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COASTAL BUTTERFLIES AND MOTHS OF WELLINGTON AND SOUTH WAIRARAPA

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1. INTRODUCTION

1.1 The Setting

It has long been recognised that the wild coastline of the southern North Island is home to a rich array of native insects and plants. Rich not just because of an abundance of species but also because an upland element – species more typical of alpine and montane areas of the South Island is present. This is an exciting coastline for the naturalist with high cliffs and steep slopes clothed in low shrubs, herbs and grasses, scree-like gravel slopes and beaches, rocky headlands and shrubby hillsides. Contrasting bone-dry divaricating shrublands on one hand and lush sedgelands and herbfields sheltering in low forest on the other. The landscape is high in natural values. In many ways this coast looks and feels like part of the upland South Island, and in fact many of its species are either the same or closely related to such species in upland habitats on the other side of Cook Strait.

Several high profile insects are present on this coastline, although neither is widespread there. These include the following;

Huttons speargrass weevil *Lyperobius huttoni*
a large-bodied species typical of the eastern South Island high country

Myers black cicada *Maoricicada myersi*
a southern Wellington endemic species

The former is an upland species here at its northern limit – possibly a relict distribution (Fleming 1971). It is more widely known from the eastern South Island south to the Waitaki River, while the latter has most of its close relatives singing from rocky vantage points on the many peaks of the South Island. Fleming (1971) elegantly described this black cicada species and circumscribed its distribution, song and ecological association.

Patrick (1994) reported on the butterflies and moths of the coastline of the southern South Island and also found an upland fauna component on that similarly rugged coastline.

Sawyer et al (1998) documented the many threatened and rare New Zealand native plants that survive in refugia on this coastline. Rogers & Walker (2005) noted that the South Wellington coast was rich for native plant families, genera and species. They also noted that eleven species growing on this coastline have a limited distribution, being confined to up to two additional areas.

1.2 Previous Sampling Effort

R.M. Sunley reared moth larvae associated with coastal plants at Makara particularly *Pimelea prostrata* (Sunley 1911). He recorded three significant moth species from this then common hostplant – *Meterana pictula, Ericodesma aerodana* (as *Tortrix indigestana*) and *Notoreas* new species (as *Lythria perornata*)

(Hudson 1928). George Hudson himself collected on the coast including the type of the obscure *Scoparia humilialis* at Sinclair Head (Hudson 1951).

David Gaskin comprehensively sampled the moths by way of a light trap from 1962-1964 at his Karori home in Wellington (Gaskin 1964a, b, c & d). Using a 150 watt clear bulb over three hours per night he recorded 170 species of moths over these two years. Interestingly none of the rare or threatened moths which are the focus of this study were found in his trapping programme.

John Grehan performed an insect survey of Somes Island (Matiu) in Wellington Harbour in which he sampled the Lepidoptera (Grehan 1990). No rare moth species were found but he interestingly commented on the biogeography of the insect species he did find and recognised strong links to the South Island high country.

1.3 Possible Sampling Regime

It is clear, based on the above summary of entomological research, that the night-flying moths of this coastline have been somewhat neglected. Modern technology in light trapping can quickly and efficiently reveal the presence of nocturnal species that are otherwise difficult to detect. The presence of nocturnal moth species that have been fortuitously discovered and known from single or very few collections can be relatively easily confirmed or not. This survey, in contrast to my previous ten entomological visits to this coastline, concentrated on sampling nocturnal moth species while not ignoring diurnal butterfly and moth species.

1.4 Aim Of This Survey

A survey of moth species of this coastline was undertaken for the Department of Conservation to ascertain the conservation status of a suite of data deficient and possibly threatened moth species (MacGuinness, 2001, Patrick & Dugdale, 2000).

The aim of this survey was to not only to attempt to find these species (listed below), but to try to tie each species, if found, to a certain community and if possible hostplant. This additional information would be invaluable in any future management of either the moth species or their communities or both.

1.5 The Species

- MacGuinness (2001) lists these eleven data deficient moth species as follows:
  (author and Type Locality if in Wellington region is added)

Geometridae
Notoreas new species "Wellington"
Helastia siris (Hawthorne 1897) Cape Terawhiti, Wellington
Austrocidaria lithurga (Meyrick 1911b) Makara

Noctuidae
Bityla sericea Butler 1877
Graphania omicron (Hudson 1898) Karori, Wellington
Meterana pictula (White in Taylor 1855)

Tortricidae
Ericodesma aerodana (Meyrick 1881a)

Tineidae
Erechthias lychnopa Meyrick 1927a Sinclair Head, Wellington

Oecophoridae
Chersadaula ochrogastra Meyrick 1923 Breaker Bay, Wellington
Izatha rigescens Meyrick 1929 Howard Point, Wellington Harbour

Elachistidae
Elachista eurychora (Meyrick 1919) Paekakariki

- Patrick & Dugdale (2000) catagorised the eleven species as follows:

Category C (known only from Type Locality)
Chersadaula ochrogastra, Erechthias lychnopa, Izatha rigescens & Graphania omicron

Category D (Uncommon or rare, biology unknown)
Austrocidaria lithurga, Bityla sericea & Helastia siris

Category E (Type Locality grossly altered)
Elachista eurychora

Category G (Hostplant, niche at risk)
Meterana pictula, Ericodesma aerodana & Notoreas new species

2. METHODS

2.1 Timing

A two week-long survey in mid summer was planned to coincide with the flight season of the maximum number of the listed potentially threatened taxa. Key sites were chosen for this survey from my previous experience of this coastline in the field and from a study of topographic maps looking for other strategic sites. Table One presents a list of the present survey together with the previous ten expeditions that sampled this coastline in different seasons, noting other entomologists who accompanied me.

2.2 Sampling sites

2.2.1 Light trapping was carried out at the following sites during the 2003-2004 Expedition:

- Orongorongo River mouth area shrublands
- Turakirae Point Scientific Reserve
- Windy Point
- Waitetuna Stream, Cape Palliser
- Kirikiri Stream, Cape Palliser
- Sinclair Head

2.2.2 Whereas day collecting was performed at:

- Orongorongo River mouth area – coast and shrublands
- Baring Head to Turakirae Point
- Windy Point
- Palliser Bay
- Lake Ferry to Cape Palliser
- Te Humenga Point

- Red Rocks to Sinclair Head
- Waitetuna Stream to Te Kaukau – White Rock

2.3 Sampling Methods

Sampling was done by both day and night although it was expected that night time light trapping would be the most productive based on the habits of the particular species involved. The light trapping utilised a 240 volt powered 250 watt mercury vapour, ultra violet light bulb. Otherwise hand sampling of plants for larvae and adult moths or catching day flying moths with a net was employed with success. Several species were successfully reared back in Dunedin that were not found as adults during the survey timeframe.

John Dugdale's Lepidoptera catalogue (Dugdale 1988) proved to be a reliable and interesting guide to the early records from this coastline, leading to many forays into the older literature in pursuit of "old moth records" and "old moth identities".
All specimens collected are pinned and stored dry in the Natural History collections of the Otago Museum, Dunedin.

Table One

List of Expeditions to Coastal Wellington & South Wairarapa Coast by the author

July 1978 Coastal Wellington City
9-12 May 1988 Turakirae; with John Grehan
13-14 November 1992 Pencarrow; with George Gibbs and John Grehan
2-3 May 1994 Mana Island; with DoC Conservancy Scientists
24-26 November 1994 Titahi Bay; with Greg Sherley
13-14 November 1996 Lake Ferry - Cape Palliser – White Rock; with Holly Patrick
6 February 2000 Makara
8 April 2001 Onoke Spit; with Aalbert & Susan Rebergen
28-30 October 2001 Te Humenga Point – Cape Palliser; with George Gibbs
12-13 April 2003 Lake Ferry - Cape Palliser; with Hamish Patrick
29 December 2003 – 12 January 2004 Red Rocks - Sinclair Head, Baring Head - Turakirae, Windy Point, Lake Ferry – Te Kaukau; with Christine, Holly & Hamish Patrick

3. RESULTS

3.1 Weather

The 2003-2004 Expedition was fortunate in having superb weather for almost all of the sampling. The hot daytime temperatures and warm, calm night-time weather greatly increased the success of the survey. This is epitomised in the capture of 78 and 100 species of moth attracted to light on two consecutive nights (1st and 2nd January 2004) at Waitetuna Stream and Kirikiri Stream, Cape Palliser respectively.

3.2 Survey Results

Table Two lists the total Lepidoptera from all eleven expeditions to this coastline by the author, with notes on the significance, hostplant, ecology and distribution of the species.

Table Two: Lepidoptera of Coastal Wellington & South Wairarapa Coast

T = Type Locality X = recorded in this survey O = old record in literature * = introduced species

Family & species	**Titahi Bay Cape Terawhiti Sinclair Head Point Dorset**	**Pencarrow Head Baring Head Turakirae Onoke Spit Windy Point**	**Lake Ferry Te Humenga Point Cape Palliser Te Kaukau**	**Significance** Foodplants, biology, distribution Conservation status Notes on behaviour, size and activity Ecology and habitat
Hepialidae				
Aenetus virescens		**X**	**X**	Puriri moth – wingspan 15cm – North Island only - larvae at first on fungi on ground and later bore in tree trunks of various species
Wiseana copularis			**X**	Common porina moth – larvae subterranean and feed on grasses
Wiseana cervinata		**X**		Common porina moth - larvae subterranean and feed on grasses
Wiseana signata		**X**	**X**	Common porina moth – northern 2/3rds of NZ only
Wiseana umbraculata	**X**	**X**	**X**	Common porina moth – damp sites - larvae subterranean and feed on grasses
Nepticulidae				
Stigmella n.sp.			**X**	Larvae mining *Brachyglottis greyi* – adults unknown
Stigmella ogygia		**X**		Larvae mining *Olearia paniculata*
Coleophoridae				
*Coleophora trifoli		**X**	**X**	Introduced case-bearing larvae on flowers of clovers
Choreutidae				
Tebenna micalis			**X**	Widespread in warmer parts of New Zealand with larvae in Asteraceae
Arctiidae				
Utetheisia pulchelliodes			**X**	Speckled footman moth - vagrant diurnal species

Nyctemera annulata	**X**	**X**	**X**	Magpie moth - larvae on *Senecio* spp. -diurnal
*Tyria jacobaea		**X**	**X**	Introduced cinnarbar moth -larvae on ragwort – diurnal bright red adults
Elachistidae				
Elachista ochroleuca		**X**		Widespread species
Cosmiotes archaeonoma	**X**			Widespread and common small species of grasslands
Gelechiidae				
Kiwaia monophragma			**X**	Widespread small species but never common
Kiwaia lithodes	**X**	**X**	**X**	Widespread, active & diurnal species associated with *Raoulia* cushions
*Symmetrischema plaesiosema	**X**		**X**	Widespread – larvae on *Solanum* spp. including poroporo
Gracillariidae				
Caloptilia elaeas		**X**		Widespread and common – larvae mine *Coriaria* spp.
Caloptilia linearis	**X**			Widespread and common – larvae mine *Coriaria* spp.
Lecithoceridae				
Lecithocera micromela			**X**	Diurnal, small and dark species - October
Oecophoridae				
Hierodoris atychioides		**X**		Widespread diurnal species - distinctive form whose larvae feed in colony on foliage of *Ozothamnus leptophyllus*
Leptocroca asphaltis		**X**	**X**	Widespread species – forest where larvae feed on dying vegetation under rocks and wood
Leptocroca scholaea		**X**		Widespread and common species – larvae in litter/ detritus
Trachypepla contritella	**X**		**X**	Widespread and common species – larvae in leaf litter
Trachypepla conspicuella	**X**			Widespread and sometimes common species
Trachypepla lichenodes			**X**	Widespread but uncommon forest species – larvae on litter

Trachypepla euryleucota		**X**	**X**	Widespread with larvae feed on detritus including litter in bird nests
Trachypepla importuna			**X**	Local species – uncommon – poorly known
Tingena yellow		**X**	**X**	
Tingena siderodeta		**X**		Widespread and common – larvae on litter in shrubland & forest – diurnal adults
Tingena contextella			**X**	Larvae on leaf litter
Tingena sp.			**X**	Unidentified at this point
Izatha apodoxa			**X**	Local species
Barea confusella	**X**	**X**	**X**	Widespread forest species – larvae on dead wood
Gymnobathra sarcoxantha			**X**	Widespread species of forest and open areas – case-bearing larvae feed on leaf litter
Gymnobathra hamatella	**X**		**X**	Widespread northern New Zealand species
Gymnobathra parca		**X**		Widespread in open and woody areas
Psychidae				
Small dark species		**X**		Tiny dark species remains unidentified
Tortricidae				
Epichorista emphanes		**X**		Widespread in beech forests with larvae on *Nothofagus* spp.
Bactra noteraula		**X**		Widespread but local; larvae bore in sedge stems such as those of *Desmoschoenus spiralis*
Capua semiferana	**X**	**X**	**X**	Widespread and common particularly in coastal areas – larvae on leaf litter
Cnephasia jactatana	**X**	**X**	**X**	Widespread and common with larvae polyphagous on tree, fern and shrub foliage
Dipterina imbriferana			**X**	Widespread but local – larvae on *Melicytus ramiflorus, Macropiper & Fuchsia excorticata*
*Cydia succedana	**X**		**X**	Introduced gorse moth is now widespread and is diurnal
Undescribed genus & species			**X**	Mottles grey species which is widespread – larvae in silk tunnels amongst sward
Apoctena flavescens	**X**			Widespread species of forest and shrubland – larvae polyphagous
Apoctena taipana			**X**	Uncommon, local species – larvae feed on foliage of fern *Pyrrosia eleagnifolia*

Epiphyas postivittana	**X**	**X**	**X**	Widespread and common Australian species – larvae polyphagous on herbs mainly
Cryptaspasma querula		**X**		Widespread but local species
Crocodosema plebejana	**X**			Widespread on coast with larvae on Chenopodiaceae
Ericodesma aerodana	**X**	**X**		Widespread but local now because of habitat and host restriction – crepuscular adults and larvae on *Pimelea* shoots - webbing
Harmologa antitypa	**X**	**X**	**X**	Widespread coastal species with larvae tying leaves of *Ozothamnus leptophyllus*
Harmologa oblongana	**X**			Widespread and common in shrublands – larvae polyphagous on various shrub species
Merophyas leucaniana	**X**		**X**	Common species with polyphagous larvae but *Pimelea* favoured host
Philocryptica polypodii			**X**	Rarely seen diurnal species of forest and coast in the warmer parts of New Zealand where the larvae mine the thick leaves of the fern *Pyrrosia eleagnifolia.* Here on coastal rocks
Pyrgotis species	**X**			Unidentified species
Sperchia intractana	**X**	**X**		Widespread and common Australian species – larvae on detritus
Ctenopseustis obliquana		**X**		Widespread and common with larvae polyphagous on tree and shrub foliage
Strepsicrates zopherana		**X**	**X**	Widespread and common leaf roller of manuka and kanuka
Strepsicrates sideritis		**X**		Brown species – uncommon
Thyrididae				
Morova subfasciata		**X**		Widespread species of forest and shrublands – larvae in swelling on *Muehlenbeckia* spp. – adults diurnal sometimes
Stathmopodidae				
Stathmopoda horticola		**X**		Widespread and common species – larvae on detritus

Stathmopoda skelloni	**X**			Local species – bred from *Senecio* flowers from Mana Island
Stathmopoda endotherma			**X**	Local species
Glyphipterigidae				
Glyphipterix scintelella			**X**	Widespread lowland to upland species of wetlands
Glyphipterix alychoesa			**X**	Common and widespread in grassy areas – larvae stem miner of grasses – adults diurnal
Noctuidae				
Agrotis ipsilon	**X**	**X**	**X**	Worldwide greasy cutworm – larvae polyphagous
Agrotis innominata	**X**	**X**	**X**	Local species of coastal areas – larvae polyphagous on herbs and grasses including *Calystegia soldanella* (Patrick & Green, 1991) Type Locality is Wellington
Graphania ustistriga	**X**	**X**	**X**	Widespread & common cutworm – larvae polyphagous on shrubs
Graphania homoscia	**X**	**X**	**X**	Abundant cutworm here – larvae on *Ozothamnus leptophyllus*
Graphania insignis	**X**	**X**	**X**	Widespread & abundant cutworm – larvae on herbs
Graphania plena		**X**		Widespread and abundant cutworm – larvae on herbs
Graphania pelanodes		**X**		Widespread and local cutworm – larvae on herbs
Graphania lignana	**X**	**X**	**X**	Widespread and common cutworm – adults in late summer – larvae on grasses
Graphania morosa		**X**	**X**	Widespread and common cutworm – larvae on grasses
Graphania omoplaca		**X**		Widespread and common cutworm – larvae on grasses
Graphania mutans	**X**	**X**	**X**	Widespread cutworm – larvae on herbs
Graphania nullifera	**X**			Large speargrass cutworm, widespread especially in montane to alpine grasslands, rare on coast - larvae on *Aciphylla squarrosa* stems
Graphania temperata		**X**	**X**	Coastal cutworm – local – larvae on *Ozothamnus leptophyllus*
Graphania sequens			**X**	Uncommon and local cutworm of mostly upland areas in both islands
Graphania omicron	**O**		**X**	Type Locality Karori – rarely seen species –found at two sites near Cape Palliser
Heliothis armigera			**X**	Widespread and common species – larvae polyphagous and often a pest species
Leucania stenograpta			**X**	Widespread in warmer parts of New Zealand - larvae on *Spinifex*

Persectania aversa	**X**	**X**	**X**	Widespread and common cutworm – larvae on grasses
Rictonis comma	**X**	**X**	**X**	Widespread and common – larvae polyphagous on grasses and herbs
Diarsia intermixta		**X**		Widespread and only locally common – larvae on herbs
Tmetolophota arotis	**X**	**X**	**X**	Widespread and common – larvae on monocots
Tmetolophota steropastis	**X**	**X**	**X**	Widespread and common – larvae is the flax notcher
Tmetolophota atristriga		**X**	**X**	Widespread and common cutworm – larvae on grasses
Tmetolophota phaula		**X**		Coastal cutworm – larvae on *Desmoschoenus* and marram – local coastal moth species
Homodotis fortis	**X**	**X**	**X**	Widespread small cutworm - larvae on foliage of *Melicytus crassifolius*
Meterana decorata		**X**	**X**	Widespread cutworm – larvae on kowhai
Meterana dotata		**X**		Widespread and abundant noctuid – larvae on *Nothofagus* spp.
Meterana n.sp. aff. asterope		**X**		Distinct species smaller than M.asterope – known from upland areas of Mts Taranaki and Ruapehu – larvae probably on *Hebe* spp.
Small distinctive noctuid			**X**	One only Cape Palliser area
Aletia moderata		**X**		Widespread and common cutworm – larvae on *Raoulia*
Bityla defigurata	**X**	**X**	**X**	Widespread and common cutworm – larvae on *Muehlenbeckia* foliage
Bityla sericea	**X**	**X**		Local and generally uncommon cutworm of eastern South Island shrublands – locally abundant here at two sites
Physetica caerulea		**X**		Widespread and locally abundant cutworm of open coastal and inland sites – larvae on coastal herbs here
Feredayia graminosa		**X**	**X**	Widespread and common cutworm – larvae on *Melicytus ramiflorus* foliage
Nolidae				
Celama parvitis			**X**	Uncommon exquisite small moth, typical of eastern and inland South Island shrublands- larvae on foliage of *Helichrysum lanceolatum*

Lycaenidae				
Antipodalycaena maui		**X**	**X**	Large bright orange copper butterfly – larvae on *Muehlenbeckia complexa*
Antipodalycaena n.sp. 1	**X**	**X**	**X**	Common copper butterfly – larvae on *Muehlenbeckia complexa*
Antipodalycaena n.sp. 2			**X**	Boulder coppers are locally common north of Cape Palliser and at Te Humenga Point – larvae on *Muehlenbeckia complexa*
Zizina labradus	**X**	**X**	**X**	Common blue butterfly generally common – larvae feed on introduced clovers
Nymphalidae				
Vanessa itea	**X**			Yellow admiral butterfly is widespread and seasonally abundant – larvae on exotic nettles
Vanessa gonerilla	**X**	**X**	**X**	Red admiral butterfly is widespread and abundant – larvae on exotic and native nettles such as *Urtica ferox* and *U.incisa*
Lyonetiidae				
Bedellia psamminella	**X**	**X**	**X**	Widespread and common tiny moth - larvae mine leaves of *Calystegia* and *Convolvulus* spp.
Momphidae				
Zapyrastra new species		**X**		Larvae mine *Haloragis erecta* leaves – diurnal adults
Pieridae				
*Pieris rapae	**X**	**X**	**X**	Introduced white butterfly is generally common – larvae on Brassicaceae
Plutellidae				
*Plutella xylostella	**X**	**X**		Introduced diamond-back moth is common and widespread – larvae on Brassicaceae
Geometridae				
Austrocidaria gobiata	**X**	**X**	**X**	Widespread and common in shrublands – larvae on small-leaved *Coprosma* spp.
Austrocidaria parora		**X**		Widespread and common in forest & shrublands – larvae on small-

				leaved *Coprosma* spp. – more common in northern NZ
Austrocidaria similata	**X**	**X**	**X**	Widespread and common in forest and shrubland – larvae on small-leaved *Coprosma* spp.
Austrocidaria lithurga	**T X**	**X**		Rare species of Wellington coast
Austrocidaria callichlora			**X**	Widespread and common in forest & shrublands – larvae on small-leaved *Coprosma* spp.
Dasyuris partheniata	**X**			Diurnal orange species – widespread but local of lowland to alpine areas – larvae on *Aciphylla* spp.
Epyaxa rosearia	**X**	**X**	**X**	Widespread and very common in lowlands – larvae on herbs – both native and exotic
Epyaxa venipunctata	**X**	**X**	**X**	Widespread and common, often coastal species with larvae on lianes and herbs
Chalastra ochrea			**X**	Widespread but uncommon species of forest mainly – larvae on kowhai spp.
Epiphryne verriculata			**X**	Widespread and common with larvae feeding on foliage of cabbage tree
Asaphodes chlamydota		**X**	**X**	Widespread but local with larvae on *Clematis* spp.
Epicyme rubropunctaria	**X**	**X**	**X**	Widespread and common with larvae on *Haloragis erecta*
Scopula rubraria	**X**	**X**	**X**	Widespread & numerous diurnal moth, open areas – particularly common on coast with larvae on foliage of *Plantago* spp.
Sarisa muriferata		**X**		Widespread and common forest species – also coastal where larval foodplant *Pyrrosia* grows on rocks
Hydriomena deltoidata	**X**	**X**	**X**	Widespread and common in grasslands where larvae feed on *Plantago*
Phrysogonus laticostatus	**X**		**X**	Widespread and common in northern New Zealand
Dichromodes sphaeriata	**X**	**X**	**X**	Widespread but local interesting species with cryptic larvae feeding on lichens on rock faces
Homodotis megaspilata		**X**	**X**	Widespread and very common with larvae on leaf litter
Pseudocoremia rudisata		**X**	**X**	Widespread and locally common – larvae feed on *Olearia* spp.
Pseudocoremia productata			**X**	Widespread and common forest species with polyphagous larvae on foliage of various trees

Pseudocoremia melinata		**X**	**X**	Widespread but local species of forest edge and shrublands – larvae on *Carmichaelia* foliage
Pseudocoremia suavis		**X**		Widespread and very common forest species with polyphagous larvae on podocarps
Pseudocoremia lupinata			**X**	Widespread and locally common – larvae on foliage of kanuka
Zermizinga indocilisaria			**X**	Widespread and locally common – larvae on various shrubs – *Pimelea* and matagouri, and herbs - lotus
Helastia siris	**T**	**X**	**X**	Rarely seen species of Wellington coast – larvae may be associated with *Helichrysum lanceolatum*
Helastia semisignata			**X**	Widespread North Island species of forest and open coast. Larvae have been reared from *Pimelea* foliage
Declana new species			**X**	Rare species of Wellington and Taranaki areas
Declana leptomera		**X**	**X**	Widespread and common forest species – larvae polyphagous on foliage of small tree species
Declana flocossa		**X**	**X**	Widespread and very common species – larvbae polyphagous on foliage of tree species
Declana junctilinea		**X**	**X**	Widespread and common in shrublands – larvae polyphagous on shrub foliage such as *Corokia, Ozothamnus*
Pasiphila aristias			**X**	Uncommon species – found at two sites
Pasiphila lunata		**X**	**X**	Widespread and local forest species – larvae on *Hebe* flowers and foliage
Pasiphila bilineolata		**X**	**X**	Widespread and common species of forest and shrublands – larvae on *Hebe* flowers and foliage
Pasiphila rivalis			**X**	Rare species of forested areas – found at two sites
Pasiphila dryas			**X**	Widespread Northern species with larvae on *Hebe* species
Pasiphila new species “broom”		**X**	**X**	Widespread but uncommon green species withy larvae reared from *Carmichaelia* spp.
Poecilasthena pulcharia		**X**	**X**	Widespread and common forest species – larvae on *Cyathode*s
Poecilasthena schistaria			**X**	Widespread and very common in forest – larvae on manuka and kanuka
Notoreas new species	**X**	**X**	**X**	Colourful diurnal moth with larvae on *Pimelea* spp. – threatened because of habitat shrinkage and foodplant disturbance
Xanthorhoe semifissata		**X**	**X**	Widespread and common in forest, shrubland and grassland with larvae feeding on *Cardamine* spp.

Chloroclystis inductata	**X**	**X**	**X**	Widespread and numerous in forest and coastal areas with larvae on various flowers
Chloroclystis testulatus		**X**	**X**	Widespread and numerous in forest and coastal areas with larvae on various flowers
Chloroclystis filata	**X**		**X**	Tasmanian species that is now widespread and numerous in lowland to alpine areas with larvae on various flowers
Orthoclydon praefectata		**X**		Widespread and often common large white species that has larvae feeding on flax *Phormium* leaves
Ischalis fortinata	**X**	**X**	**X**	Widespread and common – larvae on *Polystichum* fern
Cleora scriptaria	**X**	**X**	**X**	Widespread and common looper – larvae polyphagous but larval feeding conspicuous on *Macropiper* & *Pseudowintera*
Xyridacma veronicae			**X**	Widespread and common – larvae on *Hebe* spp.
Xyridacma ustaria			**X**	Widespread and common – larvae on *Pittosporum* spp.
Samana falcatella			**X**	Uncommon and local species – larvae on *Carmichaelia* spp.
Microdes quadristrigata			**X**	Uncommon and local species
Crambidae				
Orocrambus flexuosellus	**X**	**X**	**X**	Widespread and very common grassmoth of both native and exotic grasslands
Orocrambus vittellus		**X**	**X**	Widespread and very common grassmoth of both native and exotic grasslands
Orocrambus angustipennis		**X**		Widespread and common larger species – larvae in *Cortaderia*
Orocrambus cyclopicus			**X**	Widespread and very common grassmoth of both native and exotic grasslands
Orocrambus ramosellus	**X**	**X**	**X**	Widespread and very common grassmoth of both native and exotic grasslands
Orocrambus callirrhous	**X**		**X**	Widespread but local grassmoth of both coastal dunes and inland valleys
Orocrambus lewisi			**X**	Widespread and very common grassmoth of both native and exotic grasslands
Eudonia colpota		**X**	**X**	Widespread but local species of forest
Eudonia chlamydota			**X**	Widespread and often common species of forest
Eudonia steropaea		**X**	**X**	Widespread in coastal and inland open areas – never common
Eudonia sabulosella	**X**	**X**	**X**	Widespread and numerous sod webworm of open areas
Eudonia asterisca		**X**		Widespread but local species of lowland to montane areas

Eudonia leptalea	**X**	**X**	**X**	Widespread and numerous sod webworm of open areas
Eudonia philerga	**X**	**X**		Widespread and very common species of forest and shrubland with larvae on mosses on tree trunks
Eudonia new species	**X**			Rare species of coastal rocks – scattered records
Eudonia submarginalis		**X**	**X**	Widespread and numerous sod webworm of open areas
Eudonia manganeutis		**X**	**X**	Widespread and common species of rocky areas where the larvae tunnel and feed within mosses
Eudonia aspidota		**X**	**X**	Widespread and often common species of lowland to montane areas of shrubland and forest
Eudonia trivirgata			**X**	Widespread and numerous species of open areas – low alpine in South Island
Eudonia chalicodes			**X**	Widespread and numerous species of open areas
Eudonia bisinualis		**X**		Widespread but local in North Island
Eudonia cataxesta		**X**		Widespread and numerous species of open areas especially rocky sites
Loxostege philocapna	**X**	**X**	**X**	Widespread in North Island
Hygraula nitens		**X**	**X**	Pond moth has aquatic larvae – common species
Deana hybreasalis	**X**		**X**	Widespread and common – larvae on *Clematis* at least
Gadira acerella		**X**	**X**	Larvae on lichens on rock surfaces – common species
Culladia strophaea			**X**	Uncommon and local species – larvae on rockfaces on lichens? Type locality is Wellington
Glaucocharis chrysochyta			**X**	Widespread but local species
Glaucocharis lepidella			**X**	Widespread and common – larvae feed on mosses
Glaucocharis pyrsophanes		**X**		Widespread and common – larvae feed on mosses
Scoparia humilialis	**T**	**X**		Type locality Sinclair Head; species status needs assessment with respect to *Eudonia leptalea*
Scoparia halopis		**X**	**X**	Widespread and common – larvae in soil as sod webworm
Scoparia mollifera			**X**	Local and uncommon species – larvae mine leaves of *Pyrrosia eleagnifolia*
Scoparia exilis	**X**	**X**	**X**	Widespread and locally common in open areas
Udea flavidalis	**X**	**X**	**X**	Widespread and common species – larvae polyphagous on herbs and lianes
Udea daiclesalis	**X**			Local attractive species – larvae on *Hebe* spp. Northern spp

Uresiphita maorialis		**X**	**X**	Kowhai moth is widespread and abundant – diurnal adults with larvae defoliating kowhai
Pyralidae				
Diplopseustis perieresalis			**X**	Widespread but uncommon – larvae in sedges?
Homoeosoma anaspila	**X**	**X**	**X**	Widespread but local – larvae in flowers of Asteraceae including *Pseudognaphalium luteoalbuum*
Patagoniodes farinaria		**X**	**X**	Widespread species – larvae bore in *Senecio* spp.
Pterophoridae				
Pterophorus innotatalis		**X**	**X**	Widespread but local plume moth - larvae on *Dichondra* spp. foliage, mining leaves at first
Platyptilia repletalis		**X**		Widespread and common plume moth - larvae on *Plantago* spp. flowerheads
Scythridae				
Scythris epistrota		**X**		Widespread but local small diurnal species - larvae in axils of *Carmichaelia* spp.
Tineidae				
*Opogona comptella	**X**			Widespread and common Australian species
Opogona omoscopa		**X**	**X**	Widespread and common in warmer parts of NZ – larvae on detritus

4. DISCUSSION & RECOMMENDATIONS

4.1 Biodiversity of Lepidoptera

This survey lists a total of 207 species of New Zealand Lepidoptera (Table Two), 200 of which are native or endemic species. Only seven are introduced, either intentional or unintentionally (3.4 %). Given the both the timing and extent of this survey this indicates a rich moth and butterfly fauna reflecting interesting flora and ecological associations.

Of the most speciose families of Lepidoptera in New Zealand, this survey recorded 50 geometrids, 34 noctuids and 34 crambids – making up 55% of the total species. But in all 29 families were recorded highlighting the diversity of both species and life-styles of the fauna of this stretch of coast.

4.2 Biogeography

The list of moth species in Table Two contains both widespread coastal, forest and shrubland species together with species of much more restricted distribution.

A suite of moth species define the study area and confirm that it is a natural unit in biogeographical terms – a biogeographical node – complete with local endemics, rare species and species at their biogeographical limits. The following species fit these catagories:

Local endemic species (probably confined to the study area)
Notoreas new species
Helastia siris
Austrocidaria lithurga (see notes)
Antipodalycaena new species (boulder copper butterfly)
Graphania omicron
Stigmella new species

Moth species at northern limit (ie. more typical of South Island)
Celama parvitis
Bityla sericea

Typical specialised coastal species:
Harmologa antitypa
Bactra noteraula
Orocrambus callirrhous
Aletia temperata
Ericodesma aerodana
Agrotis innominata
Tmetolophota phaula
Austrocidaria arenosa
Eudonia new species
Culladia strophaea

Typical of open areas ie. low vegetation or bare ground
Physetica caerulea
Scoparia exilis
Eudonia cataxesta

Eudonia manganeutis
Homoeosoma anaspila
Pterophorus innotatalis
Homohadena fortis

Many of the Lepidoptera species are more typical of upland areas of the South Island than the lowland coastal North Island, reflecting the coastal topography and its exposed nature.

Normally upland species
Graphania nullifera
Graphania sequens
Dasyuris partheniata
Meterana new species aff. asterope
Physetica caerulea
Bityla sericea
Pasiphila rivalis

4.3 Key Threatened Species

Of the eleven threatened moth species listed as Data Deficient under 1.3, six were found in this brief survey, perhaps highlighting the lack of study of this particular coastal fauna as much as their rarity. Four of the six appear to be confined to this coastline in the North and South Islands.

Based on this survey I recommend that the following seven species previously treated as **Threatened**, are regarded in the following way:

4.3.1 Notoreas new species

Patrick (1998) reported that there are ten, mostly undescribed coastal *Notoreas* species found in particular places around the New Zealand coastline. Hudson (1928) correctly distinguished this species from other forms he knew of from the central North Island (*N. perornata)* south to Otago (*Notoreas* new species 2). Patrick (1998) figured this distinct species in an article on the coastal *Notoreas* species. Sunley, working at Makara, was the first to rear this genus from *Pimelea* (Sunley 1911, Hudson 1928). George Gibbs and myself have mapped the distribution of the species from White Rocks on the southern Wairarapa coastline to Titahi Bay. It is still locally common but threatened by habitat destruction and habitat degradation (Patrick 1998). Agents for these changes are trail bikes and four-wheel drive vehicles, as well as infra-structure installations and roads along the coast. Tracks should be minimised and vehicles restricted to these defined lines.

4.3.2 Helastia siris (Hawthorne 1897)

Type Locality Cape Terawhiti

Found abundantly during this survey at three sites where the adults were attracted to light traps (Orongorongo River mouth, Kirikiri and Waitetuna Streams, Cape Palliser.
Apparently only found on this coast and on the Chatham Islands. Larvae and host unknown but a similar and larger South Island species *H. triphragma* is associated with the shrub *Helichrysum lanceolatum* – also found here at several places. The species appears to be locally abundant so should be regarded as a species with a restricted distribution rather than threatened.

As the larval host is not confirmed there is no solid biological framework with which to base a management regime for *Helastia siris.* However this shrubland moth species draws attention to the

comparative richness of such under-valued habitats and the need to protect them in many settings along with the natural processes that sustain them.

4.3.3 Ericodesma aerodana (Meyrick 1881)

This is a crepuscular (dusk-flying) small grey species whose larvae web the foliage, particularly the new shoots of *Pimelea prostrata*. First reared by Sunley as *Tortrix indigestana* (Hudson, 1928). The species is still locally abundant here but like *Notoreas* new species is still in danger of local extinction because of disturbance to its specialised habitat and hostplant.

Although known from at least twenty-two coastal sites nationwide, particularly in the North Island, all sites are at risk from a suite of human related disturbance (Patrick & Dugdale, 2000).

4.3.4 Meterana pictula (White in Taylor 1855)

This large and stunning species was featured on the cover of McGuinness (2001) but sadly appears to be locally extinct on the Wellington coast, underlining the sad state of affairs our coastal *Pimelea* low shrub communities are in. The bright green larvae and pink and green adults should be carefully searched for in suitable habitat by day and night respectively.

Sunley (1911) described the larvae from Makara, Wellington, where he found it feeding on *Pimelea prostrata.* The attractive species appears to have disappeared and become locally extinct since then, but it is still relatively common in the alpine zone in the central North Island and in Northwest Nelson. It has also been recorded from lowland sites in the Bay of Plenty region where it is at risk from local extinction (Patrick & Dugdale, 2000).

4.3.5 Austrocidaria lithurga (Meyrick 1911b)

Type Locality Makara

This distinctive species appears to be endemic to the Wellington coastline where the larvae probably feed on small-leaved *Coprosma* foliage as in the rest of the genus. During this survey it was found to be reasonably common at several sites including Sinclair Head and two sites in the Turakirae Head area. The fact that it was not found at either of the two productive sites at Cape Palliser under ideal conditions leads me to speculate that it does not occur there but is restricted to the coast immediately east and west of Wellington Harbour.

Patrick & Dugdale (2000) note one record of this species from Mid Canterbury. White (2002) recorded "*Austrocidaria* sp. nr *prionota*" from Mid Canterbury and noted that "the distinction if any from *A. lithurga* are unclear". I recommend that more taxonomic work is performed on this group of moths to ascertain the identity of these populations. But given that this survey found *A. lithurga* relatively common at the sites sampled, that analysis will not affect the status of the species in the Wellington region.

Interestingly, the discoverer of the species, Mr R.M. Sunley, also found a pupa of this species enclosed in a loose cocoon amongst *Muehlenbeckia* at Makara. He speculated that the species fed on that host. While this native liane can't be ruled out as a host, it is more likely that *Coprosma* grew in the vicinity and is the true hostplant. Sunley also records *A. lithurga* from Sinclair Head (Hudson, 1928). Sunley recorded adults in October and November, while this survey found adults in late December and January, revealing a fairly long emergence period, perhaps indicating more than one generation per year.

4.3.6 Graphania omicron (Hudson 1898)

Although superficially similar to *Aletia inconstans*, this distinct species was found at two sites – Kirikiri and Waitetuna Streams, Cape Palliser. Apart from the original discovery and these recent finds, the species has been recorded only from Broken River, Mid Canterbury (Hudson, 1939). It has not been found elsewhere and may be endemic to the Wellington area and southern Wairarapa coastline. Unfortunately the Type is lost, but the original description and rediscovery during this survey greatly help to clear-up the status of this species.

I recommend that the Mid Canterbury specimen is examined to check its identity in light of both the original description and the series found in this survey.

4.3.7 Bityla sericea Butler 1877

This distinctive noctuid was found commonly at three sites on the Wellington coastline – Sinclair Head (where ten adults were trapped) and Windy Point and Turakirae Point. The species, for which the hostplant is as yet unknown, is typical of montane dry shrublands of the eastern South Island. In recent years intensive light trap sampling of this habitat has found the species to be reasonably numerous especially in the late summer to early autumn at a large number of sites. I recommend that the species is removed from threatened species lists based on this and complementary South Island surveys.

4.4 Additional Species of Interest

4.4.1 Austrocidaria arenosa (Howes 1911)

This pale coloured species is rarely collected although is still abundant at several localities that I know of – Cape Campbell, Marlborough. Larvae feed on *Coprosma acerosa.* Within this study area it is recorded from Titahi Bay the type locality. It may be locally threatened but needs deliberate searching on the host if it still exists in the area.

4.4.2 Celama parvitis (Howes 1917)

First North Island records from Cape Palliser area – two sites. The amazing larvae feed on the foliage of the daisy shrub *Helichrysum lanceolatum*.

4.4.3 Dasyuris partheniata Guenee 1868

This magnificent day-flying moth is not common on the Wellington coast. It is recorded by Hudson (1928) from “Wellington”.

4.4.4 Dichromodes sphaeriata (Felder & Rogenhofer 1875)

The cryptic *Dichromodes sphaeriata* is a rock face specialist with adults flying by both day and night. *Dichromodes petrina* Meyrick 1892 described from Wellington is a synonym of *D. sphaeriata* (Dugdale 1988). Further research is necessary to check that *D. sphaeriata* from Nelson (the type population) is identical with this species also recorded from Paekakariki and Wellington by Hudson (1928). The species is locally abundant on the Wellington coast where the cryptic larvae feed on similarly coloured lichen on rock faces.

4.4.5 Other Nationally rare species

Meterana new species cf *asterope, Microdes quadristrigata, Samana falcatella, Pasiphila rivalis, Eudonia* new species, *Apoctena taipana* and *Trachypepla importuna* present in this region and found on this survey

are all of conservation interest and require further work on their life-history and ecology to determine the degree of threat they are under. The two undescribed species would benefit from taxonomic work to clarify their species status and relationships.

4.4.6 Data deficient moths not found in this survey

Four data deficient moth species that were targeted by this survey were not found. These species – *Chersadaula ochrogaster, Elachista eurychora, Erechthias lychnopa and Izatha rigescens* are all relatively small species and undoubtably have specialised habitats and lifestyle. It is possible that their emergence times did not coincide with this survey's relatively brief timeframe. Small species such as these will be hard to find in general surveys unless more information is cleaned on habitat preferences or hostplants.

In fact Hudson (1939) notes the emergence time of *Izatha rigescens* as March, and that combined with its dull colouring, may be the reason for its apparent rarity. This species is only known from the unique Type Specimen (Patrick & Dugdale, 2000)

The original series of *Chersadaula ochrogaster* discovered as larvae at Breaker Bay consisted of five specimens of both sexes. The species was also found on Stephens Island, Cook Strait (Dugdale, 1988). Hudson (1928) discovered the larvae in silken tubes in the earth under stones amongst grass roots only about three metres above the high water mark. He reared these larvae to adults in November but never found adults in the wild. He speculated that the species would be common in such habitat around Wellington Harbour.

The distinctively marked *Erechthias lychnopa* was found in November in wind-swept shrubland at Sinclair Head and has not been found since.

The tiny *Elachista eurychora* was found at Paekakariki in March on coastal sandhills amongst rough vegetation (Hudson, 1928). I have one specimen from The Gorge, Queenstown collected at light on 16 January 1993.

4.5 Key Plant Communities

4.5.1 Plant communities

This survey has clearly shown that the Wellington and South Wairarapa coastline has a butterfly and moth fauna of national significance both in terms of species richness and local endemism. To sustain this diverse fauna requires protection from development and disturbance of a suite of natural communities. The following list of plant communities all contain exposed rock as a major component. Additionally the plant communities are not isolated from each other but inter-grade.

Key plant communities:

- gravel pavement with *Pimelea* often dominant
- dunes of spinifex, pingao and sand tussock
- steep cliffs of grasses, mountain flax and scattered shrubland
- scree slopes with scattered herbs and low shrubs
- herbfield and shrublands at the base of cliffs with abundant *Muehlenbeckia complexa*
- scattered forest remnants with abundant ferns and lianes
- dry divaricating shrublands on coastal slopes

4.5.2 Plant species

From the list of both threatened moths and other species of conservation interest it is apparent that several hostplants standout as key plant species of this coast. Here is my list of native plants that are key plants for the survival of this distinctive Wellington and South Wairarapa coast moth fauna. They should be considered for any replanting projects attempted in this area to better secure the insect component as well as floral part of the biota.

Key plant species:
Aciphylla squarrosa
Brachyglottis greyi
Calystegia soldanella
Carmichaelia species
Clematis species
Coprosma (small-leaved species)
Desmoschoenus spiralis
Dichondra species
Haloragis erecta
Hebe stricta
Helichrysum lanceolatum
Melicytus crassifolius
Pimelea prostrata and other low shrubby Pimelea
Plantago species
Olearia spp.
Muehlenbeckia complexa & M. australis
Ozothamnus leptophyllus
Pyrrosia eleagnifolia
Raoulia new species
Senecio species
Spinifex sericeus
Sophora molloyi
Urtica ferox & U. incisa
Mountain flax
Manuka & kanuka

4.5.2 Key sites on the Wellington and south Wairarapa coastline

- **Makara Beach & Ohariu Bay area –** coastal cliffs and dune communities
- **Ohau Point to Cape Terawhiti –** coastal cliffs and shrublands
- **Red Rocks to Sinclair Head to Oteranga Bay –** coastal shrublands and cliffs
- **Pencarrow Head to Baring Head to Orongorongo River mouth –** coastal shrublands, gravel herbfields and cliffs
- **Turakirae Head to Windy Point –** coastal gravel herbfields, shrublands and cliffs
- **Onoke Spit to Ocean Beach –** dune communities
- **Te Humenga Point to Otakaha Stream** – dune communities
- **Te Kawakawa Rocks to Cape Palliser to Mataopera Stream –** gravel herbfields, shrublands and rocks

All these sites are nationally significant and require recognition for their special natural values. Some also require active management to ensure the identified natural values are retained and enhanced following varying degrees of human-induced degradation.

4.6 What moths are Threatened and Why?

Based on this survey and experience of similar coastal communities elsewhere in New Zealand, I believe the following moth species are truly threatened with extinction unless positive steps are made to protect their hostplant and the community that supports it:

- *Notoreas* new species – disturbance by vehicles is currently killing the hostplant *Pimelea* mats. Past and future roading threatens to further add to this damage. While the hostplant is still relatively common, it requires fencing to halt the destruction (Patrick 1998)
- *Ericodesma aerodana* - disturbance by vehicles is currently killing the hostplant *Pimelea* mats. Past and future roading threatens to further add to this damage. While the hostplant is still relatively common, it requires fencing to halt the destruction

Both these species rely on the gravel pavement beach habitat which supports their hostplant and other specialised plant species such as the matplant *Raoulia.* Already the handsome large noctuid *Meterana pictula* has disappeared from this coastline within the last fifty years. Its attractive green larvae would have required substantial plant resources to reach maturity.

Other moth and butterfly species may be threatened on this coastline but for many the lack of biological information hinders an assessment of their status let alone their ecological association. Much of my discussion is based on experience of similar species in other parts of New Zealand.

4.7 Future research

Research in regards to the moths and butterflies of this stretch of coastline is in its infancy. This study is but a first step towards the understanding of the diversity, biogeographic relationships, biology, ecology and conservation status of the many species.

Some possible avenues of research are:

- The following additional species first described from open communities in the Wellington area require further research by systematists to assess their taxonomic or conservation status:
  ◊ "*Scoparia" humilialis* Hudson 1951 – described from Sinclair Head
  ◊ *Trachypepla cyphonias* Meyrick 1927 – described from "open scrub on shrubs on the eastern side of Wellington Harbour"

- Searching, including light trapping in spring, early summer and autumn should be performed to detect the described moth species that were missed by this survey (see Section 4.4.6)

- Much work needs to be done on defining the distributions more finely than this survey achieved but that may be difficult given the unseasonably good weather encountered during this survey

- Additionally, many species require their exact hostplant in this setting to be confirmed as this will lead to a more satisfactory understanding of their ecology and pinpointing of their habitat for conservation purposes

I recommend that a suite of the distinctive coastal communities are formally protected and managed for conservation of the distinctive flora, fauna and landscape of this stretch of coast. Once this is achieved various projects of "research by management" can be implemented such as the following:

- The re-introduction of lost species such as *Meterana pictula* should be the aim, once appropriate areas are protected and secured. One such possible area for that species is Onoke Spit, already the subject of some physical protection. Wether the species is re-introduced from Northwest Nelson coastal or Central North Island alpine populations is a matter of debate for a later time

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APPENDIX ONE

List of other insect orders collected on the Wellington and South Wairarapa Coast

Coleoptera (Beetles)

Pericoptus truncatus - sand scarab found at Cape Palliser
weevil on *Aciphylla squarrosa* at Cape Palliser

Hemiptera (Bug)

Maoricicada iolanthe - on scree at Te Rakauwhaka – Mataopera Stream
Nysius huttoni - Te Humenga Point
Rypodes chinai - Te Humenga Point
Pimeleochoris luteus – Te Humenga Point on *Pimelea* sp.

Isoptera (Termite)

Kalotermitidae
Stolotermes ruficeps – widespread coastal species in driftwood

Neuroptera (Lacewing)

Hemerobiidae
Micromis tasmaniae - widespread
Psectra nakaharai – Cape Palliser

Orthoptera (Grasshopper)

Phaulacridium marginale - common Cape Palliser

Plecoptera (Stonefly)

Stenoperla prasina – large green stonefly – Cape Palliser & Windy Point, Turakirae Point
Zelandobius confusus – small stonefly – Cape Palliser
Spaniocerca zelandica – grey jumping stonefly – Windy Point, Turakirae Point

Trichoptera (Caddis)

Plectrocnemia maclachlani – Orongorongo River mouth & Waitetuna Stream – Cape Palliser
Neurochorema armstrongi - Windy Point, Turakirae Head
Neurochorema confusum - Waitetuna Stream – Cape Palliser
Costachorema xanthopterum- Orongorongo River mouth & Turakirae Reserve
Hydrobiosis umbripennis- Orongorongo River mouth, Kirikiri Stream-Cape Palliser, Turakirae Reserve, Windy Point & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Hydrobiosis parumbripennis - Turakirae Reserve & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Hydrobiosis spatula - Windy Point, Turakirae Head
Hydrobiosis soror – Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Philanisus plebeius – marine caddis – Kirikiri Stream, Cape Palliser & Turakirae Reserve & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Aoteapsyche colonica - Kirikiri Stream, Cape Palliser, Turakirae Reserve & Waitetuna Stream – Cape Palliser

Olinga feredayi - Kirikiri Stream, Cape Palliser & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Orthopsyche fimbriata - Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Psilochorema macroharpax - Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Psilochorema mimicum - Kirikiri Stream, Cape Palliser, Turakirae Reserve & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Psilochorema leptoharpax - Turakirae Reserve & Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Polyplectropus aurifusca - Kirikiri Stream, Cape Palliser, Turakirae Reserve, Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Edpercivalia nsp. - Kirikiri Stream, Cape Palliser
Edpercivalia thomasoni - Windy Point, Turakirae Head
Hudsonema amabile - Windy Point, Turakirae Head
Oecetis unicolour - Waitetuna Stream – Cape Palliser
Oeconesus maori - Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Pycnocentrodes aeris - Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Pseudoeconesus hudsoni – Turakirae Reserve
Oxyethira albiceps - Turakirae Reserve & Waitetuna Stream – Cape Palliser
Paroyethira hendersoni - Windy Point, Turakirae Head
Helicopsyche zelandica - Windy Point, Turakirae Head & Waitetuna Stream – Cape Palliser
Hydrochorema crassicaudata - Windy Point, Turakirae Head
Synchorema tillyardi - Waitetuna Stream – Cape Palliser
Hydrobiosella stenocerca - Waitetuna Stream – Cape Palliser
Tiphobiosis nsp. - Waitetuna Stream – Cape Palliser