLE 3

THEVENARD ISLAND - REPTILES

Nature Reserve C 33174 544 HA and surrounding areas

Compiled from: CALM records 1983-1987
WAPET ERMP 1987
Storr, Smith and Johnstone 1986

		ERMP	Nov. 1987
SCINCIDAE			
Ctenotus saxatilis		x	x
Lerista bipes		x	-
Lerista muelleri		x	x
PYGOPIDIDAE			
Delma tincta ?		-	-
VARANIDAE			
Varanus acanthurus		x	x
GEKKONIDAE			
Heteronotia binoei		x	x
Gehyra variegata		x	x
AGAMIDAE			
Gemmatophora gilberti		x	x
BOIDAE			
Morelia stimsoni	(one specimen taken in 1986 believed to have been introduced to the island)	x	x
HYDROPHIIDAE	At least 15 species of sea snake probably occur in the waters around Thevenard Island.	x	-
CHELONIIDAE			
Chelonia mydas	- Green Turtle	x	x
Natator depressa	- Flatback Turtle	-	x
Eretmochelys imbricata	- Hawksbill Turtle	x	x
Caretta caretta	- Loggerhead Turtle	-	?

Tracks of Green and Hawksbill Turtles were noted on the beach below the Mackerel Island buildings, i.e. south east, and Green Turtle tracks were noted on the beach on the vacant Crown land, i.e. north east.

A number of small turtles were noted which possibly were Loggerhead, but none were observed closely enough to positively verify this record.

A dead Flatback Turtle was found on the southern beach about midway along the island in the first line of sandhills.

Table 3 indicates all records of reptiles in the area.

2.2.4 Invertebrates

No invertebrates were collected but pit trapping revealed the presence of Wolf and Ogre Spiders, Phasmid, Mantis (two species) Opilone and ants (3 species at least).

Other investigations revealed flies were plentiful and common. Redback spiders were common. Orb weaver spiders occurred.

2.2.5 Traplines

Traplines yielded 33 vertebrates from 80 trap nights - a very poor result in the circumstances. This was easily explained by the very harsh, dry and wind blown conditions at the time of survey. One aspect of very strong winds is that the drift mesh fences move in the wind and tend to scare animals away.

Table 4 shows trapline results and totals.

Trapline methods were established with a view to creating statistical analysis returns, thus five pits of 10½" diameter, 20" deep were established at 5 metre intervals and a 25 metre long x 9" high drift fence was established protruding equally on each end of the line.

The pits were plastic with sealed bottoms and 10 mm of sand was placed in each one with water poured in. Half of the traps were baited with fresh apple. The others were unbaited. No distinction was noted in capture between baited and unbaited traps.

Traplines were selected to coincide with the boundaries of the proposed development area but sufficiently removed to avoid interference during construction. Thus line 1 parallels the Mackerel Island/WAPET lease boundary and occupies the first interdune on the eastern extremity of the islands behind the first Acacia coriacea.

Trapline 2 is approximately 100 m due south of the airstrip wind sock. Trapline 3 is approximately 200 m due north of the airstrip wind sock. Trapline 4 is at the western end of the airstrip running west and crossing a recently made seismic track.

TABLE 4

TRAPLINE RESULTS - THEVENARD ISLAND

Line	27 Nov.	28 Nov.	29 Nov.	30 Nov.	Totals
1	Mus musculus F Lycosid 1/5	Lycosid 0/5	Heteronota binoei Ctenotus saxatilis Lycosid 2/5	Mus musculus M 2/5	5/20
2	Mus musculus 1M 4F non breeding Ctenotus saxatilis Gehira variegata 7/5	Mus M J C.saxatilis Leggadina forresti M? 3/5 Lycosid	Mus musculus 1M 1F Leggadina forresti M? 3/5 Lycosid	0/5 Mantis Lycosid(2)	13/20
3	Mus musculus 1M 2F Nil Lycosid	(2) C.saxatilis Gemnatophora gilberti (2) 4/5 Lycosid	Ctenotus saxatilis 1/5	Mus musculus 1M 1F Ctenotus saxatilis 3/5 Mantis opilone	11/20
4	Nil Nil Lycosid	- 0/5 -	Mus musculus M 1/5 Lycosid	Mus musculus M Leggadina (2) 3/5 Lycosid mantis motn.	4/20
	Mus 2M 7F Ctenotus Gehira 11/20	Mus 1M Leggadina 1 Gemmatophora 2 Ctenotus 3 7/20	Mus 2M 1F Leggadina 1 Heteronotea 1 Ctenotus 2 7/20	Mus 3M 1F Leggadina 2 Ctenotus 1 Lerista muellerii 1 8/20	33/80 41.2

We understand from Mr. Morris that he has established other permanent traplines in other parts of the island and we would appreciate exchanging information on results from these. We see little value in duplicating work carried out by competent field officers.

3.0 FLORA SURVEY

3.1 General

The records given us by Mr. Morris were field examined and where possible verified by locating plant species. We were unable to locate some species, specifically Triodia pungens, Thysanotus sp., Gomphrena cunninghamii, Mollugo molluginis, Acacia ampliceps and A. ligulata, Vigna lanceolata, Erythrina vestertilio, some Euphorbias, and Terminalia canescens.

We also have some problems with speciation on the compiled list but recognise and accept the CALM identities at this stage.

Our survey of the lease area supported the details outlined in the ERMP. We found no species within the lease area that was not adequately represented on the reserve or in the Mackerel Islands region.

We further believe that surveys carried out following rain events would lead to a wider range of floral records.

3.2 Transects

Contemporary with the trapline location 25 metre transects were established. Vegetation for 1 metre width over the 25 metres was identified as to species, percentage of square metre cover and height. These permanent transects will be re-surveyed as part of the ongoing monitoring on Thevenard Island in conjunction with the fauna monitoring.

All plants on the survey were readily identified and no samples were collected.

Table 5 indicates all recorded flora on Thevenard Island.

TABLE 5 THEVENARD ISLAND - FLORA

Nature Reserve C 33174 544 HA and leases.

Compiled from: Burbidge and Sokolowski visit 1979
Trudgen - Westminco ERMP 1984
LeProvost et al. WAPET ERMP 1987
Butler - WAPET ERMP 1987

Nomenclature follows Green (1985)

		ERMP	Nov 1987
31	POACEAE		
	Enneapogon sp.	-	x
	Eulalia fulva	x	x
	Spinifex longifolius	x	x
	Sporobolus virginicus	x	x
	Whiteochloa aeroides	-	x
	Setaria dielsii	x	x
	Triodia pungens	-	-
	Triodia angusta	x	x
	Sorghum plumosum	x	x
54	LILIACEAE		
	Corynotheca acanthoclada	-	x
	Thysanotus sp.	-	-
105	CHENOPODIACEAE		
	Atriplex isatidea	x	x
	Enchylaena tomentosa	x	x
	Salsola kali	x	x
	Thelkeldia diffusa	x	x
	Rhagodia eremaea (= obovata = preissii)	x	x
106	AMARANTHACEAE		
	Gomphrena cunninghamii	-	-
	Gomphrena conferta	x	x
	Ptilotus villosiflorus	x	x
	Ptilotus sp.	-	-
107	NYCTAGINACEAE		
	Commicarpus australis (= Boerhavia repands)	x	x
	Boerhavia sp.	-	-
110	AIZOACEAE		
	Carpobrotus sp. (= australe)	x	x
110A	MOLLUGINACEAE		
	Mollugo molluginis	-	-
111	PORTULACACEAE		
	Portulaca pilosa	x	x
131	LAURACEAE		
	Cassytha sp.	x	x
137A	CAPPARACEAE		
	Cleome viscosa	x	x
163	MIMOSACEAE		
	Acacia bivenosa	-	x
	Acacia coriacea	x	x
	Acacia sclerosperma	x	x
	Acacia ampliceps	-	-
	Acacia gregorii	x	x
	Acacia tetragonaphylla	-	x
	Acacia ligulata?	-	-
165	PAPILIONACEAE		
	Rhynchosia cf. minima	x	x
	Canavalia maritima	x	x
	Vigna lanceolata	-	-
	[illegible]vthr[illegible]sper[illegible]	-	-

		ERMP	Nov 1987
173	ZYGOPHYLLACEAE		
	Zygophyllum aurantiacum	-	x
	Tribulus occidentalis	-	x
	Tribulus platypterus	-	-
185	EUPHORBIACEAE		
	Euphorbia australis	x	x
	Euphorbia coghlanii	-	-
	Euphorbia tannensis (= eremophila)	x	x
	Euphorbia aff. drummondii	-	-
	Euphorbia myrtoides	-	x
207	SAPINDACEAE		
	Diplopeltis eriocarapa	x	x
223	STERCULIACEAE		
	Melhania oblongifolia	-	x
235	ELATINACEA		
	Bergia perennis	-	x
272	COMBRETACEAE		
	Terminalia canescens	-	-
276	HALORAGACEAE		
	Haloragis gossei	x	x
305	ASCLEPIDACEAE		
	Sarcostemma australe	x	x
	Cynanthum floribundum	x	x
307	CONVOLVULACEAE		
	Ipomoea pes-caprae	x	x
310	BORAGINACEAE		
	Heliotropium tenuifolium	-	x
316	SCROPHULARIACEAE		
	Morgania pubescens	-	x
331	RUBIACEAE		
	Synaptantha tillaeacea	-	x
341	GOODENIACEAE		
	Scaevola crassifolia	x	x
	Scaevola cunninghamii	-	x
	Scaevola spinescens	x	x
	Goodenia sp.	-	-
345	ASTERACEAE		
	Angianthus cunninghamii	-	x
	Flaveria australasica	x	x
	Launaea sarmentosa	x	x
	Olearia axillaris	x	x
	Pterocaulon sphacelatum	x	x
	INTRODUCED SPECIES		
	Tamarisk - Tamarix aphylla	x	x
	- Casuarina equisitifolia	x	x
	- Melaleuca sp.	x	x
	Cotton Palm	x	x
	Couch Grass	x	x
	Buffel Grass - Cenchrus ciliaris	x	x
	[illegible]k Bush - Aerva javanica	x	x

4.0 DISCUSSION

The baseline survey carried out when placed in conjunction with the previous biological surveys carried out and reported in the ERMP give a reasonable assessment of what is essentially a simple collection of plant assemblages and dependent fauna on a geologically recent island.

The development of baseline studies at the harshest time of the year allows an assessment of permanent or perennial species to be made which is not complicated by the presence of annual flora or transient, opportunistic or nomadic fauna. Against this is the recoghition that at such a bad period of the year fauna species would be at low ebb and therefore results would be expected to be less than in a more favourable climatic response time.

As previously stated, mammals are certainly present but reduced in number from the high results recorded by Mr. Morris.

This suggests that the "plague" is reducing. This supposition is perhaps verified by the lack of raptors visible on the island, in particular the Black-shouldered Kite which is a prime mouse predator.

The lack of surface freshwater and green material, coupled with the drying wind all mitigate against water dependent species, such as finches. The presence of the Bar-shouldered Doves is surprising in this respect as they are a water dependent species, but being strong fliers may have alternate resources elsewhere.

The very dry conditions of the first foot of soil probably hampers most cryptic reptiles. The monitoring points set up, also capable of infinite repeat without any specialised skills, thus verification monitoring can be carried out by a wide range of people on these locations in the future.

It is extremely interesting to note that there were no repeats of captures as reptiles were marked and released, Mus were destroyed and Leggadina were retained.

While recognising that the destructive sampling of mammals on these lines could skew future records, it is our belief because of the island situation, coupled with the known high breeding and colonisation rate of murids that any such destructive sampling would quickly be replaced by new generations as seasons progressively allow breeding.

Also of interest is the fact that where Leggadina and Mus were together in pit traps, Mus was unquestionably victorious and Leggadina from such a trap was in a somewhat battered condition, whereas Mus appeared to be relatively unmarked. This indicates there is a positive interaction between the two species within certain situations Mus actively attacking Leggadina.

It is also notable that field behaviour of trapped Mus is active and aggressive towards the captor, whereas Leggadina is passive and quiet and no attempt is made to bite when the animal is handled gently.

The very high incidence of turtles offshore suggests that previous assessment of turtle numbers may have been underestimated. While Thevenard is certainly not in the same category as Barrow Island, where 400+ turtles were seen offshore on one small beach during the same survey period, nevertheless the numbers counted around Thevenard indicate a higher frequency than previously suspected.

The ERMP statement on this matter, however, was vindicated and the majority of turtles were beaching on the reserve with relatively few beaching on the proposed WAPET lease area.

No evidence of bird nesting was discovered at this time which is probably valid.

The presence of additional wader records is in itself not significant as currently on Barrow Island there are very large numbers of migratory waders. It is reasonable to assume that the birds may rest on Thevenard Island. However, considerable numbers were also noted on Rosalie Island during overfly, and again it is pointed out that the lack of mud flats makes the habitat for waders little more than a transit area. This does not decrease its importance but is an attempt to put it in perspective.

Overflying the mainland areas around Onslow, particularly to the north east of Onslow, very large flocks of waders were observed in the mud flats of this area.

5.0 CONCLUSION

The results of this baseline survey, when coupled with the results obtained from all sources, indicate that the conclusions drawn in the ERMP were valid, i.e. that no species of plant or animal is threatened by the development of a small portion of Thevenard Island. The restriction of the development to a finite section of Thevenard Island, coupled with the stringent application of environmental requirements and an ongoing workforce education program, should avoid conflict and pressure upon any species.

Further, such restrictions and applications will ensure that the development and its attendant services will have a minimum and short term effect.

The demonstrable ability of WAPET to rehabilitate larger and more complex ecosystems on Barrow Island, but also to rehabilitate equivalent ecosystems to those occurring on Thevenard Island, suggests that similar methods should be effective on Thevenard as there are no particular complexities or unusual circumstances.

The fauna and the flora of Thevenard Island are relatively recent because of the geological formation of the island in geologically recent times. They have developed and evolved under extreme stress from periodic events such as wildfire, cyclones, drought, salt spray, floods, sand blast, dehydration and human utilisation. While the effect of this project will be to excise a percentage of the island from biota during the operation of the development, very few individual plants or animals will be affected in proportion to the total population of the island.

The repeat of the baseline surveys and monitoring, coupled with existing and ongoing works of officers of CALM, should allow clarification of environmental management procedures and practices and verification of their effectiveness. The Environmental Management Program currently being prepared allows for flexibility should any prediction or any untoward event occur.

6.0 ACKNOWLEDGEMENTS

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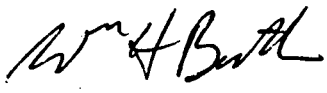
WAPET and WAPET personnel, in particular R.D. Langdon, Environmental Coordinator, J. Wright, Project Coordinator, and C. Prattini, Senior Management; D. CALM - in particular A.A. Burbidge and K. Morris for information and availability of updated records, plus the Department for the issuance of Scientific Licence and Island Permits; W.A. Museum for verification of collected vertebrates; LeProvost Semeniuk and Chalmer, Consultants, in particular Penny Wurms for associated information; and Mrs. G. Banks for report preparation.



W.H. BUTLER
for Dinara Pty. Ltd.
Conservation Consultants