Tasman Island Flora and Fauna Survey 2005




The Hamish Saunders Memorial Island Survey Program

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Hamish Saunders Memorial Trust, NZ
and
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BIODIVERSITY CONSERVATION BRANCH
DEPARTMENT OF PRIMARY INDUSTRIES AND WATER
and
HAMISH SAUNDERS MEMORIAL TRUST, NEW ZEALAND

Tasman Island: 2005 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

In 2005 the Hamish Saunders Memorial Island Survey Program was launched with a survey of Tasman Island. Situated about 3 km off the southeast tip of the Tasman Peninsula, Tasman Island was once a manned lighthouse and weather station but is nowadays seldom visited. A number of important species are known to occur on the island including the threatened plant *Allocasuarina crassa* and a rare species of cave cricket *Tasmanoplectrum isolatum*. The island also provides haul-out sites for Australian and New Zealand fur seals, breeding colonies for a range of seabirds, and supports a large population of feral cats. No detailed flora or fauna surveys have ever been conducted.

In November 2005 a team of six scientists including two New Zealand volunteers conducted a seven-day integrated biological survey. A range of field techniques were used to investigate various aspects of the island's ecology including vegetation quadrat surveys and weed mapping, vertebrate and invertebrate sampling, spotlighting and pest control measures. Six vegetation communities were intensively ground-truthed and used as the basis for fauna sampling and a study of vegetation composition.

The results from the survey were significant. Eight previously unrecorded native flora taxa were found on the island *Blechnum wattsii, Exocarpos cupressiformis, Lepidosperma elatius, Colobanthus* sp., *Euchiton litticola, Senecio biserratus, Comesperma volubile* and *Thelymitra ixioides,* and a comprehensive flora list was compiled. Important information was obtained on *Allocasuarina crassa* by surveying its island distribution, collecting cones as well as root and stem tips for a genetic study being conducted at the University of Tasmania. The boundaries and description of vegetation communities were refined from previous work and a TASVEG vegetation map produced. Soil profiles were described for different vegetation communities across the island. Weeds were assessed to inform future management programs and two additional weed species were identified.

Further observations were made on the newly discovered breeding group of New Zealand Fur Seals. The only species of native or exotic land mammal identified was the feral cat. Eight feral cats were dispatched despite many more being seen. The trialing of new methodologies involving the cutting of tracks to direct cat movement was found to be successful. Twenty six species of land and seabirds were recorded including breeding records and the positive identification of Lewin's Rail. Population estimates were made for Fairy Prion, Short-tailed Shearwater and Sooty Shearwater colonies and the local extinction of the Little Penguin colony was confirmed. Four species of reptile were identified on the island including two endemic species. The Metallic Skink was abundant in most habitats whereas White's Skink, Ocellated Skink and She-oak Skink were recorded only once.

A systematic collection of invertebrates resulted in 22 orders being recorded and a number of exciting finds. Nine species of land snail were collected adding to the previously one known species. A new species, *Planilaoma*? sp. nov. "Tasman Island", has been discovered. This exciting find resembles the most primitive charopid *Planilaoma* and is of considerable evolutionary interest. A second previously undescribed snail species, *Pedicamista* sp. "Southport", has also been identified. Two unexpected species of millipede were collected, the polydesmidan *Lissodesmus hamatus* and a male *Spirostreptida species*, both require further investigation. One of the two species of amphipod collected, *Mysticotalitrus* sp. has yet to be ascribed to a species. Live specimens of the rare cricket *Tasmanoplectron isolatum* were collected enabling better identification of their features and the proper lodgment of voucher specimens with the Tasmanian Museum and Art Gallery.

Recommendations

1. A feral cat eradication program should be undertaken as a conservation management priority. Eradicating cats would protect a minimum of three species of burrowing seabird, help restore the Little Penguin population, protect the island's reptile fauna, especially endemic species, and maintain the island as a refuge should the Red Fox become established on mainland Tasmania.

2. To prevent the introduction of rats, mice and other pest species and to avoid the risk of introduction of *Phytophthora cinnamomi*, standard quarantine and hygiene protocols should be implemented for all staff, their field equipment and visitors to the island.

3. Targeted removal of garden plants especially *Hebe* sp. from the vicinity of the top homestead is recommended to prevent further spreading and a strategy for weed control should be prepared then implemented.

Acknowledgments

Sincere thanks are extended to the Hamish Saunders Memorial Trust for partnering the program, in particular Alan and David Saunders for administration of procedures and the New Zealand volunteers. Thanks also to Michael Pemberton and John Whittington for Tasmanian agency support. Rosemary Gales organized the marine survey in September 2005 which greatly assisted this work. Mike Driessen, Steve Mallick and Mathew Pauza assisted with the sorting of invertebrate samples which led to the identification of new species and other interesting findings. Stephen Mallick and Matthew Pauza sorted the sweep, pitfall and bucket samples, Kevin Bonham identified and provided expert information on land snails, as did Bob Mesibov on millipedes, Associate Professor Alistair Richardson on Amphipoda and Mike Driessen on Orthoptera as well as performing all ordinations. Liz Turner and Peter Taylor (Tasmanian Museum and Art Gallery) identified the spiders and vouchered the specimens at the Tasmanian Museum. Drew Lee and Sue Robinson allowed use of information from their September 2005 marine survey and Drew Lee contributed to seabird discussions.

Richard Schahinger allowed the use of information from his unpublished manuscript on vegetation communities and contributed to the vegetation section of this report. Thanks to Greg Jordan and Rob Wiltshire (School of Plant Science, UTAS) for determination of *Allocasuarina crassa* specimens and access to an unpublished information. Alex Buchanan (Tasmanian Herbarium) and Richard Schahinger (DPIW) assisted with identification of several plant specimens. Other Branch staff provided logistical support including Rosemary Gales, Mark Holdsworth, Drew Lee, Robbie Gaffney, Bill Brown, Phil Bell and Rupert Davies. Nick Bates (PWS) allowed use of the light keeper's house and Warwick Brennan kindly organized media coverage including a special feature on National television's ABC 7.30 Report. David Pemberton kindly accompanied the team on the supply trip. Thanks also to Kristy Goddard and Drew Lee for map formatting, Wieslawa Misiak for proof reading and Andrew Gibson (ILS) for designing the finished report.

All images in this report were taken on Tasman Island by the survey team. The report has been prepared and edited by Sally Bryant and Justine Shaw. Major sections have been written by Sally Bryant, Justine Shaw, Eve Lazarus, Sue Robinson, Drew Lee and Mike Driessen.

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 Hon Judy Jackson MHA in June 2005.

Tasman Island

Tasman Island is located about 3.0 km off the southeast tip of the Tasman Peninsula (43˚14' S, 148˚05' E, Fig 1). It forms part of the Tasman Island National Park and is managed by the Parks and Wildlife Service (PWS 2001). The island is approximately 1.6 km long, 1.0 km wide and about 120 hectares in area. The island is roughly oval in shape with a rugged shoreline of steep coastal cliffs and boulder-strewn slopes. The cliffs rise to a gently level plateau at about 280 - 300 m altitude with deep fissures on the northwest side. Soils, where present, are mostly sandy peat. The cliffs are spectacular vertical columns of dolerite and are considered an outstanding representative of Australia's geodiversity (Dixon and Household 1996).

Access to the island is by helicopter or boat, with the nearest mainland departure point being Safety Cove. In calm weather a boat landing is possible on the northeast side where a dilapidated jetty is located below a steep, unstable haulage-way leading to the plateau. Tasman Island was once a manned lighthouse but after the mid 1970s the light was automated and the island is now seldom visited. The three original keepers' houses, sheds and service structures still remain but most are now derelict and only the 'top' house (nearest the lighthouse) is in reasonable condition. A helipad is located below the lighthouse and is used regularly by the Australian Maritime Safety Authority to service the automated light.

Previous Research

Tasman Island in an important breeding site for a number of seabird species that utilise the fissures and crevices in the dolerite and areas of sufficient soil types and depth to provide nesting habitat. The Short-tailed Shearwater and Sooty Shearwater were first identified breeding on Tasman Island in 1933 and 1936 by Frederic Wood Jones (1936) and later discussed by Sharland (1946, 1956). Nigel Brothers visited the island on numerous occasions and spent five days in January 1982 with Nick Mooney surveying seabirds and assessing feral cat impact (Brothers 1979, Brothers *et al.* 2001). Brothers conducted population counts of Short-tailed Shearwater *Puffinus tenuirostris*, Sooty Shearwater *Puffinus griseus*, Little Penguin *Eudyptula minor* and Fairy Prion *Pachyptila turtur* and estimated that the Fairy Prion colony was the largest in Tasmania and possibly Australia at 300,000 – 700,000 breeding pairs. Brothers identified 28 species of birds, 5 species of reptile (Green and Rainbird 1993) and noted the serious damage being caused by the growing feral cat population. During the 1940s cats were kept on the island as pets and subsequently established in the wild. A program to eradicate feral cats commenced in 1977 using 1080 baits and shooting but was discontinued before it achieved success (Brothers 1982). The lightkeepers maintained grassland areas for grazing sheep and cattle and used draught horses for pulling carts up the haulage way but no other native or exotic land mammals have been recorded on the island.

In three trips between 1977and 1978 Brothers collected 100 plant species from Tasman Island which were identified by Mick Brown (Brothers 1979) and later discussed by Brown and Duncan (1989). On an archaeological trip in 1982 Stephen Harris expanded Brothers' preliminary plant list to 112 species (Harris 1984). In 2001 a team of DPIWE staff visited the island for 3 hours to assess the population of threatened *Allocasuarina crassa*. This trip also enabled compilation of a draft vegetation map of the island (Schahinger 2002a, b).

Tasman Island is the largest haul-out in southeast Tasmania for Australian and New Zealand fur seals and has been monitored on a regular basis by Departmental staff. A survey in September 2005 identified sites and preliminary counts of seal and seabird colonies on the island as well as information on feral cat impacts (Lee and Robinson 2005).

No information has been published on invertebrate species of Tasman Island except for the rare endemic Tasman Island cricket *Tasmanoplectron isolatum* (Richards 1971). One species of native land snail *Caryodes dufresnii* has been recorded on the island by George Davis (K. Bonham, pers comm).

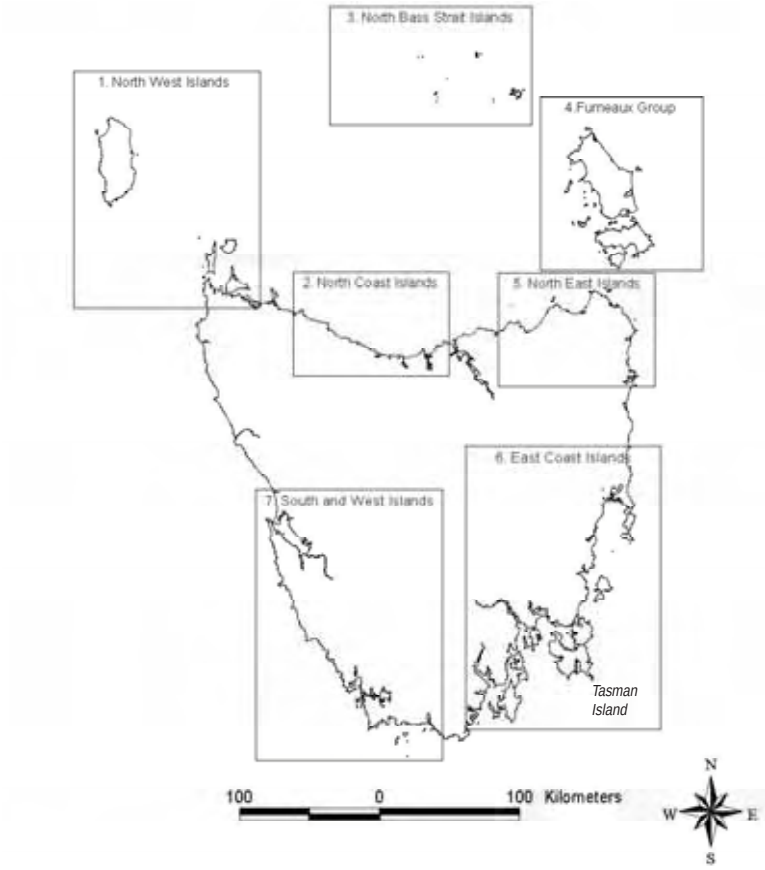

Figure 1 Tasman Island and Tasmania's island sectors (from Brothers *et al.* 2001).

Methods

L to R: Eve Lazarus, Justine Shaw, Jenni Drummond, Sue Robinson, Andrew Dopheide, Sally Bryant

Field Program and Survey Methods

Start: Monday 14th November 2005

Return: Saturday 19th November 2005

Logistics and planning for the survey follow the guidelines outlined in the Hamish Saunders Memorial island survey program (Biodiversity Conservation Branch 2005). Transport to and from the island was by helicopter departing either from Hobart (travel time ~ 30 minutes) or Safety Cove (travel time ~10 minutes). Equipment was transported by helicopter sling from Safety Cove. The nightly communication schedule was delivered through Mekina Technology.

The two New Zealand volunteers arrived in Hobart two days before departure to enable OH&S induction and to assist with planning arrangements and media. Appendix A contains an outline of the daily work schedule and weather conditions.

Field Team

Sally Bryant	Manager, Threatened Species Section (Team Leader)
Sue Robinson	Marine Interactions Officer, Marine Section
Justine Shaw	RFA Botanist, Threatened Species Section
Eve Lazarus	Botanist, Threatened Species Section
Jenni Drummond	3rd yr science student, Auckland University
Andrew Dopheide	Masters degree student marine biology, Auckland University

Flora

Vegetation communities

The six vegetation communities were surveyed to further refine Schahinger's (2002a) vegetation map and to identify previously undetected plant species and or vegetation components. To assess the accuracy of mapping an effort was made to survey each community across each mapped polygon. Replicate random 10m x 10m quadrats were surveyed within each community. Sampling effort was higher for communities that appeared structurally and floristically complex on initial site assessment. As a result the following sampling effort was undertaken per community:

Community	Survey effort	
Regenerating Scrub	6 quadrats	600 m^2
Heathy Scrub	5 quadrats	500 m^2
Grassland	4 quadrats	400 m^2
She-oak Woodland	3 quadrats	300 m^2
Sedgeland	3 quadrats	300 m^2
Coastal Mosaic	2 quadrats	200 m^2

For each quadrat, all species within were identified to species level or specimens were collected and later identified. Maximum vegetation height was recorded for each quadrat, and any strata within the vegetation were identified and their maximum height measured. A 1.4 m steel probe was used to measure five random soil depths within each quadrat. Soil texture, rock type and % of rock cover were recorded for each quadrat. All these values were averaged for each community. Degrees of slope was recorded for each quadrat, these values were then summarised to give a general description for each community; flat, sloping, steep.

Visual assessments were made of community boundaries, to determine their accuracy. Areas of the map that were not previously ground-truthed were traversed on foot (were physically possible) to determine accuracy and locate any previously unrecorded species. Presence and density of weed species was recorded.

Allocasuarina crassa

Allocasuarina crassa exhibits morphological variation across environmental gradients (Blackman *et al.* 2005). Leaf samples were taken from 15 *Allocasuarina crassa* plants across the island and from a variety of morphological forms. These were later examined to identify whether they were all *A. crassa* or if any *A. monolifera* or hybrids were present. Its extent was mapped using Schahingers map (2002) and ground surveys.

Fauna

Fauna trapping

Native fauna was surveyed using a range of methods (Table 1). Smooth plastic bucket traps (25 cm height x 15 cm diameter) were buried flush with the ground and provided with 1.0 cm of soil at the bottom. Pitfall cups (10 cm height x 7.5 cm diameter) were buried using a soil auger and filled to 3.0 cm with 70% ethanol. Elliot traps were baited with a mixture of peanut butter and wild birdseed. 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 from a range of under-storey plants.

Traps (Elliot, pitfall and bucket) were set along a transect through the mid section of six vegetation communities from Schahinger (2002a): 1 She-oak Woodland, 2 Regenerating Scrub, 3 Heathy Scrub, 4 Grassland, 5 Coastal Mosaic and 6 Sedgeland. Duplicates (A, B) of each community were sampled. Each transect contained 5 sample sites (site 1 – 5) except for Sedgeland which had only 3 sample sites. Each sample site was approximately 50 meters apart. A pitfall trap and Elliot trap were placed at each sites along the transect. A bucket trap was placed at site 1 and sweep net samples were collected at site 3 of each transect. The sweep net was used to shake or hit the vegetation in the 0.5 to 1.0 meter height layer 100 times. The Sedgeland community was sampled using 3 pitfall traps spaced 15 meters apart and a total of 100 sweeps of the net. The location of each sample site was recorded by handheld GPS (GDA 94, see Appendix B).

Traps remained open for a total of 5 days (4 nights) during the survey period and were checked a total of 3 times each. All live skinks were marked then released. On collection at day 5, the pitfall samples for each transect were pooled into one container.

- Number of vegetation communities surveyed = 6 communities
- Total number of transects (2 per vegetation community) = 12 transects
- Total number of sample sites (10 transects x 5 sites + 2 transects x 3 sites) = 56 sites
- Total number of Elliot traps = 50 Elliot traps - 200 trap nights
- Total number of bucket traps = 10 bucket traps - 40 trap nights
- Total number of pitfall traps = 56 pitfall traps - 206 trap nights
- Total number of sweep net samples = 12 samples - 1,200 sweeps
- Total number of samples collected = 12 pitfalls, 10 buckets, 12 sweep net samples

An Annabat® was used to detect the presence of bats by amplifying calls. It was carried in a backpack with the long handled microphone held above the head and turned while walking. The Annabat® was used on: 16 Nov for two 15 min periods walking from the top house to bottom house and around water bore, and 17 Nov for 45 min walking from top house to start of haulage way and return. Leica 10 x 32 binoculars and a x 30 Swarovski Scope were used for bird observations.

Table 1 Methods used for fauna surveys.

Birds	Binoculars and scope, call, burrow counts, spotlighting, flushing
Small Mammals	Elliot traps, scats, bat calls, incidental observations
Feral Cats	Mascot traps, leghold traps, spotlighting, shooting, lures, tracks and scats
Reptiles and Amphibians	Elliot traps, pitfall traps, bucket traps, frog calls, sweep net, incidental observations
Invertebrates	Pitfall traps, bucket traps, sweep net, incidental observations
Marine Mammals	seal counts at haul-outs

Feral Cats

Mascot (cage) traps baited with chicken and soft catch leg hold traps were used for live trapping. Traps were set at strategic locations around the island to gather information on diet, condition, numbers and behaviour. Traps were placed along tracks and near Fairy Prion colonies. Additional tracks were cut using a brush-cutter to facilitate cat movement. In some cases unrelated cat urine was sprayed on or near the leg-hold trap site as an attractant. Cat scats and bird carcasses were collected.

Spotlighting was conducted over a number of nights to locate cats and detect eye shine (see Appendix A). Where possible, cats were shot using a .22 rifle. Cats were weighed, measured and stomach samples collected for laboratory analysis on diet and parasites. On one night a video recorder was used to film cat movement and behaviour.

Marine Mammals

Observations of seals were made from vantage points above haul-out sites using binoculars to identify species, evidence of entanglement, and to re-sight tagged individuals. Humpback whales were observed from atop of the high cliffs.

Seabirds

Accessible seabird colonies were mapped by conducting a ground search for the extent of burrows (which often conformed to areas of sufficient soil type and depth). The extent of the major portions of the colony were positioned by handheld GPS (Accuracy ± 20m), areas with very low densities (ie ≤ 1 burrow * 10m^2) where not included in the analyses. Densities were calculated by running 100m x 2m transects through the colony, recording the species type, occupation status (not occupied, apparently occupied, bird present in nest) and nest contents (ie eggs, chicks etc). Burrow density was estimated for each colony and the number of breeding pairs was extrapolated from the aerial extent of each colony. Exhaustive search methods were used to locate other areas of breeding seabirds outside the mapped colonies. Spotlighting was also conducted to determine the presence of seabirds that were not identified in the colony during daylight hours.

Analysis of Invertebrate Samples

Invertebrate samples were sorted to Order, with the exception of Gastropoda, Collembola and Diplopoda which were sorted to Class. Diplopoda, Chilopoda, Amphipoda, Gastropoda and Orthoptera were sent to specialists for species identification.

The ordination technique of Non-metric Multi-dimensional Scaling (NMS) was used to investigate the relationship between sampling method and habitat and the composition of the sampled fauna. Taxa recorded in less than 5% of samples were excluded from the analysis. All data were log-transformed for analysis.

For the three sampling methods and habitats combined, a 3-dimensional solution was recommended, with a final stress of 14.93, a final instability of 0.005, and 40 iterations. NMS was used to investigate the effects of habitat within each sampling method. For the sweep samples, a 3-dimensional solution was recommended, with a final stress of 5.32, a final instability of 0.004, and 29 iterations. For the pitfall samples, a 3-dimensional solution was recommended, with a final stress of 4.41, a final instability of 0.005, and 20 iterations. For the bucket samples, a 3-dimensional solution was recommended, with a final stress of 2.37, a final instability of 0.004, and 46 iterations.

All invertebrate samples were lodged with the Tasmanian Museum and Art Gallery.

Results

Flora

Vegetation Communities

Surveys of each vegetation community provide an overview of the vegetation structure and physical attributes of Tasman Island vegetation (Table 2). Eight new native taxa were recorded for the island *Blechnum wattsii, Exocarpos cupressiformis, Lepidosperma elatius, Thelymitra ixioides, Colobanthus sp., Euchiton litticola, Senecio biserratus, Comesperma volubile* (Table 3) and two new weed species *Bromus sp.* and *Holcus lanatus*. A list of all plant species recorded on Tasman Island to-date is provided in Appendix C.

Table 2 Vegetation community attributes on Tasman Island.

Community description	Regenerating Scrub	Heathy Scrub	Coastal Mosaic	Sedgeland	She-oak Woodland	Grassland
TASVEG community and codes	Coastal scrub - SSC	Coastal scrub - SSC	Seabird Rookery complex - SRC	Lowland sedgy grassland- GSL	*Allocasuarina verticillata* forest - NAV	Lowland *Poa labillardierei* grassland - GPL
Max Vegetation height	6m	5m	< 1m	2m	7m	1.5m
Mid- storey height	2m	2-3m	-	-	2.5m	-
Slope	Flat	Flat- sloping	Steep	Flat	Sloping	Flat

Table 3 New native plant species recorded on Tasman Island.

Species	Number/area	Habitat (& TASVEG code)
Lepidosperma elatius	common	In dense Heath Scrub & She-oak Woodland NAV SSC
Blechnum wattsii	Several plants in 200m2	Drainage line amongst sedges and grasses - GSL
Thelymitra ixioides	< 20 plants	In the open understorey of Heath Scrub vegetation - SSC
Colobanthus sp. (most likely *C. apetalus)*	< 20 plants	In dolerite depressions on steep cliff edges
Exocarpos cupressiformis	<10 plants	In dense heath - SSC
Comesperma volubile	Not counted	Amongst sedges and grasses - GSL GPL
Euchiton litticola	Not counted	In the understorey of Heath Scrub vegetation - SSC
Senecio biserratus	Not counted	Amongst grasses and herbs of Coastal Mosaic - SRC

Surveys of vegetation communities provided information on community composition, identified dominant species and the presence of any alien species (Table 4). Heathy Scrub community supported the most species whereas the Coastal Mosaic grassy herbfield was the most depauperate. The most intact community was Heathy Scrub, which was dominated by three tree species: *Banksia marginata, Allocasuarina crassa* and *Allocasuarina verticillata*, all of which were low in stature (maximum height 5 m). The tallest vegetation community was She-oak Woodland, many of the *Allocasuarina verticillata* plants at these sites were multi-stemmed (coppicing). An old growth remnant of Heathy Scrub containing *Banksia marginata* 9m high and *Allocasuarina crassa* 7m high was found in an area previously mapped as Regenerating Scrub (Schahinger 2002a).

The most intact patch of Grassland on the island, ie containing very few introduced species (<2% cover), occurred on the mid-western section of the plateau. *Poa poiformis* was the dominant species (80% cover) and stood at 70cm high. Other areas of Grassland and Sedgeland had large quantities of introduced species (up to 50% cover). Introduced species found in the surveys are listed in Table 4 in bold.

Table 4 Plant community assemblages (introduced species are shown in bold).

Dominance	Regenerating Scrub	Heathy Scrub	Coastal Mosaic	Sedgeland	She-oak woodland	Grassland
Dominant species (% cover are mean values)	*Cassinia aculeata (20%)*	*Leptospermum scoparium (25%)*	*Poa poiformis var. ramifer (~30%)*	*Introduced grasses (27%)*	*Allocasuarina verticillata (65%)*	*Poa poiformis (39%)*
	Banksia marginata (15%)	*Banksia marginata (20%)*	*Poa poiformis (~30%)*	*Isolepis nodosa (24%)*	*Rhagodia candolleana (15%)*	*Introduced grasses (22%)*
	Poa poiformis (12%)	*Dianella tasmanica (15%)*	*Rhagodia candolleana (25%)*	*Hydrocotyle hirta (10%)*	*Correa alba (12%)*	*Carpobrotus rossii (14%)*
	Isolepis nodosa (9%)	*Ozothamnus ferruginous (15%)*	*Tetragonia implexicoma (10%)*			.
	Carex appressa (10%)	*Allocasuarina crassa (10%)*				
		Allocasuarina verticillata (10%)				
Less dominant species (<10% cover)	*Melaleuca squarrosa*	*Poa poiformis*	*Carpobrotus rossii*	*Poa poiformis*	*Poa poiformis*	*Pteridium esculentum*
	Rhagodia candolleana	*Viola hederacea*	*Actites megalocarpa*	*Acaena novae zeelandiae*	*Dodonaea viscosa*	*Isolepis nodosa*
	Allocasuarina crassa	*Olearia phlogopappa*	***Holcus lanatus***	*Pteridium esculentum*	*Carpobrotus rossii*	***Dactylis glomerata***
	Acacia verticillata	*Ozothamnus reticulatus*	*Isolepis nodosa*	*Microsorum pustulatum*	*Olearia phlogopappa*	*Hydrocotyle hirta*
	Dianella tasmanica	*Pultenaea daphnoides var. obcordata*	*Senecio pinnatifolius*	***Holcus lanatus***	*Microsorum pustulatum*	***Acetosella vulgaris***
	Polystichum proliferum	*Leptecophylla juniperina*	*Apium prostratum*	***Vicia sp.***	*Actites megalocarpa*	*Olearia phlogopappa*
	Leptecophylla juniperina	*Xerochrysum papillosum*	*Asplenium obtusatum*	*Leptospermum scoparium*	*Tetragonia implexicoma*	*Agrostis sp.*
	Pteridium esculentum	*Pittosporum bicolor*	***Bromus sp***	*Geranium potentilloides*	***Vicia sp.***	***Bromus sp***
	Monotoca glauca	*Gonocarpus teucrioides*	*Pelargonium australe*	*Juncus pallidus*	*Dianella tasmanica*	*Rhagodia candolleana*
	Leptospermum scoparium	***Vicia sp.***		*Ozothamnus ferruginous*	*Leucopogon parviflorus*	*Actites megalocarpa*
	Pittosporum bicolor	*Pelargonium australe*		***Acetosella vulgaris***	*Lepidosperma elatius*	*Acaena novae zeelandiae*
	Gonocarpus teucrioides	*Correa alba*		*Senecio pinnatifolius*	*Bursaria spinosa*	*Microsorum pustulatum*
	Hydrocotyle hirta	*Exocarpos cupressiformis*		*Viola hederacea*	*Crassula sieberiana*	*Dodonaea viscosa*

Dominance	Regenerating Scrub	Heathy Scrub	Coastal Mosaic	Sedgeland	She-oak woodland	Grassland
	Olearia phlogopappa	*Billardiera longiflora*		*Actites megalocarpa*	*Dianella brevicaulis*	*Geranium potentilloides*
	Viola hederacea	*Brachyscome sp*		*Banksia marginata*	*Geranium potentilloides*	*Oxalis sp.*
	Geranium potentilloides	*Comesperma volubile*		*Pittosporum bicolor*	*Pteridium esculentum*	*Senecio pinnatifolius*
	Juncus sp.	*Crassula sieberiana*		***Taraxacum sp.***	*Senecio pinnatifolius*	***Taraxacum sp.***
	Acaena novae zeelandiae	*Microsorum pustulatum*			***Taraxacum sp.***	***Trifolium sp.***
	Leucopogon parviflorus	***Taraxacum sp.***			*Wahlenbergia gracilis*	***Vicia sp***
	Galium sp	*Thelymitra ixioides*				
	Senecio pinnatifolius	*Lepidosperma elatius*				
	Tasmannia lanceolata	*Monotoca glauca*				
	Blechnum wattsii	*Carpobrotus rossii*				
	Hierochloe sp.	*Dodonaea viscosa*				
	Microsorum pustulatum	*Acacia verticillata*				
	Ozothamnus ferruginous	***Aira caryophyllea***				
	Pelargonium australe	*Austrodanthonia sp. (pilosa?)*				
	Vicia sp.	*Geranium potentilloides*				
		Hydrocotyle hirta				
		Microtis unifolia				
		Poranthera microphylla				
		Pterostylis parviflora				
		Senecio biserratus				
		Senecio pinnatifolius				
		Stackhousia monogyna				
		Tetragonia implexicoma				
Total no. of species (excluding introduced grasses)	33	42	13	20	22	22
Mean cover of introduced grasses	6% cover			26% cover		21% cover

A refined vegetation community map using TASVEG codes has now been constructed (Fig 2).

Figure 2 Vegetation communities and new plant species recorded on Tasman Island.

Allocasuarina crassa

The coastal scrub at the southwest corner of the plateau is co-dominated by the threatened species *Allocasuarina crassa*, which is listed as rare under the *Threatened Species Protection Act 1995*. It co-occurs with *Allocasuarina verticillata* and *Banksia marginata* and has 20-40% cover of the canopy. It does not dominate any other of the island's communities. The largest individuals of *Allocasuarina crassa* occurred in a patch of remnant heath, which had previously been mapped as Regenerating Scrub. There were seven large *A. crassa* trees at this site, the largest being 7m high with a trunk circumference of 70 cm. Specimens were collected from a range of sites within the Heathy Scrub and Regenerating Scrub to investigate if they were 'true' *A. crassa* or whether hybridisation with *Allocasuarina monolifera* was occurring.

Adjacent to these trees was a large *Banksia marginata* that was 9 m high with a trunk circumference of 172 cm. Node counts of large *Banksia marginata* plants in Heathy Scrub were up to 25 nodes per plant suggesting that this plant had not experienced fire for over 25 years.

Soils

The soil profile of Tasman Island was investigated across all vegetation types. Figure 3 indicates that Tasman Island generally has shallow soils. The greatest depth recorded was 68 cm beneath the Regenerating Scrub community while the shallowest depth occurred beneath the Heathy Scrub (< 8 cm). The shallower soils of the Heathy Scrub were consistent across the site as shown by the low standard error. Coastal Mosaic soil depths were variable (indicated by the error bars) which was to be expected due to the boulders and rocks scattered along the coastal fringe.

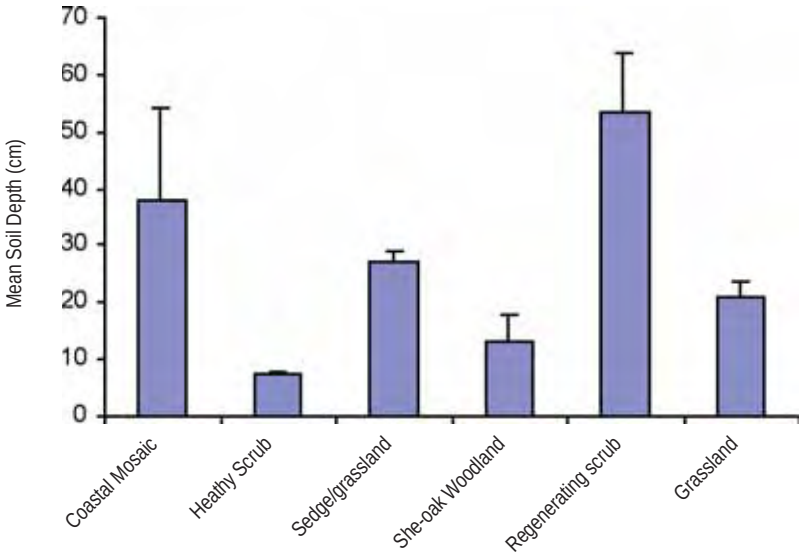

Figure 3 Soil profiles of vegetation communities on Tasman Island.

Fauna

Marine Mammals

In September 2005 a total of 213 Australian Fur Seals and 7 New Zealand Fur Seals were counted hauled-out on the northern slopes (Lee and Robinson 2005). A highlight of that field trip was the discovery of a new breeding group of New Zealand Fur Seals on the northwest slopes. Four large pups (under yearlings), two pregnant females (plus two juveniles and two large bulls) were seen. No new season pups were seen on this trip, however, a subsequent trip in February 2006 identified 20 new pups. No tagged or entangled seals were seen during this survey.

Two adult Humpback Whales were observed on 17th November breaching approximately 500 meters off the jetty. They remained in the local area for about 45 minutes then proceeded to swim northeast around the island and presumably further out to sea. This sighting is not unusual for this location or time of year in Tasmania.

Small Mammal Trapping

No native or exotic small mammals were trapped by Elliot traps or otherwise identified during the survey. There were only four Elliot trap captures and two signs of disturbance in 200 trap nights (Table 5).

Table 5. Capture and disturbance results for Elliot traps.

Veg - Site	Capture / Disturbance
She-oak Woodland B-1	4 *Tasmanoplectron isolatum*
She-oak Woodland B-3	Shut - empty
She-oak Woodland B-5	1 *Tasmanoplectron isolatum*
Heathy Scrub A-5	Tipped over
Grassland A-1	1 Ocellated Skink
Grassland B-5	2 *Limas maximus* (introduced slug)

There was no sign (visual or sonic) of bats being present on Tasman Island during this survey. The only land mammal identified on the island was the feral cat. Figure 4 shows the location of survey lines and important fauna sightings.

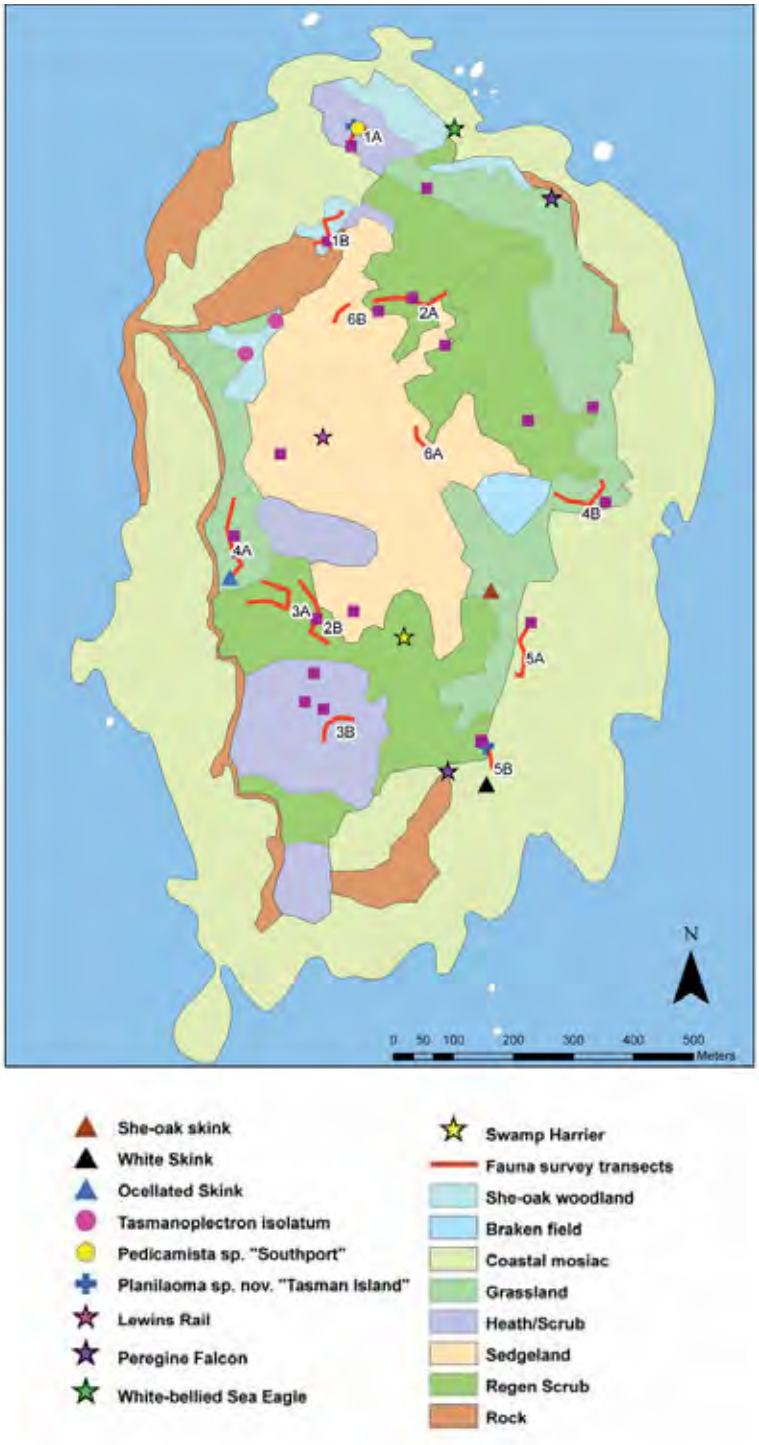

Figure 4 Fauna survey sites and important findings, including nests

Feral Cats

Information on the effort and breeding status of Feral Cats caught on Tasman Island is provided in Tables 6, 7 and 8 and Figure 5.

Table 6 Feral cats caught on Tasman Island this survey.

Trap no.	Type	Area	Trap nights	Cats	Lure
1	leghold	East access	4		
2	leghold	East access	4		
3	leghold	NE b/cut track	4		urine
4	leghold	NE b/cut track	4	1	urine
5	leghold	Top of Zig Zag	4		
6	leghold	Top of Zig Zag	4		
7	leghold	West ravine access	4		
8	leghold	West ravine access	4	3	urine
9	leghold	south access	4		
10	leghold	south access	4	1	urine
11	cage	southern top paddock	3		chicken skin
12	cage	southern top paddock	3		chicken skin
13	cage	next to lighthouse	3		chicken skin
14	cage	middle house	3		chicken skin
15	leghold	NW boulder field	1		chicken skin
16	leghold	NW boulder field	1		chicken skin

Table 7 Success of spotlighting feral cats on Tasman Island.

Night	Area	Cats seen	Shot	Hours
2	South east	0	0	3
3	North west	5	2	4
4	North west	1	1	4

Table 8 Feral cats dissected and sampled.

Cat	Sex	Weight kg	Length cm	Colour	Stomach Contents	Gut	Leg	Notes
1	M	3.8	76	tabby	feathers	Sampled	Sampled	
2	M	3.0	78	tabby	empty	Sampled	Sampled	
3	F	3.6	68	tabby	feathers	Sampled	Sampled	pregnant
4	M	3.5	76	tabby	feathers	empty	Sampled	
5	M	3.5	76	tabby	nr empty, feathers	Sampled	Sampled	
6	M	3.6	78	tabby	feathers	Sampled	Sampled	
7	M	3.7	80	black	nr empty, feathers	Sampled	Sampled	
8	F	3.1	73	tabby	empty	Sampled	Sampled	lactating

Cat 3 had 3 full term foetuses, 2 tabby and 1 black.

Bird Observations

A total of 26 bird species were recorded on this survey compared to 22 species a few weeks earlier by Lee and Robinson (2005) and 28 species by Brothers *et al.* 2001 (Table 9). Breeding records were obtained for Silvereye (nest), Welcome Swallow (nest), Fairy Prion, Sooty Shearwater and Short-tailed Shearwater (occupied burrows) and Swamp Harrier. A pair of Swamp Harrier were seen regularly and found breeding approximately 100 m below the helipad. The nest was constructed in Heathy Scrub and contained four eggs (see photo below). A pair of White-bellied Sea-Eagle were active in the northern sector but their nest could not be identified from the cliff top (see Fig 4). Two Peregrine Falcons were active and whitewash was observed on a cliff ledge in front of the top house. Lewin's Rail were positively identified by flushing in Sedgeland, 'rail' calls heard on several occasions near the water bore and collection of a severed wing and skull. Sighting and call information identified no obvious barring on the chest, flight short distance, clumsy and slow with legs dangling, call being a soft 'crack, crack' made from dense damp Sedgeland (no call when flushed).

Table 9 Bird species recorded on Tasman Island (# Brothers *et al.* 2001, ◆ Lee & Robinson 2005, □this survey).

Name	Previously	Observations this trip
Eudyptula minor Little Penguin	#	Not seen this survey. 300-700 pairs recorded by Brothers, possibly now extinct.
Pachyptila turtur Fairy Prion	# ◆ □	Breeding. Burrows common on grassy slopes and ledges around island, many thousands returning at dusk, wing and bodies evidence of predation.
Puffinus griseus Sooty Shearwater	# ◆ □	Breeding. Larger burrows located on slopes below ZZ track, and small numbers (10s) observed returning at dusk. Brothers estimated 1,000 pairs. This survey pop estimate 650.
Puffinus tenuirostris Short-tailed Shearwater	# ◆ □	Flocks commonly seen flying in the channel, breeding, burrows common on grassy slopes, many thousands returning at night. Pop. estimate this survey 5,450 breeding pairs.
Pelecanoides urinator Common Diving Petrel	#	Not seen this trip. Common in Tasmania and possibly out-competed for nest sites by Fairy Prion.
Diomedea cauta Shy Albatross	#	Not seen this trip but regularly in the area from nearby breeding colonies on Pedra Branca and Mewstone.
Macronectes halli Northern Giant Petrel	◆	Not seen this trip. Likely to occur regularly in these waters.
Morus serrator Australasian Gannet	# ◆ □	Regularly flying offshore singularly or in pairs. Gannet skeleton: marine debris death – netting wrapped tightly around lower mandible.
Phalacrocorax fuscescens Black-faced Cormorant	# ◆ □	60 roosting on rocks NW of haulageway.
Ardea novaehollandiae White-faced Heron	# ◆	Not seen this trip. One at the base of eastern cliffs in Sep 2005.
Aquila audax fleayi Wedge-tailed Eagle	# ◆ □	Individual seen flying northwest towards mainland. Likely to be seen regularly in region.
Haliaeetus leucogaster White-bellied Sea-Eagle	# ◆ □	Singly or pair flying over channel opposite the Blade and above northwest sector – nest not seen.
Circus approximans Swamp Harrier	◆ □	Singly or pair regularly seen hovering over grassland. Nest with 4 eggs located 50 m west of helipad.
Accipiter fasciatus Brown Goshawk	#	Not seen this trip.
Falco berigora Brown Falcon	# □	1-2 regularly heard calling and seen hovering and flying across island.
Falco peregrinus Peregrine Falcon	# ◆ □	Single or pair flying above southeast cliff ledge opposite top house – active and likely territory.
Ninox novaeseelandiae Southern Boobook	□	Single bird calling on two nights in the northeast sector from the top homestead.
Dryolimnas pectoralis Lewin's Rail	□	One bird flushed in Sedgeland (and calls heard around bore at lower homestead. Wing found near on the track near the top homestead.
Haematopus fuliginosus Sooty Oystercatcher	◆ □	3 individuals on rock island directly opposite the haulageway.
Larus pacificus Pacific Gull	◆ □	3 individuals on small rock island in front of the haulage way.
Larus novaehollandiae Silver Gull	# □	20 roosting on coastal rocks to the NW of haulageway.

Name	Previously	Observations this trip
Sterna bergii Crested Tern	# □	6 roosting on coastal rocks to the northwest of the haulageway with Black-faced Cormorants and Silver Gulls.
Calyptorhynchus funereus Yellow-tailed Black-Cockatoo	# ◆ □	Common and noisy flocks of 2 to 8 regularly over northern sector of island, feeding daily in Banksia.
Phylidonyris pyrrhoptera Crescent Honeyeater	#	Not seen this trip. Conspicuous in their absence.
Phylidonyris novaehollandiae New Holland Honeyeater	# ◆ □	Very common and seen constantly feeding in Banksia and other flowering shrubs. Abundant.
Anthochaera lunulata Little Wattlebird	◆	None seen this trip. Recorded as highly abundant on Plateau in September 2005.
Petroica phoenicea Flame Robin	#	Not seen this trip.
Hirundo neoxena Welcome Swallow	◆ □	Breeding, two nests in the ceiling of hallway of the bottom house – adults actively flying throughout and around house.
Hirundo nigricans Tree Martin	# ◆ □	2 – 4 Commonly seen flying over water bore in front of the lower house.
Zosterops lateralis Silvereye	# ◆ □	Very Common – feeding around homestead in banksias. Breeding, nest found in heathy scrub.
Anthus novaeseelandiae Richard's Pipit	# ◆	Not seen this trip – previously recorded near homestead in September 2005.
Corvus tasmanicus Forest Raven	# ◆ □	Regularly heard calling and seen flying over the island.
Alauda arvensis Skylark	# □	Very Common. Calling constantly disturbed areas and grassland.
Carduelis carduelis European Goldfinch	#	Not seen this trip.
Carduelis chloris European Greenfinch	□	Regularly seen and heard - most common in disturbed areas, around track sites and grassland.
Passer domesticus House Sparrow	#	Not seen this trip.
Turdus merula Common Blackbird	#	Commonly heard calling in disturbed areas and grassland.
Sturnus vulgaris Common Starling	# ◆ □	Very common – roosting around cliff sites.

Seabird Surveys

Due to the inaccessible nature of much of the island, the seabird survey effort focused on surveying the colonies located in the Northwest Haulage area and the Southeast Slopes. Three species of seabird were confirmed breeding during the survey period (Table 10, Figure 5).

Fairy Prions were found nesting amongst boulder complexes, cavities in boulders, cavities in boulders overgrown with vegetation, shallow soil burrows (usually opening into boulder cavity) and in low densities in cracks in the sheer dolerite columns that girt the island. The level of burrow occupancy was hard to establish due to the presence of high levels of predation. Often active nests contained the remains of predated prions. Prions would return to the colony between 19:30 – 20:30, and this also coincided with the emergence of cats from denning sites. An assessment of the Fairy Prion abundance was not undertaken due to their prolific nesting on the island and time required to access all sites.

Sooty and Short-tailed Shearwaters were found breeding amongst the *Poa poiformis* tussocks. Sooty Shearwater burrows appeared restricted to the colony located on the northwest area of the island with burrows sparsely scattered at a density of one burrow per 0.005 m^2. The breeding population of Sooty Shearwaters was estimated at between 617-683 breeding pairs.

Short-tailed Shearwaters were found breeding predominantly on the eastern side of the island. Burrow density estimates were significantly higher in the southern portion of the colony, at a mean density of one burrow per 0.225 m^2. The southeastern slopes were estimated as carrying a mean density of one burrow per 0.08 m^2. The breeding population of Short-tailed Shearwaters for Tasman Island was estimated at 5,175 – 5,525 breeding pairs.

Despite intensive searches in the area previously occupied by Little Penguins the species was not recorded. No fresh guano, moulting feathers or recent activity was observed. Some contact calls were heard from birds on the water but no calls could be confirmed as originating from the island.

Table 10 Population estimates for Sooty Shearwater and Short-tailed Shearwater on Tasman Island.

Colony	Area surveyed m^2	Colony Size Ha	Density m^2	Breeding pairs per colony	Total Breeding Pairs
Haulage Colony Sooty Shearwater	400 m	6.5	0.005	650	650
SE Slopes STSW	400 m	4	0.08	3200	
South Colony STSW	80 m	1	0.225	2250	5450

Figure 5 Seabird colonies and cat trap locations on Tasman Island.

Reptiles and Amphibians

Four species of reptile were identified during the survey (Table 11). The most commonly recorded was Metallic Skink *Niveoscincus metallicus* with a total of 82 individuals captured in either pitfall or bucket traps. Of the 82 caught, 71 were released alive and 11 found dead in pitfall traps: 5 adults and 1 juvenile in Coastal Mosaic A, 4 adults in Grassland A and 1 adult in Sedgeland B. This species was also plentiful around the house sites, outbuildings and disturbed areas. One adult Ocellated Skink *Niveoscincus ocellatus* was trapped in Grassland A1 (see photo) in an Elliot trap located about 10 m from the cliff edge (GPS 581049 / 5211945). This individual was probably caught while foraging in the tussock for amphipods and other invertebrates. The animal was released unharmed. The tail section of one adult She-oak Skink *Cyclodomorphus casuarinae* was collected from the pathway outside the top house. This was the only sighting of She-oak skink during this survey. One individual White's Skink *Ergernia whitii* was observed on rocks at Coastal Mosaic 5B-4 (Appendix B) recognisable by its size and cream spots on the flanks. No other individuals of this species were observed.

No amphibians were recorded despite trapping, listening for calls, searching in damp areas and sweep netting the small bore near the lower homestead.

Table 11 Location of reptiles caught or observed on Tasman Island (counts for replicate sites A&B are bulked).

Reptile	Abundance	Habitat	Pitfall captures	Bucket	Other Obs.	Total number
Niveoscincus metallicus Metallic Skink	Present	She-oak Woodland	3	1		4
	Present	Regenerating Scrub	2	0		2
	Present	Heathy Scrub	3	0		3
	V. Common	Grassland	17	9	Under tin	26
	V. Common	Coastal Mosaic	25	21	On rocks	46
	Present	Sedgeland	1	Not used		1
Ergernia whitii White's Skink	Possibly Rare	Coastal Mosaic	0	0	1 (on rock boulder)	1
Cyclodomorphus casuarinae She-oak Skink	Possibly Rare	path near top house	0	0	1 (fresh tail)	1
Niveoscincus ocellatus Ocellated Skink	Possibly Rare	Grassland	0	0	1 Elliot trap	1

Invertebrates

Individual taxa were sent to specialists (named in the acknowledgments) for formal identification to species where possible. Taxa which have so far been identified to species are the Amphipoda, Gastropoda, Diplopoda, Orthoptera and Scorpionida (single Tasmanian species)(Table 12). All Aranea (spiders) have been identified to family and where possible to species (Appendix D). Sixty eight individual specimens of *Planilaoma?* sp. nov. "Tasman Island" and 10 *Pedicamista* sp. "Southport" were collected in She-oak Woodland A by sweep net. A further 4 individual *Planilaoma?* sp. nov. "Tasman Island" were collected in the Coastal Mosaic B pitfall sample.

One male and four females of the rare Tasman Island cricket *Tasmanoplectron isolatum* were collected in Elliot traps in She-oak Woodland (Sites B1, B5). Although the traps were in She-oak Woodland they were situated on boulders and rock shelves which is more the typical habitat of this species. Interestingly, a number of individuals were also observed in the drain of the disused laundry troughs in the top homestead, which supports the species preference for dark, rocky places typical of cave evolving species.

The introduced Large Earth Bumble Bee *Bombus terrestris* was observed in low numbers all over the island especially on grassy slopes containing seabird colonies.

Table 12. Invertebrate taxa recorded during this survey.

Species	Habitat	Trap
Class: Mollusca		
Limax maximus (intro. slug)	Grassland	Elliot
Arion intermedius (intro. slug)	Grassland	Bucket
Bothriembryon tasmanicus	Coastal Mosaic She-oak Woodland	Pitfall Sweep
Pernagera officeri	Coastal Mosaic She-oak Woodland Grassland	Pitfall Pitfall Sweep
Magilaoma penolensis	She-oak Woodland	Bucket
Thryasona diemenensis	Grassland	Sweep
Tasmaphena sinclairi	Coastal Mosaic	Bucket
Laomavix collisi	Coastal Mosaic	Pitfall
Paralaoma caputspinulae	Coastal Mosaic	Pitfall
Pedicamista sp. "Southport"	She-oak Woodland	Sweep
Planilaoma? sp. nov. "Tasman Island"	Coastal Mosaic She-oak Woodland	Pitfall Sweep
Order: Scorpionida		
Cercophonius squama (forest scorpion)	Heathy Scrub	Bucket
Order: Amphipoda		
Keratroides angulosus	Not stated	Observed
Mysticotalitrus 'tasmaniae'	Not stated	Observed

Species	Habitat	Trap
Order: Diplopoda		
Notodesmus scotius	She-oak Woodland Heathy Scrub Grassland	Pitfall Pitfall Pitfall
Paredrodesmus purpureus	Regen Scrub	Pitfall
Lissodesmus hamatus	She-oak Woodland Heathy Scrub	Pitfall Pitfall
Spirostreptida sp.	Coastal Mosaic	Pitfall
Order: Amphipoda		
Keratroides angulosus	Not stated	Observed
Mysticotalitrus 'tasmaniae'	Not stated	Observed
Order: Orthoptera		
*Tasmanoplectron isolatum**	She-oak Woodland	Elliot
Parvotettix fortescuensis	Coastal Mosaic	Pitfall
Kinemania ambulans	Not stated	
Order: Hymenoptera		
Bombus terrestris (exotic)	everywhere	Observed

Species	Habitat	Trap
Order: Aranaea		
Gnaphosidae	She-oak Woodland	Bucket & Pitfall
	Heathy Scrub	Bucket & Pitfall
	Grassland	Pitfall
	Regen Scrub	Bucket & Pitfall
	Coastal Mosaic	Bucket & Pitfall
Amphinectidae	Grassland	Pitfall
	Regen Scrub	Pitfall
	Coastal Mosaic	Bucket
Lycosidae	She-oak Woodland	Pitfall
Lycosidae *Lycosa* sp.	Heathy scrub	Pitfall
	Regen Scrub	Pitfall
Lycosidae *Venatrix funesta*	Heathy scrub	Pitfall
Salticidae *Ophisthoncus* sp.	Heathy scrub	Sweep
	Grassland	Pitfall
	Regen Scrub	Sweep
Amaurobiidae	Grassland	Pitfall
Amaurobiidae (ecribellate)	She-oak Woodland	Pitfall
	Regen Scrub	Sweep
	Heathy scrub	Sweep
Opiliones Palpatores Phalangeriidae *(no legs?)*	Regen Scrub	Sweep
Opiliones Palpatores Phalangeriidae *Spinicrus?*	Regen Scrub	Pitfall
Zodariidae	She-oak Woodland	Pitfall
	Sedgeland	Sweep
Zodariidae *Opisthonus* sp.	Heathy scrub	Sweep
Miturgidae *Cheiranthium* sp.	Regen Scrub	Sweep
Clubionidae *Clubiona* sp.	She-oak Woodland	Sweep
	Heathy Scrub	Sweep
	Regen Scrub	Sweep
Araneidae	She-oak Woodland	Sweep
	Heathy scrub	Sweep
	Sedgeland	Sweep

Species	Habitat	Trap
Araneidae *Dolophones* sp.	She-oak Woodland	Sweep
Araneidae *Araneus* sp.	Sedgeland	Sweep
Thomisidae *Diaea* sp.	She-oak Woodland	Sweep
	Regen Scrub	Sweep
	Heathy scrub	Sweep
	Sedgeland	Sweep
Thomisidae *Sidymella* sp.	Sedgeland	Sweep
	Regen Scrub	Sweep
Segestriidae	She-oak Woodland	Pitfall
Ctendiae	She-oak Woodland	Pitfall
Salticidae *Lycidas* group	Sedgeland	Sweep
Salticidae cf. *Sondra tristicula*	Sedgeland	Sweep
Salticidae *Ophisthoncus* sp.	Heathy scrub	Sweep
	Grassland	Pitfall
	Regen Scrub	Sweep
Salticidae different sp.	She-oak Woodland	Sweep
Hahniidae *Scotospilus?* sp.	She-oak Woodland	Sweep

Counts of individual taxa per sample are presented by sampling method (pitfall, bucket and sweep net; Table 13) and by vegetation community (She-oak Woodland, Regenerating Scrub, Grassland, Coastal Mosaic, Heathy Scrub and Sedgeland; Table 14). Table 13 shows the pitfall samples were numerically dominated by Isopoda (slaters) and Collembola (springtails), followed by Amphipoda (land hoppers), Formicidae (ants), Acarina (mites) and adult Coleoptera (beetles). Aranaea (spiders) were also common in pitfall traps. Bucket samples had a lower diversity and a smaller net catch than both pitfall and sweep net samples. Bucket samples were numerically dominated by Collembola, followed by Acarina, Isopoda, Auchenoryncha (leaf hoppers), adult Coleoptera and Diplopoda (millipedes). The sweep net samples were dominated by adult diptera (flies), followed by Acarina, adult Coleoptera, Collembola, Thysanoptera (thrips), Aranaea, Heteroptera (bugs), Gastropoda (snails), Aucenhnoryncha, Isopoda, Formicidae and adult Hymenoptera (wasps).

Ordination of all samples revealed a clear separation between the three sampling methods in terms of their compositions of invertebrate taxa (Fig. 6). Sweep samples were associated with high numbers of Heteroptera (bugs) and Blattodea (cockroaches), pitfall samples with high numbers of Collembola and Amphipoda, and bucket samples were associated with low numbers of Diptera, Auchenoryncha, Lepidoptera (adults and larvae), Aranaea, Acarina and adult Coleoptera. Spiders (Aranea) were collected by all sampling methods, but most frequently by sweep netting.

Ordination of sweep samples indicated a discreet clustering of Coastal Mosaic (associated with high numbers of Isoptera, Collembola, Gastropoda (snails) and Amphipoda), and Heathy Scrub samples (associated with high numbers of Formicidae) (Fig. 7). Ordination for the pitfall samples indicated a separation of Sedgeland samples associated with high numbers of Lepidoptera larvae (Fig. 8). Ordination for the bucket samples indicated a discreet clustering of the Grassland samples associated with high numbers of Formicidae and Coleoptera (adults) (Fig. 9).

Table 13. Counts of taxa sorted by sample method.

Sample/Method	Sorters Initials	Collembola (springtails)	Isopoda (slaters)	Acarina (mites)	Coleoptera (beetles)	Diptera (flies)	Amphipoda (land hoppers)	Formicidae (ants)	Aranaeae (spiders)	Auchenorrhyncha (leaf hoppers)	Thysanoptera (thrips)	Hymenoptera (wasps)	Gastropoda (snails)	Heteroptera (true bugs)
Pitfall														
1A She-oak Woodland	sm	64	43	29	17	6	3	1	11	0	0	0	0	0
1B She-oak Woodland	sm	6	57	7	13	6	23	11	0	0	0	1	0	0
2A Regen Scrub	mp	31	123	0	7	1	8	11	5	0	0	0	0	0
2B Regen Scrub	sm	7	1	4	7	5	55	129	3	0	0	1	0	1
3A Heathy Scrub	mp	144	0	1	14	0	51	0	5	0	0	55	0	0
4A Grassland	sm	11	10	44	15	0	61	31	17	23	1	3	1	0
5A Coastal Mosaic	mp	79	4	1	27	1	25	1	4	0	0	0	0	0
5B Coastal Mosaic	sm	230	375	60	44	2	42	1	17	5	0	0	15	0
6A Sedge1.waterbore	mp	13	0	2	2	4	3	1	15	1	0	0	0	0
6B Sedge2	mp	7	0	0	0	5	4	3	0	0	0	0	0	0
Average per sample		59.2	61.3	14.8	14.6	3.0	27.5	18.9	7.7	2.9	0.1	6.0	1.6	0.1
Bucket														
1A She-oak Woodland	sm	1	10	3	0	0	0	0	2	0	0	0	0	0
1B She-oak Woodland	sm	0	7	2	1	1	0	0	1	0	0	0	1	0
2A Regen Scrub	sm	40	0	47	0	0	0	0	0	0	0	0	0	0
2B Regen Scrub	sm	0	0	1	0	0	8	0	2	22	0	0	0	0
3B Heathy Scrub	sm	0	0	2	4	0	6	0	1	0	0	0	0	0
4A Grassland	mp	0	0	0	2	0	0	4	1	0	0	0	2	0
4B Grassland	sm	1	0	0	3	0	4	1	0	0	0	0	0	0
5A Coastal Mosaic	mp	0	11	0	0	0	0	0	1	0	0	0	1	0
5B Coastal Mosaic	sm	40	0	0	0	0	0	0	1	0	0	0	0	0
Average per sample		9.1	3.1	6.1	1.1	0.1	2	0.6	1	2.4	0	0	0.4	0
Sweep net														
1A She-oak Woodland	sm	7	0	79	30	34	0	7	14	7	64	17	0	5
1B She-oak Woodland	sm	0	0	4	1	11	0	2	3	5	0	5	0	0
2A Regen Scrub	sm	13	0	2	1	6	0	0	4	2	0	1	0	2
2B Regen Scrub	sm	21	0	109	19	26	0	1	19	22	39	4	0	0
3A Heathy Scrub	mp	4	0	4	0	0	0	37	12	2	0	0	0	17
3B Heathy Scrub	mp	4	1	5	0	21	0	18	16	4	0	2	0	2
4A Grassland	mp	0	0	0	1	43	0	0	0	0	0	0	0	57
5A Coastal Mosaic	mp	11	6	0	14	5	0	0	7	0	0	0	3	3
5B Coastal Mosaic	sm	76	62	1	6	1	5	0	2	1	0	0	80	2
6A Sedgeland 1	sm	2	0	30	106	126	0	2	27	36	19	21	0	6
6B Sedgeland 2	sm	0	0	1	0	1	0	0	1	0	0	0	0	1
Average per sample		12.5	6.3	21.4	16.2	24.9	0.5	6.1	9.5	7.2	11	4.5	7.5	8.6

Sample/Method	Sorters Initials	Dipteran larvare	Diplopoda (millipedes)	Coleoptera larvae	Lepidoptera larvae	Blattodea (cockroaches)	Lepidoptera (moths)	Orthoptera (grasshop / crickets)	Chilopoda (centipedes)	Opilionida (harvestman)	Sternorryncha (scale insects)	Gastropoda (slugs)	Hymenoptera (larvae)	Scorpionida (scorpions)	Pseudoscorpionida
Pitfall															
1A She-oak Woodland	sm	0	2	4	1	0	0	0	0	0	0	0	0	0	0
1B She-oak Woodland	sm	0	10	1	0	0	1	0	1	0	0	0	0	0	1
2A Regen Scrub	mp	0	0	0	0	1	0	0	0	2	0	0	0	0	0
2B Regen Scrub	sm	2	2	1	1	0	0	0	0	0	0	0	0	0	0
3A Heathy Scrub	mp	0	2	0	0	0	0	0	1	0	0	0	0	0	0
4A Grassland	sm	11	15	1	0	0	2	0	3	2	0	0	0	0	0
5B Coastal Mosaic	sm	27	0	2	0	0	1	3	3	0	0	0	0	0	0
6B Sedge 2	mp	24	0	0	7	0	0	6	0	1	0	0	2	0	0
Average per sample		6.4	3.1	0.9	0.9	0.1	0.4	0.9	0.8	0.5	0.0	0.0	0.2	0.0	0.1
Bucket															
1A She-oak Woodland	sm	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1B She-oak Woodland	sm	0	2	0	0	0	0	0	0	0	0	0	0	0	0
2B Regen Scrub	sm	0	1	0	0	0	0	0	0	1	0	0	0	0	0
3B Heathy Scrub	sm	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4A Grassland	mp	0	7	0	0	0	0	0	0	0	0	0	0	0	0
4B Grassland	sm	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Average per sample		0	1.2	0	0	0	0	0	0	0.1	0	0.1	0	0.1	0
Sweep net															
1A She-oak Woodland	sm	0	0	0	4	3	0	0	0	0	1	0	0	0	0
1B She-oak Woodland	sm	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2A RegenScrub	sm	0	0	1	0	4	2	0	0	0	1	0	0	0	0
2B RegenScrub	sm	0	0	0	4	2	1	0	0	2	1	0	0	0	0
3A Heathy Scrub	mp	0	0	0	1	2	2	0	0	0	0	1	0	0	0
3B Heathy Scrub	mp	0	0	0	3	0	1	0	0	0	0	0	0	0	0
4A Grassland	mp	0	4	0	0	2	0	0	0	0	0	0	0	0	0
5B Coastal Mosaic	sm	0	0	1	0	0	1	0	0	0	0	0	0	0	0
6A Sedgeland 1	sm	0	0	16	2	3	3	0	0	1	0	0	0	0	0
6B Sedgeland 2	sm	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Average per sample		0.0	0.4	1.6	1.3	1.6	1.0	0.0	0.0	0.3	0.3	0.1	0.0	0.0	0.0

Table 14 Counts of taxa sorted by vegetation community.

Sample/Habitat	Sorters Initials	Collembola (springtails)	Isopoda (slaters)	Acarina (mites)	Coleoptera (beetles)	Diptera (flies)	Amphipoda	Formicidiae (ants)	Aranaeae (spiders)	Auchenorrhyncha (hoppers)	Thysanoptera	Hymenoptera (wasps)	Gastropoda (snails)	Heteroptera (true bugs)
She-oak Woodland														
1A She-oak Woodland.18-11-05.pitfall	sm	64	43	29	17	6	3	1	11	0	0	0	0	0
1B She-oak Woodland.18-11-05.pitfall	sm	6	57	7	13	6	23	11	0	0	0	1	0	0
1A She-oak Woodland.18-11-05.bucket	sm	1	10	3	0	0	0	0	2	0	0	0	0	0
1B She-oak Woodland.18-11-05.bucket	sm	0	7	2	1	1	0	0	1	0	0	0	1	0
1B She-oak Woodland.16-11-05.sweep	sm	0	0	4	1	11	0	2	3	5	0	5	0	0
1A She-oak Woodland.16-11-05.sweep	sm	7	0	79	30	34	0	7	14	7	64	17	0	5
Average per sample		13.0	19.5	20.7	10.3	9.7	4.3	3.5	5.2	2.0	10.7	3.8	0.2	0.8
Regenerating Scrub														
2A Regen Scrub.18-11-05.pitfall	mp	31	123	0	7	1	8	11	5	0	0	0	0	0
2A Regen Scrub.18-11-05.bucket	sm	40	0	47	0	0	0	0	0	0	0	0	0	0
2A Regen Scrub.18-11-05.sweep	sm	13	0	2	1	6	0	0	4	2	0	1	0	2
2B Regen Scrub.18-11-05.bucket	sm	0	0	1	0	0	8	0	2	22	0	0	0	0
2B Regen Scrub.18-11-05.pitfall	sm	7	1	4	7	5	55	129	3	0	0	1	0	1
2B Regen Scrub.18-11-05.sweep	sm	21	0	109	19	26	0	1	19	22	39	4	0	0
Average per sample		18.7	20.7	27.2	5.7	6.3	11.8	23.5	5.5	7.7	6.5	1.0	0.0	0.5
Grassland														
4A Grassland.18-11-05.bucket	mp	0	0		2	0	0	4	1	0	0	0	2	0
4A Grassland.18-11-05.pitfall	sm	11	10	44	15	0	61	31	17	23	1	3	1	0
4A Grassland.18-11-05.sweep	mp	0	0	0	1	43	0	0	0	0	0	0	0	57
4B Grassland.19-11-05.bucket	sm	1	0		3	0	4	1		0	0	0	0	0
Average per sample		3.0	2.5	11.0	5.3	10.8	16.3	9.0	4.5	5.8	0.3	0.8	0.8	14.3
Coastal Mosaic														
5A Coastal Mosaic.19-11-05.bucket	mp	0	11	0	0	0	0	0	1	0	0	0	1	0
5A Coastal Mosaic.19-11-05.pitfall	mp	79	4	1	27	1	25	1	4	0	0	0	0	0
5A Coastal Mosaic.19-11-05.sweep	mp	11	6	0	14	5	0	0	7	0	0	0	3	3
5A Coastal Mosaic.19-11-05.bucket	sm	40	0	0	0	0	0	0	1	0	0	0	0	0
5B Coastal Mosaic.19-11-05.sweep	sm	76	62	1	6	1	5	0	2	1	0	0	80	2
5B Coastal Mosaic.19-11-05.pitfall	sm	230	375	60	44	2	42	1	17	5	0	0	15	0
Average per sample		72.7	76.3	10.3	15.2	1.5	12.0	0.3	5.3	1.0	0.0	0.0	16.5	0.8
Heathy Scrub														
3A Heathy Scrub 18-11-05.pitfall	mp	144	0	1	14	0	51	0	5	0	0	55	0	0
3A Heathy Scrub 18-11-05.sweep	mp	4	0	4	0	0	0	37	12	2	0	0	0	17
3B Heathy Scrub 18-11-05.sweep	mp	4	1	5	0	21	0	18	16	4	0	2	0	2
3B Heathy Scrub 19-11.05.bucket	sm	0	0	2	4	0	6	0	1	0	0	0	0	0
Average per sample		38.0	0.3	3.0	4.5	5.3	14.3	13.8	8.5	1.5	0.0	14.3	0.0	4.8
Sedgeland														
6A Sedge1.17-11-05.sweep	sm	2	0	30	106	126	0	2	27	36	19	21	0	6
6A Sedge1.waterbore.18-11-05.pitfall	mp	13	0	2	2	4	3	1	15	1	0	0	0	0
6B Sedge2.18-11-05.sweep	sm	0	0	1	0	1	0	0	1	0	0	0	0	1
6B Sedge2.19-11-05.pitfall	mp	7	0	0	0	5	4	3	0	0	0	0	0	0
Average per sample		5.5	0.0	8.3	27.0	34.0	1.8	1.5	10.8	9.3	4.8	5.3	0.0	1.8

Sample/Habitat	Sorters Initials	Dipteran larvare	Diplopoda (millipedes)	Coleoptera larvae	Lepidoptera larvae	Blattodea	Lepidoptera (moths)	Orthoptera (grasshoppers)	Chilopoda (centipedes)	Opilionida (harvestman)	Sternorryncha (scale insects)	Gastropoda (slugs)	Hymenoptera (larvae)	Scorpionida	Pseudoscorpionida
She-oak Woodland															
1A She-oak Woodland pitfall	sm	0	2	4	1	0	0	0	0	0	0	0	0	0	0
1B She-oak Woodland pitfall	sm	0	10	1	0	0	1	0	1	0	0	0	0	0	1
1A She-oak Woodland bucket	sm	0	1	0	0	0	0	0	0	0	0	0	0	0	0
1B She-oak Woodland bucket	sm	0	2	0	0	0	0	0	0	0	0	0	0	0	0
1A She-oak Woodland sweep	sm	0	0	0	4	3	0	0	0	0	1	0	0	0	0
1B She-oak Woodland sweep	sm	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Average per sample		0.0	2.5	0.8	0.8	0.5	0.3	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.2
Regenerating Scrub															
2A Regenscrub.18-11-05.pitfall	mp	0	0	0	0	1	0	0	0	2	0	0	0	0	0
2A RegenScrub.18-11-05.sweep	sm	0	0	1	0	4	2	0	0	0	1	0	0	0	0
2B RegenScrub.18-11-05.bucket	sm	0	1	0	0	0	0	0	0	1	0	0	0	0	0
2B RegenScrub.18-11-05.pitfall	sm	2	2	1	1	0	0	0	0	0	0	0	0	0	0
2B RegenScrub.18-11-05.sweep	sm	0	0	0	4	2	1	0	0	2	1	0	0	0	0
Average per sample		0.3	0.5	0.3	0.8	1.2	0.5	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0
Grassland															
4A Grassland.18-11-05.bucket	mp	0	7	0	0	0	0	0	0	0	0	0	0	0	0
4A Grassland.18-11-05.pitfall	sm	11	15	1	0	0	2	0	3	2	0	0	0	0	0
4A Grassland.18-11-05.sweep	mp	0	4	0	0	2	0	0	0	0	0	0	0	0	0
4B Grassland.19-11-05.bucket	sm	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Average per sample		2.8	6.5	0.3	0.0	0.5	0.5	0.0	0.8	0.5	0.0	0.3	0.0	0.0	0.0
Coastal Mosaic															
5B Coastal Mosaic.19-11-05.sweep	sm	0	0	1	0	0	1	0	0	0	0	0	0	0	0
5B Coastal Mosaic.19-11-05.pitfall	sm	27	0	2	0	0	1	3	3	0	0	0	0	0	0
Average per sample		4.5	0.0	0.5	0.0	0.0	0.3	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Heathy Scrub															
3A Heathy Scrub 18-11-05.pitfall	mp	0	2	0	0	0	0	0	1	0	0	0	0	0	0
3A Heathy Scrub 18-11-05.sweep	mp	0	0	0	1	2	2	0	0	0	0	1	0	0	0
3B Heathy Scrub 18-11-05.sweep	mp	0	0	0	3	0	1	0	0	0	0	0	0	0	0
3B Heathy Scrub 19-11.05.bucket	sm	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Average per sample		0.0	0.5	0.0	1.0	0.5	0.8	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0
Sedgeland															
6A Sedge1.17-11-05.sweep	sm	0	0	16	2	3	3	0	0	1	0	0	0	0	0
6B Sedge2.18-11-05.sweep	sm	0	0	0	0	2	0	0	0	0	0	0	0	0	0
6B Sedge2.19-11-05.pitfall	mp	24	0	0	7	0	0	6	0	1	0	0	2	0	0
Average per sample		6.0	0.0	4.0	2.3	1.3	0.8	1.5	0.0	0.5	0.0	0.0	0.5	0.0	0.0

Invertebrate Ordinations

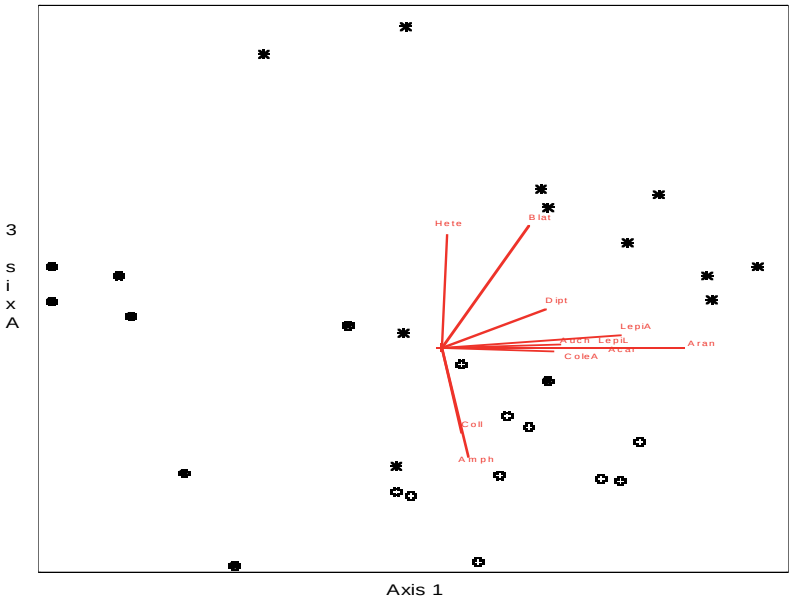

Fig. 6. Ordination plot of all Tasman Island samples showing separation of the three sampling methods and the principal invertebrate taxa contributing to the separation. The more similar the composition of the samples the closer together the samples are plotted. A 3-dimensional solution was recommended only a plot of axis 1 and axis 3 is shown, final stress=14.93. Sample Codes: First 1 or 2 digits is habitat (sheoak SO; regenerating scrub RS; grassland G; coastal mosaic CM; heath H; sedgeland S); next single digit is sample (A and B); final digit is method (sweeps S; pitfalls P; buckets B). Method is also indicated makers (black circle = bucket, open circle = pitfall and star = sweep).

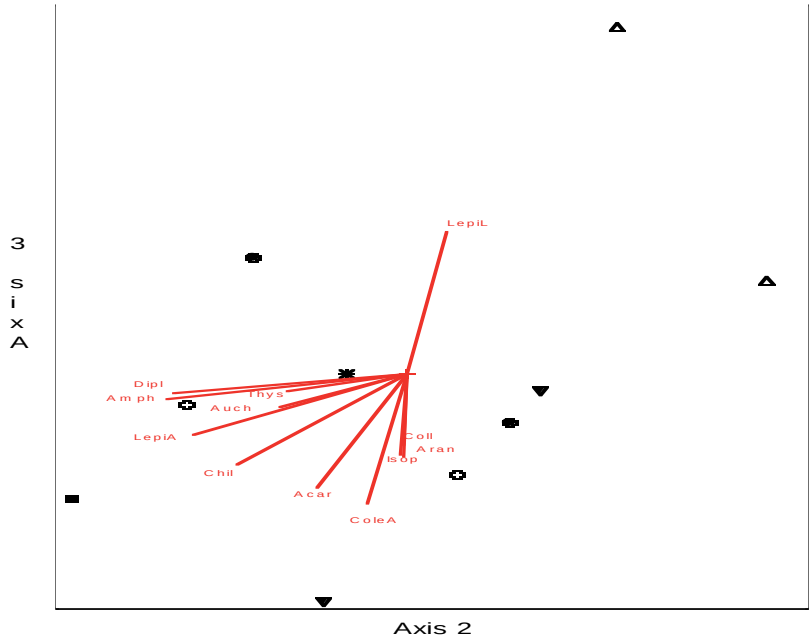

Fig. 7. Ordination plot of pitfall samples showing separation of Sedgeland sites (open triangles) and the principal invertebrate taxa contributing to separation. A 3-dimensional solution was recommended however only a plot of axis 2 and axis 3 is shown, final stress=4.41. Sample Codes: First 1 or 2 digits is habitat (sheoak SO; regenerating scrub RS; grassland G; coastal mosaic CM; heath H; sedgeland S); next single digit is sample (A and B); final digit is method (sweeps S; pitfalls P; buckets B). Habitat is also indicated markers (black circle = regenerating scrub, open circle = sheoak, black square = grassland, black triangle = cliff mosaic, open triangle = sedgeland and star = Heathy Scrub).

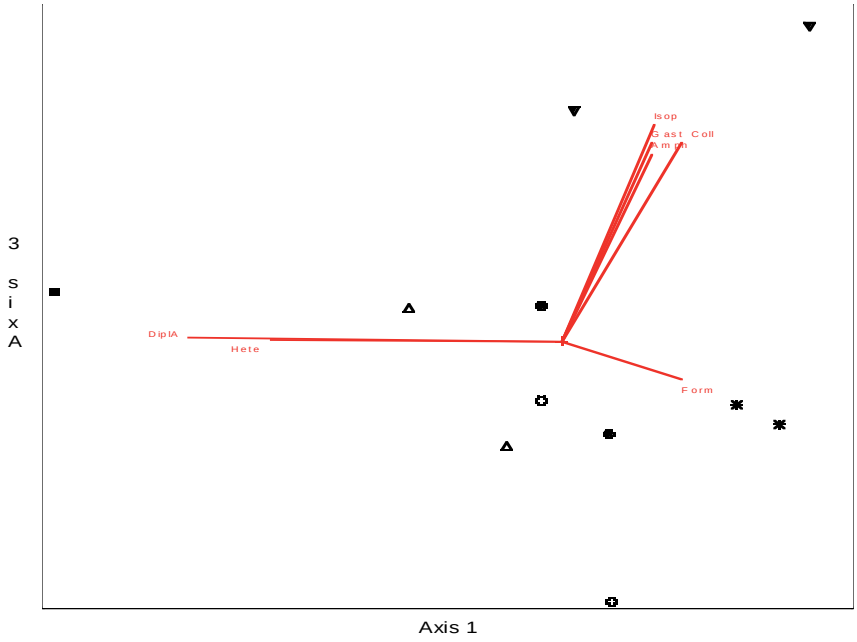

Fig. 8. Ordination plot of sweep samples showing separation of Cliff Mosaic (black triangle) and Heathy Scrub samples (star) and the principal invertebrate taxa contributing to separation. A 3-dimensional solution was recommended however only a plot of axis 2 and axis 3 is shown, final stress=5.32. Sample Codes: First 1 or 2 digits is habitat (sheoak SO; regenerating scrub RS; grassland G; coastal mosaic CM; heath H; sedgeland S); next single digit is sample (A and B); final digit is method (sweeps S; pitfalls P; buckets B). Habitat is also indicated markers (black circle = regenerating scrub, open circle = sheoak, black square = grassland, black triangle = cliff mosaic, open triangle = sedgeland and star = Heathy Scrub).

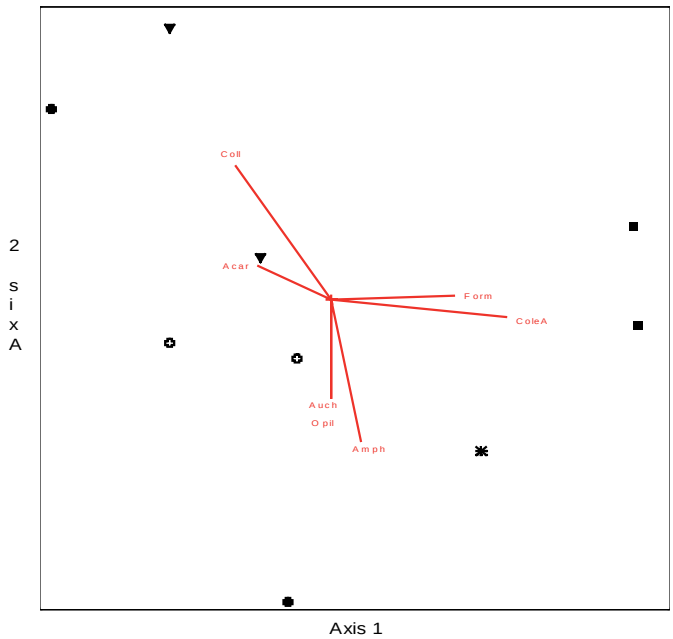

Fig. 9. Ordination plot of bucket samples showing separation of grassland samples (black square) and the principal invertebrate taxa contributing to separation. A 3-dimensional solution was recommended however only a plot of axis 1 and axis 3 is shown, final stress=2.37. Sample Codes: First 1 or 2 digits is habitat (sheoak SO; regenerating scrub RS; grassland G; coastal mosaic CM; heath H; sedgeland S); next single digit is sample (A and B); final digit is method (sweeps S; pitfalls P; buckets B). Habitat is also indicated markers (black circle = regenerating scrub, open circle = sheoak, black square = grassland, black triangle = cliff mosaic, open triangle = sedgeland and star = Heathy Scrub).

Discussion

Flora

Vegetation communities

Historic accounts and photos of the vegetation of Tasman Island indicate that the island once supported a denser covering of vegetation, with elements of closed forests prior to European settlement. Schahinger's (2002a) vegetation map shows areas of intact mature heath and woodlands and identifies areas of heath that are regenerating following the cessation of grazing and fire. This study enabled these previously mapped vegetation units to be expanded, with community structural and floristic descriptions. An old growth element was identified within a designated area of regenerating scrub, suggesting that small remnant fragments were retained in this area despite grazing and fires.

Schahinger (2002a) discussed soils and sediments on the island. "Geological maps of Tasman Island and the southern portions of Cape Pillar reveal little but Jurassic dolerite (Banks *et al.* 1989), though there is a sliver of Middle Permian sediments on the northern tip of the island (and an associated wave-cut intertidal shore platform much favoured by basking seals). However, there are in fact extensive deposits of wind blown sand overlaying the dolerite bedrock near the end of the Cape (up to at least 2–3 m in places; Schahinger pers. obs.), with suggestions that a similar scenario exists on Tasman Island (Harris 1984). The depth and extent of aeolian sand on the island would clearly have been a determining factor in shaping the pre-European vegetation, along with the extreme exposure to salt-laden winds and an unknown incidence of fire (the presence of Aboriginal artefacts on the island raises the possibility that pre-European firing may have wrought some changes to the island's floral composition, though also bearing in mind that the original ignition point would not necessarily have been on the island itself — as evidenced by the 1967 experience in which embers from a fire on Cape Pillar drifted onto the island)."

The current study investigated soil depths with soils greater than 90 cm recorded in some wet areas of Regenerating Scrub. Coastal Mosaic vegetation occurs on deep loam soils rich in organic matter,

which are likely to be attributable to burrowing seabird activity and high plant productivity. The most intact areas of vegetation (Heathy Scrub and She-oak Woodland), dominated by woody trees and shrubs, had the shallowest soils. The Regenerating Scrub is co-dominated by woody trees and sedges, therefore would have higher productivity, and occurs in the interior of the island plateau, which is wetter. The rocky cliff edge areas supporting intact Heathy Scrub and She-oak Woodland are drier and more exposed thus having lower productivity and perhaps slower soil accumulation rates.

New Species Records

Several new plant species were recorded which reflects the low level of botanical survey undertaken on the island. No doubt future works will expand the island's species list. It is possible that previous trips did not coincide with the flowering time of the orchid species *Thelymitra ixioides*. The *Colobanthus sp.* (most likely *C. apetalus*) was restricted to the sheer cliff edge at the eastern end of the island, above a shearwater colony. *Blechnum wattsii* was found approximately 500m east of the lighthouse in a drainage line, amongst dense, tall *Juncus pallidus* and *Isolepis nodosa*. It did not occur anywhere else on the island suggesting its distribution may be influenced by water availability as this was one of the wettest areas on the island. *Exocarpos cupressiformis* was surrounded by dense heath and therefore was unlikely to have been detected previously if this specific area hadn't been surveyed. *Lepidosperma elatius* occurred in the sedgeland, which may have not been previously surveyed. *Comesperma volubile* is a small scrambling vine with bright blue flowers making it easy to detect amongst the grasses and sedges. *Euchiton litticola* is a small flowering daisy that could be easily overlooked. *Senecio biserratus* is a yellow flowering daisy that perhaps was assumed to be another *Senecio* sp.

Schahinger (2002a) commented on the absence of the following species from Tasman Island given their presence at nearby Cape Pillar: *Bedfordia salicina, Pomaderris apetala, Olearia viscosa, Richea dracophylla, Epacris marginata, Epacris myrtifolia, Hakea megadenia, Hibbertia riparia, Lepidosperma concavum, Lomatia tinctoria, Pentachondra involucrata, Pimelea nivea, Sprengelia incarnata* and *Spyridium obovatum. Hakea lissosperma, Anopterus glandulosus* and *Telopea truncata* (which occur further north at Corruption Gully) are also absent. The surveys conducted during this trip did not detect any of these species, re-enforcing their suspected absence from the island. Even if the pappused seeds of the wind dispersed species (*O. viscosa, B. salicina*) reach Tasman Island, they appear unable to germinate or establish. The absence of species with seeds or fruits known to attract birds (*R. dracophylla, L. concavum*) is also unexpected as these species occur on Tasman Peninsula. Establishment may be limited more by lack of suitable growing conditions rather than seed dispersal.

Allocasuarina crassa

Allocasuarina crassa is confined to an area on the Tasman Peninsula between Arthurs Peak and Tasman Island, occurring only in the Tasman National Park (Schahinger 2002b). It is listed as rare on the *Tasmanian Threatened Species Protection Act 1995*. The species is listed because it is "subject to stochastic risk of endangerment because of its naturally small population size". Its distribution on Tasman Island is likely to have been reduced since the early 1900s by vegetation clearance and subsequent slashing and sheep grazing (Schahinger 2002a).

A new key to the Tasmanian *Allocasuarina species* was developed in 2002 (Schahinger 2002b). Blackman *et al.* (in prep) studied *Allocasuarina crassa* L.A.S.Johnson and *Allocasuarina monilifera* L.A.S.Johnson. Where these two species meet (the contact zone), mixed populations containing a range of intermediate morphotypes were observed suggesting hybridisation. Such contact zones provide an opportunity to study mechanisms of speciation and the origin and divergence of polyploidy in the genus *Allocasuarina*. These species (Steane *et al.* 2003) are morphologically divergent, although specimens allocated to *A. crassa* are variable (Schahinger 2002b). Chromosome counts indicated that *A. monilifera* is tetraploid (4n=44; Barlow 1959 in Blackman (in prep.); Blackman 2003) and *A. crassa* may be octoploid (x ~ 80; Blackman 2003). *A. crassa* dominates more exposed sites within the Cape Pillar region and is physiologically adapted to exposed coastal environments (Blackman *et al.* 2005).

Allocasuarina crassa specimens collected from Tasman Island were submitted to Greg Jordan (UTAS). Cladode thickness, internode length, leaf scale length, degree of hairiness were measured on each sample. These four characters are recognised as features distinguishing *A. crassa* and *A. monilifera*. Based on these morphological attributes the specimens were identified to be "true" octoploid *A. crassa*. There was no evidence of hybridisation with *A. monilifera*. This further supports Jordan *et al.* (in prep) theory that intermediate hybrids occur at a contact zone as *A. monilifera* does not occur on Tasman Island.

The population of *A. crassa* on Tasman Island is of high conservation value. While the risk of introduction of *Phytophthora cinnamomi* is likely to be low as visitor traffic is small, standard hygiene protocols should be required for all staff and visitors to the island.

Weeds

Weed species were most abundant in Sedgeland and Grassland mainly in the form of grasses. The most intact Grassland occurred at the cliff edges (away from the Sedgeland). *Vicia* sp. was present in both, however, in the Grassland the species was densest close to the Sedgeland ecotone. There were many weed species, most of which were not flowering, thus making identification to species level difficult. Eradication of these species would be extremely difficult without causing considerable damage to the surrounding vegetation. They are likely to have been introduced as pasture improving species or accidentally with feed and livestock. Eradication is possible and perhaps worthwhile for the exotic garden plants located in front of the old homestead. *Hebe* sp. appears to be slowly spreading into the surrounding vegetation (<20m from the origin).

Fauna

Feral Cats

Feral cats originated on Tasman Island from the domestic cats brought in by light-keepers. During the early 1980s eradication was attempted but failed due to lack of support at the end of the program (Brothers 1982). On Tasman Island cats feed mostly on Fairy Prion, catching them as they arrive in the boulder fields after dark. With a feral cat population estimated at around 50 cats, up to 150 prion are potentially killed per night, equating to 54 000 Fairy Prion per year. It is feasible to eradicate feral cats from the island and the likelihood of re-introduction is very low. A well-planned project using a variety of methods including poisoning, trapping and shooting during autumn and early winter months is recommended. Follow–up monitoring for remaining cats, possibly with trained cat detection dogs, is essential. The topography of the island, though inaccessible in places, lends itself to efficient use of leg hold traps. Providing bycatch issues can be addressed, leg hold traps would be an effective method of capture. Brush cutting tracks and clear areas for placing leghold traps would be a useful technique in a cat eradication program by encouraging cats to use specific paths. Possible by-catch species in leghold traps are ravens and crakes. Adjustments to trap plate pressure and using low, angled fencing to divert walking birds off paths may reduce the possibility of trapping crakes. The use of 1080 as an eradication method is also feasible as Tasman Island does not contain any small mammals. Given that Brothers (1982) estimated that only a few cats remained on the island after only a moderate eradication effort, success by using a combination of contemporary techniques and a sustained program is highly likely.

Birds

The list of birds collated during this and the September 2005 survey reflects a typical mix of resident and transient species that can easily move, seasonally and even daily, to and from the mainland for feeding and breeding. An interesting finding is the positive identification of the Lewin's Rail in Sedgeland. While there was some discussion of the potential for a second rail species to be present, possibly the Spotless Crake, this could not be confirmed and may have been immature Lewin's Rail. Lewin's Rail have been recorded on some other Tasmanian offshore islands but their movements are poorly known. While the species may be fairly sedentary, they are capable of moving when conditions alter. Milledge (in Marchant and Higgins 1993) reported the species as potentially flying between mainland Tasmania and Maatsuyker Island, a distance of 12 kms therefore, the distance of 3 kms between Tasman Island and the Tasman Peninsula could easily be crossed. The finding of a skull and severed wing suggests rails are subject to predation either from feral cats or native predators like raptors.

Bird species identified breeding on Tasman Island include Fairy Prion, Sooty Shearwater, Short-tailed Shearwater, Swamp Harrier, Welcome Swallow, Silvereye and most likely White-bellied Sea-eagle, Peregrine Falcon and small passerine species. As Tasman Island contains no small native or introduced mammals or annual abundance of grasshoppers, the Swamp Harrier and Peregrine Falcon are likely to be feeding at times on reptiles, bird species such as Starling and seabirds as well as foraging on the mainland. A nest of the White-bellied Sea-eagle has been recorded on the northern columns opposite 'The Blade' but despite a pair of sea-eagles regularly being seen in this area, it was not possible to locate a nest from the plateau above. As there are few mature trees on the island and possibly none with hollows or branches, there is little suitable nesting habitat for many species like Wedge-tailed Eagle, Brown Falcon, Brown Goshawk, Forest Raven, or for cavity nesting species like parrots or cockatoos.

Seabirds

Population counts show that both shearwater species are within previous estimates published by Brothers (Brothers *et al.* 2001). The Sooty Shearwater colony was estimated to be approximately 650 breeding pairs compared to Brothers estimate of "up to 1000 pairs". The colony mapping only extended along the accessible NW colony, and this extent was used to extrapolate the density estimates. Brothers noted that sparsely scattered burrows also occur throughout the northern section of the island, therefore as it is possible that up to several hundred birds may breed in these areas, it is likely that the figure provided by Nigel Brothers remains a realistic estimate.

Short-tailed Shearwaters were found in distinctively different geographic locations on the island compared to the Sooty Shearwaters. Two distinct colonies were mapped on the southeast slopes. The first colony located on the southeast terraces was of medium density (0.08 burrows per m^2), though the southern most colony (south colony), while smaller in area held a density of 0.225 burrows per m^2. Brothers estimated the breeding population at between 3 000-7 000 burrows. As the Short-tailed Shearwater colonies were quite accessible the estimate of between 5 175 – 5 525 during this survey shows that despite cat predation, the short-tailed shearwater population remains stable.

The level of burrow occupancy for Fairy Prion was hard to establish due to the presence of high levels of predation. Often active nests contained the remains of predated prions and the use of signs of occupation to determine active nests may have

been ambiguous. The year round occupation of breeding colonies by Fairy Prions means there is a constant food source for feral cats on the island. A cat eradication program therefore is one of the most important objectives for future management of the island.

This survey confirmed the local extinction of the Little Penguin colony, estimated by Nigel Brothers to contain 200 breeding pairs in 1978 (Brothers 1979) and between 300-700 breeding pairs in 1982 (Brothers *et al.* 2001). Despite intensive searches, no active nests were located or signs of presence observed. An earlier field trip in September 2005 (Lee and Robinson 2005) also failed to locate any signs of penguins on the island. The decline of the once thriving Little Penguin population could be due to either predation, fishing practices or a combination of both. Little Penguins of breeding age do not undertake significant levels of migration in South East Tasmania (Drew Lee pers comm 2006) maintaining an occupation of the colony throughout the year. This life history provides a year round food source for the feral cat population and cats have been implicated in the decline of penguin numbers on a variety of other islands (Bruny Island, Wedge Island) in the region. Other known predators, such as New Zealand Fur Seal may also have applied pressure to the population. Access to the island for flightless birds is quite limited due to the island's topography. Only a few access points exist, with the major documented access point being the haulage way on the western coast of the island. The establishment of a New Zealand Fur Seal breeding colony directly in the access point may have actively deterred Little Penguins from using the site.

Previous trips to Tasman Island have observed gill nets set adjacent to the haulage site and Little Penguins are commonly caught in gill nets when set near colonies. Little Penguins will aggregate on the water just offshore to their access points, often in considerable numbers. Many cases exist in Tasmania where significant proportions of colonies are caught in just one gillnet set near access points.

Reptiles

Four of the five species of reptile previously recorded on Tasman Island by Brothers (Green and Rainbird 1993, Brothers 1979, Brothers *et al.* 2001) were reconfirmed during this study. Apparently Brothers lodged 12 specimens of the endemic Tasmanian Tree Skink Niveoscincus pretiosus collected from Tasman Island in 1977-78? and referred to the species as being common (Green and Rainbird 1993). No other information has been sourced on the collection of this species and so there remains some confusion. Although the species was not identified during this survey it could have been quite easily overlooked or confused with the Metallic Skink. The Tasmanian Tree Skink is known to occur throughout mainland Tasmania and on nearly all associated islands surviving in extreme environments and occupying a range of habitats including coastal rock platforms (Hutchinson *et al.* 2001).

The Metallic Skink is the most widespread Tasmanian reptile, occurring in a variety of habitats from sea level to alpine elevations as well as on the majority of offshore islands (Hutchinson *et al.* 2001). This species was widespread and abundant and in large numbers around the houses, sheds, under tin and occupation structures. Sampling methods found greatest numbers in Coastal Mosaic and Grassland. These habitat types are the preferred nesting habitat for burrowing seabirds and on the deepest, nutrient rich soils which contain the densest concentrations of invertebrates.

The three larger skink species were all recorded in low numbers during this survey. This could be because they occur in low numbers on the island or that their preferred rocky habitats were not targeted during the survey. Ocellated Skink and White's Skink prefer rock crevices (Hutchinson *et al.* 2001) and the steepness of the slopes and extent of cliff ledges around Tasman Island suggests these two species could potentially be more abundant. The remains of a She-oak Skink collected on the track near the top house suggests that reptiles are being targeted by predators, especially feral cats. Brothers *et al.* 2001 recorded She-oak Skink as being common and therefore the lack of observations during this survey suggests the species has declined significantly. The She-oak Skink and Ocellated Skink are endemic to Tasmania and as there are no rats or house mice on Tasman Island, eradicating feral cats would create a safe refuge for these and other reptile species.

Invertebrates

A range of survey methods across six vegetation types has resulted in 22 invertebrate Orders being identified during this work: Isopoda (slaters), Collembola (springtails), Orthoptera (grasshoppers), Amphipoda (land hoppers), Formicidae (ants), Acarina (mites), Coleoptera (beetles), Blattodea (cockroaches), Lepidoptera (moths), Scorpionida (scorpions), Pseudoscorpionida (false scorpions), Chilopoda (centipedes), Araneae (spiders), Opilionida (harvestman), Auchenorrhyncha (leaf hoppers), Diplopoda (millipedes), Diptera (flies), Thysanoptera (thrips), Sternorryncha (scale insects), Heteroptera (bugs), Gastropoda (snails) and Hymenoptera (wasps, ants, bees). The three sampling methods (pitfall, bucket and sweep net) were found to target different compositions of invertebrates (Figs. 6,7,8,9) whereas different habitats were found to have different communities of invertebrates even at the coarse level of analysis. This information further highlights that a range of methods are needed to more accurately define invertebrate groups and that traps should remain in place for as long as possible to improve the diversity of collections.

Gastropoda (land snails and slugs)

The total native snail diversity for Tasman Island is now 10 species; quite high for a relatively small island. Nine species were recorded from the present study plus *Caryodes dufresnii* has been previously recorded by George Davis. A total of seven described native land snails (Gastropoda) were identified in samples: *Bothriembryon tasmanicus, Pernagera officeri, Magilaoma penolensis, Thryasona diemenensis, Tasmaphena sinclairi* (juvenile), *Laomavix collisi*, and *Paralaoma caputspinulae*. These seven named species are found in similar habitat on mainland Tasmania and their presence on Tasman Island is not unexpected.

However, two additional undescribed species of land snail were recorded in samples. The record of *Pedicamista* sp. "Southport" is the tenth locality for this south-east coastal endemic and a range extension of about 10 km from the nearest record at Crescent Bay (K. Bonham pers. comm.). Tasman Island is the fourth small island where *Pedicamista* sp. "Southport" has been recorded, the others being Courts, Betsey and Partridge Islands.

The new species *Planilaoma*? sp. nov. "Tasman Island" most closely resembles *Planilaoma* but includes a fairly major sculptural difference. The main species in the genus, *P. luckmanii*, is a widespread but variable species (or complex of species) mainly found in eastern and northern Tasmania. However, *P. luckmanii* has never correctly been recorded from the Tasman or Forestier Peninsulas or elsewhere within about 60 km of Tasman Island. The group is evolutionary significant (Planilaoma being the most primitive known charopid), and the Tasman Island specimen is therefore of considerable interest.

Two introduced species of slug were identified from Grassland samples, *Limax maximus* and *Arion intermedius*. Both have been recorded from the adjacent Tasman Peninsula and are widespread over mainland Tasmanian (Smith and Kershaw 1981). Their occurrence is not unexpected given the past history of stock grazing.

Scorpionida (true scorpions)

A single individual of the only true scorpion native to Tasmania, the Wood or Forest Scorpion (*Cercophonius squama*) was captured by bucket sample in Heathy Scrub. *C. squama* is relatively widespread on mainland Tasmania in forested habitats.

Amphipoda (landhoppers)

Two species of Amphipoda or landhopper were identified in samples. By far the commonest was a species of *Mysticotalitrus*, which is similar to *M. tasmaniae*, but differing from it in the form of the perieopod 6 gill, which was more elongate and projecting caudally. The other species was *Keratroides angulosus*, but this was much rarer, with only two specimens recorded.

The absence of the widespread and common *Keratroides vulgaris* is of interest. Friend (1987) discusses the distribution *K. vulgaris* in Tasmania and its offshore islands, noting that the presence or absence of the species on islands, and the depths of channels separating those islands from the mainland are consistent with a range expansion by *K. vulgaris* between 11500 and 6000 BP from somewhere in the east of Tasmania. The channel between Tasman Island and the mainland is about 45 m deep (Banks *et al.* 1989), significantly deeper than those between Maria and Schouten Islands, both of which have *K. vulgaris*. Thus the absence of *K. vulgaris*, despite its ubiquity on mainland Tasmania, is understandable.

K. angulosus has a disjunct distribution in Tasmania with one part of its range in the far south and the other in the east (north of Triabunna) and north. It is absent from Schouten and Maria islands, but present on Maatsuyker and De Witt Islands in the south. This record from Tasman Island raises the question of whether it is present at coastal sites on South Bruny Island, and whether the Tasman Island population is related to the southern or northern section of the species' range.

Orthoptera (grasshoppers and crickets)

Only three species of Orthoptera were collected on Tasman Island, including the rare Rhaphidophoridae *Tasmanoplectron isolatum*, known only from Tasman Island. *T. isolatum* was described in 1971 by Aola Richards who worked on New Zealand Rhaphidophoridae. While the species is only known from Tasman Island, Richards (1971) suggested the species may also occur in suitable habitat on the Tasman Peninsula. *Tasmanoplectron* is unique amongst other genera of Australian Rhaphidophoridae, but in spination of the legs and shape of the external genetalia it has strong affinities with at least nine New Zealand and subantarctic genera. This suggests that *Tasmanoplectron* and its ancestors are of considerable antiquity.

It is surprising that no other species of Orthoptera were collected, particularly Acrididae grasshoppers which should be common in grassland areas of the island. Most would have been immature at the time of the survey and were perhaps overlooked. The absence of black field crickets is also unusual as they are easily trapped in pitfalls and are common in most habitats on mainland Tasmania.

Millipedes

Four species of millipede were collected during the survey. Two species of Polydesmida, *Notodesmus scotius* and *Paredrodesmus purpureus* were to be expected but the two other species were real surprises. The polydesmidan *Lissodesmus hamatus*, has not been collected on either Forestier or Tasman Peninsula, and in forest on both these the peninsulas it is replaced by *L. peninsulensis*. It could be that *L. hamatus* has been introduced to Tasman Island in east coast firewood. If so, then the same could be true of the second polydesmidan collected, but both species do occur on the Peninsulas as well as the east coast. The second surprise millipede is a male Spirostreptidan – which has never been seen before. It has a number of features that set it apart from all other Tasmanian Spirostreptida, so again it is possible that this species is an introduction but this time from an unknown place. Further investigation is needed to classify this species.

Volunteer reports

Jenni Drummond

The Tasman Island Wildlife Survey involved many things that I had previously no experience of. As an onlooker I experienced the amount and intensity of organization involved in a project of this caliber. I learnt of the necessity of undertaking risk assessments, communication planning and the logistics of gear, transport and personnel organization. This was a valuable experience for me, as now I have an insight to the importance of project planning.

The wildlife survey involved surveying the different flora communities on the island as well as setting traps to survey fauna. Small pitfalls were put in place to trap invertebrates, and larger ones for lizards and frogs. Elliot traps were set to determine whether small mammals were present. This was an important aspect of the survey as the cats on the island are predating sea birds, and eradication of cats is more feasible if small mammals are absent. In conjunction with these surveys, traps were set for cats, and during three of the nights, two people spotlighted for cats and shot any present. For me, the most rewarding activities were being involved in the seabird transects and the cat hunting expeditions. I had no previous knowledge about how these two activities were undertaken and now I know much more about how to carry out both and the importance of the information we gathered.

I have definitely benefited from being a research volunteer on Tasman Island. As well as gaining experience in the various aspects of the wildlife survey, I have gained knowledge about Tasmania's wildlife and have been inspired by the people I worked with on the island. I believe it is important for programs of this sort to continue and to involve collaboration between New Zealand and Australia in their common goals to protect native biodiversity. I also believe that involving volunteers allows people like me, on the brink of deciding a career path, an opportunity for passions to mature and therefore to be in a better position to contribute to the knowledge of the next generation.

Andrew Dopheide

The opportunity offered by the Hamish Saunders Memorial Trust and DPIWE to visit Tasman Island offered me a chance to participate in a professional, scientific, wildlife survey in a unique location. I hoped to gain valuable scientific and conservation related skills and experience, in a remote and spectacular natural environment, and a chance to pursue my photographic interests. I had not previously been involved in a thorough survey of biota on such a comprehensive scale. I learned about use of non-lethal traps to test for presence of small mammals, and pitfalls and nets to collect reptiles and invertebrates. It was interesting to discover what may have been trapped on successive days, and to observe the different outcomes from traps located in different habitat types. I have gained skills in species identification and handling, experience in surveying of seabird burrows, and an understanding of the ecological impacts and control of feral cats. The trip has provided a valuable understanding of the design and implementation of an ecological survey, and an insight into the logistics of organizing and operating a scientific program in a remote environment, in terms of transport, provisions, and communications. Involvement of biological, zoological and pest control expertise indicates that the survey achieved an integrated understanding of island ecology, and upon leaving the island it was clear that a number of useful scientific conclusions could be drawn on the basis of the survey outcomes.

The most enjoyable aspect of the expedition for me was exploration of the island, beginning with the view from the helicopter, and subsequent discovery of new sights, different birds and plants, and gradual development of a mental picture of the island, its habitats and biota. I was entertained by the boisterous activity of fur seals, regular sightings of squawking cockatoos and wriggling skinks in pitfall traps. While looking for the shine of cat's eyes I found the sight of multitudes of seabirds flitting about boulders by torchlight fascinating. Prior to this it was difficult to believe the number of prions and shearwaters burrowed into the steep slopes. The sheer cliffs and rock stacks provided a series of visually intriguing forms and vistas, and I greatly enjoyed the photographic possibilities and challenges presented by the landscape and biota, as well as the remnants of human habitation of the island.

The Hamish Saunders Memorial Trust has provided a valuable and fulfilling experience and an opportunity to gain a range of skills, insights and experiences that will no doubt be relevant to conservation, ecology and science in Tasmania, New Zealand and elsewhere.

New Zealand volunteers Jenni Drummond and Andrew Dopheide

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Appendix A Daily Schedule and Weather

Nov 2005	Daily Schedule
14 Nov	First team arrive 10 am, commence unloading. Sequential arrival of staff, equipment and media. Media and visitors depart 1pm. Complete unpacking, lunch, discuss field program. Set fauna traps on transects 1A, 1B, 2A, 2B, 3A, 4A and commence flora quadrats. Brush cut walking track between lighthouses and cat lines and reconnoiter September 05 cat trapping sites. Finish by 6.30pm.
Weather	Still, warm and sunny during the day. Deteriorating late afternoon to light rain, wind with heavy rain in evening.
15 Nov	Checked transects 1A, 1B, 2A, 2B, 3A, 4A. Set fauna traps on transects 3B, 4B, 5A, 5B. Continue flora quadrats on transect lines. Completed brush-cutting cat lines and set leg-hold traps. Spotlighting and cat shooting 9pm - 12.30 am above site 5B.
Weather	Windy, overcast and heavy cloud during day. Wind and light misty rain in evening.
16 Nov	Checked transects 3B, 4B, 5A, 5B. Sweep net 1A and 1B. Continued flora quadrats. Visit seal haulout at bottom of ZZ track late afternoon and look for cat signs. Spotlighting and cat shooting above ZZ track 9.30 pm to 12.30am. 1.5 hours of spotlighting at Fairy Prion colony above 5B 9.30 pm – 11.30pm. Annabat for 2 x 15 min periods walking from top house to bottom house and around water bore.
Weather	Cool early morning then fine to sunny and hot. Warm still evening.
17 Nov	Set fauna traps at 6A and 6B and sweep net 6A and 2A. Climbed down haulageway and viewed seal colony and seabirds. Sighted 2 HB whales 500 m off jetty and observed for 1 hour. Surveyed SS burrows and conducted burrow transects in 'top paddock'. Searched for eagle nest to the east of transect 1A but surface steep and unstable. Spotlighting and cat shooting 10pm to 1 am. 45 minute transect with the Annabat® walking from top house to start of haulage way and return.
Weather	Sunny, still and hot all day. Warm, still evening.
18 Nov	Collect traps at transects 1A, 1B, 2A, 2B, 3A, 4A. Sweep net samples for 2B, 3A, 4A, 5A, 5B, 6B. Collected pitfalls at 6A, 6B. Prepared and labeled samples, press plants. Too wet for evening cat work.
Weather	Wet and foggy early, consistent rain all day, heavy rain in evening.
19 Nov	Collect traps at transects 3B, 4B, 5A, 5B. Prepared and labeled samples. Pack gear, clean house, prepare sling load, start depart at 11.30 am, first team to Safety Cove. Last team departed island for Hobart by 2pm.
Weather	Wet and foggy early, clearing to fine and light wind by late morning.

Appendix B Location of fauna survey sites

Locations of sampling points along transects in each vegetation community 1 She-oak Woodland, 2 Regenerating Scrub, 3 Heathy Scrub, 4 Grassland, 5 Coastal Mosaic, 6 Sedgeland (A,B are replicates). Datum is GDA 94.

Veg-Site	Easting	Northing	Altitude m	Veg-Site	Easting	Northing	Altitude m
1A-1	581253	5212660	209 (7.1)	1B-1	581237	5212556	187 (6.0)
1A-2	581249	5212672	180 (6.8)	1B-2	581228	5212546	188 (6.0)
1A-3	581261	5212698	161 (6.4)	1B-3	581206	5212540	192 (5.0)
1A-4	581269	5212699	157 (8.2)	1B-4	581216	5212510	195 (5.0)
1A-5	581285	5212681	157 (7.2)	1B-5	581187	5212501	200 (5.0)
2A-1	581287	5212406	216 (4.7)	2B-1	581214	5211835	237 (4.2)
2A-2	581317	5212411	213 (5.0)	2B-2	581183	5211854	236 (3.0)
2A-3	581342	5212411	216 (5.0)	2B-3	581199	5211882	242 (3.0)
2A-4	581376	5212399	213 (5.0)	2B-4	581190	5211905	243 (3.4)
2A-5	581410	5212420	219 (3.0)	2B-5	581164	5211940	240 (4.0)
3A-1	581102	5211939	242 (4.0)	3B-1	581256	5211709	238 (4.3)
3A-2	581148	5211922	242 (3.6)	3B-2	581228	5211711	243 (3.8)
3A-3	581144	5211893	241 (3.5)	3B-3	581212	5211701	243 (6.8)
3A-4	581114	5211906	235 (3.7)	3B-4	581206	5211687	242 (7.1)
3A-5	581076	5211903	233 (3.7)	3B-5	581206	5211670	245 (8.6)
4A-1	581049	5211945	238 (3.5)	4B-1	581588	5212087	238 (5.0)
4A-2	581069	5211966	240 (3.4)	4B-2	581610	5212073	230 (6.0)
4A-3	581053	5211991	241 (3.3)	4B-3	581648	5212067	239 (4.4)
4A-4	581044	5212027	235 (3.1)	4B-4	581671	5212096	240 (4.4)
4A-5	581056	5212078	224 (3.5)	4B-5	581666	5212108	239 (4.8)
5A-1	581550	5211870	217 (5.7)	5B-1	581464	5211674	204 (7.9)
5A-2	581531	5211839	210 (8.6)	5B-2	581470	5211680	211 (9.5)
5A-3	581540	5211818	206 (8.4)	5B-3	581479	5211665	211 (9.3)
5A-4	581535	5211781	190 (9.3)	5B-4	581476	5211640	172 (17.1)
5A-5	581523	5211783	207 (9.6)	5B-5	581486	5211624	157 (10.5)
6A–1,2,3	581359	5212198	221 (3.6)	6B-1,2,3	581249	5212402	210 (3.4)

Appendix C Flora species recorded on Tasman Island

The following plant list is based on the following surveys (re):

1 = Stephen Harris (June 1982) and Nigel Brothers (January 1982)
2 = Threatened Species Section (June 2001)
3 = This survey (November 2005)

Plant nomenclature and common names follow Buchanan (2005) and Wapstra *et al.* (2005), respectively. The status of a species (st) is as follows:

i = introduced and naturalised in Tasmania,
e = endemic in Tasmania,
no symbol indicates that the species is native to Tasmania and the Australian mainland.

140 higher plant species have been recorded from Tasman Island, including 31 introductions; 5 species are endemic. Two species are listed as rare on the schedules of the *Tasmanian Threatened Species Protection Act 1995*: *Allocasuarina crassa* and *Poa poiformis var. ramifer*.

Family	re	st	Species name	Common name
DICOTS				
AIZOACEAE	1		*Carpobrotus rossii*	native pigface
	1		*Tetragonia implexicoma*	bower spinach
APIACEAE	1		*Apium prostratum*	creeping sea-celery
	1		*Hydrocotyle hirta*	hairy pennywort
ASTERACEAE	1	i	*Achillea millefl orum*	yarrow
	1		*Actites megalocarpa*	dune thistle
	1		*Brachyscome spathulata* subsp. *glabra*	blue daisy
	1	i	*Caardus* sp.	thistle
	2		*Cassinia aculeata*	dollybush
	1	i	*Cirsium arvense*	creeping thistle
	1	i	*Cirsium vulgare*	spear thistle
	3	e	*Euchiton litticola*	coast cottonleaf
	1	i	*Hypochoeris glabra*	smooth catsear
	1	i	*Hypochoeris radicata*	rough catsear
	1	i	*Leontodon taraxacoides*	hairy hawkbit
	1		*Leptinella longipes*	coast buttons
	1		*Leptinella reptans*	creeping buttons
	1		*Olearia* sp. aff. *ramulosa*	twiggy daisybush
	1		*Olearia phlogopappa*	dusty daisybush
	1		*Olearia stellulata*	sawleaf daisybush
	1		*Ozothamnus argophyllus?*	spicy everlastingbush
	2		*Ozothamnus ferrugineus*	Tree everlastingbush
	1		*Ozothamnus purpurascens*	columnar everlastingbush
	1		*Ozothamnus reticulatus*	veined everlastingbush
	1	i	*Picris* sp.	hawkweed

Family	re	st	Species name	Common name
	1		*Pseudognaphalium luteoalbum*	jersey cudweed
	3		*Senecio biserratus*	jagged fireweed
	1		*Senecio pectinatus?*	alpine groundsel
	1		*Senecio pinnatifolius*	coast groundsel
	1	i	*Sonchus asper*	prickly sowthistle
	1	i	*Taraxacum officinale*	common dandelion
	1	i	*Vellereophyton dealbatum*	white cudweed
	1		*Xerochrysum papillosum*	cliff everlasting
BRASSICACEAE	1		*Lepidium foliosum?*	leafy peppercress
CAMPANULACEAE	1		*Wahlenbergia gracilis*	sprawling bluebell
CARYOPHYLLACEAE	1	i	*Cerastium fontanum*	mouse-ear
	3		*Colobanthus apetalus*	cupflower
	1		*Scleranthus biflorus*	twinflower knawel
CASUARINACEAE	2	e	*Allocasuarina crassa*	cape pillar sheoak
	1		*Allocasuarina verticillata*	drooping sheoak
CHENOPODIACEAE	2		*Atriplex* sp.?	saltbush
	1		*Einadia nutans* subsp. *nutans*	climbing saltbush
	1		*Rhagodia candolleana* subsp. *candolleana*	coastal saltbush
	1		*Sarcocornia quinqueflora*	glasswort
	1		*Suaeda australis*	southern seablite
CONVULVULACEAE	1		*Dichondra repens*	kidneyweed
CRASSULACEAE	1		*Crassula sieberiana*	stonecrop
EPACRIDACEAE	1	e	*Leptecophylla abietina?*	seaspray pinkberry
	1		*Leptecophylla juniperina*	pinkberry
	1		*Leucopogon parviflorus*	coast beardheath
	1		*Monotoca glauca*	goldey wood
EUPHORBIACEAE	1		*Poranthera microphylla*	small poranthera
FABACEAE	1		*Glycine clandestina*	twining glycine
	1		*Kennedia prostrata*	running postman
	1	i	*Medicago* sp.	medick
	1		*Pultenaea daphnoides* var. *obcordata*	heartleaf bushpea
	1		*Pultenaea dentata*	swamp bushpea
	1	i	*Trifolium glomeratum*	cluster clover
	1	i	*Trifolium subterraneum*	subterranean clover
	1	i	*Vicia sativa* subsp. *nigra*	narrowleaf vetch
GERANIACEAE	1	i	*Geranium potentilloides*	mountain cranesbill
	1		*Pelargonium australe*	southern storksbill
HALORAGACEAE	1		*Gonocarpus teucrioides*	forest raspwort
MIMOSACEAE	1		*Acacia melanoxylon*	blackwood
	1		*Acacia verticillata* var. *ovoidea?*	prostrate prickly moses

Family	re	st	Species name	Common name
	1		*Acacia verticillata* var. *ruscifolia*	broadleaf prickly moses
	1		*Acacia verticillata* var. *verticillata*	prickly moses
MYOPORACEAE	1		*Myoporum insulare*	common boobialla
MYRTACEAE	2		*Calytrix tetragona*	common fringemyrtle
	2	e	*Leptospermum glaucescens*	smoky teatree
	1		*Leptospermum lanigerum*	woolly teatree
	1		*Leptospermum scoparium* var. *eximium*	broadleaf common teatree
	2		*Leptospermum scoparium* var. *scoparium*	common teatree
	1		*Melaleuca squarrosa*	scented paperbark
ONAGRACEAE	1		*Epilobium* sp.	willowherb
PITTOSPORACEAE	1		*Billardiera longiflora*	purple appleberry
	1		*Bursaria spinosa*	prickly box
	1		*Pittosporum bicolor*	cheesewood
PLANTAGINACEAE	1	i	*Plantago coronopus*	buckshorn plantain
	1	i	*Plantago major*	great plantain
	1		*Plantago triantha*	saltspray plantain
POLYGALACEAE	3		*Comesperma volubile*	blue lovecreeper
POLYGONACEAE	1	i	*Acetosella vulgaris.*	sheep sorrel
	1	i	*Rumex* sp.	dock
PORTULACACEAE	2		*Calandrinia* sp.	purslane
PROTEACEAE	1		*Banksia marginata*	silver banksia
ROSACEAE	1		*Acaena novae-hollandiae*	common buzzy
	1	i	*Rubus fruticosus*	blackberry
RUBIACEAE	2	i	*Coprosma repens*	mirrorbush
	2	e	*Rubus gunnianus?*	alpine raspberry
RUTACEAE	1		*Correa alba* var. *alba*	white correa
	1	e	*Correa reflexa* var. *nummulariifolia*	roundleaf correa
SANTALACEAE	3		*Exocarpos cupressiformis*	common native-cherry
SAPINDACEAE	2		*Dodonaea viscosa* subsp. *spathulata*	broadleaf hopbush
SOLANACEAE	1		*Solanum laciniatum*	kangaroo apple
STACKHOUSIACEAE	2		*Stackhousia monogyna*	forest candles
	1		*Stackhousia spathulata*	coast candles
STYLIDIACEAE	2		*Stylidium graminifolium*	narrowleaf triggerplant
VIOLACEAE	1		*Viola hederacea* subsp. *hederacea*	ivyleaf violet
WINTERACEAE	1		*Tasmannia lanceolata*	mountain pepper
MONOCOTS				
CYPERACEAE	1		*Carex appressa*	tall sedge
	1		*Ficinia nodosa*	knobby clubsedge
	1		*Gahnia grandis*	cutting grass

Family	re	st	Species name	Common name
	1		*Isolepis inundata*	swamp clubsedge
	3		*Lepidosperma elatius*	tall swordsedge
JUNCACEAE	1		*Juncus pallidus*	pale rush
	1		*Juncus pauciflorus?*	looseflower rush
	1		*Luzula densiflora?*	dense woodrush
LILIACEAE	1		*Bulbine semibarbata*	bulbine-lily
	1		*Dianella revoluta*	spreading flaxlily
	1		*Dianella tasmanica*	forest flaxlily
	1		*Drymophila cyanocarpa*	turquoise berry
ORCHIDACEAE	1		*Microtis unifolia*	common onion-orchid
	1		*Thelymitra aristata*	great sun-orchid
	3		*Thelymitra ixioides*	spotted sun-orchid
	1		*Thelymitra pauciflora*	slender sun-orchid
POACEAE	2	i	*Aira caryophyllea*	silvery hairgrass
	1	i	*Aira elegantissima*	delicate hairgrass
	2		*Austrodanthonia pilosa*	velvet wallabygrass
	1		*Austrostipa stipoides*	coast speargrass
	3	i	*Bromus* sp.	brome
	2	i	*Cynosurus echinatus*	rough dogstail
	1	i	*Dactylis glomerata*	cocksfoot
	1		*Dichelachne crinita*	longhair plumegrass
	1		*Hierochloe redolens*	sweet holygrass
	3	i	*Holcus lanatus*	yorkshire fog
	1	i	*Hordeum murinum* subsp. *leporinum*	long-anther barleygrass
	1	i	*Lolium perenne*	perennial ryegrass
	1		*Poa poiformis* var. *poiformis*	coastal tussockgrass
	2		*Poa poiformis* var. *ramifer*	island purplegrass
FERNS				
ADIANTACEAE	1		*Cheilanthes austrotenuifolia*	green rockfern
ASPLENIACEAE	1		*Asplenium obtusatum* subsp. *northlandicum*	shore spleenwort
BLECHNACEAE	3		*Blechnum wattsii*	hard waterfern
DENNSTAEDTIACEAE	1		*Pteridium esculentum*	bracken
DICKSONIACEAE	1		*Dicksonia antarctica*	soft treefern
DRYOPTERIDACEAE	1		*Polystichum proliferum*	mother shieldfern
GRAMMITIDIACEAE	2		*Grammitis magellanica* subsp. *nothofageti*	beech fingerfern
LYCOPODIACEAE	2		*Huperzia varia*	long clubmoss
	1		*Lycopodium lateralis*	slender clubmoss
POLYPODIACEAE	1		*Microsorum pustulatum* subsp. *pustulatum*	kangaroo fern

Appendix D Spiders from Tasman Island Survey, November 2005

Collected by Sally Bryant

Registered into Tasmanian Museum Collection.

TasIs. 4A Grassland. 18-11-05. pitfall.

J3645 Gnaphosidae
J3546 Amaurobiidae *Badumna* sp.
J3647 Amphinectidae *Amphinecta* sp.
J3648 Salticidae *Opisthoncus* sp.
J3649 Gnaphosidae
J3650 Gnaphosidae

TasIs. 2B Regen 18-11-05 pitfall

J3651 Lycosidae *Lycosa*? sp.
J3652 Gnaphosidae
J3653 Amphinectidae *Amphinecta* sp.

TasIs. 3A Heath 18-11-05 pitfall

J3654 Lycosidae *Lycosa*? sp.
J3655 Lycosidae *Venatrix funesta* (C.L.Koch, 1847)
J3656 Gnaphosidae

TasIs. 2A Regen scrub 18-11-05 pitfall

J3657 Opiliones Palpatores Phalangeriidae *Spinicrus*? sp.
J3658 Amphinectidae *Amphinecta* sp.
J3659 Gnaphosidae

TasIs. 5B Cliff Mosaic 19-11-05 bucket

J3660 Gnaphosidae

TasIs. 3B Heath 19-11-05

J3661 Gnaphosidae

TasIs. 5B Cliff Mosaic 19-1-05 bucket

J3662 Amphinectidae *Amphinecta* sp.

TasIs. 1A Casuarina 16-11-05 Sweepnet

Unidentifiable

TasIs. 1A Sheoak 18-11-05 bucket

J3663 Gnaphosidae

TasIs. 2B Regen scrub 18-11-05 bucket

J3664 Gnaphosidae
J3665 Gnaphosidae

TasIs. 5A Cliff Mosaic 19-11-05 pitfall

J3666 Gnaphosidae

TasIs. 1A Sheoak 18-11-05 pitfall

J3667 Gnaphosidae
J3668 Zodariidae
J3669 Gnaphosidae

TasIs. 2B Regan scrub 18-11-05 Sweepnet

J3670 Miturgidae *Cheiracanthium* sp.
J3671 Salticidae *Opisthoncus* sp.
J3672 Clubionidae *Clubiona*? sp
J3673 Amaurobiidae (ecribellate)
J3674 Thomisidae *Diaea* sp.

TasIs. 3A Heath 18-11-05 Sweepnet

J3675 Thomiside *Diaea* sp. (2 species?)
J3676 Salticidae *Opisthoncus* sp.
J3677 Clubionidae *Clubiona*? sp.
J3678 Amaurobiidae (ecribellate)
J3679 Araneidae
J3680 Thomisidae *Sidymella* sp.

TasIs. Sedge 2 18-11-05 Sweepnet

J3681 Thomisidae *Diaea* sp.

TasIs. 1B Sheoak 18-11-05 pitfall

J3682 Amaurobiidae (ecribellate)
J3683 Segestriidae
J3684 Lycosidae
J3685 Ctenidae

TasIs. 1B Sheoak 18-11-05 bucket

Unidentifiable (immature moult?)

TasIs. 2A Regen 18-11-05 Sweepnet

J3686 Salticidae *Opisthoncus* sp.
J3687 Opiliones Palpatores Phalangeriidae? (legs missing)
J3688 Thomisidae *Sidymella* sp.

Tas.Is. 1B Casuarina ?-11-05 Sweepnet

J3689 Thomisidae *Diaea* sp
J3690 Clubionidae *Clubiona*? sp.

TasIs. 5B Cliff Mosaic 19-11-05 pitfall

J3691 Gnaphosidae

TasIs. 3B Heath 18-11-05 Sweepnet

J3692 Clubionidae *Clubiona*? sp.
J3693 Zodariidae?
J3694 Araneidae

TasIs. Sedge 1 18-11-05 Sweepnet

J3695 Salticidae *Lycidas* group
J3696 Salticidae cf. *Sondra tristicula* (Simon, 1909)
J3697 Thomisidae *Sidymella* sp.
J3698 Araneidae *Araneus* sp.
J3699 Araneidae
J3700 Zodariidae?

TasIs. 1A Casuarina 16-11-05 Sweepnet

J3701 Araneidae *Dolophones* sp.
J3702 Thomisidae *Diaea* sp.
J3703 Clubionidae *Clubiona*? sp.
J3704 Araneidae
J3705 Salticidae (not other 3 species)
J3706 Hahniidae *Scotospilus*? sp.