

Three Hummock Island Flora and Fauna Survey 2006



The Hamish Saunders Memorial Island Survey Program

HAMISH SAUNDERS MEMORIAL TRUST, NEW ZEALAND

Three Hummock Island: 2006 flora and fauna survey

A partnership program between the Hamish Saunders Memorial Trust,
New Zealand and Biodiversity Conservation Branch, DPIW, Tasmania

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Summary

Three Hummock Island is situated 45 km off the northwest coast of Smithton and is one of the larger of 12 islands and rock stacks in the Hunter Island group. Comprising over 7,000 ha, the island has a rich history of aboriginal occupation and is now a Nature Reserve with a small area under private lease. Until this survey, biological work was patchy although a number of important species were known to have occurred on the island.



In December 2006, twelve wildlife scientists, two New Zealand volunteers and two Parks and Wildlife Service staff conducted an eight day integrated biological survey using a wide range of techniques. Previously mapped vegetation communities were intensively ground-truthed to update the TASVEG map. Assessments were made on species of threatened flora and fauna known or suspected to be on the island and a determination made as to whether Three Hummock Island would be suitable as a relocation site for Tasmanian devils free of the deadly facial tumour disease.

The new TASVEG 1.3 map shows nearly one third of Three Hummock Island is covered by dry eucalypt forests, including a few protected areas containing trees 50 years or more in age. Much of the remaining vegetation is short *Melaleuca ericifolia* forest, inland and coastal scrubs and coastal tussock grasslands, with small patches of rookery vegetation and remnant wetlands. Though wetlands have been reduced by 65% there was a slight increase in the extent of the endangered *Melaleuca ericifolia* swamp forest community. Native grasslands has increased in area and agricultural land is being encroached on by alkaline scrub communities. The new TASVEG map now identifies 14 TASVEG vegetation communities, five being of conservation significance at the State level. New population data was collected on the recently described Three Hummock orchid *Prasophyllum atratum* including area of extent. The large airstrip was confirmed as being a significant location for this and other orchid species, hence appropriate ecological management is critical for orchid species long-term survival and expansion in range.

A range of mammals were identified including Long-eared bats, Forester kangaroo, Brush-tailed possum, Ring-tailed possums, Eastern pygmy possum and low numbers of Tasmanian pademelon. Estimates of Forester kangaroo were lower than those obtained in October 1999 confirming that there has not been any population increase. However, incidental observation of Tasmanian pademelon suggest a significant reduction and potential population crash. The low number of mammals and seasonal seabird populations indicates that Three Hummock Island is unsuitable as a release site for disease-free Tasmanian devil unless supplementary food was provided on a ongoing basis.

A comprehensive list of 67 bird species was made but did not include threatened species such as Fairy tern, Forty-spotted pardalote or Orange-bellied parrot despite targeted searches. Previously recorded Wedge-tailed eagle nests were not re-located, however, two active White-bellied sea-eagle nests and a recently used Swamp harrier nest were found. Re-survey of Short-tailed shearwater and Little penguin colonies found occupancy estimates similar to previous counts by Brothers (et al. 2001). Shorebirds were counted around the sandy beaches with Hooded plover and Pied oystercatcher being the most common breeding species. The herpetological fauna comprised 7 reptile and 2 amphibian species which is typical of larger islands in western Bass Strait and included the subspecies of Mottled banjo frog *Limnodynastes dumerilii variegatus* known only from King Island and Three Hummock Island.

Over 3,000 invertebrates were collected by various trapping methods and sorted into either order, family or species level. Amphipods were the most numerous invertebrate collected while beetles, bugs, spiders and moth and butterfly larvae were the best represented in all samples across most habitat types. Eight species of butterfly were identified from hand net samples. The coleoptera sample was diverse with 72 morpho-species identified from the 330 specimens collected and included several potentially un-described species. There was at least one new millipede record for the island with potentially others being collected and which require further identification. Threatened Keeled snail were collected on the slopes of South Hummock, whereas Marrawah skipper and Schayers grasshopper were not located despite targeted surveys. Key invertebrate groups collected included the burrowing crayfish *Engaeus cunicularius* at Rendezvous Lagoon, Swamp Lagoon and in the Emerald Swamp area, an unidentified *Peripatus* species and a mole cricket. Invertebrate samples require further analysis and sorting and were lodged with the Tasmanian Museum and Art Gallery.

Recommendations

1. Subject to availability of resources, identified management priorities include:

- Exclusion of fire from wet sclerophyll forest with dogwood, musk or manfern understorey to protect habitat for the Keeled snail.
- Development of an integrated eradication program for cats and rodents including removal of Peacocks and Ring-necked pheasant to enable Three Hummock Island to become a natural refugia for important Tasmanian flora and fauna species. This should include strengthening of quarantine restrictions to prevent the import of any non-native species to the island.
- Development of prescriptions for appropriate management of the airstrip to ensure protection of the diverse range of orchid species especially the Three Hummock leek-orchid *Prasophyllum atratum*.
- Further identification of invertebrate samples collected during this survey, especially the Hemiptera and Millipedes, to ascertain whether any new species occur on the island.
- Continuing transect counts for Forester kangaroo and Cape Barren geese on a regular basis and initiating counts for Tasmanian pademelon to ensure this endemic species does not decline further or become locally extinct.
- Installation of artificial watering sites to support faunal diversity in times of prolonged drought. Sites at the two airstrips, homesteads and the northern beach entry points are ideal for management and monitoring purposes.

- Removal of emergent Euphorbia and Marram outbreaks on Homestead Beach as a priority to slow the loss of shorebird breeding habitat and surveys for nesting Fairy Tern colonies undertaken in the September–December period.
- Removal of the last remaining sheep from the island for welfare reasons.

2. Three Hummock Island is unsuitable as a release site for disease-free Tasmanian devil unless food is supplied.

Acknowledgments

Sincere thanks to the Hamish Saunders Memorial Trust for partnering the program, in particular Alan and David Saunders and volunteers Brent Barrett and Jacqueline McGowan. Sincere thanks to temporary caretakers Mark Blythman and Kym Atkinson who provided invaluable assistance with logistics and field surveys and to the lessee Richard Cameron for permission to use facilities. Thanks also to Michael Pemberton and John Whittington for Agency support, Peter Mooney for encouraging Parks and Wildlife Service staff involvement and Jayne Balmer for advice on the vegetation report.

Invertebrate samples were collated by Kevin Bonham, Mike Driessen identified Orthoptera and Phil Bell the Lepidoptera. Lynne Forster of Forestry Tasmania kindly assisted with identification of beetles using in-house reference collections. Mike Driessen and Matt Pauza identified reptiles and amphibia, Niall Doran burrowing crayfish and Greg Hocking provided background information on Forester Kangaroo and Cape Barren Goose counts. Drew Lee assisted with the seabird analysis.

Special thanks to team member Sib Corbett for organizing the TASVEG map production and GIS support by Murray Stebbing pre and post survey work. Many thanks to Brett Littleton (ILS) for layout of the finished report.

This report has been collated by Sally Bryant with input from all team members. The publication of any sections of this report by individual team members is encouraged.

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Hamish Saunders

Hamish Saunders was a New Zealand volunteer who died tragically in 2003 while conducting survey work on a Tasmanian endangered species program. Hamish graduated from Waikato University with a First Class Honours and Masters degree in marine geology. He later completed a postgraduate GIS course with distinction. He also achieved qualifications as a scuba dive instructor; was a good sportsman and was talented, not solely academically, but as an all round individual.

As an explorer, Hamish achieved in his 26 years much of which most only dream. From Antarctica to the Galapagos, Central America, South America, South-East Asia, Europe and Australia, he combined his passion for the natural world and conservation with that of an interest in local cultures and people. Not only did he travel to these places, but he also took a great interest in the people around him. He touched many lives. Hamish was a remarkable and talented young man. The passion, enthusiasm and gentle leadership he embodied in those whom he met is his legacy.

This island survey program is dedicated to the memory of Hamish Saunders and intended as a platform for emerging leaders in marine conservation. The Tasmanian Government's commitment and long-term support for the program was endorsed by the Minister for Environment and Planning, The Hon. Judy Jackson MHA, on 8 July 2005.



Hamish Saunders

Three Hummock Island

Three Hummock Island is a low-lying island 30 km northwest of Smithton (latitude 40°25', longitude 144°55', Fig. 1). The island experiences strong westerly winds with a low average rainfall of around 900 mm per year. The 40 km long coastline comprises granite outcrops with sandy beaches and dune areas fringed by thick coastal vegetation. Low hills lie in a band from the north-east to the south-west with a broad, flat plain in the centre where a series of swamps and lagoons have developed due to extensive dune systems blocking the drainage from the plain. The three highest points are North Hummock (160 m), Middle Hummock (100 m) and South Hummock (237 m). A small settlement is situated at Chimney Corner comprising two main homesteads, workshops and various outbuildings. There is a muttonbird hut at the north-east tip, a lighthouse at Cape Rochon, three serviceable airstrips, Telecom tower on South Hummock, vehicle and walking tracks, remnant fencing and a commissioned jetty. Access is by plane or boat, with most charters from Smithton.



*Homestead, Three Hummock Island.
Photo Justine Shaw*

Islands in the Hunter Group were occupied and frequented seasonally by aboriginal people especially for hunting, fishing and muttonbird harvest. Shell middens provide evidence of long aboriginal presence in the recent prehistoric past (Bowdler 1980).

Since European times Three Hummock Island has long been a port of call for vessels entering western Bass Strait. The first European visitors were Bass and Flinders in the 'Norfolk', who made landfall during their circumnavigation of Tasmania in December 1798. Flinders named the island while Bass went ashore and reported the site as "... impenetrable from the closeness of the tall brushwood, although it had been partially burnt not long before". In 1852 Guisepppe Garibaldi in the 'Donna Carmen' reported recently abandoned farm buildings suggesting some settlement and small-scale farming had occurred. In 1889 the first recorded lease was issued to a small family group of settlers who farmed until the early 1900s (Bowdler 1980). The longest period of continuous European occupation was from 1951 to 1976 by Commander John Alliston and his wife Eleanor who farmed dune land adjacent to the small settlement at Chimney Corner. The Alliston's became well known identities and their story is recorded in 'Escape to an Island' (Alliston 1966).

In 1976 Three Hummock Island was proclaimed a Nature Reserve and the Parks and Wildlife Service took on its management including de-stocking. A small area around Chimney Corner remains under private lease only recently being sold by Rob Alliston to new managers. Wildfires in 1982 and 1984 destroyed much of the island's vegetation which has since reverted to scrub/short forest.

Key Research and Biological Values

The vegetation of Three Hummock Island has been described in detail by Harris and Balmer (1997) who in October 1995 undertook extensive field work which included recording information along transects and recording floristic, structural and environmental information from fifty-nine 100m² plots of representative vegetation types. They produced a comprehensive list of 289 vascular species including 60 introduced and 6 conservation significant. Harris and Balmer noted the main changes since European settlement were clearing for grazing, an increase in fire frequency and the introduction of exotic plants and browsing animals. They produced

a map of nine vegetation communities based on 1993 black and white air photography and field work (Fig. 2), and compared this information to other Bass Strait islands.

In 2003 a new map was prepared by D. Rankin using 2001 colour air photography and translating the Harris and Balmer plant communities into 15 TASVEG classes (Fig. 3). In 2005 a new species of orchid was identified on the big airstrip and while Jones and Rouse (2006) have formally described the species as *Prasophyllum atratum* three hummock leek-orchid, little is known of its distribution or ecology. There is growing interest in the diversity of orchid flora on the airstrip and its conservation needs.

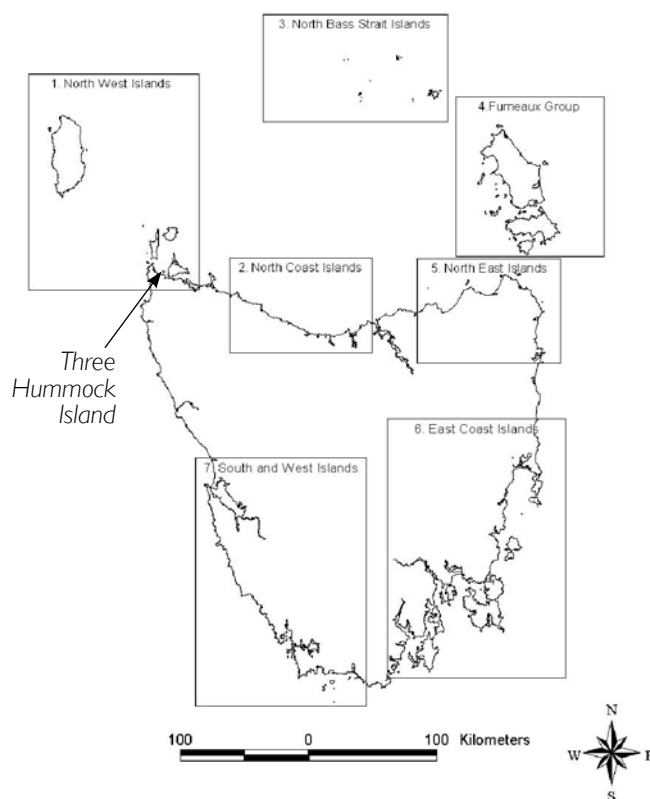


Figure 1: Tasmania's island sectors showing Three Hummock Island (from Brothers et al. 2001).

Mammals common in 1996 were Brushtail possum, Tasmanian pademelon, Ringtail possum and Water rat (PWS 1999). Surprisingly four adult Koala from Victoria were introduced in 1947 in the forest near Big Hummock but apparently died soon after (Alliston 1966, PWS 1999). Platypus were reported once by Alliston (1966) and feral cats were seen regularly. In 1975, 12 Forester kangaroo were introduced in an effort to conserve dwindling populations across their natural range in the northeast and midlands of Tasmania (not cited in Wapstra 1976 but in PWS 1999, Tanner and Hocking 2001). By 2000 the population had increased to 400 – 600 and suggestions were made for their reduction. Transects were established to provide an index of abundance and help monitor population changes in the future. A vertebrate fauna survey on nearby Hunter Island in 2001 (Skira 2001) recorded: Feral cat, Pademelon *Thylagale billardierii* (common over the island), Ringtailed possum

Pseudocheirus peregrinus (introduced), Swamp antechinus *Antechinus minimus*, Swamp rat *Rattus lutreolus* and Water rat *Hydromys chrysogaster*.

A list of bird species for the island is recorded in the draft management plan PWS 1999 and includes information from S. Plowright's internal report (no date). Threatened Wedge-tailed eagle, White-bellied sea-eagle and Fairy tern are known to have bred on the island (Bryant & Jackson 1999) and potential foraging habitat exists for Orange-bellied parrot. In 1970 Cape Barren geese were introduced (PWS 1999) and have since established around the homestead and airstrips. A small flock of sheep were retained on the island until 1998 to help maintain habitat until the geese were established. Several Short-tailed shearwater colonies were counted by Skira et al. (1995) and later in 1999 by Nigel Brothers who made incidental observations on other faunal species (Brothers et al. 2001). Brothers

estimated 2,059 pairs of Little penguin *Eudyptula minor* breeding at varying densities over much of the dune areas and 168,724 breeding pairs of Short-tailed shearwater *Puffinus tenuirostris* mostly on Ranger Point at Cape Rochon. Brothers reported illegal muttonbirding between March and April 1999 and abalone poachers using the central airstrip. Ongoing disturbances have subsequently led to many feral species eg Black rat, Peacock and Ring-necked pheasant becoming established on the island.

Herpetological fauna recorded on Three Hummock Island include: Tiger snake, Copperhead snake, White-lipped whip snake and Blue tongue lizard (PWS 1999), Metallic skink and Grass skink (S. Plowright report), Bull frog, Brown froglet, Brown tree frog and Smooth froglet (S. Plowright report).

Three Hummock Island is a key site for many conservation significant fauna

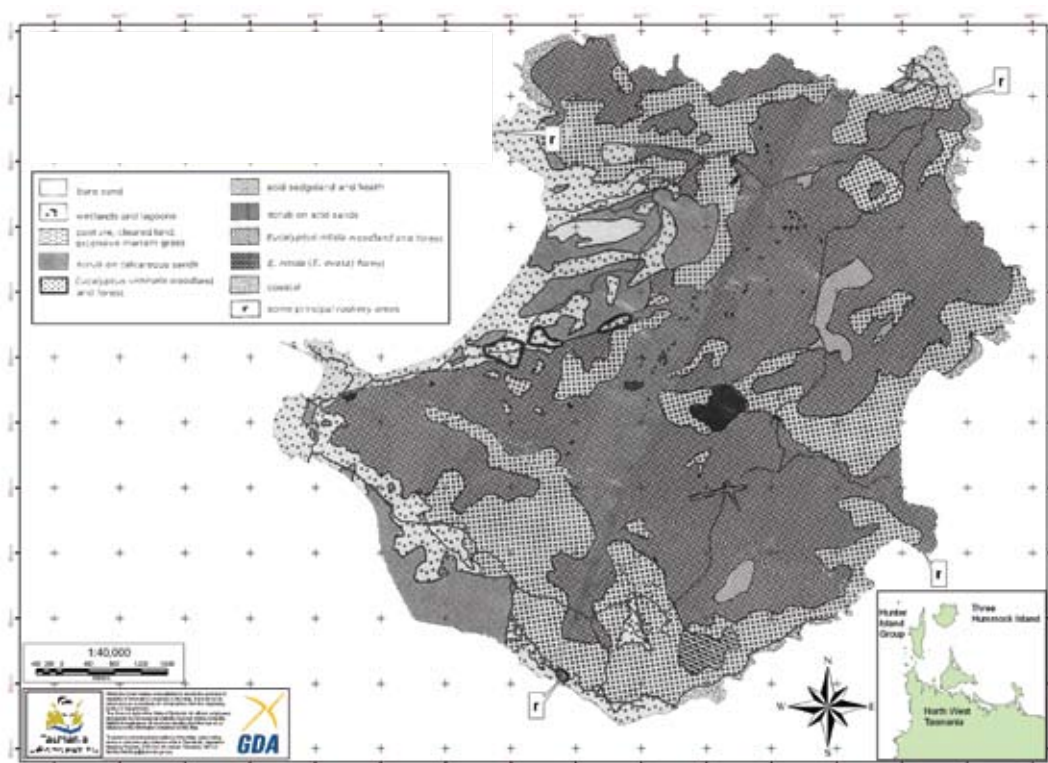


Figure 2: Map of nine vegetation communities (Harris and Balmer 1997)

especially the Keeled snail *Tasmaphena lamproides* (Bonham 1997, Bryant and Jackson 1999), a particularly cryptic and naturally rare species. The island could also support populations of the endangered Schayers grasshopper *Schayera baiulus* and endangered Marrawah skipper *Oreisplanus munionga larana*. The Marrawah skipper is known from the northwest at Penguin and from between Temma and Woolnorth (Bell 2002, 2005) hence Three Hummock Island and other sites with suitable habitat in the Hunter Island group could extend the range of this species. If Schayers grasshopper is discovered on Three Hummock Island it could represent remnant populations from a previous period when habitat was continuous with mainland Tasmania and/or mainland Australia due to lower sea levels. This species' distribution in Tasmania is disjunct with a single recorded locality at Cape Grim in the far northwest and at Rushy Lagoon in the far northeast.

Survey Aims

To improve the understanding of the flora and fauna of Three Hummock Island and specifically to:

- Update information on the Keeled snail, nesting status of threatened raptors, shorebirds, seabirds and assess Orange-bellied parrot foraging habitat
- Survey vegetation communities to update the TASVEG map and map recent vegetation changes
- Improve information on the Three Hummock Leek Orchid
- Undertake surveys for little known species such as New Holland mouse, Marrawah skipper; Schayers grasshopper; Forty-spotted pardalote and King Island thornbill
- Update the population estimates for Forester kangaroo and Cape Barren goose
- Assess the potential of Three Hummock Island being a release site for Tasmanian devils affected by facial tumour disease
- Make observations on feral cat populations and their potential impact on biodiversity.

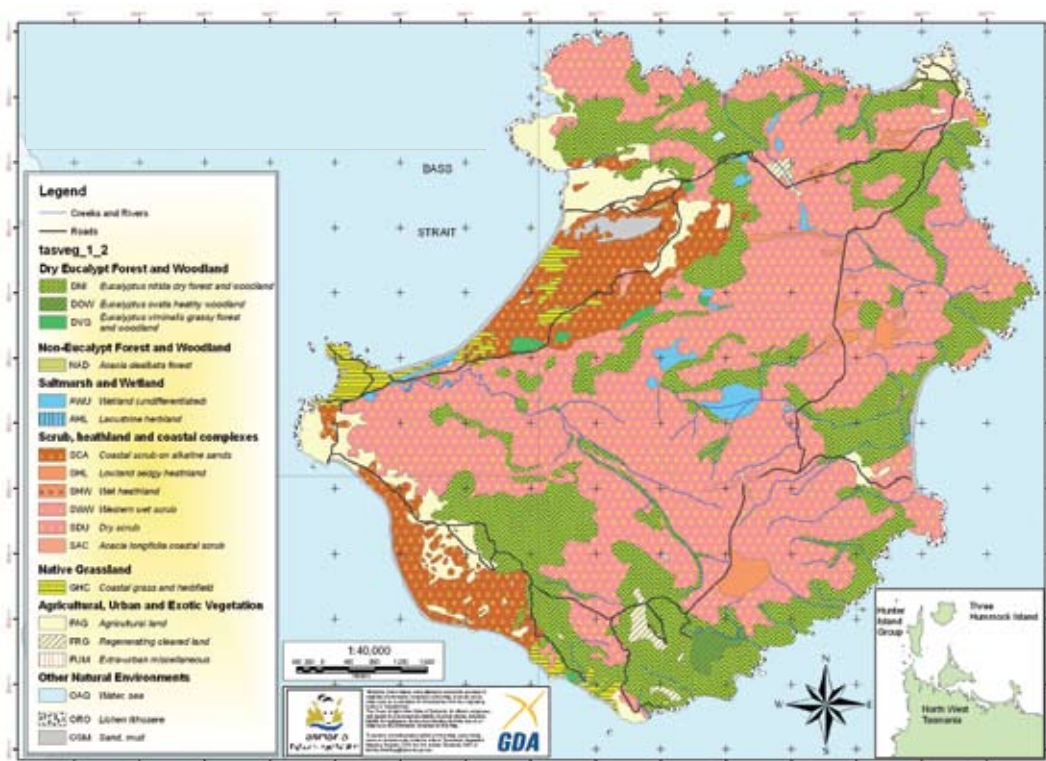


Figure 3: Translation of Harris and Balmer plant communities into 15 TASVEG classes (D Rankin 2003)

Methods

Field Program and Survey Methods

Team 1 arrived on 4th December 2006 changeover with Team 2 on 9th December; Team 2 departed on 12th December 2006.

Eighteen people were involved in survey work: 12 wildlife scientists, 2 New Zealand volunteers, 2 Parks and Wildlife Service district staff and 2 island caretakers. Logistics and planning followed the guidelines developed specifically for the program (Biodiversity Conservation Branch 2005). Transport was by Circular Head Marine Boat Charter.

Field Team

- Sally Bryant
Manager, Threatened Species Section (Team Leader 1)
- Mark Holdsworth
Manager Fauna projects, Threatened Species Section
- Phil Bell
Senior Zoologist, Threatened Species Section
- Justine Shaw
RFA Botanist, Threatened Species Section (Team Leader 2)
- Matthew Webb
Project Officer threatened hollow nesting birds, Threatened Species Section
- Bill Brown
Project Officer threatened raptors, Threatened Species Section
- Adam Smith
GIS Officer, Threatened Species Section
- Sue Robinson
Marine Interactions Officer, Wildlife Monitoring and Marine Section
- Sib Corbett
Botanist TASVEG, Vegetation Conservation Section
- Felicity Hargraves
Botanist TASVEG, Vegetation Conservation Section



*Erecting a harp trap. Mark Blythman, Nick Mooney, Phil Bell, Jacqueline McGowan, Justine Shaw.
Photo Sally Bryant*

Nick Mooney
Senior Ecologist, Wildlife Policy and Planning

Billy Lazenby
Project Officer, Devil Facial Tumour Disease program

Jacqueline McGowan
NZ Volunteer; Hamish Saunders Memorial Trust

Brent Barrett
NZ Volunteer; Hamish Saunders Memorial Trust

Lalani Hyatt
PWS Senior Ranger; Arthur River Region

Willie Gale
PWS Ranger; Arthur River Region

Mark Blythman
Three Hummock Island summer caretaker

Kym Atkinson
Three Hummock Island summer caretaker

Vegetation and Flora

Mapping equipment included a GPS, tablet PC, hardcopy topographic maps and colour prints of aerial photography. The PC contained MapInfo as the GIS program loaded TASVEG 1.2, Ortho-photos and linked to a Bluetooth GPS receiver. The vegetation assessment included individual flora species identification and community identification. Vegetation communities were grouped according to classes developed in TASVEG 1.2. Field observations were recorded against topography and aerial photography.

GIS Mapping and Digital Vegetation Comparison

Landscape Mapper was used to create ortho-rectified mosaics from the two sets of aerial photography and to convert the vegetation mapping on the transparent overlays to a vector line-work. This line work was cleaned, tagged with TASVEG vegetation codes then

exported into an ARC polygon shape file and all TASVEG attributes applied to that data. ArcMap 9.1 was used to edit the vegetation shape files produced by Landscape Mapper from aerial photograph interpretation. An ARC mxid file was created so that all source data could be viewed and assessed during the digital comparison process.

A standardised coastline, using the LIS coastline dataset and selecting the low tide average watermark, was cut into both data sets. This provided the same coastline boundary for each data set and removed any erroneous lines produced during photo-interpretation or the ortho-rectification process. The new photo-interpretation was performed, thus removing some mapping variables. However, due to the small scales of the photos and to fuzzy vegetation boundaries, there remained some variations which are unlikely to be due to vegetation changes. An on-screen technique was developed

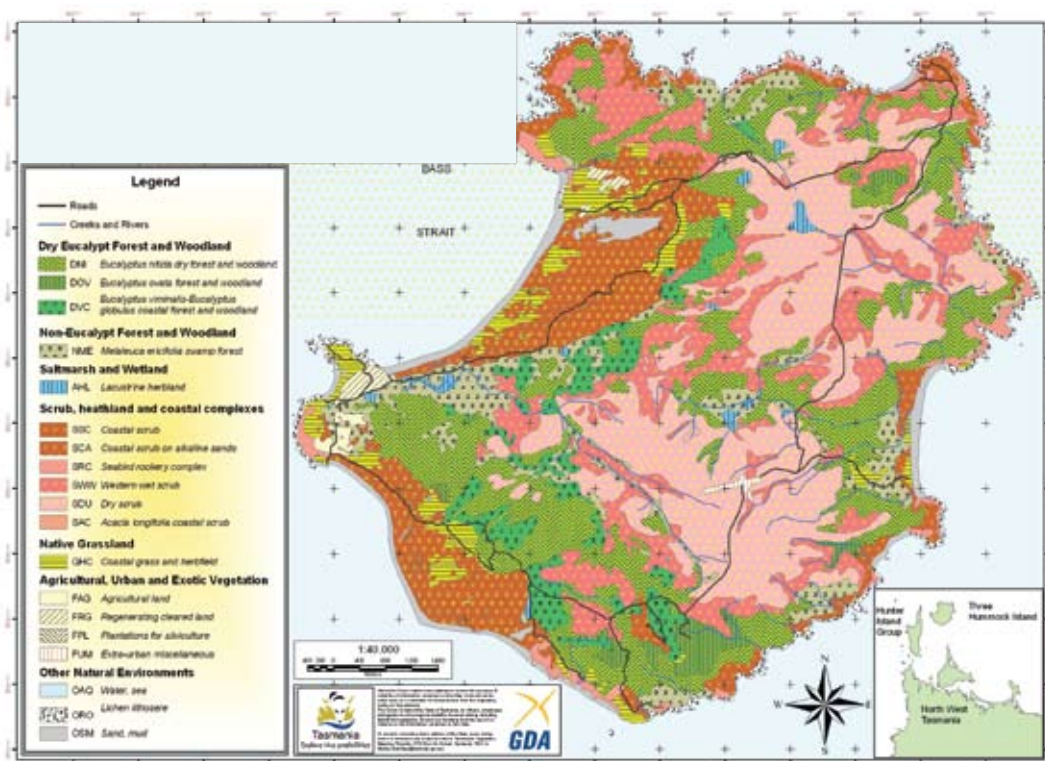


Figure 4:Vegetation of Three Hummock Island as it appears in TASVEG 1.3



Nick Mooney checks a harp trap.
Photo Justine Shaw

to reduce these variations. In the first instance polygon boundaries from both sets of photos were overlaid on the colour photo image. Visual comparison was made between the two sets of boundaries, guided by vegetation distribution seen on-screen on the greatly enlarged underlying air-photos. By turning off and on the photo layers a clearer picture of vegetation could be identified and any questionable vegetation boundaries initially captured on the photo overlay could be modified. Comparison was made for those communities where distribution is expected to have changed little in eight years, eg *Eucalyptus viminalis* and *E. ovata*-dominated forests. To achieve the best convergence, polygon boundaries were modified on either the black and white dataset or the colour dataset or both, by massaging the interpretation wherever it was reasonable. Arcmap was used to produce Figures 3 and 4.

Orchid Surveys

A survey of the main airstrip was undertaken to verify the occurrence of *Prasopphyllum atratum* (three hummock leek orchid) based on existing records of the species from Mark Clements (Tasmanian Herbarium - Jones & Rouse 2006). Ground searches of the cleared airstrip were made by slowly walking in straight transects across the width of the airstrip, roughly 20m apart for the length of most of the airstrip (the eastern end was not surveyed due to time limitations). Due to the low stature of the surrounding slashed vegetation *P. atratum* inflorescences were easily observed from several metres away. Emergent leaves were only detected from close range (2-3m). Where the species occurred the number of *P. atratum* individuals, flowering status, presence of other orchid species and surrounding vegetation cover were recorded. The bryophyte cover and proportion of slashed vegetation were also measured. Some specimens of *P. atratum* were collected and verified by Hans Wapstra who then submitted specimens to the Tasmanian Herbarium.

Fauna

Fauna Surveys

Fauna trapping was undertaken between the 4th and the 9th December 2006. Mascot traps were baited with chicken and/or fish scraps (trap sites on Fig. 5), Elliot traps were baited with a mix of peanut butter, native bird seed, honey and vanilla essence, and two harp traps were erected to detect bats. Swarovski 8 x 24 and Leica 10 x 32 binoculars and a 30x Swarovski Scope were used for bird observations. Smooth plastic bucket traps (25 cm height x 15 cm diameter) were buried flush with the ground with approximately 1.0 cm of soil in the bottom. Pitfall cups (10 cm height x 7.5 cm diameter) were buried using a soil auger and filled to 2 cm depth with 70% ethanol. A long handled (71 cm) conical sweep net (45 cm diameter x 81 cm length, mesh size of 0.9 x 0.3 microns) was used to collect invertebrates dislodged from understorey plants.



Figure 5: Fauna trap sites. Blue lines indicate transects.

Forester Kangaroos and Cape Barren Geese.
Photo Nick Mooney



Table 1. Fauna Survey Techniques

Birds	Binoculars, scope, call, burrow counts, spotlighting, flushing, nest searching, pellet identification
Mammals	Mascot traps, Elliot traps, tracks, scats, harp traps, spotlighting, incidental observation, transects
Reptiles and Amphibians	Elliot traps, pitfall traps, bucket traps, frog calls, sweep net, incidental observations
Invertebrates	Pitfall traps, bucket traps, sweep net, incidental collection

Sampling transects were established in five vegetation types: 1 Grassland, 2 Eucalypt Forest, 3 Damp Scrub, 4 Heathland, 5 Shearwater colony – each vegetation type was sampled in duplicate (A, B). Transects contained five sample sites approx 50 m apart. One Elliot trap and one pitfall trap were placed at each sample site and a bucket trap and sweep net samples collected at Site 2. The sweep net was used to collect invertebrates dislodged by shaking or hitting the vegetation in the 0.5 to 1.0 meter height layer 100 times. Two extra transect lines of Elliot traps were set in Eucalypt Forest (Brent's line 25 traps, Bryant's line 19 traps) for small mammals. Two harp traps were erected, one in forest across the large airstrip track (GPS 0317913 / 5519685) and the second at the water bore at the main homestead where they remained in place for five nights.

All traps (Mascot, Elliot, harp, pitfall and bucket traps) were set for 6 consecutive days (5 nights) and checked daily. On day 6 the contents of the 5 pitfall traps on each trap line were pooled into one container. The location of all sample sites was recorded by GPS (GDA 94, see Appendix A) and shown on Fig. 5.

Number of vegetation types surveyed
= 5 vegetation types

Total number of transects = 2 per vegetation community + 2 extra forest lines = 12 survey transects

Total number of sample sites = 10 transects x 5 sites + 2 transects x 3 sites = 56 sample sites

Total number of Elliot traps - trap nights = 50 Elliot traps - 250 trap nights

Total number of bucket traps - trap nights = 10 bucket traps - 50 trap nights

Total number of pitfall traps - trap nights = 56 pitfall traps - 206 trap nights

Total number of harp traps - trap nights = 2 harp traps – 10 trap nights

Total number of Mascot traps = 8 traps – 30 trap nights

Total number of sweep net samples = 10 samples at 100 sweeps = 1,000 sweeps

Total number of transect samples to be analysed = 12 pitfalls, 10 buckets, 12 sweep net samples

Forester Kangaroo Transects

Estimates of the index of abundance of Forester Kangaroos followed the methods outlined by Tanner and Hocking (2000). Counts for site 1 and 2 were obtained by walking along the track from the homestead to the southwest corner of West Telegraph Beach (Transect 1, 1.5 km), and from below Granite Hill ending near the junction of the South Hummock track (Arizona Run, Transect 2, 2.0 km) and by standing stationary in the middle of the paddock between the 2 homesteads at dusk and counting all kangaroos seen (Paddock count).

Feral Cats

Eight Mascot traps were set along tracks near the lodge, shearwater colony, and towards the large and small airstrips. Cat scats were collected opportunistically across the island. Cats trapped were humanely shot, weighed, measured and stomach samples collected for laboratory analysis on diet and parasites.

Raptors

Surveys were undertaken to establish the status, accurate location and activity of recorded raptor nests and to locate any new nests. Surveys were conducted by 3 raptor specialists in the vicinity of recorded nest sites and other areas of potential habitat as shown in Figure 6. In early 2007 Laylani Hyatt (PWS senior ranger) photographed and reported a juvenile Wedge-tailed Eagle in the vicinity of South Hummock suggesting a nest potentially exists on the island.

Forty-Spotted Pardalote

Surveys for the Forty-spotted Pardalote *Paradalotus quadragintus* were conducted in forest supporting mature white gum *Eucalyptus viminalis*. Three 10 minute counts using Birds Australia Bird Atlas methodology were conducted at widely spaced points while walking from 200 m N of Big Airstrip to turn off to South Hummock (GPS 0321926 / 5518149 to 0321652 / 5518056) and searching the forest canopy with binoculars. No Forty-spotted Pardalote was detected during a 1 hour dedicated survey or while frequently working in the area of white gum forest over the 8 day survey period.

Seabirds

Little Penguin and Short-tailed Shearwater colonies were mapped by ground searching the extent of burrows. The extent of the major portions of colonies were mapped by handheld GPS (Accuracy ± 20m), areas with very low densities (ie £ 1 burrow 10m²) were not included in the analyses. Densities

of Short-tailed Shearwater burrows were calculated by running 50m x 2m transects through the colony, recording the species type, occupation status (not occupied; apparently occupied; bird present in nest, see Fig 7). Burrow density was estimated for each colony and the number of breeding pairs then extrapolated from the mapped extent of each colony. Vegetation type and exhaustive search methods were used to locate other areas of Short-tailed Shearwater outside the mapped colonies. The time required to access many parts of the island precluded a more detailed analysis of Little Penguin densities, although several difficult to access colonies were visited to determine species presence.

Shorebirds

The entire length of most of the island's sandy beaches were walked and shorebird numbers recorded using GPS.

*Team enroute to survey sites (Phil Bell, Jacqueline McGowan, Brent Barrett, Mark Holdsworth, Nick Mooney, Mark Blythman, Bill Brown, Matt Webb, Felicity Hargraves).
Photo Justine Shaw*



Invertebrates

Invertebrate samples were sorted to Order, except for Gastropoda, Collembola, Diplopoda and Orthoptera which were sorted to Class and where possible to species. Lepidoptera were assessed by incidental observation and targeted searches for adult flying butterflies and day flying moths as well as developmental stages in known food plants including larvae and pupal stages and/or characteristic larval/pupal shelters. Areas supporting standing water or signs of past standing water were searched for evidence of burrowing crayfish.

Searches for the Keeled Snail were conducted along the access track that branches off the large airport track leading to the top of South Hummock. Areas on and beside the track were surveyed by exposing progressive layers of leaf litter in a 50 x 50cm area along sections where forest leaf litter had accumulated. Forest litter was closely examined and all invertebrates resembling land snails were collected. A total of twenty 50 x 50cm areas were surveyed with each area being searched for 1 hour in total (20 hours searching).

The entire invertebrate collection was lodged with the Tasmanian Museum and Art Gallery.

Results

Vegetation and Flora

Vegetation Classification

Comparison of the changes between the vegetation classes mapped by Harris and Balmer (1997), Rankin (2003) and Corbett, Stebbing and Hargraves (2007) are shown in Table 2. A detailed account of updated vegetation communities has been prepared by Corbett et al. (2006).

The differences are between classification decisions, and only marginally reflect actual vegetation changes since 1995. The classification of vegetation communities adopted by the authors follows TASVEG descriptions (Harris and Kitchener 2005) as closely as possible, but in a number of cases this island vegetation, and especially scrub, comprises distinct facies of the more general Tasmania-wide communities.

Summary of changes to vegetation communities are:

- No agricultural land (FAG) remains and much of the regenerating cleared land (FRG) observed in 1995 has now converted to native grasslands or scrub.
- Pastures on the alkaline dunes converted first to *Poa* poiformis native grasslands. Some of these grasslands appear to be stable, but many have in turn been colonised by shrubs typical of the Coastal scrub on alkaline sands (SCA) assemblage. Some areas where this conversion had already occurred were mapped by Harris and Balmer in 1995. Coastal grass and herbfield (GHC) have shown a very large increase in area since 1993 and the SCA scrubs have also increased.
- Marram grassland (FMG), reported to be extensive near the coasts in 1995, is now restricted to small patches on fore-dunes and the edges of rookeries.



Traversing *Poa* grassland.
Photo Justine Shaw

- The wetlands are drying up. Shrubby revegetation was observed at Lake Minnetonka in 1995 and is now occurring in Big Lagoon. Airphotos suggest this reduction in wetlands is occurring all over the island.
- *Melaleuca ericifolia* swamp forests associated with damp areas and surrounding the wetlands are on the increase. There is also a development towards the height and texture of swamp forest for *M. ericifolia* scrubs in drier areas.
- Scrubs on acid sands and granite are becoming taller; with an overall loss of their sedgy component. Patches of sedgy heath remain, and are included in SDU. In many areas what was dry scrub SDU is now tall and low in diversity, dominated by *Leptospermum* species and *Monotoca glauca*, with emergent *Eucalyptus nitida*. It is classified here as Western wet scrub (SWW), and this class has increased since 1993.
- There has been some increase in DNI as the *E. nitida* trees have grown and become more strongly emergent from their scrubs. The conversion is from the scrub SWW to forest DNI.
- The decrease in *Acacia longifolia* subsp. *sophorae* scrub (SAC) is in part a real change as *Leptospermum laevigatum* moves into the front line dunes and the community becomes SCA. The percentage change is not reliable because of the difficulty in interpreting SAC on air-photos.

Table 2. Vegetation changes recorded on Three Hummock Island by 2006

Veg Code	Area- 1993 B&W (ha)	% of Island	Area- 2001 color (ha)	% of Island	Increase (ha)	Decrease (ha)	% change
AHL	127	2	45	1	0	-83	-65
DNI	1432	20	1573	22	141	0	10
DOV	105	1	123	2	18	0	17
DVC	323	4	337	5	15	0	5
FAG	227	3	24	0	0	-202	-89
FPL	1	0	1	0	0	0	0
FRG	353	5	45	1	0	-309	-87
FUM	16	0	15	0	0	0	-2
GHC	19	0	285	4	266	0	1420
NME	357	5	492	7	134	0	38
ORO	193	3	185	3	0	-8	-4
OSM	196	3	185	3	0	-11	-6
SAC	43	1	8	0	0	-35	-81
SCA]	534	7	703	10	168	0	31
SDU	2412	33	1668	23	0	-744	-31
SRC	147	2	155	2	8	0	5
SSC	256	4	321	4	66	0	26
SWW	465	6	1041	14	576	0	124
Total Area	7206		7205				

* see next section for names of vegetation codes



Three Hummock Island airstrip.
Photo Sally Bryant

Beach Weeds

East Telegraph Beach was lined with Marram Grass and intermittent small patches of Spinifex. A recent infestation of Sea Spurge containing hundreds of seedlings extended in a band approximately 0.5 m wide from GPS 0375747/5519941 to GPS 0325755/5519908. An infestation of Sea Spurge occurred at the entry point to Spiers Beach extending 40 m in length and 5 to 10 m wide, containing a mix of mature plants and emergent seedlings totaling thousands of plants. Sea Spurge occurred intermittently along the entire length of Spiers Beach with hundreds of plants estimated. Marram Grass dominated the entire beach line.

Orchid Species

Tables 3 and 4 contain data for *Prasophyllum atratum* and other orchid species collected on the big airstrip (midway between Middle and South Hummock). *P. atratum* is a small fleshy terrestrial orchid with a solitary erect leaf, 12-40 cm long, 3-5 mm wide. The base of the leaf is 3-5 mm in diameter and greenish purple. The free lamina is sub-erect, 8-15 cm long, and is partly withered at flowering time. The inflorescence is a well spaced to moderately dense spike 5-10 cm long with 8-25 flowers, 5-7 mm across. The flowers are brownish green to purplish green, sessile to sub-sessile, widely opening and fragrant (Jones and Rouse 2006).

The data present here is the only ecological survey conducted specifically on this species to date. This information has management implications given that Tasmanian PWS are investigating the consequences of spraying the airstrip to remove bryophytes cover. Aircraft operators have discussed the removal

of the bryophytes with PWS stating it makes the surface slippery for landing. The airstrip is regularly slashed by PWS staff and slash piles are burnt on the edges of the airstrip. At the time of survey the airstrip appeared to have been slashed within the last few months.



Three Hummock Island leek orchid.
Photo Justine Shaw

Table 3. Data collected on *Prasophyllum atratum* on Three Hummock Island main airstrip.

Attributes	<i>Prasophyllum atratum</i>	<i>Thelymitra cyanea</i>
Total no. of individuals	43	30
Species density	0.54 plants/m ²	0.75 plants/m ²
Flowering effort	35%	na
Proportion flowering	40%	
Proportion fruiting	47%	
Proportion finished flowering	13%	
Area of extent	1000m x 700m	1000m x 700m
Total search area	96 m ²	96 m ²
Plots with > 60% vegetation slashed	53%	
Co-occurrence of bryophytes	80%	
Dominant species	<i>Leptospermum scoparium</i> , <i>Epacris impressa</i> , <i>Patersonia</i> sp.	

Table 4. Other flora present on the Three Hummock Island main airstrip

Species Name	Common Name	Family	Endemic	TSPA	EPBC
<i>Acacia mucronata</i>	catepillar wattle	Mimosaceae			
<i>Acacia mucronata</i> subsp. <i>dependens</i>	blunt caterpillar wattle	Mimosaceae	e	r	
<i>Acacia mucronata</i> var. <i>dependens</i>	variable sallow wattle	Mimosaceae	e	pr	
<i>Acacia ulicifolia</i>	juniper wattle	Mimosaceae		r	
<i>Caladenia pusilla</i>	tiny fingers	Orchidaceae		r	
<i>Centaurium australe</i>	Australian centaury	Gentianaceae		pr	
<i>Centaurium spicatum</i>	spike centaury	Gentianaceae	i?	r	
<i>Cotula vulgaris</i> var. <i>australasica</i>	slender buttons	Asteraceae		r	
<i>Lepidium flexicaule</i>	springy peppergrass	Brassicaceae	t	r	
<i>Parietaria debilis</i>	shade pellitory	Urticaceae		r	
<i>Petalochilus pusillus</i>	tiny caladenia	Orchidaceae		pr	
<i>Poa poiformis</i> var. <i>ramifer</i>	island purplegrass	Poaceae		r	
<i>Prasophyllum pyriforme</i>	graceful leek-orchid	Orchidaceae		e	
<i>Pterostylis cucullata</i>	leafy greenhood	Orchidaceae		e	VU
<i>Pterostylis sanguinea</i>	banded greenhood	Orchidaceae		r	
<i>Pterostylis vittata</i>		Orchidaceae		pr	
<i>Racosperma ulicifolium</i>		Fabaceae		pr	
<i>Ranunculus sessiliflorus</i>	annual buttercup	Ranunculaceae		pr	
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	rockplate buttercup	Ranunculaceae		r	
<i>Stellaria multiflora</i>	rayless starwort	Caryophyllaceae		r	
<i>Urochilus sanguineus</i>	banded greenhood	Orchidaceae		pr	

Fauna

Mammals

Mammal species recorded are shown in Table 5. Feral cat, black rat, House mouse and Brush-tailed possum were the only mammal species trapped.

Table 5. Mammal species recorded on Three Hummock Island in December 2006

Species	Common Name	Notes
<i>Nyctophilus timoriensis</i>	Greater long-eared bat	Observed in tool shed behind main homestead by caretakers
<i>Macropus giganteus</i>	Forester kangaroo	Greatest number near airstrip and grassland near homesteads
<i>Thylogale billardierii</i>	Tasmanian pademelon	Very low numbers, one seen at GPS 0324997/5520013
<i>Trichosurus vulpecula</i>	Brush-tailed possum	Trapped in mascot traps and signs across the island
<i>Pseudocheirus peregrinus</i>	Ringtail possum	Widespread - many dead on tracks (possibly due to drought)
<i>Cercartetus nanus</i>	Eastern pygmy possum	Caretakers reported one in swallow's nest in large airstrip shed
<i>Rattus rattus</i>	Black rat (introduced)	Trapped in mascot trap – likely to be widespread
<i>Mus musculus</i>	House mouse (introduced)	Trapped in Shearwater Elliot A5 – likely to be widespread
<i>Ovis aries</i>	Sheep (introduced)	One individual remaining on island – caught and shorn
<i>Felis catus</i>	Feral cat (introduced)	One individual trapped – scats widespread on tracks across island



Mark Holdsworth identifying lizards.
Photo Sally Bryant

Adult Ring-tail possum were observed dead on tracks across the island. Seven dead adults were counted on the right-hand side of the track from the airport gates GPS 0323146/5519793 to the site of old windmill GPS 0321922/5518141, a distance of 3 km. Their bodies showed no obvious signs of predation or injury and based on fur appearance, all appeared in relatively good condition. Feral cats pose a significant threat to Ring-tailed possum due to their ground habits (see next section) but it may also be that the long-term drought and lack of access to free standing water could be influencing the population.

One young adult 3.6 kg ginger female cat was trapped. It had good teeth, no fat around kidneys, was in lean condition and not pregnant or lactating. Stomach contents contained Ring-tailed possum baby, adult Ring-tailed possum fore foot, shearwater feathers and a large wingless cricket. Stomach and intestinal contents were collected and returned for analysis and the skin kept.

Cat prints in sand were very common along West and East Telegraph beaches, whereas cat scats were numerous along most tracks and beaches, and often on the surface. A single cat was seen at the Little penguin colony at the south end of East Telegraph Beach at 10 am.

Bird Fauna

A total of 67 bird species were positively recorded during this survey. Photographs were taken of platelets suspected to be of Painted button quail but could also have been Bronzewing pigeon sp. in thick forest along the track to South Hummock (GPS 0319965 / 5517686). The platelets were clearly defined, had a diameter of approximately 9cm and most contained a small characteristic dropping in the centre. Cape Barren geese were most common around the homestead paddocks and airstrips with a rough estimate of several hundred being present on the island.

Table 6. Forester Kangaroo Counts

Transect	Distance	Tanner & Hocking Oct 1999	This Survey Dec 2006
1 Homestead towards West Telegraph Beach	1.5 km	55 - 58	27 - 42
2 Granite Hill towards South Hummock	2.0 km	21 - 22	17 - 23
3 Paddock Count	100 m radius	93 max	29 - 30

Table 7. Feral Cat

Trap location	GPS north	GPS east	Dates set	Result
nth of lodge loc1	316690	5520830	4 to 6-Dec-06	Black rat 4 Dec
nth of lodge loc2	316650	5520909	4to 6 Dec-06	0
nth of lodge loc3	316629	5521033	4 to 6 Dec-06	0
nth of lodge loc4	316704	5521158	4 to 6 Dec-06	0
beach nr lodge loc5	316730	5520520	4 to 7 Dec-06	Brush possum 5 Dec
beach nr lodge loc6	316620	5520530	4 to 7Dec-06	0
Airstrip loc7	317100	5520700	4 to 6 Dec-06	Brush possum 6 Dec
Airstrip loc8	317200	5520800	4 to 6 Dec-06	0
South track loc9	321542.8	5516802	7 Dec-06	1 Feral cat 7 Dec
South track loc10	321589.4	5516626	7 Dec-06	0
South track loc11	321927.7	5516667	7 Dec-06	0
South track loc12	322130.8	5516683	7 Dec-06	0
South track loc13	322106.5	5516638	7 Dec-06	0
South track loc14	321659.8	5516516	7 Dec-06	0

Table 8. Bird species recorded on Three Hummock Island (s PWS 1999, n Plowright, : Brothers et al. 2001, l this study).

Species Name Common Name	Recorded By	Notes This Survey
Waterfowl and Wetlands		
<i>Porphyrio porphyrio</i> Purple Swamphen	s n l	Common around homestead and airstrips
<i>Gallinago hardwickii</i> Latham's Snipe	s	
<i>Biziura lobata</i> Musk Duck	s	
<i>Cygnus atratus</i> Black Swan	s n l	
<i>Cereopsis novaehollandiae</i> Cape Barren Goose	s n l	Most common around airstrip and homestead paddocks
<i>Tadorna tadornoides</i> Australian Shelduck	l	One individual sighted on pasture near lodge for 3 days
<i>Anas superciliosa</i> Pacific Black Duck	s n	
<i>Anas gracilis</i> Grey Teal	s	
<i>Anas castanea</i> Chestnut Teal	s	
<i>Poliiocephalus poliocephalus</i> Hoary-headed Grebe	n	
<i>Ardea ibis</i> Cattle Egret	s	
<i>Pelecanus conspicillatus</i> Australian Pelican	s : l	
<i>Egretta novaehollandiae</i> White-faced Heron	s n	
Seabirds		
<i>Eudyptula minor</i> Little Penguin	s : l	Many colonies surveyed this survey
<i>Puffinus tenuirostris</i> Short-tailed Shearwater	s : l	168,724 pairs by Brothers, 172,800 this survey
<i>Diomedea cauta</i> Shy Albatross	s l	Flying over; breeding nearby on Albatross Is
<i>Morus serrator</i> Australasian Gannet	s n l	Flying over
<i>Phalacrocorax melanoleucos</i> Little Pied Cormorant	s l	Roosting on rocks around coastline
<i>Phalacrocorax fuscescens</i> Black-faced Cormorant	n : l	Roosting on rock stacks
<i>Phalacrocorax sulcirostris</i> Little Black Cormorant	s	
<i>Phalacrocorax carbo</i> Great Cormorant	s :	
<i>Larus pacificus</i> Pacific Gull	s n : l	
<i>Larus novaehollandiae</i> Silver Gull	s n l	Common around coast and on pasture
Birds of Prey		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	s n l	Two nests identified both active, photos
<i>Circus approximans</i> Swamp Harrier	s l	Nest in sedgeland GPS 0317097/5520701, photo
<i>Accipiter cirrhocephalus</i> Collared Sparrowhawk	l	Single sighting in eucalypt forest
<i>Aquila audax</i> Wedge-tailed Eagle	s n l	Pair flying over
<i>Falco berigora</i> Brown Falcon	s n l	Common across the island
<i>Falco peregrinus</i> Peregrine Falcon	s	
<i>Ninox novaeseelandiae</i> Southern Boobook	n	
<i>Falco cenchroides</i> Australian Kestrel	s	
Shorebirds		
<i>Calidris ruficollis</i> Red-necked Stint	l	Three foraging on mudflats end of West telegraph
<i>Haematopus longirostris</i> Pied Oystercatcher	s n : l	Breeding on sandy beaches, eggs seen

Species Name Common Name	Recorded By	Notes This Survey
Haematopus fuliginosus Sooty Oystercatcher	s : l	Breeding on rocky headlands and beaches
Charadrius ruficapillus Red-capped Plover	s	None seen this trip
Charadrius bicinctus Double-banded Plover	s	
Elsyornis melanops Black-fronted Dotterel	s	
Thinornis rubricollis Hooded Plover	s n : l	Breeding on most sandy beaches this survey
Vanellus tricolor Banded Lapwing	s	None seen this survey
Vanellus miles Masked Lapwing	s n l	Common open habitats and beaches, nest Mermaid Bay
Sterna caspia Caspian Tern	s	
Sterna bergii Crested Tern	s l	Feeding in shallows
Sterna nereis Fairy Tern	s	None found this survey - suitable nesting habitat
Parrot / Cockatoo		
Calyptorhynchus funereus Y-t Black Cockatoo	s l	Flocks in woodland and flying over; common
Platycercus caledonicus Green Rosella	s n l	Widespread, nesting in wall cavity of Lodge
Neophema chrysostoma Blue-winged Parrot	s	None seen this survey
Forest, Woodland & Heath		
Coturnix ypsilophora Brown Quail	s n l	Flushed in grassland
Phasianus colchicus Common (Ring-necked) Pheasant	l	Flock of about 6 roosting on track near Spiers Beach
Pavo cristatus Indian Peafowl (Peacock)	s l	Common around homestead
Turnix varia Painted Button-quail	l ?	? platelets in forest near South Hummock, pics taken
Cuculus pallidus Pallid Cuckoo	s	
Cacomantis flabelliformis Fan-tailed Cuckoo	s l	Calling on big airstrip track
Chrysococcyx basalis Horsfield's Bronze-Cuckoo	s l	Calling in forest towards big airstrip
Chrysococcyx lucidus Shining Bronze-Cuckoo	s	
Hirundapus caudacutus White-throated Needletail	s	
Malurus cyaneus Superb Fairy-wren	s	None seen this survey
Pardalotus punctatus Spotted Pardalote	s l	Common, sighted Big Airstrip track
Pardalotus striatus Striated Pardalote	s l	Common, sighted big airstrip track
Sericornis humilis Tasmanian Scrubwren	s n l	Common over the island
Phaps chalcoptera Common Bronzewing	s l	Seen on tracks
Phaps elegans Brush Bronzewing	n l	Commonly heard and seen on tracks
Feral Pigeon	l	Feral pigeon with steel leg band on pasture at homestead
Acanthiza pusilla Brown Thornbill	n	None seen this survey
Acanthiza ewingii Tasmanian Thornbill	s l	Good sightings, widespread, breeding
Anthochaera paradoxa Yellow Wattlebird	s	
Anthochaera chrysoptera Little Wattlebird	l	
Lichenostomus flavicollis Yellow-throated Honeyeater	s	
Melithreptus validirostris Strong-billed Honeyeater	n l	Small flocks in forest
Melithreptus affinis Black-headed Honeyeater	s n l	Small flocks in forest

Species Name Common Name	Recorded By	Notes This Survey
Phylidonyris pyrrhoptera Crescent Honeyeater	s n l	Common
Phylidonyris novaehollandiae New Holland Honeyeater	s n l	
Phylidonyris melanops Tawny Crowned Honeyeater	s n l	Sedgeland between Middle and North Hummock
Acanthorhynchus tenuirostris Eastern Spinebill	s n l	Common in heath and forest habitats
Ephthianura albifrons White-fronted Chat	s n l	Widespread
Petroica multicolor Scarlet Robin	s	None seen this survey
Petroica phoenicea Flame Robin	s n l	Common, sighted West Telegraph Beach track
Petroica rodinogaster Pink Robin	n	
Melanodryas vittata Dusky Robin	s n	
Pachycephala olivacea Olive Whistler	s n l	Calling in most habitats over island
Pachycephala pectoralis Golden Whistler	s l	
Colluricincla harmonica Grey Shrike-thrush	s n	
Myiagra cyanoleuca Satin Flycatcher	s l	Male displaying in forest at GPS 0319920 / 5518391
Rhipidura fuliginosa Grey Fantail	s n l	Common in woodland and forest
Coracina novaehollandiae Black-faced Cuckoo-shrike	s l	Flying over forest toward main airstrip
Artamus cyanopterus Dusky Woodswallow	l	Forest near Rape Bay near eagles nest
Strepera fuliginosa Black Currawong	s n l	Common across island
Corvus tasmanicus Forest Raven	s n l	Common across island
Alauda arvensis Skylark	s l	Common on airstrip, open ground
Anthus novaeseelandiae Richard's Pipit	s n l	Common near airstrips and shearwater colonies
Stagonopleura bella Beautiful Firetail	l	Calling, sighted in forest, breeding
Carduelis chloris European Greenfinch	s l	Common over pasture near homestead
Carduelis carduelis European Goldfinch	s l	Common over pasture
Hirundo neoxena Welcome Swallow	s l	Nest with chicks in shed at main airstrip
Hirundo nigricans Tree Martin	s l	Around bore at homestead
Megalurus gramineus Little Grassbird	s l	Common in reeds toward small airstrip
Zosterops lateralis Silvereye	s n l	Common in forest, scrub and woodland
Zoothera lunulata Bassian Thrush	n l	Displaying on track toward main airstrip
Turdus merula Common Blackbird	s n l	Widespread, calling at dusk
Sturnus vulgaris Common Starling	s : l	Roosting and flying in large flocks

Three Hummock Island contains significant areas of potential foraging habitat for the Orange-bellied parrot *Neophema chrysogaster* and Blue-winged parrot *Neophema chrysostoma*. Neither species were observed during this study, however, both are likely to

occur on the island during northern migration (March to June). The entire rocky coastline has a range of plant species which both species can utilize e.g. *Sarcocornia quinqueflora*. In addition significant areas of pasture and native grassland around the homestead,

airstrips and shearwater colonies contain a range of exotic and native food plants. The native sedgeland between Middle Hummock, North Hummock and Rape Bay may also be utilized by both species.



White-bellied Sea Eagle.
Photo Bill Brown

Raptors

Two adult Wedge-tailed eagles were observed circling in the vicinity of South Hummock on approach to the island (8th Dec). Single white-bellied sea-eagles were observed at various locations including Telegraph Beach, Cape Rochon and Signal Hill. One wedge-tailed eagle and two White-bellied sea-eagle nests were previously recorded from the island as shown in Table 9. None of these previous nests were relocated. An active roost tree was located in the vicinity of the recorded location of nest #63 and despite two intensive searches of the area, no nest was located. Two active White-bellied sea-eagle nests were located during this survey. One nest was situated high in a eucalypt tree in the gully leading into Rape Bay and was determined to contain at least one chick. The second nest had been built on a rock stack west of Mermaid Bay and contained two large chicks close to fledging. Both nests were photographed. A third nest (probably belonging to White-bellied sea-eagles) was found 2km south east of South Hummock (Nest# 1510). This nest had clear signs of recent breeding activity indicating that a fledgling was reared in the 2006 breeding season. Given that the density of sea-eagles on nearby Hunter Island is one territory for each nine km of coastline, Three Hummock Island could potentially support four to five pairs of White-bellied sea-eagles in total. In

contrast, the island supports only one breeding pair of Wedge-tailed eagles and their current offspring.

A single Swamp harrier *Circus approximans* was regularly seen flying over the airstrip and grassland areas. A nest was located near the small airstrip (GPS 0317097 / 5520701, pic taken) which did not contain any signs of recent activity but was intact and possibly used the previous season.

Figure 6: Map of Three Hummock Island showing recorded eagle nest sites and areas searched for nests in December 2006.

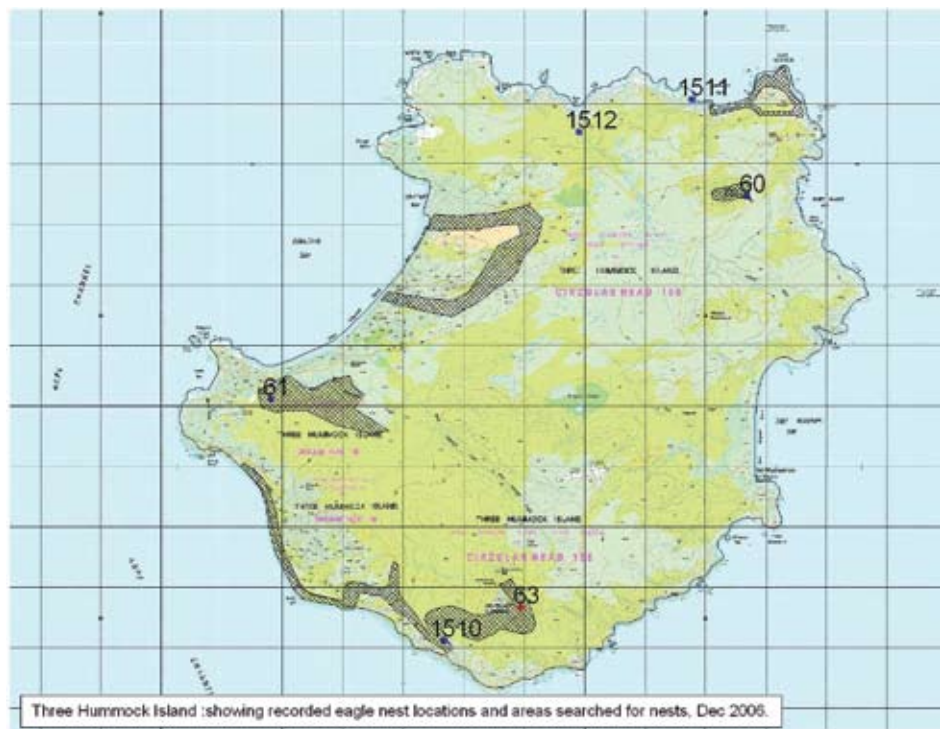


Table 9. Eagle nests recorded on Three Hummock Island

Species	Nest ID	Easting GDA	Northing GDA	Location	Status	Coordinate verification	Source
<i>Haliaeetus leucogaster</i>	60	325814	5524629	North Hummock	gone	Not verified	NA
<i>Haliaeetus leucogaster</i>	61	317946	5521271	Swan Lagoon	gone	Not verified	NA recorded
<i>Haliaeetus leucogaster</i>	1512	323000	5526750	Rape Bay	active	This survey	
<i>Haliaeetus leucogaster</i>	1511	325250	5526000	West Mermaid Bay	active	This survey	
<i>Aquila audax fleayi</i>	63	322072	5517827	South Hummock	gone	Not verified	NA recorded

Seabird Surveys

Short-tailed shearwater colonies were recorded at four main locations (confirming those of Skira et al. 1995): Home, Ranger, Mermaid and South Paddock colonies (Figure 7). Evidence of Little penguins was recorded from

North West Cape to Cape Rochon, the northern end of East Telegraph Bay, in the Short-tailed shearwater colony between Sandy Spit and Neils Rocks (South Paddock Colony) and in the Short-tailed shearwater colony west of the Homestead (Home colony) (Figure

8). Despite intensive searches in some areas reported in Brothers et al. (2001), no Short-tailed shearwaters or Little penguins were recorded in any other location (i.e. no fresh guano, moulting feathers or other signs of recent activity).

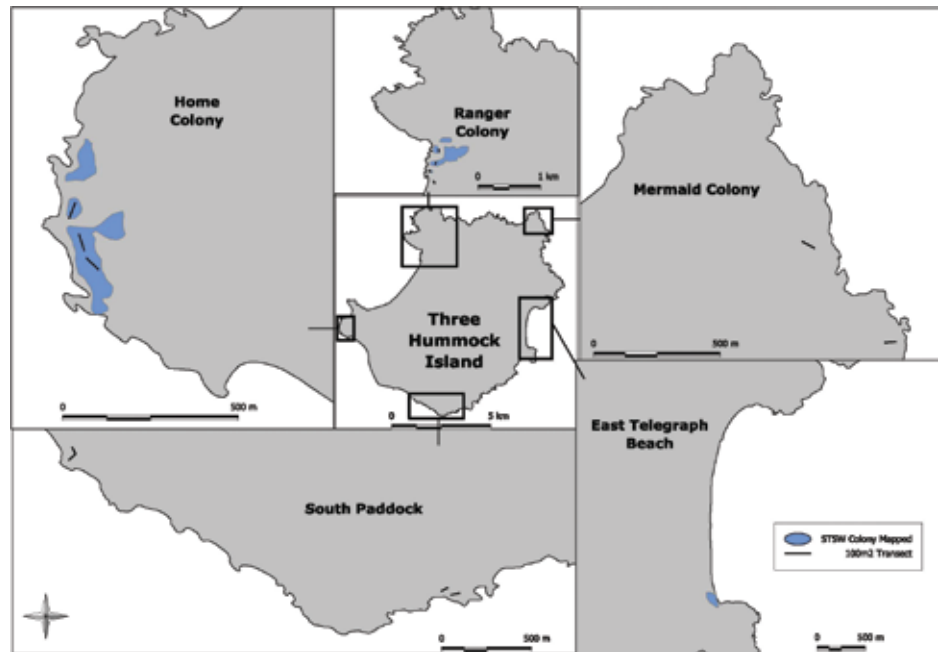


Figure 7: Short-tailed shearwater colonies

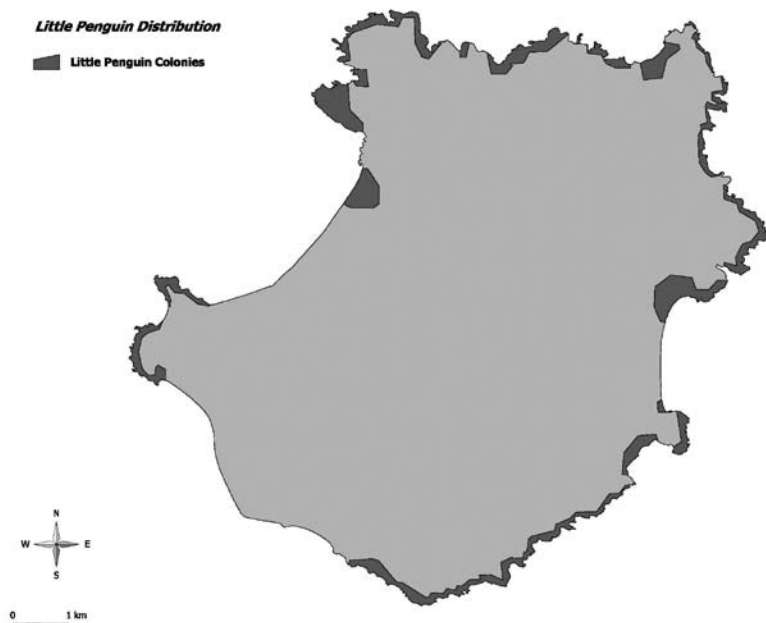


Figure 8: Little penguin distribution



Seabird nest burrows.
Photo Matt Webb

Transect burrow counts in Short-tailed shearwater colonies were undertaken in Home, Ranger, Mermaid and South Paddock colonies (see Figure 7) with burrow density estimates for these sites shown in Table 10. Burrow density estimates ranged from 0.33 to 0.65 burrows/m². Inconsistencies in the extent of Short-tailed shearwater colonies with previous colony mapping (Brothers et al. 2001) did not allow population sizes to be estimated reliably. Home colony was re-mapped during this study providing an estimate of

17,550 burrows (Table 10). Burrow estimates where the colony was not mapped during this trip used the colony area previously recorded by Skira et al. (1995), i.e. Mermaid and South Paddock colonies. This study estimated the population of Short-tail shearwaters on the island as 216,000 with an 80% occupancy rate making a total population estimate of 172,800 breeding pairs. This is similar to the estimate of 168,724 breeding pairs in Brothers et al. (2001).

Shorebird Surveys

On East Telegraph Beach two Pied oystercatchers were recorded at GPS 0325742/5520692 and broken eggshell at GPS 0325864/5521403. On West Telegraph Beach two Pied oystercatchers exhibited alarm behaviour and alarm calls while further along another two birds moved down to the waterline from a nest site recorded at GPS 0319668/5522812 (2 eggs found). Two Hooded plovers ran along the waterline for over one kilometer from their flush site. A second

Table 10. Short-tailed Shearwater Surveys on Three Hummock Island.

Colony	Area surveyed (m ²)	Colony Size ha	Skira et al. (1995) colony size ha	Burrow density (m ²)	Skira et al. (1995) burrow density (m ²)	No of burrows (breeding pairs)
Home	300	2.7	1.00	0.65	0.20	17,550
Ranger	350	10.8	10.00	0.33	NA	35,640
Mermaid	200	NA	6.39	0.62	0.46	39,618
South Paddock	200	NA	20.88	0.59	0.34	123,192
Total						172,800

Table 11. Number of shorebirds recorded on the sandy beaches of Three Hummock Island.

Beach Site (km)	Start GPS	Finish GPS	Hooded Plover	Pied Oyster C	Sooty Oyster C	Crested Tern	Red-n Stint	Total
East Telegraph	0326386 / 5521679	0325800 / 5519751	6	2 + eggshell	3	0	0	11
West Telegraph	0317713 / 5521556	0320418 / 5524078	4	4 + nest with 2 eggs	3	0	3	14
Spiers Bay	0316741 / 5521164	0316835 / 5521826	2	0	0	0	0	2
Homestead Beach	0316799 / 5520203	0318983 / 5517654	7	9 + nest with 2 eggs	0	0	0	16
Sandy Spit Bay	0319113 / 5517613	0319896 / 5517209	0	2	2	1	0	5
Lodge Gulch	0316416 / 5520514	~ 40 m ²	0	2	0	0	0	2
Ranger Beach*	Track end		0	6	0	0	0	6
Total			19	25	8	1	3	56



Photo Sally Bryant

Jacqueline McGowan laying invertebrate pitfall traps



pair also moved in front for a distance of approximately one kilometer before doubling back at the end of the beach. From the jetty onwards the long, gently sweeping Homestead Beach contained several sandy shell grit spits and small discrete bays separated by rocky outcrops. The extensive Marram Grass infestation toward the southern end had caused a steep beach profile extending to the high tide eliminating potential shorebird nesting habitat. No evidence of Fairy Tern colonies on the shingle spits or elsewhere could be found. This first stretch of beach to GPS 0317771/5518983 was the most suitable for nesting shorebirds including two Pied oystercatchers and their nest containing two eggs (GPS 0317468/5519799). A nest containing four Masked lapwing eggs was recorded on the drift line at the entrance to Mermaid Bay.

Reptiles and Amphibians

Seven reptile and two amphibian species were recorded during this survey, all species records being consistent with their previous known ranges. The huge variation in coloration and striping made skink identification difficult with suggestions that the Eastern Three-lined Skink may have been present, but this could not be confirmed by scale counts (Hutchinson et al. 2001). This diversity of herpetological fauna is typical of larger islands in western Bass Strait that contain a mixture of habitat types and is similar to that occurring on Hunter Island. Distribution of the subspecies of Mottled Banjo Frog *Limnodynastes dumerilii variegatus* is very restricted in Tasmania and only known from King Island, Three Hummock Island, western Victoria and adjacent South Australia (Littlejohn 2003).

Invertebrates

A comprehensive list of all invertebrates identified from pitfall, bucket and sweep net samples is provided in Appendix B. Pitfall traps were largely unsuccessful as traplines were sabotaged by Black Currawong who consistently overturned or destroyed the plastic cups.

Gastropods - Four native and two exotic land snail species were recorded on Three Hummock Island although none were new for the island and there was a bias towards the larger species. All native species were collected in wet forest on the slopes of South Hummock. The Keeled Snail *Tasmaphena lamproides* was collected in several locations in wet forest on the northeastern slopes of South Hummock. Compared to Bonham's 1997 survey, it was notable that *Stenacapha hamiltoni* and *S. sp.* "Hunter" were collected equally often, whereas in Bonham's survey *S. sp.* "Hunter" was abundant but only two *S. hamiltoni* were collected. This could reflect different collecting methods

Reptiles and Amphibians

Species	Common Name	Notes / location
<i>Niveoscincus metallicus</i>	Metallic skink	Specimen found dead in swamp at 0318778 5519329
<i>Niveoscincus metallicus</i>	Metallic skink	Trapped Heath A; Line 6; pitfall No 4, Shearwater A, bucket
<i>Niveoscincus metallicus</i>	Metallic skink	2 dead on track towards big airport 0318569/5519278
<i>Pseudemoia entrecasteauxii</i>	Southern grass skink	Skink-Hummock Is 6/12/06
<i>Pseudemoia entrecasteauxii</i>	Southern grass skink	Collected Shearwater A transect, pitfall site 3
<i>Egernia whitii</i>	White's skink	Dried specimen collected on track to large airport
<i>Egernia whitii</i>	White's skink	Brent's trap line Elliott trap no 17 – released alive
<i>Egernia whitii</i>	White's skink	Observed in tool shed below Lodge, others sited nearby areas
<i>Tiliqua nigrolutea</i>	Blue tongue lizard	Widespread over island – often seen on tracks
<i>Notechis ater</i>	Tiger snake	Common in grassland and open areas, hunting at night
<i>Austrelaps superbus</i>	Copperhead snake	In tussock near main homestead
<i>Drysdalia coronoides</i>	W-I whip snake	In tussock near main homestead
<i>Litoria ewingii</i>	Brown tree frog	Calling near homestead, photographed by caretakers
<i>Limnodynastes d. variegatus</i>	Mottled banjo frog	Dessicated adult collected on track near homestead



Mole Cricket, *Teleogryllus australis*.
Photo Sally Bryant

and areas sampled. *S. sp.* "Hunter" was collected in 1997 and occurs on the Hunter Group islands and at Woolnorth Point. A single marine gastropod shell was found in the samples from an unknown source but was not identified.

Coleoptera - the sample of beetles was very diverse for the small number of specimens with 72 morpho-species from only 330 specimens. The sample was dominated by staphylinids and weevils with tenebrionids also prominent - carabids and leoidids were scarce. The most numerous species, the staphylinid *Quedius* TFIC 07, was found only in one sample, hence the most common species in the samples as a whole was the tenebrionid *Saragus infelix*. There were a number of apparently un-described species that could not be placed even to a known un-described species in the TFIC collections (for example "Carabid NIC Lebiinae nr *Phloeocarabus*") - many of these may be present in other collections but some may also be entirely new.

Hemiptera (bugs) – There were about 21 morphospecies from 103 specimens - with quite a lot of diversity for few specimens. Leafhoppers were particularly numerous and require further identification to species level. Millipedes – samples contain at least one new millipede record for the island with potentially others being collected. Interestingly, Fleas were collected in the pitfall traps from the "Shearwater" colony sites.

Onychophora (velvet worms) - A dedicated search was undertaken for peripatus (velvet worms) in rotting logs in wet eucalypt forest on the eastern slopes of South Hummock. Three rotting logs were destructively sampled and one single velvet worm (picture taken) was collected and provided to Dr Bob Mesibov (Queen Victoria Museum) for identification.

Orthoptera – Additional species of grasshopper fauna were collected by incidental observation and by using a butterfly net (information shown below). While an effort was made to target habitat types known to be suitable for Schayers grasshopper *Schayera baiulus*, none were found.

The Raspy cricket, *Kinermania sp. 2* is an undescribed species that is known to occur in Tasmania. A number of specimens occur in CSIRO entomology's collection awaiting description. A large Mole Cricket was collected and photographed in grassland near the Lodge.

Orthoptera Species	Family	Habitat / Site
<i>Tasmaniacris tasmaniensis</i>	Acrididae	Coastal heath and shrubland, dry eucalypt forest
? <i>Tasmaniacris tasmaniensis</i>	Acrididae	Shearwater A Orthoptera 1
?	Acrididae	Grassland B Sweep Orthoptera 1
?	Acrididae	Shearwater B Orthoptera 2
?	Acrididae	Forest A Orthoptera 1
<i>Kinermania sp. 2</i>	Gryllacrididae	Grassland A Orthoptera 3
?	?	Grassland A Orthoptera 3
<i>Parvotettix goedi</i>	Rhaphidophoridae	Forest B Orthoptera 2
<i>Tasmaniacris tasmaniensis</i>	Acrididae	1323122 5521205 WP78 ME
Acrididae (various nymphs)	Acrididae	Acacia sphaerae coastal heathland, dry eucalypt forest
<i>Tasmaniacris tasmaniensis</i>	Acrididae	Swamp plot #1
<i>Tasmaniacris tasmaniensis</i>	Acrididae	GDA 325772 5524428
?	Acrididae	Near the grassland



Phil Bell surveying *Carex appressa* sedgeland for butterflies. Photo Justine Shaw

Lepidoptera

In addition to Appendix B additional specimens of butterflies and moths were collected by hand net and incidental collection. A list is provided below.

Moth / Butterfly Species	Common Name	Habitat	Locality
<i>Hesperilla donnysa</i>	Donnysa Skipper	<i>Gahnia grandis</i> in <i>M. ericifolia</i> and Wet <i>E. nitida</i> forest	Larvae at Emerald swamp
<i>Hesperilla idothea</i>	Flame Skipper	<i>Gahnia grandis</i> in <i>M. ericifolia</i>	Larvae at Emerald swamp
<i>Pieris rapae</i>	Cabbage White*	Most habitat types	Across island
<i>Heteronympha merope</i>	Common Brown	Most habitat types	Across island
<i>Heteronympha penelope</i>	Shouldered Brown	Most Habitat types	Across island
<i>Vanessa itea</i>	Australian Admiral	Most habitat types	Across island
<i>Vanessa kershawi</i>	Painted Lady	Most habitat types	Across island
<i>Zizina labradus</i>	Common Grass-blue	Grassland and coastal heathland	Most common on western side of island associated with old farmland

A large number of sites supporting *Carex appressa* were visited and searched for shelters of Marrawah Skipper *Oreisplanus munionga larana*. Two suitable habitat types were present, *C. appressa* sedgeland, and *Melaleuca ericifolia* swamp forest and scrub. Sites examined included small patches of habitat between Big Lagoon and the northern end of West Telegraph Beach, depressions supporting suitable habitat between Signal Hill and South Hummock, and extensive areas of *C. appressa* sedgeland surrounded by

M. ericifolia swamp forest at Emerald swamp. No evidence of this species was detected in any suitable habitat on the island. From this assessment it is likely that the Marrawah Skipper does not occur on Three Hummock Island. This conclusion is supported by the lack of evidence gained from searches for this species during recent trips to nearby King Island and Robbins Island in 2007 (P. Bell pers. comm.).

Engaeus

Burrowing crayfish burrows were observed in the creek behind the coastal dune system draining Rendezvous and Swamp Lagoon. Extensive areas of burrowing crayfish burrows were also observed in the Emerald Swamp area where various carapace parts and claws were collected. A live specimen was collected from Rendezvous Lagoon and later identified as *Engaeus cunicularius*, a species common to the Bass Strait Islands (N. Doran pers. comm.).

Species	Habitat	Locality
<i>Engaeus cunicularius</i>	Swamps, wet drainage lines	Burrows at Emerald Swamp and Rendezvous Lagoon

Discussion

Vegetation and Flora

Vegetation Communities

The vegetation of Three Hummock Island shows similarities to other Bass Strait islands with granite substrates, but has a number of unique features which differ from vegetation communities on the Tasmanian mainland. This means that classification into TASVEG vegetation classes can be difficult. European visitors over the past 200 years have generally reported Three Hummock Island to be scrub-covered, at times very densely so. It would appear that over the last 200+ years the island's vegetation has passed through a number of cycles, each one ending with fire, the most recent cycle having been initiated in 1982-4. Clearing for farming has occurred on parts of the island since the mid 1880's and after 1951 the dunes were kept clear by annual burning (Harris and Balmer 1997). In places exotic grasses were sown and there were periods of regular top dressing with superphosphate and trace elements. Cultivation was largely restricted to the homestead paddocks and a small area west of East Telegraph Beach (Rob Alliston, in Harris and Balmer 1997) but these areas have regenerated and can no longer be classed as agricultural land (FAG).

Today nearly one third of the island is covered by dry eucalypt forests, including a few protected areas where the trees are likely to be more than 50 years old. The remainder of the vegetation is short *Melaleuca ericifolia* forests, inland and coastal scrubs and coastal tussock grasslands, with small patches of rookery vegetation and remnant wetlands.

The vegetation map resulting from the present survey and re-interpretation of the 2001 air-photos will replace the current TASVEG 1.0 map in the next release of TASVEG. This mapping recognises 14 TASVEG vegetation communities, 5 being of conservation significance at a State level:





Figure 9. *Prasophyllum atratum* on the airstrip on Three-Hummock Island.

Photo Justine Shaw

The current study had as its principal aim describing and quantifying changes to vegetation which have taken place with the change from a regime of patchy grazing and high fire frequency to one under which fire, cattle and sheep have been largely absent. The baseline is a vegetation map derived by interpretation of aerial photography flown in 1993, and informed by a detailed vegetation survey carried out by Harris and Balmer, who visited the island in 1995. This map is compared with one derived from 2001 photography, with interpretation guided by field observations made in 2006 by two of the authors.

New techniques have been developed to allow progressive changes in vegetation to be measured from airphotos.

The greatest changes have occurred on the alkaline dune systems situated behind the northwestern and southwestern coasts of the island. Grazing and yearly firing began in the 1950's and ceased in 1976, but the island was again extensively burned in 1982-84. Since then there has been no significant firing or grazing pressure from domestic animals, and the changes now observed were starting to happen before the vegetation survey carried out in 1995 (Harris and Balmer, 1997).

Three Hummock Orchid

Given that the population of *Prasophyllum atratum* is small, and this is the only known occurrence of species, the site has high conservation significance. Regularly monitoring of the population should be undertaken to determine temporal flux in population numbers and any impacts of slashing and burning. Bryophytes are likely to be important at the site as they maintain humidity at the surface of the free draining sandy soil at this exposed site. Other studies have shown that bryophytes can act as propagule traps, with their presence stimulating recruitment of fine seeded species such as orchids. Bryophyte cover may also be

Table 2 Comparison of Vegetation Classes

Harris & Balmer Map	H & B species list	TASVEG (Rankin)	Corbett, Stebbing & Hargraves
bare sand	-	OSM Sand/mud	OSM Sand/mud
not mapped	-	ORO Lichen lithosere	ORO Lichen lithosere
wetlands and lagoons	acid wetlands calcareous wetlands	AWU Wetland (undifferentiated)	AHL Lacustrine herbland AHL Lacustrine herbland
pasture, cleared land, marram	pasture, horticulture	FAG Agricultural land FRG Regenerating cleared land	FAG Agricultural land FRG Regenerating cleared land
coastal	coastal vegetation calcareous grasslands	GHC Coastal grass and herbfield	SAC <i>Acacia longifolia</i> coastal scrub SSC Coastal scrub GHC Coastal grass and herbfield
some rookeries indicated	rookery vegetation	not mapped	SRC Seabird rookery complex
scrub on calcareous sand	calcareous scrub	SCA Coastal scrub on alkaline sands	SCA Coastal scrub on alkaline sands
sedgeland and heath	sedgeland heath	SHW Wet heathland SHL Lowland sedgy heath	not mapped not mapped
scrub on acid sands	acid scrub	SDU Dry scrub	SDU Dry scrub SWW Western wet scrub
not mapped	<i>Melaleuca</i> swamp forest	not mapped	NME <i>Melaleuca ericifolia</i> Swamp forest
<i>E. viminalis</i> woodland and forest	<i>E. viminalis</i> forest	DVG <i>E. viminalis</i> grassy forest and woodland	DVC <i>E. viminalis</i> - <i>E. globulus</i> coastal forest and woodland
<i>E. nitida</i> (<i>E. ovata</i>) forest	-	DOW <i>E. ovata</i> heathy woodland	DOV <i>E. ovata</i> forest and woodland
<i>E. nitida</i> woodland and forest	<i>E. nitida</i> forest	DNI <i>E. nitida</i> dry forest and woodland	DNI <i>E. nitida</i> dry forest and woodland



Matt Webb checking Shearwater burrows.
Photo Justine Shaw

necessary for the symbiotic mycorrhizae associated with the orchid species. Any proposal to spray the airstrip to reduce bryophyte cover must consider the role of bryophytes in the *P. atratum* survival.

The species meets the criteria for listing under State and Commonwealth threatened species legislation.

Fauna

Mammals

Extensive walks were carried out in what appeared to be suitable forester kangaroo habitat (including burned tussocks) and the count areas remain the core population centre. Although numbers of kangaroo in 2006 appeared to be down significantly from those obtained in October 1999 (Tanner and Hocking 2000), breeding was still common with a high proportion of young at foot and pouch young. If anything, there appeared a dearth of large, adult males and that part of the population appeared to be over-represented amongst desiccated carcasses. No fresh carcasses were seen.

Searches for other macropods in the best of the habitat across the island showed just a very few Tasmanian Pademelon (three live, one dead, occasional footprints and scats). The reduction to almost local extinction of Pademelon is a cause for concern as in 1958 Alliston (1966) estimated the population to be about 60,000. These high numbers lead to Three Hummock Island becoming a thriving base for the meat and fur trade as well as the laying of 1080 poisoning. Tanner and Hocking (2000) report that Forester Kangaroo can out-compete and displace Tasmanian Pademelon therefore this significant reduction may have been caused by a variety of factors.

The observation of dead Ringtail Possums along the tracks suggests that

the species may be relatively common on the island. The die-off may be caused by drought as well as Feral Cat predation as no damage to the fresh carcasses was observed.

In general, the low diversity and decline in density of mammals could well be a reflection of the recent and ongoing drought conditions over the island leading to a lack of free standing freshwater.

Suitability for Tasmanian Devil Translocation Site

Without culling to provide carcasses, neither the Forester Kangaroo or Tasmanian Pademelon populations could provide an ongoing food supply for more than a very few Tasmanian Devils (the incidental death rate of kangaroos appears low). While there appear to be several hundred Cape Barren Geese on the island it is likely that the breeding of these geese would quickly collapse if any devils were released. Transferring experience of devils and geese on Badger Island (Mooney pers. com.) shows that even if they nest in trees the goslings must graze and are very vulnerable to devil predation. From the many dried carcasses of Ring-tailed Possums along forested tracks it appears the species may be common. Night walks and searches for drays, however, suggested abundance must be localised and the population insubstantial for devils. A large shearwater colony would provide temporary seasonal food for Devils, though Feral Cats appear reasonably common on the island and are likely to compete for this food resource more effectively. Conclusions from this study indicate that Three Hummock Island is not suitable as a release site for disease free-Tasmanian Devils unless a significant and sustained supply of food was supplied.

Feral Cats

Feral Cat activity was evident on most

beaches and tracks. Seabird carcasses and scats revealed Little Penguins and mutton birds frequently in cat diet. A wide variety of prey species are available to cats, with mammals, birds and invertebrates all present in one cat stomach. Cats predate adult Ring-tailed Possum and are likely to prey more heavily on these during the winter months when seabird numbers are low. The current dryness of the island appears to be affecting Feral Cat numbers, with the single female caught showing very lean body condition, likely contributing to her non-breeding status (ie. not pregnant or lactating). If an eradication of cats was to be considered, it may be preferable to undertake an integrated pest management program that includes rats and mice. The density of the vegetation across the island may hinder eradication efforts, but keeping the tracks clear would provide access corridors for both cats and control methods. New poisons and baiting methods are becoming available which may provide assistance in these situations.

Birds

The list of 67 bird species recorded during this survey and those recorded from nearby Hunter Island (Bryant and Holdsworth 1992, Skira 2001) reflect a typical mix of resident and transient species that can move seasonally and even daily between islands and the mainland depending on conditions and resources.

This study has highlighted the need for further mapping of the extent of Short-tailed Shearwater colonies on Three Hummock Island to generate more reliable population estimates. The location of seabirds colonies inspected during this expedition was markedly different from that reported in Brothers et al. (2001). Short-tailed Shearwaters were recorded in the same general locations identified in Skira et al. (1995)

although the colony extent was not reported for all colonies. The extent of Short-tailed Shearwater colonies found during seabird surveys was considerably different to that reported in Brothers et al. (2001). Burrow densities were higher than those reported for Home, Mermaid and South Paddock colonies by Skira et al. (1995). This survey utilised similar methodologies for estimating density, and it does appear that Home colony has increased both in area and density. Short-tailed Shearwater were predominantly found nesting in both *Poa* sp dominated areas, and areas of succulents (*Tetragonia implexicoma*, *Rhagodia candolleana*, *Carpobrotus rossi*). It is recommended that delineation of Short-tailed Shearwater colonies from vegetation mapping be incorporated to provide realistic colony areas.

The locations of high density penguin areas reported in Brothers et al. (2001) were most likely related to mapping errors as few penguins were reported at these sites. However, at Burgess Point, Alan Wiltshire (unpublished data) recorded 80-100 pairs of Little Penguins in 1999. During this survey, no evidence of penguins was recorded but there was evidence of a recent fire which extended from the end of West Telegraph Beach to Burgess Point. If penguins were nesting in vegetation at this site then fire is most likely responsible for their absence.

Differences in the distribution of Short-tailed Shearwaters and Little Penguin between this study and Brothers et al. (2001) may have resulted from several factors, including local extinctions, natural fluctuations in seabird distribution or errors in colony mapping. Field researchers conducting the seabird distribution mapping reported in Brothers et al. (2001) were most likely constrained by the large size of the island and limited time to conduct

surveys. The information collected during the present survey provides valuable data for future seabird monitoring on the island. The Oil Spill Response Atlas database will be updated from the findings of the Three Hummock Island survey. Colony mapping and population estimates from the Home Short-tailed shearwater colony provides baseline data to assess potential impacts of a proposed tourism development adjacent to the colony.

Shorebirds

Hooded Plover and Pied Oystercatcher were observed breeding on all sandy beaches, however, shorebird diversity was relatively low and no Fairy Tern, Little Tern or Red-capped Plover were observed breeding and only one migratory shorebird species sighted. Sandy beach breeding habitat is rapidly being lost due to invading weeds especially Marram Grass and Euphorbia causing steep beach profile and unsuitable conditions. Feral Cats are also likely to be preying chicks. Lack of creek and estuary habitats, dryness and reduced wetlands means that habitat for migratory species is limited. Larger nearby islands such as Hunter and King Island may be alternative sights for shorebirds during times of drought stress and un-favourable seasons and there is likely to be regular movement by species throughout this larger region.

Herpetological Fauna

The reptile fauna recorded on Three Hummock Island is similar to that on nearby Hunter Island as reported previously (Green and Rainbird 1993, Skira 2002) and consistent with the ranges of these reptile species throughout the Tasmanian mainland and northwest offshore island sector (Hutchinson et al. 2001). Tiger snakes were numerous as were White's Skink and Metallic Skink. More focused trapping in grassland areas in the future may reveal additional species which

were expected but not found during this survey such as the Eastern Three-lined Skink *Bassiana duperreyi* and Tasmanian Tree Skink *Niveoscincus pretiosus*. Skira recorded Banjo Frog (occasional), Brown Tree Frog (common) and Common Froglet (abundant) on Hunter, the latter not being recorded on Three Hummock Island during this survey. The small number of frog species detected reflects the lack of wetland areas and waterbodies on the island and the recent drought.

Invertebrates

Further investigation of invertebrate samples will yield a clearer picture of Three Hummock Island invertebrate diversity, however, some interesting species were identified during this survey including a yet to be identified species of peripatus and *Engaeus cunicularius*. Three Hummock Island remains a key location for the threatened Keeled Snail, however, its continued survival will be enhanced by the eradication of Peacocks and Ring-necked Pheasant. Both these bird species are introduced to the island and are known to scratch and forage through leaf litter and disturb the understorey. Although Bonham (1997) described the Keeled Snail as being reasonably tolerant to a wide range of environmental conditions, fire should be excluded from areas of wet forest with dogwood *Pomaderris*, musk *Olearia argophylla* or manfern *Dicksonia* in the understorey (Bryant and Jackson 1999). Appendix B is an invaluable resource on which to build a clearer picture of invertebrate diversity.

Volunteer reports

Jacqueline McGowan

Participating as a volunteer in the Three Hummock Island wildlife survey provided me with an opportunity to work alongside specialists and learn about Tasmania's wildlife and the role islands play in the preservation of endangered species. The Three Hummock Island team was a great group of people, all passionate and so generous with their knowledge. I was able to learn a little about many of their specialties - a tasting plate of Tasmanian flora and fauna. I felt I was able to make a significant contribution to the team and that I came away with a barrage of new skills and knowledge. I observed the logistics and planning involved in taking a large team, with a mountain of equipment, to an offshore island and some of the challenges in trying to do a detailed wildlife survey on a very large island. I learnt a variety of survey methods, including the use of various traps, and I learnt how to identify species, particularly birds and reptiles. I am sure that I will learn even more when I see how all the information we gathered is brought together in a report.

I was involved in the laying of trap lines in a variety of habitats and the consequent re-baiting and processing captures each day. I helped search for eagle eyries (nests) and it was interesting learning about the sort of trees eagles prefer to nest in and some of the signs that raptors leave, such as white wash and pellets. We hunted for orchids on the main airstrip and identified leek, bearded and potato orchids, all seemingly reliant on the slashing of the airstrip for their habitat.

I assisted with counts of Forester Kangaroos, which were introduced to the island in 1975. The aim was to walk along a transect and count all the

kangaroos we saw, putting each one into its correct demographic group. With so many moving kangaroos it was very challenging to keep track of them all and not count any twice, let alone to identify sex and age group. While checking all the trap lines one day we walked up south hummock to get a view of the island. On the way down we had a rummage in the leaf litter by the track, with hopes of finding a keeled snail. We found two lovely little snails and were ecstatic when we identified one as the keeled snail we were looking for. I was fascinated by the diversity of invertebrates to be found and I would love to have stayed in Tasmania longer so I could help identify them all.

I saw lots of different birds, some of which we also have in New Zealand. I had never had the opportunity to see Little Penguin and Shearwater colonies before and I was amazed at the density of the populations – the walls of their burrows must have been very thin! It was very interesting to learn that sometimes an introduced weed can be important to the preservation of a species, in this case Boxthorn which provides an excellent protective cover for Little Penguins. One of my favourite birds was a Satin Flycatcher we saw while searching for the eagle nests. Another was a Shy Albatross. It was awesome using the scope and being able to clearly see the identifying features on the albatross.

I learnt what to do if you have a scary close encounter with a snake and to ignore the suggested serving size on the pasta packet and to take the advice of a person who has catered for 10 people many times more than myself. And strangest of all, I learnt that the genitals of all male marsupials are arranged the other way round to any other mammal – I'm still trying to figure out why.

It would have been really good to be involved in the process of sorting and

identifying specimens and creating the report after leaving the island as this isn't feasible once back in New Zealand. I understand that previous volunteers have also felt that they wanted to be involved in the write-up and it would also allow more substantial relationships to be formed by the volunteers with the staff at DPIWE. Alternatively more contact and time before the survey (which wasn't feasible this year due to short timeframes) could allow volunteers to take on a section of the survey and contribute to the background research, surveying and write-up of that aspect.

I think the most important outcome for me was a renewed passion for our environment and greater understanding of what needs to be done to preserve it. The experience has given me the drive and confidence to pursue a career in conservation and confirmed for me that my passion really lies with endangered species and pest management. I hope that the HSMT will continue to consider applications from people who may not seem as obvious a choice as other applicants who have already demonstrated their commitment to conservation. I think it's important to recognise that people who aren't already employed in conservation are still able to have significant impacts on conservation and that one enthusiastic person is likely to rub off on many others.

Brent Barrett

Imagine a world where giant, ancient looking birds roam. A haven where two legged grazing mammals bounced from paddock to tussock covered hillside. This is the world in which I found myself while participating in an ecological survey with the Hamish Saunders Memorial Trust. At just 7000 hectares the island is comprised of over 20 sandy beaches and rocky inlets, with

the main feature being three prominent hills which, when viewed from a distance, resemble three independent islands in a blue horizon. Our landing was idyllic and contrasted greatly with our preconceived ideas. Having spent the better part of 7 years researching on off-shore islands I considered my mental picture of the island to be the most accurate, however I was gladly mistaken. Packing accordingly I carried multiple layers of wet weather gear, tough walking boots and a bag of batteries to allow continued use of my camera in the absence of power. Absence was exactly what the island did not have. Here our ready-made research base came with everything you could desire, two incredibly eager and helpful caretakers with an overwhelming interest in ornithology, a house with solar power, running water, a book shelf and comfort oozing from every room. Obliging wildlife that included little penguins, Cape Barren geese, forest kangaroos, short tailed shearwaters, gannets, hooded plovers, a handful of bush birds (many endemic to Tasmania) possums in their natural setting (unique from a New Zealand perspective), skinks, eagles, butterflies and all manner of things in between.

It fell upon our likely team of 10 to locate and document the occurrence and distribution of these creatures. Furthermore the flora was to be mapped, collected and pressed. Many orchids still adorned the airport runway and track sides, with their delicate beauty and grit determination to occupy all areas, regardless of disturbance. A circus sized wagon of equipment had been hastily unloaded on the rickety wharf. This included small marsupial traps, buckets for pitfalls, bat traps, cages, butterfly nets, maps, compasses and all manner of GPS and camera equipment. The happy bunch of hard workers included a special cargo, myself and Jack both from 'across the ditch' as they say. We were the common bond between what Hamish and other like minded people considered important. The bond between international knowledge and skills and local species in need of conservation. Only through the flow of ideas and energy that is so typical of Australia and New Zealand can the common goal of better conservation be achieved.

An opportunity to participate in such an important survey doesn't come often, and I am grateful to those that facilitated my involvement. But I think the presence of Jack was more rewarding to me. Before long she was keying out lizards, identifying good trapping practices and thrashing through the bush with the best of them. To me the strength of this event is opening people's eyes to the conservation practices in the presence of highly motivated individuals such as these fine Tasmanians (of which perhaps two were actually Tasmanian born).

Personally, the chance to participate in this year's Hamish Saunders Memorial Trust presented an opportunity to commemorate a lifestyle I understand well - a way of life that is driven by an overwhelming desire to achieve positive conservation outcomes. I understand this motivation and know that sometimes in life a cause is worth fighting for; and often this takes us to the extremes of the wilderness in which we see more wildlife than most people encounter in a lifetime. For these reasons I was humbled by those who set up the trust and those who contribute toward its important work. For in that action they commemorate not only Hamish Saunders but people like him all across the globe.



*New Zealand volunteers,
Jacqueline McGowan and Brent Barr*

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Appendix A Location of survey sites

Locations of sampling points on transects in each vegetation community Grassland, Eucalypt Forest, Shearwater Colony, 3 Heathy Scrub, 4 Grassland, 5 Coastal Mosaic, 6 Sedgeland (A, B replicates). GPS Datum is GDA 94.

Trap Lines	Easting	Northing	Notes
Grassland Community A	0318420	5519278	Start of Grassland community A Big Airstrip – line of 5 traps
Grassland A – 1	0318415	5519270	
Grassland A - 2	0318418	5519230	Bucket buried at site 2
Grassland A – 3	0318457	5519243	
Grassland A – 4	0318381	5519217	
Grassland A – 5	0318343	5519218	
Grassland Community B	0316912	5520719	Start of Grassland community B Little Airstrip – line of 5 traps
Grassland B – 1	0316937	5520722	
Grassland B - 2	0316966	5520721	
Grassland B – 3	0317000	5520720	
Grassland B – 4	0317052	5520711	
Grassland B – 5	0317097	5520701	GPS site of swamp harrier nest – ? used last year
Eucalypt Forest A	0318569	5519278	Start of Forest community A – line of 5 traps
E Forest A – 1	0318569	5519300	
E Forest A – 2	0318566	5519320	
E Forest A– 3	0318557	5519343	
E Forest A – 4	0318556	5519374	
E Forest A – 5	0318540	5519406	
Eucalypt Forest B	0319920	5518391	Start of Forest community B - line of 5 traps / sighted Satin Flycatcher here
E Forest B - 1	0319918	5518411	
E Forest B - 2	0319940	5518438	Sweep sample collected from here 6/12/06
E Forest B - 3	0319966	5518459	
E Forest B - 4	0319992	5518448	
E Forest B - 5	0320014	5518465	
Damp Scrub A	0318816	5519261	Start Scrub Community A on Swamp Ck - Possums disturbed trap line
D Scrub A – 1	0318821	5519282	
D Scrub A – 2	0318823	5519318	
D Scrub A – 3	0318868	5519312	Skink + land snail shells (? Shrike thrush) at 0318778 / 5519329 on 4/12/06
D Scrub A – 4	0318789	5519330	
D Scrub A – 5	0318766	5519326	
Damp Scrub B			Dead Melaleuca stem swamp veg towards small airstrip
D Scrub B – 1	0316929	5520772	
D Scrub B – 2	0316941	5520779	

Trap Lines	Easting	Northing	Notes
D Scrub B – 3	0316954	5520781	
D Scrub B – 4	0316967	5520779	
D Scrub B – 5	0316988	5520780	
Bryant's Line Start	0319906	5518383	19 Elliots set 4/12/06 – collected 5/12/06 – no captures
Bryant's Line End	0319959	5517558	? button quail spins on track – circles droppings in centre 0319965 / 5517686
Brent's Line Start	0319914	5518368	25 Elliots set 4/12/06 – collected 5/12/06
Brent's Line End	0320998	5517862	White's Skink caught at Elliot No 17
Heath Community A			
Heath A – 1	0323125	5519616	Start position of line containing 5 traps – 25 m spacing
Heath A - 2	0323135	5519592	Start position of line containing 5 traps – 25 m spacing
Heath A - 3	0323129	5519575	Start position of line containing 5 traps – 25 m spacing
Heath A - 4	0323125	5519557	Start position of line containing 5 traps – 25 m spacing
Heath A - 5	0323104	5519484	Start position of line containing 5 traps – 25 m spacing
Heath Community B			Trap line further along main track back to Homestead
Heath B – 1	0323104	5519484	Start position of line containing 4 traps – 25 m spacing
Heath B - 2	0323083	5519487	Start position of line containing 4 traps – 25 m spacing
Heath B - 3	0323060	5519499	Start position of line containing 4 traps – 25 m spacing
Heath B - 4	0323049	5519506	Start position of line containing 4 traps – 25 m spacing
Heath B - 5	0323039	5519513	Start position of line containing 4 traps – 25 m spacing
Shearwater Colony A			Situated behind Lodge homestead. Traps set 5/12 – 2 lines of 5 traps
Shearwater A – 1	0316497	5520626	
Shearwater A – 2	0316477	5520628	6/12 Metallic skink in Bucket Trap
Shearwater A– 3	0316455	5520628	
Shearwater A – 4	0316433	5520630	
Shearwater A – 5	0316404	5520628	6/12 – 1 House Mouse
Shearwater Colony B			Transect line continued below and to the left of line A
Shearwater B – 1	0316368	5520632	
Shearwater B – 2	0316372	5520603	
Shearwater B – 3	0316374	5520564	
Shearwater B – 4	0316389	5520542	
Shearwater B – 5	0316416	5520514	
Harp Trap 1	0317913	5519685	Harp trap set across track in forest corridor
Harp Trap 2			Water bore near main homestead

Appendix B Analysis of Invertebrate Samples

Sample Gastropoda	Rhytididae	Charopidae	Charopidae	Charopidae	Helicarionidae	Limacidae	Helicidae			Sample Coleoptera	Carabidae	Carabidae	Carabidae
	Tasmaphena lamproides	Thryasona diemenensis	Stenacapha hamiltoni	Stenacapha sp. "Hunter"	Helicarion cuvieri	Lehmannia nyctelia (Introduced)	Helix aspersa (introduced) marine gastropod shell	TOTAL	MOLLUSCS	Anomotarus illawarrae	Notonomus chalybeus	Promacoderus gibbosus	
Dry creek							2	2					
Snails damp scrub GPS 0318778/5519329							4	4					
Track E Telegraph c.4km from lodge							1	1					
Leaf litter Sth Hummock ("0317838 5521615")	1				3			4					
Rotten log 0319281 5521721	1		4				1	6					
Tower track collected by P. Bell	2	9	4	5	1			21					
Slope of N Hummock 30m from 325392 5524709								0					
Leaf litter N Hummock GPS 0325392 5524709					3			3					
Litter N Hummock 325612 5524774				3				3					
GPS 0325374 5524561					3			3					
Damp Scrub A bucket trap								0		1			
Heath A bucket trap								0					
Shearwater A bucket trap								0					
Grassland A bucket trap								0					
Forest A bucket trap								0					
Forest B bucket trap								0					
Sth Hummock GPS 321924 5517513 bucket trap		1	1	1				3			5	7	
Shearwater B pitfall trap								0					
Grassland B pitfall trap								0					
Damp Scrub B pitfall trap								0					
Forest A pitfall trap								0					
Heathland A pitfall trap								0					
Grassland A pitfall trap						1		1					

Sample Gastropoda	Rhytididae	Charopidae	Charopidae	Charopidae	Helicarionidae	Limacidae	Helicidae			Sample Coleoptera			
	Tasmaphena lamproides	Thryasona diemenensis	Stenacapha hamiltoni	Stenacapha sp. "Hunter"	Helicarion cuvieri	Lehmannia nyctelia (Introduced)	Helix aspersa (introduced) marine gastropod shell	TOTAL	MOLLUSCS	Anomotarus illawarrae	Notonomus chalybeus	Promacoderus gibbosus	
Forest B pitfall trap								0					
Shearwater A pitfall trap								0					
Shearwater B pitfall trap								0					
Grassland A sweep net								0					
Grassland B sweep net								0					
Heath A sweep net								0					
Heath B sweep net								0					
Shearwater A sweep net								0					
Shearwater B sweep net								0					
Forest B sweep net								0					
Forest B sweep net 7/12/06								0					
Damp Scrub A sweep net							2	2					
Damp Scrub B sweep net								0					
TOTAL	4	10	9	9	10	1	9	1	53		1	5	7

	Lestignathus foveatus	Carabid NIC Lebiinae nr Phloeocarabus	Sloaneana tasmaniae	red hairy anobiid?	Microchaetus hystricosus	Paropstisterna (not bimaculata) - wing cover only	black ridged small ladybird	Phalidurus pencillatus	Mandalotus sp TFIC 07	Mandalotus sp nr TFIC 09,10	Pseudometryrus nr antares	Mandalotus nr muscivorus nr sp 14	Mandalotus muscivorus
	Carabidae	Carabidae	Carabidae	Anobiidae?	Byrrhidae	Chrysomelidae	Phalacridae?	Curculionidae	Curculionidae	Curculionidae	Curculionidae	Curculionidae	Curculionidae
Dry creek													
Snails damp scrub GPS 0318778/5519329													
Track E Telegraph c.4km from lodge													
Litter Sth Hummock ("0317838 5521615")													
Rotten log 0319281 5521721													
Tower track collected by P. Bell													
Slope of N Hummock 30m from 325392 5524709													
Leaf litter N Hummock GPS 0325392 5524709													
Euc litter N Hummock 325612 5524774													
GPS 0325374 5524561													
Damp Scrub A bucket trap													
Heath A bucket trap													
Shearwater A bucket trap													
Grassland A bucket trap													
Forest A bucket trap													
Forest B bucket trap													
Sth Hummock GPS 321924 5517513 bucket	6								5	5		2	14
Shearwater B pitfall trap													
Grassland B pitfall trap													
Damp Scrub B pitfall trap													
Forest A pitfall trap													

	Carabidae	Carabidae	Carabidae	Anobiidae?	Byrrhidae	Chrysomelidae	Phalacridae?	Curculionidae	Curculionidae	Curculionidae	Curculionidae	Curculionidae	Curculionidae
	Lestignathus foveatus	Carabid NIC Lebiinae nr Phloeocarabus	Sloaneana tasmaniae	red hairy anobiid?	Microchaetus hystricosus	Paropstisterna (not bimaculata) - wing cover only	black ridged small ladybird	Phalidurus pencillatus	Mandalotus sp TFIC 07	Mandalotus sp nr TFIC 09,10	Pseudometryrus nr antares	Mandalotus nr muscivorus nr sp 14	Mandalotus muscivorus
Heathland A pitfall trap													
Grassland A pitfall trap										1			
Forest B pitfall trap									2		3	2	
Shearwater A pitfall trap							2						
Shearwater B pitfall trap										1			3
Grassland A sweep net										1			
Grassland B sweep net													
Heath A sweep net													
Heath B sweep net													
Shearwater A sweep net													
Shearwater B sweep net				11									
Forest B sweep net				1									
Forest B sweep net 7/12/06													
Damp Scrub A sweep net													
Damp Scrub B sweep net													
TOTAL	6	1	1	12	1	1	2	1	8	8	3	4	17

	Roptoperus tasmaniensis	Exithius sp	Paracardiophorus sp. (humilis?)	Conoderus australiasiae	Conoderus ?cordieri	Eucinetus sp TFIC04?	Aridius costatus	Nargomorphus TFIC02	Lissotes sp. (female)	Thalycrodes australe	Notobrachypterus NIC	Heteronyx pilosellus	Heteronyx crinitus	Heteronyx sp TFIC 03	scirtid2 - colourful	scydmaenid 1 - v smooth
	Curculionidae	Curculionidae	Elateridae	Elateridae	Elateridae	Eucinetidae	Latridiidae	Leiodidae	Lucanidae	Nitulidae	Nitulidae	Scarabaeidae	Scarabaeidae	Scarabaeidae	Scirtidae	Scydmaenidae
Dry creek																
Snails damp scrub GPS 0318778/5519329																
Track E Telegraph c.4km from lodge																
Litter Sth Hummock ("0317838 5521615")																
Rotten log 0319281 5521721																
Tower track collected by P. Bell																
N Hummock 30m from 325392 5524709																
Litter N Hummock GPS 0325392 5524709																
Litter N Hummock 325612 5524774																
GPS 0325374 5524561																1
Damp Scrub A bucket trap																
Heath A bucket trap																
Shearwater A bucket trap																
Grassland A bucket trap																
Forest A bucket trap												1				
Forest B bucket trap							1									
Sth Hummock GPS 321924 5517513 bucket	1	1		10		3	1	3		3		3				
Shearwater B pitfall trap																
Grassland B pitfall trap												1				
Damp Scrub B pitfall trap																
Forest A pitfall trap																
Heathland A pitfall trap							2		1				1			
Grassland A pitfall trap			4											1		1
Forest B pitfall trap				1			2	7		4	1					

	Roptoperus tasmaniensis	Exithius sp	Paracardiophorus sp (humilis?)	Conoderus australiasiae	Conoderus ?cordieri	Eucinetus sp TFIC04?	Aridius costatus	Nargomorplus TFIC02	Lissotes sp. (female)	Thalycrodes australe	Notobrachypterus NIC	Heteronyx pilosellus	Heteronyx crinitus	Heteronyx sp TFIC 03	scirtid2 - colourful	scydmaenid 1 - v smooth	Curculionidae	Curculionidae	Elateridae	Elateridae	Elateridae	Eucinetidae	Latridiidae	Leiodidae	Lucanidae	Nitulidae	Nitulidae	Scarabaeidae	Scarabaeidae	Scarabaeidae	Scirtidae	Scydmaenidae		
Shearwater A pitfall trap																																		
Shearwater B pitfall trap			5		1			2																										
Grassland A sweep net																																		
Grassland B sweep net																																		
Heath A sweep net																																		
Heath B sweep net																																		
Shearwater A sweep net																																		
Shearwater B sweep net																																		
Forest B sweep net																																		
Forest B sweep net 7/12/06																																		
Damp Scrub A sweep net						1																								1				
Damp Scrub B sweep net																																		
TOTAL	1	1	9	11	1	4	6	12	1	7	1	5	1	1	1	1																		

	Scydmaenidae TFIC 04	Quedius TFIC 07	Heterothrops B	Homalotus C	Anotylus	Polylobus?	Anotylus B	Homalotus B	Heterothrops	Quedius B	Homalotus	staphylinid 8 - head missing medium	Aleochara?	staphylinid 10 - medium clubby antennae	staphylinid 11 - tiny pale thin	Pselaphulax sp
	Scydmaenidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae
Dry creek																
Snails damp scrub GPS 0318778/5519329																
Track E Telegraph c.4km from lodge																
Litter Sth Hummock ("0317838 5521615")																
Rotten log 0319281 5521721																
Tower track collected by P. Bell																
N Hummock 30m from 325392 5524709																
Litter N Hummock GPS 0325392 5524709																
Litter N Hummock 325612 5524774																
GPS 0325374 5524561																
Damp Scrub A bucket trap																
Heath A bucket trap																
Shearwater A bucket trap																
Grassland A bucket trap																
Forest A bucket trap																
Forest B bucket trap																
Sth Hummock GPS 321924 5517513 bucket	1	53					4		4		1	1				1
Shearwater B pitfall trap																
Grassland B pitfall trap																
Damp Scrub B pitfall trap																

	Scydmaenidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae	Staphylinidae
	Scydmaenidae TFIC 04	Quedius TFIC 07	Heterothrops B	Homalotus C	Anotylus	Polylobus?	Anotylus B	Homalotus B	Heterothrops	Quedius B	Homalotus	staphylinid 8 - head missing medium	Aleochara?	staphylinid 10 - medium clubby antennae	staphylinid 11 - tiny pale thin	Pselaphaulax sp
Forest A pitfall trap																
Heathland A pitfall trap														1	1	
Grassland A pitfall trap																
Forest B pitfall trap			1	7	2	4		11		1			2			
Shearwater A pitfall trap																
Shearwater B pitfall trap																
Grassland A sweep net																
Grassland B sweep net																
Heath A sweep net																
Heath B sweep net																
Shearwater A sweep net																
Shearwater B sweep net																
Forest B sweep net																
Forest B sweep net 7/12/06																
Damp Scrub A sweep net																
Damp Scrub B sweep net																
TOTAL	1	53	1	7	2	4	4	11	4	1	1	1	2	1	1	1

	Tenebrionidae	Tenebrionidae	Tenebrionidae	Tenebrionidae	Dermestidae	Scarabaeidae	Tenebrionidae	Scarabaeidae	Cleridae	Anthicidae	Cleridae	Corylophidae	Histeridae	Silvanidae	Zopheridae	
	Isopteron triviale	Lagriinae sp TFIC 02	Adelium abbreviatum	Lepispilus sulcicollis	Dettocryptus?	Onthipagus fuliginosus	Saragus infelix	Diphucephala colaspoides	hairy black sphere	Lemidia sp? (NIC -too small)	Anthicus sp.	small soft longicorn-like, black	Sericoderus sp.	Saprinus cyaneus	Cryptomorpha optata	Ciconocissus gibbicollis
Dry creek																
Snails damp scrub GPS 0318778/5519329																
Track E Telegraph c.4km from lodge																
Litter Sth Hummock ("0317838 5521615")																
Rotten log GPS 0319281 5521721																
Tower track collected by P.Bell																
N Hummock 30m from 325392 5524709																
Litter N Hummock GPS 0325392 5524709																
Litter N Hummock 325612 5524774																
GPS 0325374 5524561																
Damp Scrub A bucket trap		1					1									
Heath A bucket trap		1														
Shearwater A bucket trap							3									
Grassland A bucket trap							2									
Forest A bucket trap		1					2									
Forest B bucket trap																
Sth Hummock 321924 5517513 bucket	1		1	2												1
Shearwater B pitfall traps							1									
Grassland B pitfall traps																
Damp Scrub B pitfall traps								3								
Forest A pitfall traps																
Heathland A pitfall traps																
Grassland A pitfall traps					1	1	6	1		2						
Forest B pitfall traps						3						1		1		
Shearwater A pitfall traps													2			
Shearwater B pitfall traps							21	1		1			4			

	Isopteron triviale	Lagriinae sp TFC 02	Adelium abbreviatum	Lepispilus sulcicollis	Dettocryptus?	Onthipagus fuliginosus	Saragus infelix	Diphucephala colaspioides	hairy black sphere	Lemidia sp? (NIC -too small)	Anthicus sp.	small soft longicorn-like, black	Sericoderus sp.	Saprinus cyaneus	Cryptomorpha optata	Ciconocissus gibbicollis		
	Tenebrionidae	Tenebrionidae	Tenebrionidae	Tenebrionidae	Dermestidae	Scarabaeidae	Tenebrionidae	Scarabaeidae		Cleridae	Anthicidae	Cleridae	Corylophidae	Histeridae	Silvanidae	Zopheridae		
Grassland A sweep net																		
Grassland B sweep net																		
Heath A sweep net												1						
Heath B sweep net								1										
Shearwater A sweep net																		
Shearwater B sweep net								1		1								
Forest B sweep net																		
Forest B sweep net 7/12/06																		
Damp Scrub A sweep net					1													
Damp Scrub B sweep net					1			1										
TOTAL	1	3	1	2	3	4	36	7	1	1	3	1	1	6	1	1		

	TOTAL ADULT COLEOPTERA	Coleoptera larvae	bugs	earwigs	cockroaches	grasshoppers/crickets	unsorted moths	unsorted moth/butterfly larvae	unsorted ants	other hymenoptera (wasps etc)	Diptera (flies)	Diptera (flies) larvae	fleas	scale insects
			Hemiptera	Dermaptera	Blattodea (cockroaches)	Orthoptera	Lepidoptera (moths, butterflies)	Lepidoptera	Hymenoptera (ants, bees, wasps)	Hymenoptera	Diptera (flies)	Diptera	Siphonoptera	Sternorrhyncha
Dry creek	0													
Snails damp scrub GPS 0318778/5519329	0													
Track E Telegraph c.4km from lodge	0													
Litter Sth Hummock ("0317838 5521615")	0													
Rotten log 0319281 5521721	1						1							
Tower track collected by P. Bell	0								1					
N Hummock 30m from 325392 5524709	1													
Litter N Hummock GPS 0325392 5524709	1													
Litter N Hummock GPS 325612 5524774	0							3						
GPS 0325374 5524561	1								1					
Damp Scrub A bucket trap	3		1											
Heath A bucket trap	1			2				1						
Shearwater A bucket trap	3													
Grassland A bucket trap	2													
Forest A bucket trap	4								2					
Forest B bucket trap	1													
Sth Hummock GPS 321924 5517513 bucket	136		5						18	4	3			
Shearwater B pitfall trap	1													
Grassland B pitfall trap	1											1		
Damp Scrub B pitfall trap	3													
Forest A pitfall trap	0		4			1			247		2			

	TOTAL ADULT COLEOPTERA	Coleoptera larvae		Hemiptera	Dermoptera	Blattodea (cockroaches)	Orthoptera	Lepidoptera (moths, butterflyflies)	Lepidoptera	Hymenoptera (ants, bees, wasps)	Hymenoptera	Diptera (flies)	Diptera	Siphonoptera	Stenomorphyncha
				bugs	earwigs	cockroaches	grasshoppers/crickets	unsorted moths	unsorted moth/butterfly larvae	unsorted ants	other hymenoptera (wasps etc)	Diptera (flies)	Diptera (flies) larvae	fleas	scale insects
Heathland A pitfall trap	6	1		1	2					53		15			
Grassland A pitfall trap	18	1		35	2	3	3		4	40		11	10		
Forest B pitfall trap	57	3		2	3		2	1	1	87	1	30			
Shearwater A pitfall trap	4			11			1		1	47		3	1	4	
Shearwater B pitfall trap	39			2	3	1	2	2	2	32	5	15	113	2	
Grassland A sweep net	3								2			3			
Grassland B sweep net	0			2			1		2		1				
Heath A sweep net	1			16					1	1	1				
Heath B sweep net	1			1					1						
Shearwater A sweep net	0			1					1						1
Shearwater B sweep net	16			16					2			1			3
Forest B sweep net	1								1						
Forest B sweep net 7/12/06	0			3				1	1						
Damp Scrub A sweep net	4			3					10						
Damp Scrub B sweep net	2														
TOTAL	311	5		103	12	4	10	5	33	529	12	83	125	6	4

	Insecta - unsorted larvae				Diplopoda (millipedes)	Chilopoda (centipedes)		Oligochaeta (worms)		Platyhelminthes (flatworms)		Opilionida (harvestmen)	Aranea (spiders)	Scorpionida	Pseudoscorpionida	Acari
	unsorted insect larvae		colembolla		millipedes	centipedes		earthworms		flatworms		harvestmen	spiders	Cercophoniussquama	pseudoscorpions	mites
Dry creek																
Snails damp scrub 0318778/5519329																
Track E Telegraph c.4km from lodge																
Litter Sth Hummock ("0317838 5521615")																
Rotten log 0319281 5521721																
Tower track collected by P. Bell																
N Hummock 30m from 325392 5524709					1			1								
Litter N Hummock 0325392 5524709						1				4		1				
Litter N Hummock 325612 5524774																
GPS 0325374 5524561	2											1				
Damp Scrub A bucket trap					4									3		
Heath A bucket trap														2		
Shearwater A bucket trap																
Grassland A bucket trap																
Forest A bucket trap					3	1							3	1		
Forest B bucket trap						1								6		
Sth Hummock 321924 5517513 bucket					125	36		38				3	46	1	1	3
Shearwater B pitfall traps																
Grassland B pitfall traps					1											
Damp Scrub B pitfall traps														1		
Forest A pitfall traps																
Heathland A pitfall traps	2		1		4							1	7			1
Grassland A pitfall traps			9		2		2						16	2		
Forest B pitfall traps			1		5	4		11				1	17			6

	insecta - unsorted larvae												
	unsorted insect larvae	colembolla	millipedes	centipedes	earthworms	flatworms	harvestmen	spiders	Cercophonius squama	pseudoscorpions	mites		
Shearwater A pitfall traps		1						4			4		
Shearwater B pitfall traps		1		4			3	7	1		14		
Grassland A sweep net								1					
Grassland B sweep net								1					
Heath A sweep net								2					
Heath B sweep net								5					
Shearwater A sweep net													
Shearwater B sweep net								5			1		
Forest B sweep net	1												
Forest B sweep net 7/12/06								10					
Damp Scrub A sweep net		1						2					
Damp Scrub B sweep net								2					
TOTAL	5	14	139	53	52	4	10	128	17	1	29		

	isopoda	Amphipoda			
	isopods	amphipods		TOTAL	
Dry creek				2	
Snails damp scrub GPS 0318778/5519329				4	
Track E Telegraph c.4km from lodge				1	
Litter Sth Hummock ("0317838 5521615")				4	
Rotten log 0319281 5521721				8	
Tower track collected by P. Bell				22	
N Hummock 30m from 325392 5524709				3	
Litter N Hummock GPS 0325392 5524709				10	
Litter N Hummock 325612 5524774				6	
GPS 0325374 5524561				8	
Damp Scrub A bucket trap	6	5		22	
Heath A bucket trap				6	
Shearwater A bucket trap				3	
Grassland A bucket trap				2	
Forest A bucket trap	5	54		73	
Forest B bucket trap				8	
Sth Hummock GPS 321924 5517513 bucket	96	1126		1644	
Shearwater B pitfall traps	2			3	
Grassland B pitfall traps				3	
Damp Scrub B pitfall traps				4	
Forest A pitfall traps				254	
Heathland A pitfall traps		4		98	
Grassland A pitfall traps	1	4		164	
Forest B pitfall traps	9	61		302	
Shearwater A pitfall traps	19	3		103	
Shearwater B pitfall traps	34	2		284	
Grassland A sweep net				9	
Grassland B sweep net				7	
Heath A sweep net				22	
Heath B sweep net				8	
Shearwater A sweep net				3	
Shearwater B sweep net				44	
Forest B sweep net				3	
Forest B sweep net 7/12/06				15	
Damp Scrub A sweep net				22	
Damp Scrub B sweep net				4	
TOTAL	172	1259		3178	





Tasmania
Explore the possibilities

The Hamish Saunders Memorial
Island Survey Program
Hamish Saunders Memorial Trust, NZ

Biodiversity Conservation Branch
Department of Primary Industries
and Water
GPO Box 44
Hobart, Tasmania 7001