

BIODIVERSITY - FAUNA



Yellow-throated honeyeater
(*Lichenostomus flavicollis*).
Illustrations Brett Littleton.

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Summary

Fauna surveys were carried out across 8 islands in Macquarie Harbour in December 2009: Bonnet, Cat, Elizabeth, Entrance, Magazine, Neck, Philips and Soldiers Islands. Of one hundred and sixty fauna taxa identified by the survey, one hundred and thirty-two (primarily invertebrate) taxa had not been previously recorded. These included forty-nine taxa identified to the level of known species and thirty-three taxa identified as distinct morphospecies, while the rest were identified less precisely. A species of the isopod genus *Notoniscus* appeared to be new to science, though this could not be confirmed at the time of writing. Numerous bird species had previously been recorded in 'Macquarie Harbour', but the survey provided more specific locations for many of these species. The findings particularly extended the known distribution of two invertebrates: the land snail *Stenacapha vitrinaformis* and the weevil *Mandalotus subterraneus*. A few exotic species were identified: most significantly, hair tubes laid on Philips Island and Cat Island collected hair

that was confirmed as cat hair (for Philips) and suspected as cat hair (for Cat). A sea eagle's nest was found on Philips Island. It is recommended that cat eradication is considered, and that disturbance on Philips Island is avoided during eagle breeding season (July to February).

Introduction

Prior to the survey described in this report, very limited data were available on the fauna of the Macquarie Harbour islands, apart from those available from two reports for Sarah Island (Phillips 1992; Mallick 2000). Almost all data were confined to the birds of the area.

Natural Values Atlas data on fauna on the islands were almost exclusively confined to a bird list for the Harbour (Table 2), with no precise location provided for the majority of the records. The exception to this was for Sarah Island, where two studies (Phillips 1992; Mallick 2000) provide bird records specifically for this island.

It was therefore timely to survey the fauna of the other large islands in the Harbour, to guide their management by the Parks & Wildlife Service.

It was expected that islands would host a subset of the species as found on the nearby coast, hosting a greater number of



species if they were closer to the coast or larger in area (MacArthur & Wilson 1967). Nonetheless it remained possible that one or more islands might host relict populations of species which had been lost from the nearby coast. Cat, Magazine and Neck Islands, since they had similar geology and were close neighbours, would be expected to show a great deal of overlap in species compositions. Philips and Soldiers were also expected to host similar species due to their similar geology, while the same assumption held for Bonnet, Elizabeth and Sarah Island. However, the level of disturbance would be expected also to affect species number and composition.

Methods

While some fauna groups, such as birds, can easily be identified from calls and sightings during a simple traverse of a survey area, others, such as many mammal species, are difficult to identify to species level without trapping. Within the available time (9th - 11th December 2009), and given the unreliable weather conditions, trapping was not possible since each island could not be visited

for trap-checking each day. Instead, other techniques were used which required only a single return visit. Eight islands were surveyed, of which four were visited twice (Table 1). Additionally, Sarah Island was visited for a geological survey, and some fauna data were provided from this.

Island traverses, hand collection, direct observation, call surveys, field signs

During the first visit to each of the eight islands, four people walked independently across it for approximately one hour in the case of the smallest

islands and approximately four hours in the case of the larger islands. A second opportunistic traverse was possible for Neck Island. During these traverses (and where possible on the four islands re-visited to collect equipment), all fauna species observed were recorded, along with all identifiable bird calls and mammalian field signs. Small numbers of each species of invertebrate observed which could not be immediately identified were collected by hand and stored in alcohol for subsequent identification by specialists.

Hair-tubes, camera traps, pitfall traps

For the four islands which were to be re-visited, various arrangements of hair tubes, camera traps and pitfall traps were placed.

Hair-tubes were made of polypropylene tubes, 90 mm in diameter and 400 mm in length, with stiff plastic netting, containing peanut butter mixed with oats,

Hair-tube in place, Elizabeth Island. A peanut butter bait is placed within netting in the centre of the tube. Three strips of double-sided sticky tape are evenly spaced around the inside of the tube, oriented from each end towards the centre, to catch hairs of visiting mammals. Photo Clare Hawkins



wired into the centre of each. At both ends of each hair tube, three strips of double-sided sticky gaffer tape were placed at 60° angles to one another, to catch the hair of visiting mammals. Hairs subsequently collected were identified by expert consultant Barbara Triggs. These were scattered widely across Elizabeth and Soldiers Islands, and a small number were also put in areas where rodent signs (digging and scats) were observed on Cat and Magazine Islands.

A small number of video camera traps were set across Philips Island, and also on Soldiers Island and Magazine Island where signs of rodent digging were observed. A bait of walnut oil mixed with water in which mushrooms had been soaked was dribbled in a position in front of each camera such that visiting animals would trigger filming. Michael Driessen assisted with identifying filmed mammals.

Pitfall traps were scattered widely across Soldiers Island, and small numbers were also placed in areas of Cat and Magazine Islands. Each trap comprised a disposable plastic drinking cup half filled with alcohol, with a little

disposable plastic food container lid supported by wooden skewer pieces placed above each cup to limit falling vegetation and rain entering the trap. Invertebrates collected by hand or pitfall trap

were identified by Kevin Bonham (molluscs and collembolans), Lynne Forster (spiders and beetles) and Alastair Richardson (amphipods and isopods).



Top: Signs of rodent digging on Cat Island.

*Bottom: Successful hair-tube.
Photos Clare Hawkins*

The various traps and hair-tubes were left on each island for 2-3 days.

After identification for the purposes of this report, all invertebrate samples were

made available to the Tasmanian Museum and Art Gallery in Hobart and the Queen Victoria Museum and Art Gallery in Launceston, with the request that any samples subsequently identified to species level

would be reported for recording on the Natural Values Atlas.

Results

The results of the fauna survey are presented in Table 2. One hundred and sixty fauna taxa were identified during the survey, of which one hundred and thirty-two had not been previously recorded in Macquarie Harbour in the Natural Values Atlas, Phillips (1992) or Mallick (2000) (Table 2). Forty-nine of these newly recorded taxa were identified with confidence to species level, with thirty-three additional taxa identified as separate morphospecies. The rest were identified less precisely. One hundred and fifteen taxa were invertebrates, including 32 spiders, 19 beetles and 14 gastropods identified to species level as well as 14 collembolans identified at least to genus level.



Top: Pitfall trap in place: a plastic cup half filled with ethanol, protected from the rain by a lid suspended with cocktail sticks.

Bottom: Setting up a video camera trap. Walnut oil and mushroom-soaked water is dribbled on the ground one to two metres in front of the camera, such that movement in that area will trigger the video camera to start operating for one minute. Photos Clare Hawkins

Scarlet Robin (*Petroica multicolor*).
Illustration Brett Littleton.



Isopod specimens of the genus *Notoniscus* found on three of the islands were exceptionally large and also likely to be a new species. However no Australian taxonomist is currently working on onoscoideans, and those elsewhere in the world were currently unavailable to examine the specimens.

Eighteen spider morphospecies were named during the survey by Lynne Forster. Morphospecies are taxa which are morphologically distinct from currently known species; they may therefore constitute separate species, but await formal description to confirm this. However, none of these were newly identified,

with many being common and widespread across Tasmania. Similarly, most of the named spider species are not only widespread in Tasmania, but also found on the mainland eg *Novodamus nodatus* and *Prostheclina amplior*. Even the endemics (*Ommatauxesis macrops*, *Stanwellia pexa*) have a

Table 1. Dates on which each island was visited (bold = main visit)

Island	Size (Ha)	Maximum elevation m (ASL)	Position in harbour	Geology	Date	Method
Bonnet	0.17	10	Entrance	Bedrock Meta-sedimentary	10 Dec 2009	Traverse
Cat	27.26	4	Lower	Poorly consolidated sediments	9 Dec 2009	Traverse, 4 hair-tubes, 4 pitfalls
					11 Dec 2009	Collect pitfalls, hair tubes
Elizabeth	2.12	23	Middle	Bedrock Meta-sedimentary	10 Dec 2009	Traverse
Entrance	0.61	not recorded	Entrance	no information	11 Dec 2009	Traverse
Magazine	2.37	5	Lower	Poorly consolidated sediments	9 Dec 2009	Traverse, set 2 hair tubes, 1 camera
					11 Dec 2009	Collect hair tube, camera
Neck	18.22	6	Lower	Weakly consolidated Pebble conglomerate	7 Dec 2009	Traverse
					9 Dec 2009	Traverse
Philips	8.99	41	Upper	Semi-consolidated sandstone/ siltstone	8 Dec 2009	Traverse, set 3 cameras, 20 hair-tubes
					11 Dec 2009	Collect cameras & hair-tubes
Sarah	8.29	18	Upper	Inter-bedded siltstone/ sandstone sediment	11 Dec 2009	Traverse
Soldiers	12.98	21	Upper	Semi –consolidated sandstone sequence	8 Dec 2009	Traverse, set 3 cameras, 15 hair-tubes, 10 pitfalls
					11 Dec 2009	Collect cameras, hair-tubes, pitfalls

widespread distribution across Tasmania. Similarly, the beetle morphospecies and species identified on the islands have in general been found fairly widely across the state.

The four bird species newly recorded were all common species well known from the area,

and it is quite surprising that they were not already recorded on the Natural Values Atlas. At least four species of rodent were identified by the hairtubes and on one of the video cameras. Cat hairs were found on Philips Island; hairs found on Cat Island were also suspected to be cat. A sea eagle nest was newly identified on Philips Island.

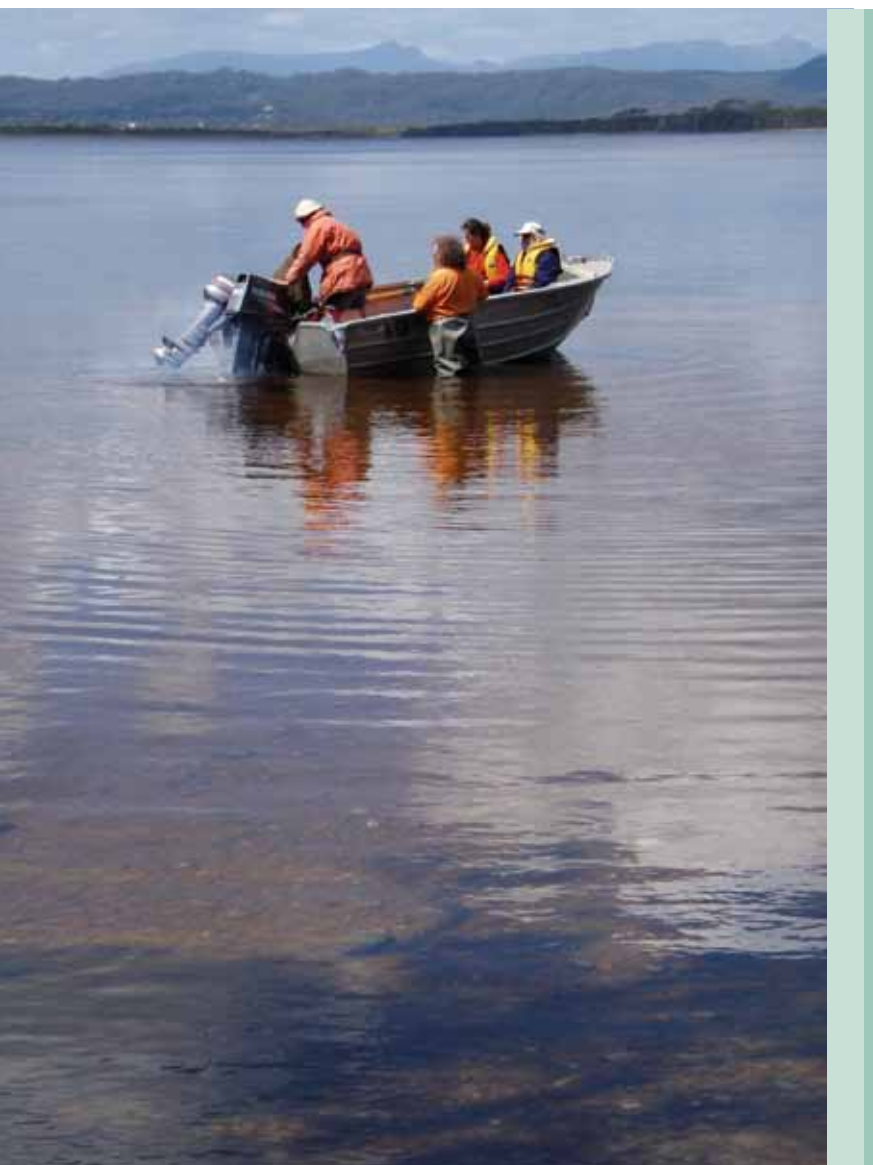
*White-bellied sea eagle
(Haliaeetus leucogaster).
Illustration Brett Littleton.*



In addition to the cat records, introduced species newly recorded in Macquarie Harbour included the black rat, rabbit, four land snails, one collembolan, an amphipod and a spider. The earwigs, which were not identified to species, were also likely to be exotic.

The highest numbers of fauna taxa were identified on Cat and Soldiers Islands, and the lowest on Bonnet Island. Island area could explain almost 65% of the variation in number of fauna and flora taxa identified on each island (Fig. 1a), though correlations were weaker when vertebrate and invertebrate taxa were considered independently (Fig. 1b), especially in the case of the vertebrates.

No taxon was found on all of the islands, although the black currawong and forest raven were recorded on seven of them.



*Setting off for Cat Island.
Photo Clare Hawkins*



Top: Sea eagle nest, Philips Island. Eagle nests should not normally be approached so closely during the breeding season; this nest was identified for the first time at the time the photograph was taken. Photo Clare Hawkins

Bottom: Tree ferns *Cyathea australis*, Philips Island. Photo Clare Hawkins

Table 2 Taxa recorded on the islands of Macquarie Harbour. Unless marked with a grey diamond, all taxa were recorded during the present survey. Data from 'Macquarie Hbr (pre Dec 2009)' are taken from the Natural Values Atlas. Data from previous surveys on Sarah Island are from Phillips (2000) and Mallick (2000).

Phylum Arthropoda

Class Acari (mites and ticks)

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
Only identified to class													-	-

Class Malacostraca (amphipods and isopods)

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
	<i>Plymphiloscia</i> spp.?	Philosciidae											-	-
	<i>Notoniscus</i> spp.	Styloniscidae											-	-
	<i>Austrotroides maritimus</i>	Talitridae											endemic	- / -
	<i>Keratroides rex</i>	Talitridae											endemic	- / -
	<i>Keratroides vulgaris</i>	Talitridae											endemic	- / -

Class Arachnida (spiders and harvestmen)

A number of morphospecies were juvenile, lacked males, or were damaged so full determination was not possible.

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
	Amaurobiidae MH1	Amaurobiidae											-	-
	Amaurobiidae MH2	Amaurobiidae											-	-
	Amaurobiidae MH3	Amaurobiidae											-	-
	Amaurobiidae MH4	Amaurobioidiae											-	-
	<i>Hickmanapis renison</i>	Anapidae											native	- / -
	<i>Acroaspis tuberculifera</i>	Araneidae											native	- / -
	<i>Araneus eburnus</i>	Araneidae											native	- / -
	<i>Araneus</i> MH1	Araneidae											-	-
	<i>Clubiona elaphines</i>	Clubionidae											native	- / -
	<i>Ommatauxesis macrops</i>	Desidae											endemic	- / -
	<i>Diplocephalus cristatus</i>	Linyphiidae											introduced	- / -
	<i>Laperousea</i> MH1	Linyphiidae											native	-
	Linyphiidae MH1	Linyphiidae											-	-
	Linyphiidae MH2	Linyphiidae											-	-
	Linyphiidae MH3	Linyphiidae											-	-
	Linyphiidae MH4	Linyphiidae											-	-
	<i>Artoriopsis expolita</i>	Lycosidae											native	- / -
	<i>Tetrallycosa oraria</i>	Lycosidae											native	- / -

Class Insecta

Other orders (Blattodea, Auchenorrhyncha, Dermaptera, Diptera, Hymenoptera, Heteroptera, Orthoptera, Sternorrhynca, Thysanoptera)

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
(Auchenorrhyncha spp)													-	-
(cockroach spp)													-	-
(earwig spp)													introduced?	-
(fly spp)													-	-
(ant spp)		Formicidae											-	-
Heteroptera spp)													-	-
Hymenoptera spp													-	-
common brown	<i>Heteronympha merope tax. salazar</i>	Nymphalidae											endemic	- / -
(Lepidoptera spp)													-	-
Raspy cricket	<i>Kinermania ambulans</i>	Gryllacrididae											endemic	- / -
cave cricket	<i>Micropathus sp</i>												-	-
(Sternorrhyncha spp)													-	-
(thrip spp)													-	-

Class Chilopoda

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
(centipede sp)	<i>Henicops maculatus</i>	Henicopidae											native	- / -
(centipede sp)	<i>Zelanion sp.</i>	Chileniphilidae											-	-
(Chilopoda spp)													-	-

Class Diplopoda

For more information on these species and genera, some of which are in the process of being classified at the time of writing, see www.polydesmida.info/tasmanianmultipedes

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
(millipede sp)	<i>Tasmaniosoma sp 'hic'</i>	Dalodesmidae											-	- / -
(millipede sp)	<i>Amastigogonus sp</i>	Iulomorphidae											-	-
(millipede spp)	<i>AcuMes'</i>												-	- / -
(millipede sp)	<i>Amastigogonus sp</i>	Iulomorphidae											-	-

(millipede spp)	<i>Lissodesmus latus</i> (?)	Dalodesmidae																-	-
(millipede sp)	<i>Procophorella innupta</i>	Dalodesmidae(?)																endemic	
(other Diplopoda spp)																		-	-

Class Collembola

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
	<i>Acanthocyrus</i> sp	Collembola											-	-
	<i>Acanthomurus</i> sp	Collembola											-	-
	<i>Brachystomella</i> sp	Collembola											-	-
	<i>Corynephoris</i> sp	Collembola											-	-
	<i>Cryptopygus</i> sp	Collembola											-	-
	<i>Hypogastrura purpurescens</i>	Collembola											introduced	
	<i>Katiannidae</i> spp	Collembola											-	-
	<i>Lepidocyrtus</i> sp	Collembola											-	-
	<i>Megalanura</i> sp	Collembola											-	-
	<i>Odontellidae</i> sp (1)	Collembola											-	-
	<i>Odontellidae?</i> sp (2)	Collembola											-	-
	<i>Parakatianna</i> (?) sp	Collembola											-	-
	<i>Uchidanurinae</i> sp	Collembola											-	-
	<i>Dicyrtomidae</i> sp	Dicyrtomidae											-	-

Phylum Mollusca

Class Pelecypoda (=Bivalvia)

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
(marine mussel)		Mytilidae											-	-

Class Gastropoda

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
hedgehog arion	<i>Arion intermedius</i>	Arionidae											introduced	- / -
	<i>Caryodes dufresnii</i>	Caryodidae											endemic	- / -
	<i>Stenacapha hamiltoni</i>	Charopidae											endemic	- / -
	<i>Stenacapha vitrinaformis</i>	Charopidae											native	- / -
	<i>Thryasona diemenensis</i>	Charopidae											endemic	- / -
	<i>Cystopelta bicolor</i>	Cystopeltidae											native	- / -
	<i>Helicarion cuvieri</i>	Helicarionidae											endemic	- / -
	<i>Helix aspersa</i>	Helicidae											introduced	- / -
	<i>Tatea rufilabris?</i>	Hydrobiidae											native	- / -

grey field slug	<i>Deroceras reticulatum</i>	Limacidae										introduced	- / -
slug	<i>Lehmannia nyctelia</i>	Limacidae										introduced	- / -
	<i>Laomavix collisi</i>	Punctidae										native	- / -
	<i>Magilaoma penolensis</i>	Punctidae										native	- / -
	<i>Trocholaoma parvissima</i>	Punctidae										native	- / -

Phylum Platyhelminthes (flatworms)

Class Turbellaria

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah (pre Dec09)	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
	<i>Artioposthia diemenensis</i>	Geoplanidae									u		endemic	- / -
	<i>Artioposthia mortoni</i>	Geoplanidae									u		endemic	- / -
	<i>Australoplana alba</i>	Geoplanidae									u		- / -	- / -
	<i>Tasmanoplana tasmaniana</i> var. <i>flavicincta</i>	Geoplanidae									u		endemic	- / -
(unidentified turbellarian sp)													-	-

Phylum Annelida

Class Clitellata

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah (pre Dec09)	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
Oligochaeta sp													-	-

Phylum Chordata

Class Actinopterygii

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah (pre Dec09)	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
Atlantic salmon	<i>Salmo salar</i>	Salmonidae										u	introduced	- / -

Class Amphibia

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah (pre Dec09)	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
Tasmanian froglet	<i>Crinia tasmaniensis</i>	Myobatrachidae										u	endemic	- / -

Class Reptilia

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
White-lipped snake	<i>Drysdalia coronoides</i>	Elapidae								u			native	- / -
Tiger snake	<i>Notechis scutatus</i>	Elapidae								u			native	- / -
snake (copperhead or tiger)		Elapidae		l									-	-
metallic skink	<i>Niveoscincus metallicus</i>	Scincidae	l						l	u			native	- / -
blotched bluetongue	<i>Tiliqua nigrolutea</i>	Scincidae										u	native	- / -
(skink sp)		Scincidae									l		-	-

Class Aves

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Phillips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/Federal lists)
tasmanian thornbill	<i>Acanthiza ewingii</i>	Acanthizidae		l			l		l	u	l	u	endemic	- / -
brown thornbill	<i>Acanthiza pusilla</i>	Acanthizidae										u	native	- / -
scrubtit	<i>Acanthornis magnus</i>	Acanthizidae						l		u		u	endemic	- / -
striated fieldwren	<i>Calamanthus fuliginosus</i>	Acanthizidae										u	native	- / -
tasmanian scrubwren	<i>Sericornis humilis</i>	Acanthizidae				l		l	l	u		u	endemic	- / -
collared sparrowhawk	<i>Accipiter cirrocephalus</i>	Accipitridae										u	native	- / -
brown goshawk	<i>Accipiter fasciatus</i>	Accipitridae								u		u	native	- / -
grey goshawk	<i>Accipiter novaehollandiae</i>	Accipitridae								u		u	native	e / -
wedge-tailed eagle	<i>Aquila audax</i>	Accipitridae								u		u	native	e / EN (TAS subspecies)
swamp harrier	<i>Circus approximans</i>	Accipitridae								u		u	native	- / -
white-bellied sea-eagle	<i>Haliaeetus leucogaster</i>	Accipitridae						l	l nest	u		u	native	v / -
eurasian skylark	<i>Alauda arvensis</i>	Alaudidae										u	introduced	- / -
azure kingfisher	<i>Ceyx azureus</i>	Alcedinidae								u			endemic	e / EN (TAS subspecies)
chestnut teal	<i>Anas castanea</i>	Anatidae								u		u	native	- / -
grey teal	<i>Anas gracilis</i>	Anatidae								u		u	native	- / -
northern mallard	<i>Anas platyrhynchos</i>	Anatidae									l		introduced	- / -
pacific black duck	<i>Anas superciliosa</i>	Anatidae		l			l			u	l	u	native	- / -
musk duck	<i>Biziura lobata</i>	Anatidae										u	native	- / -

black swan	<i>Cygnus atratus</i>	Anatidae							l feat- hers	u	l	u	native	- / -
Australian shelduck	<i>Tadorna tadornoides</i>	Anatidae								u			native	- / -
white-throated needletail	<i>Hirundapus caudacutus</i>	Apodidae										u	native	- / -
cattle egret	<i>Ardea ibis</i>	Ardeidae										u	native	- / -
great egret	<i>Ardea modesta</i>	Ardeidae										u	native	- / -
white-faced heron	<i>Egretta novaehollandiae</i>	Ardeidae	l							u		u	native	- / -
dusky woodswallow	<i>Artamus cyanopterus</i>	Artamidae										u	native	- / -
black currawong	<i>Strepera fuliginosa</i>	Artamidae	l	l	l	l	l	l		u	l	u	endemic	- / -
sulphur-crested cockatoo	<i>Cacatua galerita</i>	Cacatuidae								u		u	native	- / -
yellow-tailed black cockatoo	<i>Calyptorhynchus funereus</i>	Cacatuidae	l							u		u	native	- / -
black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>	Campephagidae						l		u		u	native	- / -
double-banded plover	<i>Charadrius bicinctus</i>	Charadriidae										u	native	- / -
red-capped plover	<i>Charadrius ruficapillus</i>	Charadriidae										u	native	- / -
lesser golden plover	<i>Pluvialis fulva</i>	Charadriidae										u	native	- / -
hooded plover	<i>Thinornis rubricollis</i>	Charadriidae										u	native	- / -
masked lapwing	<i>Vanellus miles</i>	Charadriidae										u	native	- / -
brush bronzewing	<i>Phaps elegans</i>	Columbidae								u		u	native	- / -
forest raven	<i>Corvus tasmanicus</i>	Corvidae	l	l	l	l	l	l		u	l	u	native	- / -
fan-tailed cuckoo	<i>Cacomantis flabelliformis</i>	Cuculidae			nest					u		u	native	- / -
pallid cuckoo	<i>Cacomantis pallidus</i>	Cuculidae										u	native	- / -
horsfields bronze-cuckoo	<i>Chalcites basalis</i>	Cuculidae										u	native	- / -
shining bronze-cuckoo	<i>Chrysococcyx lucidus</i>	Cuculidae								u		u	native	- / -
beautiful firetail	<i>Stagonopleura bella</i>	Estrilidae								u		u	native	- / -
brown falcon or brown falcon (tasmanian)	<i>Falco berigora</i>	Falconidae								u		u	native	- / -
european goldfinch	<i>Carduelis carduelis</i>	Fringillidae								u		u	introduced	- / -
common greenfinch	<i>Carduelis chloris</i>	Fringillidae										u	introduced	- / -
sooty oystercatcher	<i>Haematopus fuliginosus</i>	Haematopodidae										u	native	- / -

piebald oystercatcher	<i>Haematopus longirostris</i>	Haematopodidae								u	native	- / -	
welcome swallow	<i>Hirundo neoxena</i>	Hirundinidae								u	u	native	- / -
tree martin	<i>Petrochelidon nigricans</i>	Hirundinidae								u		native	- / -
kelp gull	<i>Larus dominicanus</i>	Laridae										native	- / -
silver gull	<i>Chroicocephalus novaehollandiae</i>	Laridae									u	native	- / -
pacific gull	<i>Larus pacificus</i>	Laridae								u	u	native	- / -
crested tern	<i>Thalasseus bergii</i>	Laridae								u	u	native	- / -
caspian tern	<i>Hydroprogne caspia</i>	Laridae								u	u	native	- / -
fairy tern	<i>Sterna nereis</i>	Laridae									u	native	v / -
superb fairy-wren	<i>Malurus cyaneus</i>	Maluridae								u	u	native	- / -
southern emu-wren	<i>Stipiturus malachurus</i>	Maluridae									u	native	- / -
eastern spinebill	<i>Acanthorhynchus tenuirostris</i>	Meliphagidae								u	u	native	- / -
little wattlebird	<i>Anthochaera chrysoptera</i>	Meliphagidae									u	native	- / -
white-fronted chat	<i>Epthianura albifrons</i>	Meliphagidae									u	native	- / -
yellow-throated honeyeater	<i>Lichenostomus flavicollis</i>	Meliphagidae							u		u	endemic	- / -
strong-billed honeyeater	<i>Melithreptus validirostris</i>	Meliphagidae									u	native	- / -
tawny-crowned honeyeater	<i>Glyciphila melanops</i>	Meliphagidae									u	native	- / -
new holland honeyeater	<i>Phylidonyris novaehollandiae</i>	Meliphagidae								u	u	native	- / -
crescent honeyeater	<i>Phylidonyris pyrrhoptera</i>	Meliphagidae							u		u	native	- / -
richards pipit	<i>Anthus novaeseelandiae</i>	Motacillidae									u	native	- / -
grey shrike-thrush	<i>Colluricincla harmonica</i>	Pachycephalidae							u		u	native	- / -
olive whistler	<i>Pachycephala olivacea</i>	Pachycephalidae								u	u	native	- / -
golden whistler	<i>Pachycephala pectoralis</i>	Pachycephalidae								u	u	native	- / -
spotted pardalote	<i>Pardalotus punctatus</i>	Pardalotidae								u	u	native	- / -
striated pardalote	<i>Pardalotus striatus</i>	Pardalotidae									u	native	- / -
house sparrow	<i>Passer domesticus</i>	Passeridae									u	exotic	- / -
dusky robin	<i>Melanodryas vittata</i>	Petroicidae								u	u	endemic	- / -
scarlet robin	<i>Petroica boodang</i>	Petroicidae									u	native	- / -
flame robin	<i>Petroica phoenicea</i>	Petroicidae									u	native	- / -
pink robin	<i>Petroica rodinogaster</i>	Petroicidae								u	u	native	- / -
black-faced shag	<i>Phalacrocorax fuscescens</i>	Phalacrocoracidae									u	native	- / -
great cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae								u	u	native	- / -
little pied cormorant	<i>Phalacrocorax melanoleucos</i>	Phalacrocoracidae								u	u	native	- / -

little black cormorant	<i>Phalacrocorax sulcirostris</i>	Phalacrocoracidae									u	native	- / -	
brown quail or swamp quail (ssp. of brown quail)	<i>Coturnix ypsilophora</i>	Phasianidae									u	native	- / -	
hoary-headed grebe	<i>Poliiocephalus poliocephalus</i>	Podicipididae									u	native	- / -	
southern fulmar	<i>Fulmarus glacialis</i>	Procellariidae									u	native	- / -	
blue petrel	<i>Halobaena caerulea</i>	Procellariidae									u	native	v / VU	
southern giant-petrel	<i>Macronectes giganteus</i>	Procellariidae									u	native	v / EN	
slender-billed prion	<i>Pachyptila belcheri</i>	Procellariidae									u	native	- / -	
fairy prion	<i>Pachyptila turtur</i>	Procellariidae									u	native	e / VU (southern subspecies)	
common diving-petrel	<i>Pelecanoides urinatrix</i>	Procellariidae									u	native	- / -	
white-headed petrel	<i>Pterodroma lessonii</i>	Procellariidae									u	native	v / -	
great-winged petrel	<i>Pterodroma macroptera</i>	Procellariidae									u	native	- / -	
(blank)	<i>Ardenna sp.</i>	Procellariidae										-	-	
short-tailed shearwater	<i>Ardenna tenuirostris</i>	Procellariidae					burrows				u	native	- / -	
swift parrot	<i>Lathamus discolor</i>	Psittacidae								u		migratory breeding endemic	e / EN	
ground parrot	<i>Pezoporus wallicus</i>	Psittacidae									u	native	- / -	
green rosella	<i>Platycercus caledonicus</i>	Psittacidae								u		u	endemic	- / -
eurasian coot	<i>Fulica atra</i>	Rallidae									u	native	- / -	
Lewin's rail	<i>Lewinia pectoralis</i>	Rallidae								u		native	- / -	
grey fantail	<i>Rhipidura albiscapa</i>	Rhipiduridae								u		u	native	- / -
ruddy turnstone	<i>Arenaria interpres</i>	Scolopacidae									u	native	- / -	
sanderling	<i>Calidris alba</i>	Scolopacidae									u	native	- / -	
curlew sandpiper	<i>Calidris ferruginea</i>	Scolopacidae									u	native	- / -	
red-necked stint	<i>Calidris ruficollis</i>	Scolopacidae									u	native	- / -	
latham's snipe	<i>Gallinago hardwickii</i>	Scolopacidae									u	native	- / -	
bar-tailed godwit	<i>Limosa lapponica</i>	Scolopacidae									u	native	- / -	
Terek sandpiper	<i>Xenus cinereus</i>	Scolopacidae									u	native	- / -	
little penguin	<i>Eudyptula minor</i>	Spheniscidae								u	u	native	- / -	
southern boobook	<i>Ninox novaeseelandiae</i>	Strigidae								u		native	- / -	
common starling	<i>Sturnus vulgaris</i>	Sturnidae								u	u	introduced	- / -	
australasian gannet	<i>Morus serrator</i>	Sulidae									u	native	- / -	
silveryeye	<i>Zosterops lateralis</i>	Timaliidae								u		u	native	- / -
common blackbird	<i>Turdus merula</i>	Turdidae								u	u	introduced	- / -	
bassian thrush	<i>Zoothera lunulata</i>	Turdidae								u	u	native	- / -	

Class Mammalia

Common name	Species	Family	Bonnet	Cat	Elizabeth	Entrance	Magazine	Neck	Philips	Sarah	Soldiers	Macquarie Hbr (pre Dec09)	Tasmanian species?	Threatened status (state/ Federal lists)
feral cat	<i>Felis catus</i>	Felidae		? hair					 hair				introduced	
rabbit	<i>Oryctolagus cuniculus</i>	Leporidae											introduced	
tasmanian pademelon	<i>Thylogale billardierii</i>	Macropodidae								u				
macropod sp		Macropodidae						 scat						
water-rat	<i>Hydromys chrysogaster</i>	Muridae							 hair					
long-tailed mouse / broad-toothed mouse	<i>Pseudomys higginsi</i> / <i>Mastacomys fuscus</i>	Muridae									 hair			
Swamp rat/ long-tailed mouse	<i>Rattus lutreolus</i> / <i>Pseudomys higginsi</i>	Muridae									 vid- eo			
black rat	<i>Rattus rattus</i>	Muridae									 hair		introduced	
rat	<i>Rattus</i> sp.	Muridae					 hair				 hair		introduced	
unidentified rodent		Muridae		 scat					 signs					
brushtail possum	<i>Trichosurus vulpecula</i>	Phalangeridae												

Initial exploratory analyses did not find clearly higher numbers of shared taxa between geologically similar islands than for between geologically dissimilar ones. Among geologically similar pairs, Elizabeth and Bonnet Islands shared only 11% of the 44 taxa found on at least one of them, while Philips and Soldiers Island shared 14% out of 87 taxa. Conversely the geologically dissimilar pair Philips and Elizabeth shared 16% out of 58 taxa.

Ninety-two taxa recorded previously in the Natural Values Atlas or other records as found in Macquarie Harbour were not identified during the present study. Almost all of these (82 taxa) were birds.

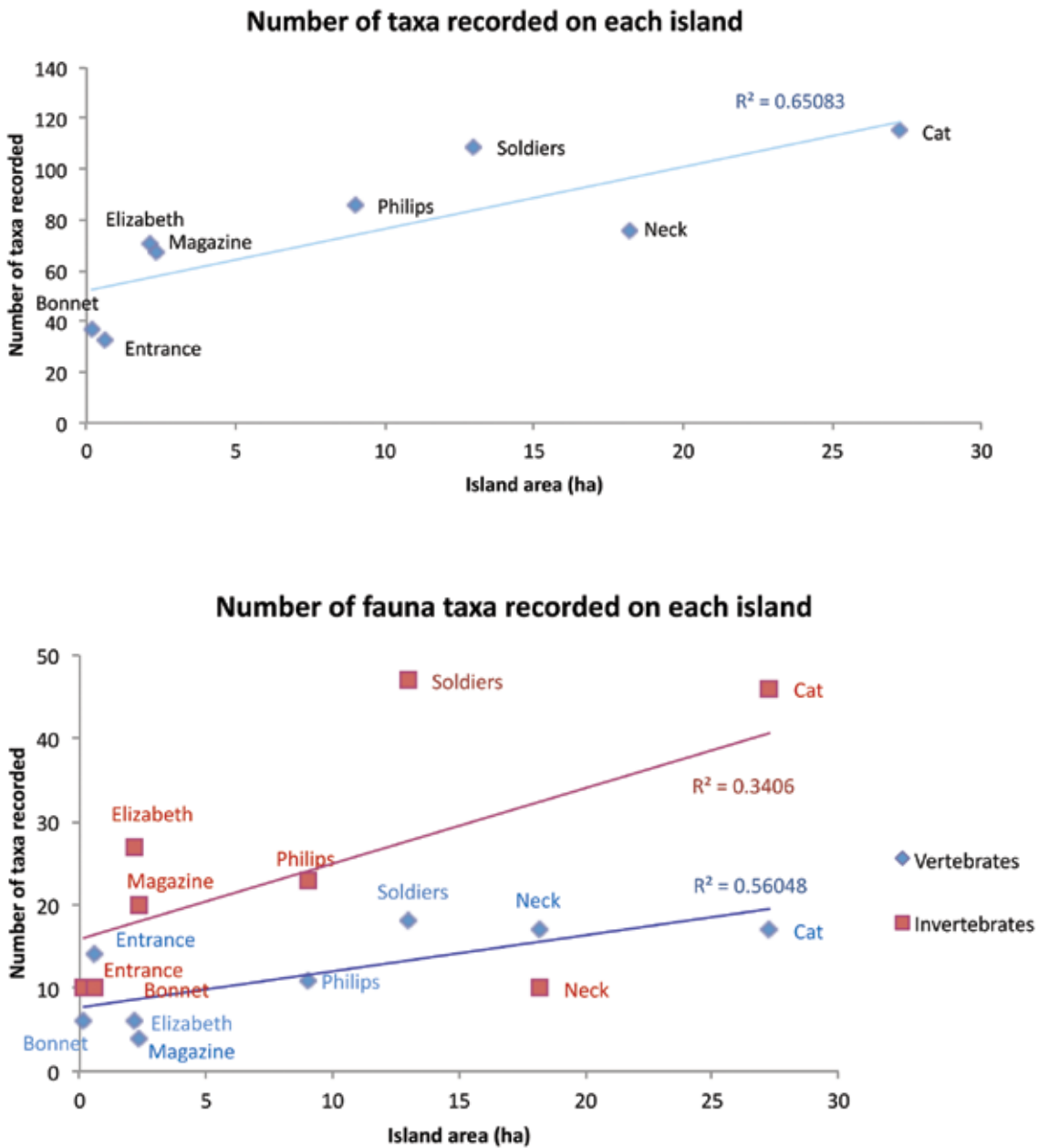
Brushtail possum
(*Trichosurus vulpecula*).
Illustration Brett Littleton.





Black currawong
(*Strepera fuliginosa*).
Illustration Brett Littleton.

Figure 1. Numbers of taxa recorded on each island during the present survey, by island area (a) Number of plant and animal taxa recorded on each island surveyed (b) Number of invertebrate and vertebrate taxa identified on each island surveyed.



Discussion

The Hamish Saunders Memorial Trust survey has provided a substantial body of new, precisely located information, especially with regard to invertebrate records. Prior to the present study, fauna records in Macquarie Harbour comprised almost exclusively information on birds, and, apart from those recorded on Sarah Island, were not located to a specific island.

Notable extensions to recorded species ranges included that for the land snail *Stenacapha vitrinaformis*. This species has been recorded only twice on the central west coast, being much more common in southern forests and the adjacent southwest, and has not previously been recorded from an island (K. Bonham pers. comm.;). Additionally, specimens of the weevil *Mandalotus subterraneus* have only previously been collected from the far north-east of the State.

Top: *Ommatauxesis macrops* (Desidae) 8mm - an endemic littoral spider found on Cat Island. a: dorsal view; b: male palps have an extremely elongate cymbium. Photos by Lynne Forster

Bottom: Metallic skink *Niveoscincus metallicus*, Philips Island Photo Clare Hawkins

A number of questions which naturally emerge cannot be answered within the confines of this relatively brief survey effort. Firstly, a number of bird species previously recorded were not recorded during the present study. This might be explained, at least in part, by the lack of precision for the previous records - the birds may have been observed on the mainland rather than on any of the islands. However, it is quite possible that these species were present but simply missed due to

the lack of time available for the survey.

Species number increased, as expected, with island area. The well-established theory of island biogeography (MacArthur & Wilson 1967) argues that the number of species found on an undisturbed island is reduced by distance of an island from the mainland, and is increased by island size. It might be expected that islands closer to the coast would lie above the regression



lines shown in Figure 1, while those further from the coast would lie below them, but this was not clearly the case. Relatively high or low levels of disturbance are also associated with reduced species number, but this does not explain why the number of species found on Neck Island was so low given its size, proximity to the coast and moderate level of disturbance. If a more exhaustive survey were possible, it would be interesting to analyse species number and composition in terms of these factors and the contribution of geology, habitat and history of disturbance - however, given the period available for survey and various sources of variation in search effort across islands and taxa (eg pitfall traps on some islands and not others), this would be of rather limited value with the presently available data.

While invertebrate diversity was relatively high given the small sample sizes, the number of invertebrate taxa recorded by the survey was only about two and half times that for the vertebrates. Given typical ratios of vertebrate to invertebrate species, and typical invertebrate species numbers in Tasmania, more thorough survey work would be expected to reveal almost an order of magnitude more invertebrate species.

Management recommendations

The most notable find relating to management requirements was the record of cat hair on Philips Island and potentially on Cat Island. The small size of these islands means that confirmation of these observations and, if present, subsequent eradication would be a relatively achievable action. Given that these islands are protected areas, it would be particularly appropriate to remove this exotic predator.

Eight species listed as threatened at least at State level (four being listed also at National level) had already been recorded on the islands. A sea eagle nest was found during the present study on Philips Island, and proposed activities on this island should avoid the breeding season, which takes place between July and February.

References

- MacArthur, R.H. & Wilson, E.O. (1967). *The theory of island biogeography*. Princeton, NJ. Princeton University Press.
- Mallick, S.A. (2000). *Preliminary survey of the impacts of helicopter flights on the bird-life of Sarah Island*. Report to Fauna Section, Department of Primary Industries, Water & Environment, Hobart.
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