

REPORT ON A VISIT TO THE MONTE BELLO ISLANDS, JULY 1970.

INTRODUCTION.

The aim of the visit was to examine the islands for the presence of native mammals and other fauna and to explore the possibility of re-establishing fauna now extinct.

The survey was carried out in conjunction with a more detailed examination of the Dampier Archipelago. The fisheries patrol vessel "Dampier" was used to reach the islands and as a base. Personnel were R. Johnstone (W.A. Museum), E.J. Little and J.D. Harman (crew of the "Dampier") and R.J. Dear and A.A. Burbidge, all from the Department of Fisheries and Fauna.

The party arrived at the islands on June 30th, 1970 and departed on July 3rd. Only Trimouille and Hermite Islands were examined. Both islands were traversed by day and night and "Elliot" live traps and break-back traps were set using "universal" bait.

HISTORY.

The Monte Bellos are a group of over 100 islands which lie about 15 miles north of Barrow Island and fifty miles north west of Cape Preston, the closest point on the mainland. Most of the islands are very small, only about 15 being of any size. The two largest are Hermite (        acres) and Trimouille (        acres).

The Monte Bello Islands have been previously visited by parties who examined the flora and fauna. The islands were named by the French Baudin expedition in 1801, although the English ship "Tryal" was wrecked off the group in 1622. This wreck has recently been located and is now being explored by the W.A. Museum. A further survey was made in 1818 by the navigator King (1826). Natural

history records date from Stokes (1846) who surveyed the islands from H.M.S. "Beagle" in 1840.

The first detailed biological survey was carried out in 1912 by Montague (1914). The next visit was by Sheard (1950). In 1952, the islands were used by the British Atomic Weapons Research Establishment as a site for testing nuclear weapons. Natural history observations made at that time were published by Hill (1955).

In 1958, Serventy and Marshall (1964) visited the group to resurvey the natural history following the nuclear explosions. In 1966, W.H. Butler made a brief visit to the group while conducting a fauna survey of Barrow Island (Butler, 1967). His visit coincided with West Australian <sup>Petroleum</sup> Pty. Ltd. drilling an exploratory well on Trimouille Island.

#### CLIMATE.

No extensive weather data have been collected from the Monte Bellos. However, records are available for Barrow Island since 1965. The nearest climate stations on the mainland are Mardie, Onslow and Dampier.

The Monte Bello Islands are in an area of low unreliable rainfall. The annual average rainfall is probably in the region of ten to twelve inches, most of this resulting from summer tropical cyclones, with the occasional thunderstorm. Judging from Barrow Island and the adjacent mainland, heavy dews occur during both summer and winter.

Temperatures on Barrow Island are milder than on the adjacent mainland and the Monte Bellos would be similar. Summer maximums are usually in the range of 90° to 105°F (32° to 40°C), while winter minimums rarely fall below 55°F (13°C).

#### GEOLOGY.

The islands consist of Pleistocene Coastal Limestone formations

which are consolidated sand dune deposits (Smith, 1965). The "Coastal Limestone" is a buff or red coloured highly calcareous, ferruginous, cross bedded sandstone. Inland, especially on Trimouille Island, there is extensive cover by loose sand derived from the coastal limestone and the topographic highs are travertinised dunes. Hill (1955) notes that the sand on Trimouille is 90% soluble in dilute acid, signifying a high lime content. Hermite is much more rocky than Timouille and has a very different vegetation.

There is no standing fresh water on the islands.

#### FAUNA.

##### a) Mammals.

Two terrestrial marsupials occurred on the islands in historic times and one is known from skeletal remains. In addition the water rat and a bat occur in the group.

##### 1. Spectacled Hare Wallaby, Lagochestes conspicillatus

Stokes (1846) mentions Trimouille as a locality for this species, stating that three guns shot nearly 20 individuals in a couple of hours. However, Montague (1914) found the species only on Hermite Island and suggested that this might also have been Stokes' locality as old charts showed the Monte Bello group as a single island named Trimouille. From what is known of the Spectacled Hare Wallaby's habitat on Barrow Island (Burbidge and Main, in press), Trimouille is a most unlikely habitat for this species. By the time of Sheard's visit in 1950, the hare wallaby was extinct and this has been confirmed by later visits.

##### 2. Boodie, Bettongia leseur

This is known only from a lower jaw found by Serventy on Hermite Island in 1958. It was not present when Montague surveyed the group in 1912. Serventy and Marshall (1964) suggested that from the condition of the bone, the species may have survived on the

island until early this century. I believe that the presence of a single jaw bone is insufficient evidence that this species occurred on Hermite Island in recent times. The species occurs on Barrow Island (this fact was unknown to Serventy and Marshall) and the skeletal remains might easily have been carried from there by sea eagles. We found skeletal remains of rock wallabies (Petrogale sp.) in sea eagle nests on Hermite Island, and these presumably came from Barrow Island which is only 15 miles away. There is no doubt that sea eagles prey on wallabies of this size and can carry them a considerable distance. Furthermore, from what is known of the distribution of macropod marsupials on islands off the West Australian coast (Main, 1961; Main and Yadav, in press) it is most unlikely that two macropods could survive together on an island as small as Hermite.

3. Golden Bandicoot or Wintarro, Isoodon auratus

Found as recent remains, including shrivelled skins, by Montague on Hermite Island. Must have become extinct shortly before 1912. Montague found that the skulls correspond with the Barrow Island form I. a. barrowensis

4. Water Rat, Hydromys chrysogaster

Tracks identified as being made by this animal were found on Hermite Island. The species occurs on Barrow Island where it lives in mangroves and swims readily in the sea. Butler (1970) recorded tracks on Trimouille Island in 1966.

5. Little Brown Rat, Eptesicus pumilis

Apparently quite common. Collected by Montague, Hill, Butler and during present trip.

6. Domestic Cat. Felis catus

Cats were recorded by Montague on Hermite Island and he attributed the extinction of the bandicoots to their presence. He further predicted that the hare wallabies would suffer the same fate.

Sheard (1950) and Hill (1955) only found cats on Hermite Island, but we also observed them on Trimouille.

7. Black Rat, Rattus rattus

Montague found this species very common on a number of islands including small outlying islets. He attributed its presence to a pearling schooner wrecked 20 years previously. Hill found that the rats were absent from Hermite, but common on Trimouille and South East Island. However, Butler found a skeleton on Hermite in 1966 and we found signs of rats there in 1970, although in very much lower density than on Trimouille where they are very common.

b) Birds.

A summary of observations is as follows:

LAND BIRDS

	MONTAGUE	SHEARD	HILL	SERVENTY & MARSHALL	
	1912	1950	1952	1958	1970
Kestrel			X		
Whistling Eagle					X
Owl (species unknown)					X
? Brown Quail					X
Sacred Kingfisher	X				
Mangrove Kingfisher	X		X		
Bar-shouldered Dove	X		X	X	
Welcome Swallow				X	
Australian Pipit	X		X	X	X
Spinifex Bird	X	X			
Black & White Wren		X			
Yellow Silvereye	X			X	X
Brown Honeyeater	X		X	X	
Zebra Finch	X			X	
White-breasted Wood Swallow	X		X	X	
Narrow-billed Bronze Cuckoo	X				
Rufous Whistler	X				
Crimson Chat	X				

SEA BIRDS AND WADERS

Wilson's Storm Petrel			X		
Wedge-tailed Shear water		X	X	X	
Australian Pelican	X		X	X	X
Pied Cormorant				X	X
Reef Heron	X			X	X
White-breasted Sea Eagle	X	X	X	X	X
Red-breasted Sea Eagle	X				
Osprey	X	X	X	X	X

SEA BIRDS AND WADERS cont.

	MONTAGUE	SHEARD	HILL	SERVENTY & MARSHALL	
	1912	1950	1952	1958	1970
Pied Oystercatcher	X			X	X
Sooty Oystercatcher	X	X		X	X
Large Sand Dotterel	X			X	
Mongolian Dotterel	X				
Little Stint	X			X	
Red-capped Dotterel	X	X			X
Grey-tailed Tattler				X	
Turnstone					X
Beach Curlew			X	X	
Crested Tern				X	X
Caspian Tern	X	X		X	X
Fairy Tern				X	X
Silver Gull	X			X	

The bird fauna is very similar to that recorded for Barrow Island (Butler, 1970), but a few differences are evident. The Brown Honeyeater has not been recorded on Barrow although it is widespread on the adjacent mainland. The Rufous Whistler and the Crimson Chat which have not been recorded since Montague's 1912 visit are also unknown from Barrow. The Owl pellets we found on Hermite Island might belong to the ~~Bookook~~ Owl which has been recorded from Barrow. The Mangrove Kingfisher has also not been recorded from Barrow Island, but it is a likely resident there.

Some of the sea birds and waders recorded from the Monte Bellos are unknown from Barrow Island, but this is not significant.

The Monte Bellos are not used extensively as a sea bird breeding area, although the Wedge-tailed Shearwater is known to breed on South-East Island (Serventy and Whittell, 1967).

c) Reptiles.

A summary of Reptiles collected is as follows:



	MONTAGUE 1912	HILL 1952	BUTLER 1966	1970
<u>GEKKONIDAE</u>				
<i>Heteronota bynoei</i>	X	X		X
<i>Gehyra variegata</i>	X		X	
<i>Gehyra australis</i>				X
<i>Gehyra punctata</i>			X	
<u>PYGOPODIDAE</u>				
<i>Lialis burtoni</i>		X		
<i>Delma fraseri</i>				X
<i>Aprasia repens rostrata</i>		X		
<u>AGAMIDAE</u>				
<i>Physignathus gilberti</i>	X	X	X	X
<u>SCINCIDAE</u>				
<i>Sphenomorphus isolepis</i>	X			X
<i>Ctenotus leseuri</i>	X			X
<i>Ctenotus wotjulum</i>			X	
<i>Morethia taeniopleura</i>				X
<i>Morethia lineocellatus</i>				X
<i>Lerista bipes</i>	X	X	X	X
<i>Lerista meulleri</i>	X			
<u>VARANIDAE</u>				
<i>Varanus gouldi</i>	X	X		X
<i>Varanus acanthurus</i>	X			X
<u>TYPHLOPIDAE</u>				
<i>Rhamphotyphlops diversus</i>	X			
<u>BOIDAE</u>				
<i>Liasis childreni</i>	X	X	X	
<u>ELAPIDAE</u>				
<i>Brachysoma christeanum</i>		X		
<i>Demansia psammophis reticulata</i>		X		



In addition to these a number of marine reptiles are known from the islands. These are the Green Turtle (Chelonia mydas), the Hawksbill Turtle (Eretmochelys imbricata) and the sea snakes Hydrophis elegans, Hydrophis ornatus, Astrotia stokesi, and Aipysurus laevis laevis.

Of the terrestrial reptiles, most have been recorded from Barrow Island (Butler, 1970). However, a few have not. Both Varanus gouldi and V. acanthurus are unknown from Barrow which Harbours V. giganteus. V. gouldi occurs on Trimouille and some of the smaller islands, but is absent from Hermite where V. acanthurus is found.

The distribution of Varanus in this area is especially interesting. V. gouldi burrows and this might explain its absence on Hermite which is very rocky, while V. acanthurus is found under rocks. The Monte Bellos are possibly too small for V. giganteus to persist and V. gouldi presumably would not be able to compete with V. giganteus on the much larger Barrow Island. Gehyra australis, Gehyra punctata and Morethia lineocellatus are also unknown from Barrow. Further collecting might extend the number of species on the Monte Bellos and the amount of overlap on Barrow Island.

Montague (1914) noted that all reptiles he collected were significantly smaller than mainland representatives of the same species.

#### d) Invertebrates.

Descriptions and lists of invertebrates collected on the island in 1912 and 1952 can be found in Montague (1914), Rathbun(1914), Iredale (1914), Robson (1914), Hill (1955), Britton (1955), Pope (1955), Cameron (1955), Kimmins (1955) and Salmon (1955). No collections were made during our visit.

#### DISCUSSION.

The Monte Bello Islands contain an interesting and varied fauna,

even after the introduction of exotic mammals and the disturbance of nuclear weapon testing. It is clear that the marsupials became extinct before the atomic testing and that the atomic tests have had no appreciable affect on the remaining fauna.

The causes of the extinction of the marsupials are not clear. Montague (1914) suggested that the introduction of the feral cat had caused the extinction of Isoodon auratus which had died out just before his visit. He further suggested that the hare wallaby would suffer the same fate, a supposition which has been confirmed. Thus, any re-introduction of the marsupials would probably be unsuccessful unless the feral cat population can be exterminated or considerably and permanently reduced.

Both marsupials which previously occurred on the Monte Bellos still occur on Barrow Island, and it would be relatively easy to capture some there and release them on the Monte Bellos. It is considered that only Hermite Island would be suitable as an area for introducing these mammals as:

1. Evidence indicates this was the only island inhabited by the animals in historic times.
2. The vegetation of Hermite is very similar to that on Barrow Island, being a spinifex (Triodia) grassland while Trimouille has very different soils and no spinifex.
3. Hermite is the largest island in the group (2,510 acres) compared with Trimouille which is only 1,170 acres. From what is known of the distribution of macropod marsupials on offshore islands (Main, 1961; Main and Yadav, in press) the larger islands are better able to support a population than smaller ones. Work on Barrow Island (Burbidge and Main, in press) suggests that Lagochestes conspicillatus needs a large territory, of the order of 20 acres for a female and possibly twice that for a male. These figures

indicate that Hermite Island could support about 60 males and 120 females, a figure which is probably below or very near the minimum needed for long term survival. It seems probable that L. conspicillatus actually requires a smaller area than that suggested above or else it would not have survived on Hermite Island until historic times.

Serventy and Marshall (1964) suggest that the extinction of the marsupial fauna on Hermite might have been due to the deterioration of the climate. Were this so, it would be unlikely that both Isoodon and Lagochestus became extinct at roughly the same time. This contention might be supported if, after the eradication of the cats, the introduced mammals fail to re-establish.

#### FUTURE USAGE.

The Monte Bello Islands, although somewhat isolated are in an area which is seeing rapid development and they will doubtless have tourist appeal in the future. Due to the large number of islands in the group there seems to be no reason why tourism should not be able to co-exist with the fauna. Trimouille Island would seem to be the best location for any tourist resort since it has good beaches and is unsuitable for the re-establishment of wallabies. The introduced rats which occur there would be a major problem to any land based operation, but this would <sup>be the same.</sup> ~~occur~~ on any island.

Hermite Island, on the other hand, is less suitable for tourism because of its rocky nature and lack of beaches, but it does provide suitable wallaby habitat.

A number of other islands also have an interesting fauna and flora and should be left undisturbed. South-East Island is a breeding area for Wedge-tailed Shearwaters and Hill (1955) reports that this island also has an interesting flora. The Bungarra (Varanus gouldi) occurs on South-East, North-West and Alpha Islands as well as Trimouille (Hill, op. cit)

Any tourist development would have to be carried out in such a way that it did not adversely affect the fauna and flora or cause erosion. Thus, domestic pets would have to be forbidden or else it would only serve to negate efforts to re-establish the native marsupials.

RECOMMENDATIONS.

1. That Hermite Island be made an 'A' class reserve for the 'Conservation of Fauna', and that it be vested in the Western Australian Wild Life Authority.
2. That the remainder of the Monte Bellos be made a 'C' class reserve for the 'Conservation of Fauna and Tourism' and that it be vested in the Western Australian Wild Life Authority. Reserve No 13517 (Campbell Island) for the purpose of "Water for the Pearling Industry" should be cancelled or the purpose amended as above.
3. That action be taken to exterminate or permanently reduce the population of feral cats on the islands.
4. That, assuming recommendation 3 is successful, hare wallabies and bandicoots be introduced onto Hermite Island from Barrow Island.

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West Australian Petroleum Pty. Ltd. provided geological information on the islands.

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List of Flora of Monte Bello Islands, 1970.

	<u>TRIMOUILLE</u>	<u>HERMITE</u>
<u>GRAMINEAE</u>		
Aristida browniana		X
Eulalia fulva (R.Br) O. Kuntze	X	
Panicum decompositum R.Br.		X
Sorghum plumosum (R.Br.) Beauv.	X	
Spinifex longifolius R.Br.	X	X
Sporobolus virginicus (L.) Kunth.	X	X
Themeda australis (R.Br.) Stapf.		X
Triodia pungens R.Br.		X
Triodia ?wiseana C.A. Gardn.		X
<u>LILIACEAE</u>		
Acanthocarpus preissii Lehm.	X	X
<u>CHENOPODIACEAE</u>		
Bassia uniflora (R.Br.) F. Muell.	X	X
Enchylaena tomentosa R.Br.		X
Rhagodia preissii Moq.		X
Salsola kali L.	X	
<u>AMARANTACEAE</u>		
Amaranthus pallidiflorus F. Muell.	X	X
Ptilotus exaltatus Nees et Esenb.	X	X
Ptilotus murrayi F. Muell.	X	
<u>NYCTAGINACEAE</u>		
Boerhavia repandra Willd.	X	
<u>AIZOACEAE</u>		
Trianthena aff. oxycalyptra F. Muell.		X
<u>CAPPARIDACEAE</u>		
Capparis spinosa L. var. nummularia (D.C.) Bailey		X
Cleome viscosa L.	X	X
<u>MIMOSACEAE</u>		
Acacia bivenosa D.C.	X	
Acacia coriacea D.C.	X	X
Acacia gregorii F. Muell.	X	
<u>CAESALPINIACEAE</u>		
Cassia sophera L.		X
<u>PAPILIONACEAE</u>		
Canavalia maritima (Aubl.) Thou.	X	X
Crotalaria trifoliastrum Willd.		X
Indigofera linifolia Retz.		X
Indigofera trita L.		X
Rhynchosia minima D.C.	X	
	X	



	<u>TRIMOUILLE</u>	<u>HERMITE</u>
<u>PAPILIONACEAE</u> cont.		
<i>Swaisionia</i> <sup>A</sup> <i>beasleyana</i> F. Muell.		
<sup>A</sup> spp. <i>eglantoides</i> A. Lee	X	
<i>Tephrosia eriocarpa</i> Benth.		X
<i>Tephrosia</i> ? <i>flammea</i> (F. Muell.) Benth.		X
<u>EUPHORBIACEAE</u>		
<i>Euphorbia atoto</i> Forst.	X	X
<i>Euphorbia australis</i> Boiss.	X	
<i>Euphorbia eremophila</i> A. Cunn.	X	
<i>Phyllanthus maderaspatanus</i> L.	X	X
<u>TILIACEAE</u>		
<i>Corchorus walcottii</i> F. Muell.	X	X
<u>MALVACEAE</u>		
<i>Abutilon exonemum</i> F. Muell.	X	X
<i>Malvastrum spicatum</i> (L.) A. Gray		X
<u>STERCULIACEAE</u>		
<i>Melhania icana</i> Heyne		X
<u>FRANKENIACEAE</u>		
<i>Frankenia pauciflora</i> D.C.	X	X
<u>RHIZOPHORACEAE</u>		
<i>Rhizophora mucronata</i> Lam.		X
<u>ASCLEPIADACEAE</u>		
<i>Cyanchum floribundum</i> R.Br.		X
<u>CONVOLVULACEAE</u>		
<i>Evolvulus alsinoides</i> L. (Sprawling form)	X	
<i>Evolvulus alsinoides</i> L. (Erect form)	X	
<i>Ipomoea pes-caprae</i> (L.) R.Br.	X	
<u>BORAGINACEAE</u>		
<i>Trichodesma zeylanicum</i> (L.) R.Br.	X	X
<u>VERBENACEAE</u>		
<i>Avicennia marina</i> (Forsk) Vierh.		X
<u>SOLANACEAE</u>		
<i>Solanum esuriale</i> Lindl.	X	X
<u>GOODENIACEAE</u>		
<i>Scaevola globulifera</i> Labill.	X	X
<i>Scaevola spinescens</i> R.Br.		X

	<u>TRIMOUILLE</u>	<u>HERMITE</u>
<u>COMPOSITAE</u>		
Flaveria australasica Hook.	X	X
Launea bellidifolia Cass.	X	
Olearia axillaris F. Muell.		X
Pterigeron decurrens (D.C.) Benth.		X
Vittadinna sp.		X