BUTTERFLY BAY
Report on Ecological Issues

August 2006 (revised December 2006)
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INTRODUCTION

This report covers ecological issues with respect to potential development of the property at Butterfly Bay, Northland.

Butterfly Bay is located east of Whangaroa Harbour heads, west of Tauranga Bay and about 15 km. north of Kaeo, Northland, New Zealand (Map 1.)

The subject site (41 hectares) largely lies in a north-south direction extending from the beach area to the power pylons.
Cerulean Properties NZ has proposed (2005) an extensive development of the site – a 229-guest luxury resort, Project Blue Spa, with the following elements:

- 74 guest chalet buildings
- Resort facilities including the following components – spa facilities, yoga centre, swimming pools(3), bar, fitness centre (gymnasium), treatment rooms (18), tennis courts
- Restaurant, staff accommodation, administration building,
- Maintenance and service buildings; internal site and external access road improvements
- Provision of services (including upgrades) for all components of the proposal.

The application was lodged with the Northland Regional Council and Far North District Council. The proposal also included proposed earthworks, vegetation removal (82,700 m²), parking shortfalls, water discharge (219 m³ per day) and other District Plan requirements.
BACKGROUND

Monarch Butterfly Biology

The Monarch Butterfly or Wanderer (*Danaus plexippus*) is a North American species of butterfly that established widely in the Pacific Region in the nineteenth century.

Butterflies (Lepidoptera - Rhopalocera) are relatively scarce (in terms of numbers of species) in New Zealand. Currently over 30 species are recognised but research indicates that this number could increase significantly with the recognition of several “cryptic” species confined to specific areas of the South Island. The Monarch belongs to the family Nymphalidae, subfamily Danainae – two other species of this subfamily, *Danaus chrysippus petilia* (Lesser Wanderer) and *Danaus hamatus* (Australian Blue Tiger) have been reported as occasional migrants (vagrants) to New Zealand.

In North America the Monarch Butterfly is well known for its regular migrations from Canada and the U.S.A. to Mexico, and return journey. In the mid-1800s the species undertook a vast extension of its range – reaching Hawaii in 1840, Pohnpei in 1857, Tonga in 1863, Samoa in 1867, Rarotonga in 1869, Australia in 1870-1 and Tahiti in 1872.

The first published record for New Zealand is of a specimen taken at Waimarama, Hawkes Bay in 1873, but there are unsubstantiated records of occurrences in 1840-1 and 1848 in the Wairoa Valley, Hawkes Bay and in Nelson about 1868, (Gibbs 1980.) Though this butterfly may have made earlier “colonising” flights, it would have been unable to establish in the Pacific Region as its foodplants, in the family Asclepiadaceae did not naturally occur in this region.

Evidence for the prodigious flights of the Monarch is substantiated by regular reports of occurrences in western England – after a Transatlantic flight.

The reported foodplants of the Monarch Butterfly in New Zealand are:

- *Asclepias curassavica* L. – Blood-flower
- *Asclepias tuberosa* L. – Butterfly Weed
- *Gomphocarpus fruticosus* (L.) R. Br. – Swan Plant
- *Gomphocarpus physocarpus* E. Meyer – Swan Plant
- *Araujia sericifera* Brot. – Moth Plant – in captivity
- *Oxypetalum caeruleum* (D. Don) Decaisne – Tweedia – in captivity
- *Schinus molle* L. - Pepper Tree – in captivity
- *Cucurbita* sp. – Pumpkin – in captivity (large larvae only will feed on ripe fruit)
Female Monarch Butterflies deposit creamy yellow eggs singly, usually on the underside of leaves of the foodplant. Eggs hatch after 5-10 days.

The larvae (caterpillars) feed voraciously and may complete their growth in three (or more) weeks depending on food supply and weather conditions. There are five larval instars – the periods between the moult (ecdysis) of the caterpillar’s skin.
When growth is complete, the larva moult into a green pupa (with golden-coloured spots on the thorax and a band of shiny dark black bead-like spots on the abdomen.) The pupal stage lasts for about 3 weeks.

The adult Monarch Butterfly may live for up to six months and is the stage that overwinters in New Zealand.
Overwintering butterflies may congregate in coastal trees (see below.)

**Natural Enemies**

Note: In crowded conditions cannibalism may occur in caterpillars.

No parasites have been reported in New Zealand. [In Australia, a Tachinid Fly parasitises larvae.] The following predators have been reported feeding on larvae:

**Heteroptera – Pentatomidae (Shield Bugs)**
*Cermatulus nasalis* (Westwood) – Brown Soldier Bug, Glossy Shield Bug
*Oechalia schellenbergii* (Guérin-Méneville) – Schellenberg’s Soldier Bug, Spined Predatory Shield Bug

**Hymenoptera : Vespidae (Wasps)**
*Polistes chinensis* Fabricius – Chinese Paper Wasp
*Polistes humilis humilis* (Fabricius) – Australian Paper Wasp

**Mantodea : Mantidae**
*Miomantis caffra* Saussure – African Praying Mantis

**Aves : Cuculidae**
*Chrysococcyx lucidus lucidus* (Gmelin) – Shining Cuckoo, Pipiwharauroa
Shining cuckoos have been seen to feed voraciously on Monarch Butterfly larvae.
Butterfly Bay Report  © Peter Maddison, Field Studies

Associates

Quite frequently colonies of yellow aphids occur on milkweed. These may occupy parts of the young leaves, stems, flowers and fruits and are therefore often found in close proximity to Monarch caterpillars. These have been identified as:

Homoptera : Aphididae (Aphids)
Aphis nerii Boyer de Fonscolombe – Oleander Aphid

History of Monarch Butterfly at the site

The first report of occurrence of overwintering butterflies at Butterfly Bay is by Tim (W.A.) Healy in 1963. This article from the “Weekly News” of June 1963 is reproduced below:

Monarchs' Refuge

Northland's coastline contains many beautiful and secluded spots known only to the more adventurous visitors as they are way off the beaten track.

One such of these scenic gems is Tauranga Bay, some ten miles north of Kaeo, in Whangaroa County. Tauranga Bay has a mile-long gently curving beach of clean untrodden sand backed by tussock-covered sand dunes and flanked at each end with cave-riddled cliffs.

Out to sea, about three miles distant, is that lonely uninhabited Stephenson's Island, home of the almost extinct tuatara.

Our visit was not, however, for the scenery but for a look at a remarkable gathering of Monarch butterflies.

After feeding throughout the summer as caterpillars on their natural food, the Swan plant, which grows in profusion on this stretch of the coast, they had congregated in countless thousands in a sheltered, steep-sided gully running up from the beach, and containing a stand of native timber.

As we entered the bush - which in itself has no claim to beauty - we saw the odd butterfly flitting around, but as we progressed we found the air full of them, twisting and turning in the sunlight. Then we saw that, everywhere, the branches of the trees were festooned with settled butterflies, hanging in clusters on the foliage like colourful Chinese lanterns.

Some of the sleepers were hanging with their wings closed together, in other clusters, the butterflies were opening and closing their wings as if in some ritual exercise, and the colours glowed on the shafts of autumn sunshine that pierced the foliage, making a picture of indescribable beauty.

For a while we stood watching. Then, suddenly, as if a warning had been given the butterflies took flight in unison. The whirr of their wings could be distinctly heard, and the air was filled with black and orange against the green of the foliage and the blue of the sky.

Our last treasure was the finding of a solitary caterpillar on a Swan plant at the base of the hill. Most grubs are repulsive looking, but this individualist in its variegated, hooped jacket evoked not repugnance but wonder. Midwinter is now close at hand and here we have this lazy fellow refusing to give in and accept that fact. Soon he will be flitting about around that wooded dale above.

I have read an article somewhere of similar gathering of wintering Monarch butterflies in California, where they attract many tourists to see them, and consequently they are protected.
If the Monarchs decide to gather annually in this out of the way spot, no doubt they will attract many visitors. But if this does not become one of their annual winter resorts, Tauranga Bay is still worth a visit.

— W A Healy

A series of photographs taken in the 1970s shows butterfly activity at the Butterfly Bay site. [source friend of Christopher Burgess]
Butterflies clustered on tree tops

Butterflies on silver fern frond
Butterflies in cabbage tree crown
Gibbs (1980) in his monograph of New Zealand Butterflies mentions the Tauranga Bay site.

The following account is from 1984:

Butterfly Bay has to be seen to be believed.

Walking around the rocks the last part of the route takes you under a natural stone bridge. The bay has streams at either end, but it was the southernmost stream where I saw countless numbers of butterflies in 1984...

The Monarchs were there in their hundreds, drifting around above the pohutukawa trees, like autumn leaves scattered by a gust of wind. They’d land on a branch which would take on the gleam of the brightest copper. They seemed to be attracted by the warmth and shelter the valley provided, with the manuka, pohutukawa and orange-and-red lantana.

Jacqui Knight

Jacqui Knight (pers. comm.) reports seeing up to 20 butterflies in her visits in 2005-6, but a maximum of only five were seen during this survey (see Appendix 1.)
METHODS

Vegetation

In surveying the plants occurring at the site, the area was observed by walking across the site at various levels and by investigating special sites in detail – e.g. the stream and pond, rock faces, strand area and areas already occupied by buildings. Plants seen were noted and where the identity of the plant needed verification, specimens were collected, dried and pressed and mounted for identification.

Invertebrates

Special sampling methods were used to gain an indication of the invertebrates (insects, spiders, crustaceans, etc.) present at Butterfly Bay. These included:

- Pitfall trapping of sites from the strand area and along the southern track.
- Sampling of plants – beating foliage onto a white tray and collecting specimens into 75% ethanol.

Additionally notes were kept of other insects seen while at the site. A night walk was taken around the tracks to look for animals active on vegetation and tree trunks.

Specimens collected were preserved either in 75% ethanol or were directly dry-mounted. Specimens were labelled and deposited in the Field Studies collection, 631 West Coast Road, Oratia, Waitakere City.

Vertebrates

 Searches of vegetation and under logs, rocks, etc. were made to look for reptiles (lizards).

While at the site, observations and records were made of all birds and mammals seen at the site. Particular attention was given to birds occurring in the sandy strand area and the cave in the cliffs.
RESULTS

A list of the flora and fauna recorded and identified to date is given in Appendix Table 1.

The vegetation of most of the site is of manuka dominated scrubland. Much of this vegetation appeared to be of similar age suggesting a recovery from an earlier clearance or fire. To the south of the site was a pine plantation – with trees 20-30 years old. At the base of the cliffs were larger trees, particularly pohutukawa and cabbage trees. These trees are important in providing shelter for the overwintering Monarch Butterflies. During one night, observations were made for the possible occurrence of kiwi at the site, but no birds were heard.

Birds observed in the coastal sandy area included Variable Oystercatcher and New Zealand Dotterel

A pair of Dotterel was active in the flat sandy area during both visits and it is likely that this species will nest there.

New Zealand Dotterel is listed as a threatened (Category B) Species by the Department of Conservation and International Union for the Conservation of Nature (IUCN). Protection of the sandy area from trampling is important and it is suggested that signs be erected to alert people to the presence of the Dotterel – as is done in many beach areas of New Zealand.
The Little Blue Penguin (*Eudyptula minor*) is known to occur along the rocky coast and cave near the eastern boundary of the site. Though footprints were seen, no birds were observed during the nighttime survey. However a dead bird was found.

These penguins are an iconic bird for the rocky coasts of New Zealand and are in serious decline in the northern part of New Zealand, particularly as the result of predation by cats and dogs. It is recommended that this cave breeding colony be given protection by banning the keeping of pet cats and dogs at the site and restricting the access of dogs along the coast.

One skink was seen (disappearing) under a log on the sandy area. It is important for a thorough survey of the reptiles of the site be made, as coastal skink species are in decline in New Zealand.

Few observations were made of Monarch Butterflies but a summary of information on them is presented in this report. The planting of additional milkweed could help boost numbers at the site (See Recommendations below.)
RECOMMENDATIONS

Note: Separate recommendations are given for monarch butterfly conservation.

A) As originally proposed “Project Blue Spa” was intended as a 229-guest luxury resort. It is recommended that it will be necessary to evaluate the proposal (as amended from the original one) in terms of an Environmental Impact Report. This should include traffic/access issues, waste disposal/recycling policies, water use and wastewater disposal, impact on flora and fauna, particularly of the coastal and neighbouring marine area, fire protection and pest and weed management. Certain of these are addressed in more detail below.

B) No development should be allowed in the coastal strand area – it is recommended that this area be set aside as an Esplanade Reserve. The sandy area is habitat for New Zealand Dotterel (a threatened species) and Variable Oystercatcher and measures are needed to preserve the habitat and restrict access of people and dogs during the nesting season of these birds. Similarly the caves and holes in the coastal cliffs (together with the rocky areas near the pond) provide nesting and resting-places for Little Blue Penguin. A restriction on dog access to these areas is recommended.

C) The pond has been created artificially – with the result that access of migratory fish such as kokopu and (possibly) eels has been prevented. Consideration needs to be given to the effects of the proposed development on the streams on the property. This includes the potential effects of increased stormwater flows and of emergency water overflows (and cleaning of the proposed development’s water features).

D) The intensity of this proposed development will undoubtedly result in considerable discharge of wastewater (sewage) into the Bay. The impact of this discharge on the marine ecosystem will need to be considered. Likewise the impact of discharges from the desalination plant.

E) No specific study of reptiles was made at the site, but at least one skink was seen. Because there are several “threatened” skink species in the coastal area, it is recommended that a comprehensive study is needed to determine the species present at the Butterfly Bay site. [If any such threatened skink is found, then special protection measures could include the banning of cats from the site.]

F) As for E), no specific study was made to determine if any “special” molluscs (snails) occurred at the site. It is recommended that a comprehensive study is needed to determine the species present at the Butterfly Bay site. [This is suggested because there are known to be several resurrected large land snails in the Northland Region.]

G) The intense development will undoubtedly result in large-scale vegetation clearance. Retention of as much vegetation as possible is needed to provide soil stability, shade and habitat for associated flora (including epiphytes) and fauna.

    The preservation of large trees is important. Planning of fire breaks or fire containment measures will be necessary, together with maintaining the integrity of the forest cover – it is noted that several native New Zealand shrub/tree species have high fire-retardant properties.

    It is possible that the New Zealand Brown Kiwi still survives in this coastal area – surveys should be done to confirm this. If found, this would be an extra reason for
recommending retaining the integrity of the bush and incorporating a “dog and cat-free” status for the area.

H) There are several areas where aggressive exotic weed species are prominent. The impact of the development in encouraging rats and predators needs evaluating. It is recommended that a comprehensive pest and weed management plan be developed.

I) In any revegetation programme, it is recommended that suitable native (“eco-sourced”) plants be grown.

J) There should be restrictions on the development of “garden areas” – development of these would entail further bush clearance. However enhancement of existing flower borders with plant suitable for butterflies is addressed below. Restrictions on potentially weedy species are needed.

K) A plan is also needed for the management of the pine trees at the site.

L) A comprehensive survey of archaeological sites on the subject site is needed.

M) Should the development proceed (in any form), it would be desirable that workmen at the site were bound into any conditions which may hopefully be applied, {i.e. no dogs on site, no unnecessary clearance of vegetation, etc.)
RECOMMENDATIONS REGARDING MONARCH BUTTERFLY

1. Institute a regular series of winter counts of monarch butterfly presence/activity at the coastal site.

2. Ask that all large coastal trees at the site be protected from removal or extensive pruning activities.

3. Suggest a series of small garden areas for planting of milkweed species and other larval hosts. Also ask that garden areas are planted with nectariferous plants – these could include Hebe (including cultivars), Tweedia (Oxypetalum), etc. These non-weedy plants should be planted in species where the lantana (Lantana camara) – a potentially serious weed – is removed.

4. Ask that the pest management programme for the site includes measures designed to remove and suppress wasps, particularly paper wasps (Polistes) – these are important predators on monarch caterpillars.

5. Suggest that “remote areas” of the site be planted with appropriate host plants of other native (endemic) butterflies – so that these are encouraged to re-colonise the site.

Monarch butterfly nectaring on Hebe Wiri Spears
REFERENCES


ACKNOWLEDGMENTS

This survey was made possibly through support from the Monarch Butterfly NZ Trust and particularly through the dedicated work of Jacqui Knight. We are grateful to Jacqui (and Bonnie) for considerable support of the field work and in writing-up the report.

We also thank the Greenbury family for accommodating us during one of the visits. Also to the team who set out and monitored the pitfall traps: Betty Greenbury, Ana, Larissa and Tor Heggland, Joan and Tony Ismail, Jacqui Knight and Andreas Reimann.

We attended a meeting of local residents at the home of Monte and Mary Woodworth in Tauranga Bay and were grateful for this opportunity to learn of the concerns of local residents, as well as some of the background to Butterfly Bay. After this meeting the Butterfly Bay Protection Society was formed.

We are also grateful to Christen Bartelt of Cerulean Properties NZ for allowing access to the site and for providing useful information on the proposed development.

Peter Maddison
20 August 2006
(Document revised January 2007)
Appendix Table 1 Provisional List of Flora and Fauna found at Butterfly Bay.

(Note: additional records will be sent to the Monarch Butterfly Trust, as they are identified or authenticated.)

FAUNA
Phylum: ARTHROPODA
Class: INSECTA
Order: DIPTERA
Family: TEPHRITIDAE
*Procecidochares utilis Stone
2005 – 13/7 – galls in stems of Ageratina adenophora (Diptera: Tephritidae)

Order: HOMOPTERA
Family: APHIDIDAE
Aphis nerii (Boyer de Fonscolombe) – Oleander Aphid
2005 – 13/7 – several colonies on Gomphocarpus fruticosus (Asclepiadaceae)

Order: HYMENOPTERA
Family: APIDAE
*Bombus terrestris (L.) – Buff-tailed Bumble Bee, Twobanded Bumble Bee
2005 – 13/7

Order: LEPIDOPTERA
Family: NYMPHALIDAE
Danaus plexippus (L.) – Monarch Butterfly
2005 – 13/7 – adults (5), larva and pupa (1) on Gomphocarpus fruticosus (Asclepiadaceae)

Phylum: MOLLUSCA
Class: BIVALVIA
Order: MYTILOIDA
Family: MYTILIDAE
Perna canaliculus (Gmelin) – Common Mussel, Green-lipped Mussel
2005 – 13/9 – beach (7 shells)

Order: PTERIOIDA
Family:PECTINIDAE
Pecten novaezelandiae novaezelandiae Reeve – Scallop
2005 – 13/9 – beach (2 shells)

Order: VENEROIDA
Family: VENERIDAE
Tawera spissa (Deshayes) – Morning Star Shell
2005 – 13/9 – beach (1 shell)
Class: CEPHALOPODA
Order: DECAPODA
Family: SPIRULIDAE
*Spirula spirula* (Linnaeus)
2005 – 13/9 – beach (2 shells)

Class: GASTROPODA
Subclass: PULMONATA
Order: SIGMURETHRA
Family: HELICIDAE
*Cornu aspersum* (Muller) [=*Cantareus aspersus* (Müller)] – Brown Garden Snail
2005 – 13/7 - under log

Phylum: CHORDATA
Class: AVES
Family: ALCEDINIDAE
*Todiramphus sancta vagans* (Lesson) – Kotare, New Zealand Kingfisher, Sacred Kingfisher
2005 – 13/7

Family: CHARADRIIDAE
*Charadrius obscurus* (Gmelin) – New Zealand Dotterel, Tuturiwhatu Pukunui, Paturiwhata
2005 – 13/7(2)

Family: COLUMBIDAE
*Hemiphaga novaeseelandiae novaeseelandiae* (Gmelin) – Kereru
2005 – 13/7

*Streptopelia “risoria” (L.)*” – Barbary Dove
2005 – 13/7, 12/9(white doves)

Family: FRINGILLIDAE
*Carduelis carduelis britannica* (Hartert) - Goldfinch
2005 – 13/7

*Fringilla coelebs gengleri* Kleinschmidt – Chaffinch
2005 – 13/7

Family: HAEMATOPODIDAE
*Haematopus unicolor* Forster – Variable Oystercatcher
2005 – 13/7(2)

Family: HIRUNDINIDAE
*Hirundo tahitica neoxena* Gould – Welcome Swallow
2005 – 13/7
Family : MUSCICAPIDAE
*Rhipidura fuliginosa placabilis* Bangs – Fantail
2005 – 13/7

*Turdus merula merula* L. - Blackbird
2005 – 13/7

*Turdus philomelos clarkei* Hartert – Song Thrush
2005 – 13/7 - song

Family : NUMIDIDAE
*Numida meleagris* (L.) – Crested Guineafowl, Helmeted Guineafowl
2005 – 13/7(2) - + calls

Family : STURNIDAE
*Acridotheres tristis* (L.) – Indian Myna
2005 – 13/7

Family : ZOSTEROPIDAE
*Zosterops lateralis lateralis* (Latham) – Silvereye, White-eye
2005 – 13/7

Class : MAMMALIA
Order : ARTIODACTYLA
Family : BOVIDAE
*Capra hircus* L. – Goat
2005 – 13/7(2)

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**FLORA**

Kingdom : FUNGI
Division : EUMYCOTA
Sub-Division : LICHENES
Class : DISCOMYCETES
Order : LECANORALES
Family : PARMELIACEAE
*Xanthoria parietina* (L.) Th. Fr.
2005 – 13/7 – on rocks

Division : PTERIDOPHYTA
Class : FILICOPSIDA
Family : CYATHEACEAE
*Cyathea medullaris* (G. Forster) Swartz - Mamaku, Black Tree Fern
2005 – 13/7

Family : NEPHROLEPIDACEAE
*Nephrolepis cordifolia* (L.) C. Presl - Tuber Ladder Fern
2005 – 13/7
Division: MAGNOLIOPHYTA
Class: MAGNOLIOPSIDA
Family: ASCLEPIADACEAE
*Gomphocarpus fruticosus* (L.) R. Br. – Swan Plant
2005 – 13/7 – fruits (+ larvae & pupa of *Danaus plexippus* (Lepidoptera: Danaidae); several colonies of *Aphis nerii* (Homoptera: Aphididae))

Family: ASTERACEAE
*Ageratina adenophora* (Sprengel) R. King & H. Robinson – Mexican Devil
2005 – 13/7 (+ gall caused by *Procecidochares utilis* (Diptera: Tephritidae))
*Ageratina riparia* (Regel) R. King & H. Robinson – Mistflower
2005 – 13/7
*Aster subulatus* Michaux – Sea Aster
2005 – 13/7 – flowers, fruits
*Erigeron karvinskianus* De Candolle - Mexican Daisy
2005 – 13/7 – flowers
*Taraxacum officinale* G. Weber agg. - Dandelion
2005 – 13/7

Family: CONVOLVULACEAE
*Calystegia soldanella* (L.) R. Br. - Shore Bindweed
2005 – 13/7

Family: CORIARIACEAE
*Coriaria arborea* R. Lindsay – Tutu
2005 – 13/7

Family: FABACEAE
*Ulex europaeus* L. – Gorse
2005 – 13/7, 12/9 - flowers

Family: HALORAGACEAE
*Haloragis erecta* (Murray) Oken – Toatoa
2005 – 13/7

Family: LAMIACEAE
*Plectranthus grandis* (Cramer) Willems
2005 – 13/7 - flowers

Family: LOGANIACEAE
*Geniostoma rupestre* J. R. & G. Forster var. *ligustrifolium* (Cunningham) Conn. – Hangehange
2005 – 12/9

Family: MALVACEAE
*Hoheria populnea* Cunningham – Houhere, Lacebark
2005 – 13/7

Family: MYRSINACEAE
Myrsine australis (A. Richard) Allan - Mapou, Red Matipo  
2005 – 13/7  

Family : MYRTACEAE  
Leptospermum scoparium J.R. & G. Forster - Manuka  
2005 – 13/7, 12/9 - flowers  
Metrosideros excelsa Gaertner – Pohutukawa  
2005 – 13/7  

Family : PHYTOLACCACEAE  
*Phytolacca octandra L. – Inkweed  
2005 – 13/7 - flowers  

Family : PIPERACEAE  
Macropiper excelsum (G. Forster) Miq. - Kawakawa  
2005 – 13/7  

Family : PLANTAGINACEAE  
*Plantago lanceolata L. – Ribwort, Narrow-leaved Plantain  
2005 – 13/7  

Family : POLYGONACEAE  
Muehlenbeckia complexa (Cunningham) Meissner – Pohuehue  
2005 – 13/7  

Family : RUBIACEAE  
Coprosma rhamnoides Cunningham  
2005 – 13/7  

Family : RUTACEAE  
*Citrus limon (L.) N. L. Burman – Lemon  
2005 – 13/7 - fruits  

Family : SOLANACEAE  
*Physalis peruviana L. – Cape Gooseberry  
2005 – 13/7 - fruits  

Family : TILIACEAE  
Entelea arborescens R. Br. – Whau  
2005 – 13/7  

Family : TROPAEOLACEAE  
*Tropaeolum majus L. – Garden Nasturtium  
2005 – 13/7  

Family : VERBENACEAE  
*Verbena bonariensis L. – Purpletop  
2005 – 13/7
Class: LILIOPSIDA
Family: AGAVACEAE
*Cordyline australis* (G. Forster) Endlicher - Ti, Cabbage Tree
2005 – 13/7

Family: ALLIACEAE
*Agapanthus praecox* Leighton - Agapanthus
2005 – 13/7

Family: ARACEAE
*Monstera deliciosa* Liebm. - Fruit Salad Plant, Monstera
2005 – 13/7

Family: CYPERACEAE
*Desmoschoenus spiralis* (A. Richard) J.D. Hooker - Pingao
2005 – 13/7

Family: LILIACEAE
*Chlorophytum comosum* (Thunberg) Jacques cv. 'Vittatum' - Bracket Plant
2005 – 13/7
*Collospermum hastatum* (Colenso) Skottsberg – Kahakaha, Perching Lily
2005 – 13/7
*Kniphofia uvaria* (L.) Hooker – Poker Plant
2005 – 13/7 - flowers

Family: PHORMIACEAE
*Phormium cookianum* Le Jolis – Mountain Flax, Wharariki
2005 – 13/7
*Phormium tenax* J.R. & G. Forster – Harakeke, New Zealand Flax
2005 – 13/7

Family: POACEAE
*Dactylis glomerata* L. – Cocksfoot Grass
2005 – 13/7 – fruits
*Lagurus ovatus* L. - Harestail
2005 – 13/7 – fruits
*Oplismenus hirtellus* (L.) P. Beauvois ssp. *imbecillus* (R. Br.) U. Scholz
2005 – 13/7
*Paspalum urvillei* Steudel – Vasey Grass
2005 – 13/7 - fruits
*Pennisetum clandestinum* Chiovenda – Kikuyu Grass
2005 – 13/7