

# **COASTAL RESOURCE INVENTORY**

## **FIRST ORDER SURVEY**

### **OTAGO CONSERVANCY**

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**CONSERVATION  
TE PAPA ATAWHAI**

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## PREFACE

The Coastal Resource Inventory (CRI) programme is an ongoing project of the Department of Conservation. The programme is organized into First, Second and Third Order Surveys which span the coastal zone of New Zealand. The First Order Survey provides the basis for a national overview of coastal conservation values and is derived from information on the physical, biological and human resources of the coastal zone. The Second Order CRI Surveys will provide regional overviews for each of the Departments Conservancies. Third Order Surveys will provide detailed information at a site specific level for a specific purpose.

The coastal zone covered by the Coastal Resource Inventory is an area bounded by the outer limits of the New Zealand Territorial Sea, 12 nautical miles offshore and the landward limit of marine influence. The latter varies from place to place depending on site specific physical, biological and human factors.

The First Order Coastal Resource Inventory presented here covers the coastal zone of one of the thirteen coastal conservancies of the Department. It is based on existing information compiled by conservancy staff from regional and national databases, published and unpublished reports, limited field surveys and personal or anecdotal information from various experts. The information has been compiled according to guidelines and standards set by the Departments' Coastal Resource Inventory Taskforce.

As one might expect, the First Order Survey has revealed a substantial variation in the quality and quantity of information between Conservancies and also between information categories. In general there is more information about the resources and attributes of the landward part of the coastal zone than the seaward part, especially offshore. Conservancies with large metropolitan centres such as Auckland have more information than the remote coastal areas of New Zealand such as the East Coast. This does not mean that the latter areas are lower in coastal conservation values or resources. Rather, it simply reflects the lack of knowledge and possible directions for further work, so that a balanced national overview of coastal conservation values and resources is eventually obtained.

The First Order CRI provides essential information for managers, planners and users of the coastal zone of New Zealand. The national overview provided by the First Order Survey will be updated from time to time by the Department as new information comes to hand.



**Bill Mansfield**  
**DIRECTOR GENERAL**  
**DEPARTMENT OF CONSERVATION**

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## NATIONAL OVERVIEW

### INTRODUCTION

The Coastal Resource Inventory (CRI) programme was initiated in 1987 as the Department of Conservation's principal tool for breaking the cycle of reactive management that has characterised coastal management in New Zealand in the past. CRI provides important information on the physical, biological, recreational, cultural, historic, archaeological, human modification, uses, protection and threats to the coast.

The First Order Survey consists of thirteen volumes, one from each coastal conservancy (Northland, Auckland, Waikato, Bay of Plenty, East Coast, Hawke's Bay, Wanganui, Wellington, Nelson/Marlborough, Canterbury, West Coast, Otago, Southland). Each volume includes a brief description of the conservancies' coastal zone, a summary of the conservation values, a list of issues of concern and recommendations for further work. The information is described on site sheets and plotted on maps at a scale of 1:250 000 to give a broad, overall impression of the coastal conservation values within each conservancy.

In addition to its primary use for coastal management, First Order CRI information will help identify areas suitable for marine reserves and aid in the advocacy role of the Department at both the national and conservancy level.

#### Mission Statement:

The primary mission of the First Order Survey was:

*"To provide information for the maintenance, enhancement and restoration of natural character and qualities of coasts and their sensitive use."*

The following specific tasks were developed to achieve the mission:

1. *"To identify coasts with important natural, scientific, historic, cultural and spiritual values;*
2. *to identify coasts currently protected and warranting protection;*
3. *to identify coastal conservation values susceptible to existing and potential threats;*
4. *to identify human modification and uses of coasts".*

## INSTRUCTIONS FOR USE OF THE COASTAL RESOURCE INVENTORY

This folder consists of an introduction, summary, site record forms, and maps. The site record form gives written information on each site and is to be used with corresponding maps for that site.

Read the site record form with its corresponding maps by following these steps:

### SITE RECORD FORMS

1. Turn to the site record forms.
2. Find the site number in the top right-hand corner of the page e.g. CRI 01 0001. The number 01 represents a conservancy coastline. Refer to map of New Zealand below e.g. 01= Northland Conservancy. The number 0001 refers to a particular site e.g. Firth of Thames.
3. Each site record form gives written information on the following:

natural values	}	site of
cultural values		conservation value
historic values		
existing threats		
human use and modification		
existing protection		

4. Letter codes (a,b,c,d,e,f,g) give detail for each part of the information on the site record form. A key is provided on the maps and the codes are listed in the "Methods" section.

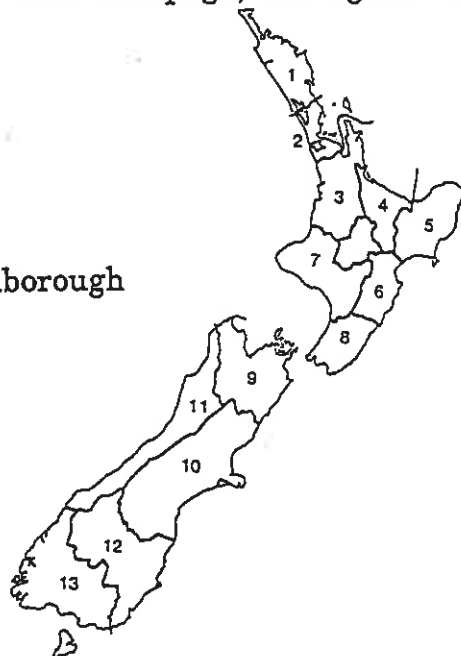
### MAPS

5. Turn to the map index overleaf. The index gives the site number and its corresponding maps.
6. Find the corresponding maps in the second part of the folder.
7. Accompanying the maps are two transparent map overlays:
  - i) CONSERVATION VALUES overlay
  - ii) BASE MAP overlay
8. The BASE MAP and CONSERVATION VALUES overlays are designed to lift out and overlay onto each of the previous pages (i.e. natural, cultural, historic, human modification and use, existing threats, existing protection etc.)
9. To accurately overlay the base map with each page, use register marks which are found on each map.

i.e.  overlays on 

### DEPARTMENT OF CONSERVATION COASTAL CONSERVANCIES

- |                  |                        |
|------------------|------------------------|
| 1. Northland     | 8. Wellington          |
| 2. Auckland      | 9. Nelson/ Marlborough |
| 3. Waikato       | 10. Canterbury         |
| 4. Bay of Plenty | 11. West Coast         |
| 5. East Coast    | 12. Otago              |
| 6. Hawkes Bay    | 13. Southland          |
| 7. Wanganui      |                        |



**MAP INDEX - OTAGO**

<b>Site No.</b>	<b>Map Grp.</b>
0001	15.2
0002	15.2
0003	15.2
0004	15.2
0005	15.2
0006	15.2
0007	15.2 and 17.3
0008	17.3
0009	17.3
0010	17.3
0011	17.3
0012	17.3
0013	17.3
0014	17.3
0015	17.3 and 17.2
0016	17.3 and 17.2
0017	17.2
0018	17.2
0019	17.2
0020	17.2
0021	17.2 and 17.1
0022	17.2 and 17.1

## METHODS

The information for the First Order Survey has been collated and mapped in six major categories: natural, historic, cultural, existing threats, human modification and use, and existing protection.

### 1. Natural Values:

Information on known areas of physical, biological and ecological value in the coastal zone under the following headings:

- a - High degree of naturalness
- b - Rare/unique species, communities or habitats
- c - Important breeding/feeding/roosting/haulout/nursery areas
- d - Fragile/environmentally sensitive areas
- e - Unique or unusual landforms
- f - Representativeness
- g - Known scientific value
- h - National or international importance
- i - Other

### 2. Cultural Values:

Areas of important Maori and non-Maori cultural values in the coastal zone under the following headings:

- a - Traditional values
- b - Aesthetic value
- c - Landscape (seascape) value
- d - Spiritual value
- e - Educational value
- f - Other

### 3. Historic Values:

Areas of important historic and archaeological value in the coastal zone under the following headings:

- a - Known historic value
- b - Archaeological value - Maori origin
- c - Archaeological value - Non-Maori origin
- d - Shipwrecks and wreck sites
- e - Known national or international significance
- f - Other



### Explanatory Notes

- (i) The decision to include the attributes "high degree of naturalness", "representativeness", aesthetic value", "land/seascape value" and "spiritual" value was based on the experience of the data recorder.

The Natural, Cultural and Historic categories of information were combined to form the Conservation Value overlay map, where all features of natural, historic or cultural value were overlaid then amalgamated to form sites of conservation value (Conservation Sites). For each of these sites a brief description was provided on the Site Record Form. The Site Record Form contains details of the conservation values mapped and includes the following three other categories (4-6) that impact on these values:

#### 4. Existing Threats:

Threats may be natural or human induced activities that are or have a history of damage or destruction of the coastal resources. Information on the following was collated and mapped:

- a - Erosion, flooding, landslip
- b - Siltation
- c - Noxious and invasive exotic plants
- d - Noxious or farmed animals
- e - Water pollution
- f - Mining
- g - Shore stabilisation works
- h - Aquaculture
- i - Fishing techniques
- j - Spoil and refuse dumping
- k - Recreation
- l - Coastal subdivision
- i - Other

### Explanatory Notes

- (ii) The inclusion of "recreation", "mining", "aquaculture" and "fishing techniques" in the "Existing Threats" category was only used where these activities threatened conservation values. It is acknowledged that there are many places where these activities do not pose a threat.

#### 5. Human Modification and Use:

Information on the following was collated and mapped:

- a - Land development
- b - Reclamations and causeways
- c - Commercial port areas
- d - Small boat harbours and moorings
- e - Outfalls, major pipelines and cables
- f - Artificial cuts
- g - Beach replenishment
- h - Shoreland-based recreation
- i - Water-based recreation
- j - Traditional Maori use
- k - Other

#### 6. Existing Protection:

Areas of varying protection status in the coastal zone were mapped, including:

- a - National protected areas
- b - Regional protected areas
- c - Local protected areas
- d - Protective zonings
- e - Marine parks
- f - Private protected areas
- g - Voluntary protection of areas
- h - Rahui
- i - Other

#### Evaluating Site Importance

Evaluation of site importance was largely species based using the following criteria: The criteria for fauna (Bell, 1986) and flora (Given et al, 1987 and Wilson and Given 1989) are based on the IUCN Red Data list.

1. If a species of plant or animal is listed as endangered and it is an endemic species, then the place(s) where this plant or animal still remain are of INTERNATIONAL importance.
2. If a species of plant is vulnerable or rare, then the site where it naturally occurs is of NATIONAL importance. Similarly if a species of animal is classified as threatened or rare then the site is of NATIONAL importance.
3. For a species of animal that is classified as threatened regionally only, the site has regional importance.
4. Where sufficient information allowed the Ramsar convention was used to determine site importance in Wellington, East Coast and Bay of Plenty. The Ramsar convention states; "*a site is of international importance if 1% of the total*

*population of a species or subspecies is found there or if the area supports 1% of breeding pairs".*

5. Other information on site importance from the historic or cultural categories which is documented in the literature was also used.
6. The highest level of importance for any category located within a site is given to the whole site.

### **Explanatory Notes**

(iii) The site importance is not a ranking system for the sites. It merely indicates whether there is a feature present at the site which is of known importance. The Conservation Sites identified in the First Order Survey vary considerably in size and importance.

(iv) Wildlife which have an established international conservation status in New Zealand include the terrestrial mammals, birds, reptiles and amphibians and terrestrial arthropods and molluscs. There is no established status list for fish, marine invertebrates and marine mammals. This means that the assessment of comparative site importance in this survey has an unavoidable bias towards the importance of terrestrial wildlife.

(v) Archaeological site information was presented here without comment on its comparative importance. This was necessary because:

(a) authority to assess archaeological site importance under the Historic Places Act 1980 rests with the New Zealand Historic Places Trust, for the purpose of regulating site damage.

(b) No methodology is recognised for assessing comparative importance in a similar manner applied to the other resources described here.

## GLOSSARY

archaeological site	Any place in New Zealand associated with human activity which occurred more than 100 years before that time.
historic place	A place which is associated with the past. This includes archaeological sites, traditional sites, buildings, natural objects and historic areas.
holostratotype	A geological term describing the type section that has become the time definition for a New Zealand stage.
tombolo	A bar connecting an island with the mainland or with another island.
type locality	The place where a geological formation is named, and is typically displayed.
ventifact	Rock cut by wind-blown sand.

## BIOLOGICAL TERMS:

endangered	Species in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are those whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are considered to be in immediate danger of extinction.
threatened/ vulnerable	Species believed to likely to move into the endangered category in the near future if the causal factors continue operating.
regionally threatened	Where species are considered to be threatened regionally.
rare	Species with small world populations that are not at present endangered or vulnerable, but are at risk. These are usually localised within restricted geographic areas or habitats or are thinly scattered over a more extensive range.
indeterminate	This category is used for plants thought to be extinct, endangered, vulnerable or rare, but for which there is insufficient information to allow allocation to a category.

In New Zealand a category additional to those used by IUCN (International Union for the Conservation of Nature and Natural Resources) has been found useful:

local	This category includes plants not under threat but potentially threatened, and hence deserving some level of monitoring and possibly protection. Included are regional endemics, plants of potentially vulnerable habitats, and species occurring as frequent but small populations.
-------	--

endemic	A species which is confined to New Zealand and is not found elsewhere.
endemic subspecies	A subspecies or geographic race which is confined to New Zealand.
introduced	A species which has been transported to New Zealand, and helped establish by humans.

## MAORI

## ENGLISH

hāngi	earth oven
hapū	section of large tribe, clan, subtribe
iwi	nation, people; tribe that traces its history back to a common ancestor
kai moana	food from the sea
kāinga	dwelling place, village
kaitiaki	guardian, keeper
Kaumātua	adult, old man or woman
kōhatu/ toka	stone, rock
mātaitai	food resources from the sea
mahinga mātaitai	the areas from which these resources are gathered
mahinga kai	sites for harvesting kai moana according to tribal customary values
mana	authority, control; influence, prestige, power; psychic force
mana whenua	customary authority exercised by a tribe in an identified area
marae	enclosed space in front of a meeting house, courtyard
mauri	life principle which is latent in all things
midden	Māori shell deposits
moana	sea
Moriori	tangata whenua of Rēkohu (Chatham Islands)
pā	fortified place
rāhui	control/ restriction (e.g. fishing control)
rūnanga	assembly/ council
taiāpure	area of coastal water set aside under the Maori Fisheries Act 1989 as a local fishery because of its special significance to an iwi or hapū, either as a source of food or for spiritual or cultural reasons
Tangaroa	god of the sea
Tangata whenua	indigenous people
tapu	sacred, forbidden (tapu consists of different levels of prohibitions)
tauranga waka	original canoe landing site
tupuna/ tipuna	ancestor/ grandparent
urupā	burial place
wāhi tapu	sacred site
waka	canoe; supra-tribal grouping
whānau	family

<b>Site No.</b>	<b>Site Name</b>
130001	Waitaki Mouth to Oamaru Harbour
130002	Oamaru Harbour to Bridge Point
130003	Bridge Point to Moeraki Point (excluding the Moeraki Boulders)
130004	Moeraki Boulders
130005	Moeraki Point to Stony Creek; south of Shag River Mouth
130006	Stony Creek to Pleasant River
130007	Pleasant River to Warrington Beach
130008	Blueskin Bay to Heyward Point including Warrington Spit
130009	Heyward Point to Pilots Beach excluding the inner Otago Harbour but including the outer harbour to the halfway islands
130010	Otago Peninsula: Pilots Beach to St Clair Cliffs
130011	Portobello Peninsula and Halfway Islands
130012	Inner Otago Harbour
130013	St Clair Cliffs to South Bank Kaikorai Estuary
130014	Kaikorai Estuary to Akatore Mouth
130015	Akatore Mouth to Tokomairiro Mouth
130016	Tokomairiro Mouth to Molyneux Bay
130017	Kaka Point to Remarkable Cave
130018	Remarkable Cave to Hawyard Point
130019	Hayward Point to Long Point
130020	Long Point to Lathyrus Bay
130021	Lathyrus Bay to Wallace Head
130022	Wallace Head to North Head
Appendix I	Key to the codes used in overlays
Appendix II	Archaeological overview of the Otago Conservancy

Farm runoff and septic tank seepage is responsible for the steady eutrophication of many of the conservancy's estuaries and inlets. It is important that such ecologically valuable and environmentally sensitive areas are not degraded further. All of the conservancy's estuaries have important wildlife values, wetland habitat or saltmarshes associated with them. The values of these areas could be maintained to a greater extent if they were protected from enrichment, siltation, reclamation and grazing.

Reclamations are an issue which is assuming prominence within the conservancy. At present Port Otago Ltd has plans for a major redevelopment of Port Chalmers which involves significant reclamation. In addition, a number of smaller reclamations have been touted for the Upper Otago Harbour in and around Dunedin, most of which are for roading or recreational use. The director of the Portobello Marine Laboratory, Associate Professor John Jillet, has suggested that the upper harbour may have reached a point where further reclamation could result in serious sedimentation problems. It is important that sediment transport processes within the harbour are well understood before reclamations and other major physical developments are undertaken.

Coastal refuse and spoil dumping is another threat to the integrity of the conservancy's coast. The present Dunedin City Council refuse tip is located in a significant estuary (Kalkorai Estuary). This is of great concern particularly as it represents a threat to the estuary from leachates and lowered water quality. The defunct Oamaru Borough Council (now Waitaki District Council) recently proposed a new tip site near to the Bushy Beach Scenic Reserve. A tip at this location would represent a serious threat to the yellow-eyed penguin colony at the beach.

In the Catlins estuary holiday home owners have been dumping car bodies and other "solid fill" in an attempt to "stabilise" an eroding estuary bank. The Clutha County (now District) Council which is the Grant of Control authority has made no attempt to prevent this even though their own bylaws forbid the dumping of rubbish on the foreshore. There are a number of other small dumping areas on the coast which are illegal and are of concern. Conservation staff have had to remind local councils on a number of occasions that it is unacceptable to dump "fill" on the foreshore.

Many areas in North Otago have significant erosion problems. These appear to be predominantly natural processes although in some cases they may endanger areas of conservation values.

Less specific coastal issues in the conservancy relate to coastal mining, stock damage of conservation sites and the effects of recreation and tourism on local wildlife. There are very few coastal mining sites within the conservancy however it is important that they are monitored to assess their impacts on conservation values. Stock cause significant damage to sensitive estuarine, salt marsh and turf communities within the conservancy and measures may need to be taken to limit this. Recreationalists and wildlife watchers can cause localised problems by interfering with wildlife and riding trail bikes over sensitive dune communities.

#### **Direction for Second Order Survey**

The first order survey has identified a number of areas where it would be desirable to collect additional data. Information as it relates to the tangata whenua (ie, cultural) could not be collected in the short time frame available. Experience has shown that relationships with runanga take some time to develop and we anticipate that this will be a major part of second order survey. Subtidal information is also limited. Close liaison with MAF, Portobello Marine Laboratory and local commercial fishers combined with conservancy subtidal surveys will be required at second order to correct this imbalance. It is acknowledged that the Catlins coast is the least known in the conservancy. Further field investigations in conjunction with the University of Otago may be required in this district. Areas which are subject to significant development such as the Otago and Oamaru harbours and areas identified as potential marine reserves such as Nugget Point and Otago Peninsula will be high priorities for second order survey. This should enable us to begin building a detailed and comprehensive database of the conservancy coastline.

Jeff Connell  
Regional Conservator

## CONTACTS

M Cawthorn, Scientist, DOC, Wellington

J Darby, Curator of Sciences, Otago Museum, Dunedin

Dr J Jillett, Director, Portobello Marine Laboratory, Portobello, Dunedin

Dr P Johnson, Scientist, DSIR, Botany Division, Dunedin

Dr C A Landis, Associate Professor, Department of Geology, University of Otago, Dunedin

L Locherble, Archaeologist (Retired), Otago Museum, Dunedin

G Loh, Conservation Officer (Protected Species and Habitats), DOC, Dunedin

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin

A Petrie, Landscape Architect, DOC, Dunedin

## REFERENCES

Allen R B (1978) "Scenic Reserves of the Otago Land District" Biological Survey of Reserves Series No. 4. Department of Lands and Survey.

Bell B D (1986) "The Conservation Status of New Zealand Wildlife" NZ Wildlife Service Service Occasional Publication No. 12, 103 pp.

Buckingham R and J Hall-Jones (1985) "The Catlins", DOC.

Department of Lands and Survey (1982) "Mapoutahi Pa Historic Reserve Management Plan". Department of Lands and Survey.

Geopreservation Inventory - Database held by the NZ Geological Society.

Gliven D R, W R Sykes, P A Williams and C M Wilson (Compilers) (1987) "Threatened and Local Plants of New Zealand : A Revised Checklist" DSIR Botany Division Report. 17 pp.

Historic Places Trust (1986) "Historic Places Inventory Dunedin City : includes Maniototo, Silverpeaks and Waihemo Counties". Historic Places Trust.

Lalas C (1984) "Green Island, Otago : Survey of Fauna". Unpublished report to the Department of Lands and Survey, Dunedin.

Seddon, P J, Y M Van Heezik and J T Darby (1989) "Inventory of Yellow-eyed Penguin (*Megadyptes antipodes*) Mainland Breeding Areas, South Island, New Zealand". Report to the Yellow-eyed Penguin Trust and Royal Forest and Bird Protection Society. pp

Sites of Special Wildlife Interest (SSWI) NZ Wildlife Service Database, held at DOC Dunedin.

Ward G and C M Munro (1989) "Otago II" Biological Survey of Reserves Series No. 20, DOC.



# Site Record Forms



Site Name/s: Waitaki Mouth to Oamaru Harbour Site No: 130001

Recorders Name: Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260 J41 23590 55749

Date: 21.03.90

**Brief Description of Site:** This site begins at the conservancy's northern boundary (the south bank of the Waitaki River Mouth) and extends southward to the Oamaru Harbour. The site consists of gravel and sand beaches backed by small coastal cliffs. Oamaru harbour is protected by Cape Wanbrow to the south and breakwaters to the north and east. The site is approximately 24 km in length. Human impact is not significant in the northern section of the site however Oamaru has significant coastal impacts by way of sewage and breakwater development.

**Conservation Values:** Natural: d Cultural: b,c Historic: b

**Comment:** The cliff tops have some botanically and entomologically interesting turf communities which include the moths *Scoparia augastis* and *Arctesthes catapyrrha* which have a local distribution (Patrick pers comm). Seabirds use the site and some Southern blue penguins (*Eudyptula minor minor*) have attempted to nest in timber stacks at an Oamaru Timber yard (Loh pers comm). Visually the coast is important and Petrie (pers comm) notes that "this would have to be a rare and uncommon coastal type". Historic Places Trust (1986) identifies three archaeological sites within this site.

**Site Importance:** International National Regional **Local** Unknown

**Comment:** The coastline is visually interesting however there is little documentation of its conservation values. Generally the values of this site are of local importance (Patrick pers comm).

**Existing Threats:** a,c,e,f

**Type and Comment:** Erosion is a threat to this site, the coastal cliffs are very prone to landslide and this has been exacerbated by land development for grazing (Houston pers comm). *Undaria* spp. is present in Oamaru harbour and this may represent a threat to native seaweeds (Houston pers comm). There are three effluent outfalls within the site, two servicing Oamaru town and one servicing a meat works (Otago Regional Council (ORC) 1990). There are also two gravel extraction areas in the site (ORC 1990).

**Human Modification and Use:** a,b,c,e,h,i

**Type and Comment:** The port of Oamaru is extensively used which includes both water and shore based recreation. There are a number of reclamations within Oamaru harbour and the harbour is a minor commercial port. The entire site has been extensively developed for grazing or urban development. There are three effluent outfalls within the site.

**Existing Protection:**

**Type and Comment:** There is no known protection within this site. Petrie (pers comm) is concerned that the landscape values of the site may be worthy of protection.

**Availability of Information:**

**Comment:**

Natural	1	2	3	
Cultural	1	2	3	1 Well documented.
Historic	1	2	3	2 Limited information (general).
Threats	1	2	3	3 Little information (if any).
Human Mod. & Use	1	2	3	

**Sources of Information:**

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use.	1	2	3	4	5	6	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

D Houston, Conservation Officer, Dunedin Field Centre, Dunedin.

G Loh, Conservation Officer (Protected Species and Habitats), DOC, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

A Petrie, Landscape Architect, DOC, Dunedin.

**References:**

Otago Regional Council (1990): Submission to "Southern Coasts - Worth Protecting". DOC File MAR 38/5.

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**Recorded on Existing Databases: Comment:**

- 1 WERI - 1 site, Kaik Road wetland, 1982, local importance
- 2 SSWI - no records
- 3 PNA - no records
- 4 Geopreservation - no records
- 5 HPT County Inventories - 3 sites, surveyed 1986
- 6 Other
- 7 None

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**Other Considerations:**

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**Accompanying Maps and Photographs:**

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Site Name/s: Oamaru Harbour to Bridge Point

Site No: 130002

Recorders Name: Rob Forlong/Dave Houston

Conservancy: Otago

Map/Grid Ref: NZMS 260 J42; J41 23481 55612

Date: 22.02.90

**Brief Description of Site:** Cape Wanbrow is a prominent headland bordering Oamaru Harbour. The headland itself is steep with many cliff areas. Most of the land around the headland is modified as grazing land except for one small area at Bushy Beach. Immediately to the south of Cape Wanbrow is Kakanui beach. This is an area of coastal cliffs often with small pebbly beaches or rock outcrops at the base. Kakanui estuary and township are found at the south end of the beach. The estuary, although extensively modified, supports important wildlife populations. Further south is All Day Bay which is a major swimming beach. The site's southern boundary is the rocky outcrops known as Bridge point. Along the entire site there are extensive beds of bull kelp (*Durvillaea* spp.) and bladder kelp (*Macrocystis pyrifera*) offshore (pers obs). The total site length is approximately 18 km.

**Conservation Values:** Natural: b,c,d,e,g,h Cultural: a,b,c,d,e Historic: b

**Comment:** The coast around Cape Wanbrow is visually impressive and provides habitat for rare yellow-eyed penguins (*Megadptes antipodes*) (Seddon et al 1989, Bell 1986). Southern blue penguins (*Eudyptula minor*), Sooty shearwaters (*Puffinus griseus*), shags and New Zealand fur seals (*Arctocephalus forsteri*) (Ward and Munro 1989) are also present. The area is the northern limit of rare endemic Stewart Island shags (*Leucocarbo carunculatus chalconotus*) (Lands and Survey 1984). The Bushy Beach area is particularly important as it has the only remnant of coastal forest (Department of Lands and Survey 1984) in the Oamaru ecological district. Bushy Beach also contains the uncommon plant *Einadia natans* and is the southern limit for *Olearia paniculata* (Allan 1961). Forty six species of lepidoptera have been recorded from Bushy Beach some of these are at their distribution limit (northern or southern) and two species are "uncommon" (Patrick 1989). The insect community is described as vulnerable by Patrick (1989). The northwestern flank of Cape Wanbrow also has an outcrop of pillow lavas which are a scenic attraction and of international interest to geologists (Landis pers comm). The area known as Old Rifle Butts has important fossils and is used for educational purposes (Landis pers comm). Kakanui Beach has a shag colony in the cliffs and Hector's dolphins (*Cephalorhynchus hectori*) often use the bay (Houston pers comm). There is an important Maori archaeological site at the mouth of Awamoa Creek (Houston pers comm). Further South there is an important fossil outcrop along the seacliffs and at the site known as Everets Quarry (Gage 1956). The area immediately south of Everets Quarry is a traditional kaimoana gathering area (Houston pers comm). There is little other information regarding cultural values of this site. The Kakanui Estuary, although significantly enriched from farm runoff and septic tank seepage, is an important wildlife area and is contained in the Sites of Special Wildlife Interest database (SSWI). There are two areas of geological interest around the estuary. Gees Point has a geological unconformity which has both scientific and educational value (Landis pers comm). The Kakanui mineral breccia is an internationally known area of ejected mantle which contains large crystals of minerals (Landis pers comm). A small artificial lagoon at All Day Bay is a waterfowl breeding area (Houston pers comm). It is also visited by white herons (*Egretta alba*) and royal spoonbills (*Platalea leucorodia regia*), occasionally. Bridge Point contains a community of the vulnerable Cooks scurvy royal grass (*Lepidium oleraceum*) (Given et al 1984), possibly the only one in North Otago (Johnson pers comm). Bridge Point also contains an important fossil outcrop and is described in the Geopreservation Inventory as being "one of the few rich microfossil localities of this (runangan) age".

**Site Importance:** International National Regional Local Unknown

**Comment:** Bushy Beach is of regional importance for ecological reasons (Patrick pers comm). The geological sites at Cape Wanbrow and Kakanui are of international importance to scientists (Landis pers comm). Generally the site is nationally important (Patrick pers comm).

**Existing Threats:** a,d,e,f,i,j,m

**Type and Comment:** The public represent a significant threat to the Bushy Beach yellow-eyed penguins. Over the last year several penguins have either been shot, or killed by dogs (Houston pers comm). Set netting occasionally takes yellow-eyed penguins. The now defunct Oamaru Borough Council has proposed a refuse tip near Bushy Beach (presently being evaluated by the Waitaki District Council) which represents a significant threat to the biota of Cape Wanbrow. There is some illegal sand mining along Kakanui beach which represents a threat to the integrity of the beach (Houston pers comm). There are two sewage outfalls within the site. The Kakanui outfall is located between Catseye and Gees Points and discharges tertiary treated sewage (ORC 1990). The Oamaru outfall (one of three serving the town) is an aerial discharge of imhoff tank/primary treated sewage (ORC 1990). Grazing is a general threat to coastal plant communities throughout the site (Patrick pers comm). There are minor erosion problems along the beaches (Houston pers comm).

**Human Modification and Use:** a,d,e,h,i

**Type and Comment:** The site has been mainly developed for agriculture or urban settlement. The northern site boundary abutts the Oamaru Harbour. There is a small boat launching area at the Kakanui Estuary. The site contains two outfalls one servicing Oamaru and one Kakanui. The site is close to the urban area of Oamaru and thus has high recreational usage. The area is used by the citizens of Oamaru and Kakanui for recreation which ranges from beachcombing to diving and fishing. All Day Bay is a popular swimming beach. The area north of Kakanui is a traditional shellfish gathering area.

**Existing Protection:** a

**Type and Comment:** There is some protection over Cape Wanbrow. The northern section is unallocated Crown land which is bordered to the north by Oamaru Harbour and to the south by the 3.6 ha Bushy Beach Scenic Reserve. There is a strip of 14.9 ha recreation reserve along most of Kakanui Beach. The Kakanui Estuary has important wildlife values and these should be protected.

**Availability of Information:**

Natural	①	2	3
Cultural	1	②	3
Historic	1	②	3
Threats	1	②	3
Human Mod. & Use	1	②	3

**Comment:** Biological report on Lands and Survey file 8/3/223. DOC files RSC 30 and TC 3/3, DOC Dunedin

- 1 Well documented.  
2 Limited information (general).  
3 Little information (if any).

**Sources of Information:**

Natural	1	②	3	4	5	⑥	⑦
Cultural	1	②	3	4	5	⑥	7
Historic	1	②	3	4	5	⑥	7
Threats	1	②	3	4	5	⑥	7
Human Mod. & Use.	1	②	3	4	5	⑥	7

- 1 Derived information from existing literature and databases.  
2 Derived information as above and field check.  
3 Derived from existing maps and aerial photographs.  
4 Recent DOC survey including sampling and analysis.  
5 Recent DOC survey excluding sampling and analysis.  
6 Experience.  
7 Expert Opinion.

**Contacts:**

D Houston, Conservation Officer, Dunedin Field Centre, Dunedin.  
P N Johnson Scientist, DSIR Botany Division, Dunedin.  
Dr C A Landis Associate Professor, University of Otago Department of Geology, Dunedin.

**References**

- Allan H H (1961). "Flora of New Zealand" Volume I, Government Printer.
- Bell B D (1986) "The Conservation Status of New Zealand Wildlife" NZ Wildlife Service occasional publication No. 12, 103 pp.
- Department of Lands and Survey (1984) Biological Report on Bushy Beach Scenic Reserve.
- Gage M (1956) "Geology of the Waitaki Subdivision" NZ Geological Society Bull 65.
- Given D R, W R Sykes, P A Williams and C M Wilson (compilers) (1987) "Threatened and local plants of New Zealand : A revised checklist". DSIR Botany Division Report. 17 pp.
- Otago Regional Council; Submission to "Southern Coasts - Worth Protecting". DOC File MAR 38/5.
- Patrick B H (1989) "Lepidoptera, Species List" in file ECM 1/4/2 - Bushy Beach Scenic Reserve.
- Seddon P J, Y M Van Heezik and J T Darby (1989) "Inventory of Yellow-eyed penguin (*Megadyptes antipodes*) mainland breeding areas, South Island, New Zealand". Report to Yellow-eyed Penguin Trust and Royal Forest and Bird Society.
- Ward G and C M Munro (1989) "Otago II" Biological Survey of Reserves Series No. 20 DOC.

**Recorded on Existing Databases: Comment:**

- 1 WERI - 2 sites: All Day Bay Lagoon, 1982, Regional importance: Kakanui River Mouth, 1982, Local importance.
- 2 SSWI - 3 sites: Cape Wanbrow, 1982, Outstanding importance: Kakanui River Mouth, 1982, Potential importance: All Day Bay Lagoon, 1982, moderate/high importance (surveyed by fauna survey unit NZ Wildlife Service)
- 3 PNA - no records
- 4 Geopreservation - 5 sites: Bridge Point-Aorere Point, 1986: Campbells Beach, 1986: Everetts Quarry-underlying tuff, 1986: Everetts Quarry, 1986, vulnerable (1): Gees Point, 1986
- 5 HPT County Inventories - 17 sites, 1986

**Other Considerations:** The area around Cape Wanbrow has been shown by the "Southern Coasts" package to have significant public support for a marine reserve.

**Accompanying Maps and Photographs:**  
Photos after summary.

Site Name/s: Bridge Point to Moeraki Point  
(excluding the Moeraki Boulders)

Site No: 130003

Recorders Name: Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260 J42 23401 55432

Date: 21.03.90

**Brief Description of Site:** This site covers a large area and includes three small estuaries. The sites northern boundary is at Bridge Point on the northern end of Te Hikapureiri Beach. The beach gives way to a rocky shoreline immediately north of the Wainakarua River estuary. South of the estuary is Lookout Bluff which in turn is followed by an area of small coastal cliffs. These precede Hampden Beach which grades into Moeraki Beach (see site 130004, Moeraki Boulders). Moeraki Beach is bordered to the south by the Moeraki Harbour, which is the sites southern boundary. The total length of the site is 19 km. Human impact is not high at this site being restricted to grazing, fishing and two small coastal towns.

**Conservation Values:** Natural: c,d,e Cultural: Historic: b

**Comment:** The site contains a number of interesting natural values although most are also found in other sites within the conservancy. There are three sites of special wildlife interest (SSWI) within the site. Those areas have a number of wildlife values which include good waterfowl habitat (Kakaho Creek estuary) and good seabird colonies (Lookout Bluff) (SSWI). Lookout Bluff has in the past been the breeding site for one pair of yellow-eyed penguins (*Megadyptes antipodes*) however Darby (pers comm) notes that there has been no breeding there for a number of years. Hector's dolphins (*Cephalorhynchus hectori*) are commonly seen off Hampden Beach (Houston pers comm). Bowally Road wetland has a small saltmarsh which is of some interest to botanists (Johnson pers comm). There are a number of fossil outcrops within the site including the Hampden Coast and Kakaho Creek (Geopreservation Inventory). These contain a diverse range of fossils including molluscs (Landis pers comm). The Historic Places Trust (1986) has identified 16 archaeological sites within the sites boundaries.

**Site Importance:** International National Regional Local Unknown

**Comment:** Although this site has a number of natural values they are generally better expressed in other sites within the conservancy. The presence of Hector's dolphins give the site regional importance.

**Existing Threats:** a,d,j

**Type and Comment:** There are few significant threats to this site. Erosion is a general threat to the North Otago coast and it is visible in a number of areas within this site. In areas such as the Kakaho Creek estuary and Lookout Bluff stock have caused some damage to sensitive saltmarsh and coastal cliff habitats. There is a refuse tip on the coast at Hampden (Houston pers comm).

**Human Modification and Use:** a,h

**Type and Comment:** All of this coast has been modified for pastoral farming. The estuaries are used by whitebaiters and other fishers (Houston pers comm).

**Existing Protection:** a

**Type and Comment:** There is a small (7.5 ha) recreation reserve at Moeraki (Moeraki Recreation Reserve).

**Availability of Information:**

**Comment:**

Natural	1	②	3	
Cultural	1	②	③	1 Well documented.
Historic	1	②	3	2 Limited information (general).
Threats	1	②	3	3 Little information (if any).
Human Mod. & Use	1	②	3	

**Sources of Information:**

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use.	1	2	3	4	5	6	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

J T Darby, Curator of Sciences, Otago Museum, Dunedin.

D Houston, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

Dr P N Johnson, Scientist, DSIR Botany Division, Dunedin.

Dr C A Landis, Associate Professor Department of Geology, University of Otago, Dunedin.

B H Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

**References:**

HPT (1986), "Historic Places Inventory Waitaki County" Historic Places Trust

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**Recorded on Existing Databases: Comment:**

- 1 WERI - 2 sites - Kakaho Creek, 1982, Local importance: Waianakarua Estuary, 1982, Regional/local importance
  - 2 SSWI - 3 sites: Lookout Bluff, 1982, high importance: Waianakarua Estuary, 1982, potential importance: Kakaho Creek, 1982, moderate importance. (Surveyed by the Fauna Survey Unit, NZ Wildlife Service (NZWS))
  - 3 PNA - no records
  - 4 Geopreservation - 2 sites: Hampden Coast, 1986: Kakaho Creek, 1986
  - 5 HPT County Inventories - 16 sites, 1986
  - 6 Other
  - 7 None
- 

**Other Considerations:****Accompanying Maps and Photographs:**



Site Name/s: Moeraki Boulders

Site No: 130004

Recorders Name: Dave Houston

Conservancy: Otago

Map/Grid Ref: NZMS 260 J42 23396 53374

Date: 20.02.90

**Brief Description of Site:** The Moeraki Boulders are spherical concentrations of paleocene mudstone which are released from the coastal cliffs by wave erosion (Landis pers comm). Landward of the boulders is a mixture of gorse and emerging native shrubs. An extensive area has been revegetated to give the Boulders a more natural setting. The site is very small, slightly less than one hectare.

**Conservation Values:** Natural: e,g,h Cultural: b,d,e Historic: -

**Comment:** The boulders are easily accessible and are valued as both a scientific and scenic attraction (Houston pers comm). Hampden Beach is also a reputed landing site of the waka, Araiteuru, the boulders are gourds lost overboard when the waka was wrecked (Griffiths and Goodall 1980).

**Site Importance:** International National Regional Local Unknown

**Comment:** The boulders are a tourist attraction, gaining visitors from New Zealand and overseas. They are also of some scientific value and educational value (Patrick pers comm).

**Existing Threats:** k

**Type and Comment** The only significant threat to the boulders is theft. However they are often large and this would be difficult.

**Human Modification:** a,h

**Type and Comment:** The land behind the boulders has been developed for farming, although revegetation is being attempted (Petrie pers comm). The major use of the site is veiwing the Moeraki Boulders.

**Existing Protection:** a

**Type and Comment** The area surrounding the boulders is a scenic reserve of 0.94 ha which adequately protects the boulders.

**Availability of Information**

**Comment:**

Natural	①	2	3
Cultural	①	2	3
Historic	1	②	3
Threats	1	②	3
Human Mod. & Use	1	②	3

1 Well documented.  
2 Limited information (general).  
3 Little information (if any).

**Sources of Information**

Natural 1 ② 3 4 5 ⑥ ⑦  
 Cultural 1 ② 3 4 5 ⑥ 7  
 Historic 1 ② 3 4 5 ⑥ 7  
 Threats 1 ② 3 4 5 ⑥ 7  
 Human Mod. & Use. 1 ② 3 4 5 ⑥ 7  
 :

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

D Houston, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

Dr C A Landis, Associate Professor Department of Geology, University of Otago, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

A Petrie, Landscape Architect, DOC, Dunedin.

**References:**

Griffiths and Goodall (1980), "Maori Dunedin", Otago Heritage Books, Dunedin.

**Recorded on Existing Databases: Comment:**

- 1 WERI - no records
- 2 SSWI - no records
- 3 PNA - yes: Moeraki Boulders Scenic Reserve, surveyed 1984 published in "Register of NZ Protected Natural Areas"
- 4 Geopreservation - yes: Moeraki Boulders, semi vulnerable (2) 1986
- 5 HPT County Inventories - no records
- 6 Other - no
- 7 None

**Other Considerations:**

Erosion may represent a potential threat to the boulders although at present there is no problem (Houston pers comm).

**Accompanying Maps and Photographs:**

Site Name/s: Stony Creek to Pleasant River

Site No: 130006

Recorders Name: Dave Houston/Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260 J43 23353 55172

Date: 22.02.90

**Brief Description of Site:** This site includes two sensitive estuaries and the yellow-eyed penguin (*Megadyptes antipodes*) breeding area at Bobbys Head. The northern border of the site is the Stony Creek estuary which gives way to a beach. South of the beach there are some coastal cliffs which border Bobbys Head. South of Bobbys Head there is a beach which extends down to the Pleasant River estuary, the southern site boundary. Human impacts on this nine kilometre site are largely restricted to grazing and fishing.

**Conservation Values:** Natural: b,c,d Cultural: a Historic: b

**Comment:** Both the Stony Creek estuary and the Pleasant River estuary have high wildlife values and are contained in the SSWI. There have been reported sightings of vulnerable Australasian bitterns (*Botaurus stellaris*), and royal spoonbills (*Platalea leucorodia*) (Bell 1986) from the Stony Creek estuary (SSWI). Sooty shearwaters (*Puffinus griseus*) are known to breed in the cliffs south of the Stony Creek estuary (SSWI). Bobbys Head has a small colony of rare (Bell 1986) yellow-eyed penguins (Seddon et al 1989). Both estuaries have salt marshes and are of significant botanical value (Johnson pers comm, Patridge & Wilson 1988). There are 12 archaeological sites in the area (Historic Places Trust 1986) including an occupation site at the Pleasant river estuary.

**Site Importance:** International National Regional Local Unknown

**Comment:** Generally this site is regionally important as it contains a diverse range of coastal habitats including beaches, rocky shores, estuaries, a headland and coastal cliffs. It contains a small yellow-eyed penguin breeding area which gives the site national importance.

**Existing Threats:** d

**Type and Comment:** Trampling of coastal habitats such as yellow-eyed penguin habitat and salt marshes by grazing animals represents a significant threat to this site (Houston pers comm).

**Human Modification and Use:** a,b,h,i

**Type and Comment:** The area has been modified for farming. Some parts of the Pleasant River estuary have been reclaimed, also for farming. The only noticeable recreational use of the site is fishing and some boating near Bobbys Head (pers obs).

**Existing Protection:**

**Type and Comment:** There is no formal protection over this site. It is important that yellow-eyed penguin breeding habitat is afforded some protection, as should the Stony Creek estuary and Pleasant River estuary (McKinlay pers comm).

**Availability of Information:****Comment:**

Natural	1	②	3	
Cultural	1	2	③	1 Well documented.
Historic	1	②	3	2 Limited information (general).
Threats	1	②	3	3 Little information (if any).
Human Mod. & Use	1	②	3	

**Sources of Information:**

Natural	1	②	3	4	5	⑥	⑦	1 Derived information from existing literature and databases.
Cultural	1	②	3	4	5	⑥	7	2 Derived information as above and field check.
Historic	1	②	3	4	5	⑥	7	3 Derived from existing maps and aerial photographs.
Threats	1	②	3	4	5	⑥	7	4 Recent DOC survey including sampling and analysis.
Human Mod. & Use.	1	②	3	4	5	⑥	7	5 Recent DOC survey excluding sampling and analysis.
								6 Experience.
								7 Expert Opinion.

**Contacts:**

D Houston, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

Dr P N Johnson, Scientist DSIR Botany Division, Dunedin.

B McKinlay, Senior Conservation Officer (Protected Species and Habitats), DOC, Dunedin.

B H Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

**References:**

Bell B D (1986) "The Conservation Status of New Zealand Wildlife" NZ Wildlife Service occasional publication No. 12, 103 pp.

Historic Places Trust (1986) "Historic Places Inventory: Dunedin City; Maniototo, Silverpeaks and Waihemo Counties". Historic Places Trust.

Partridge T R and J B Wilson (1988) "Vegetation Patterns in Salt Marshes of Otago, New Zealand". NZ JI Botany 26:497-510

Seddon P J, Y M Van Heezik and J T Darby (1989) "Inventory of Yellow-eyed penguin (*Megadyptes antipodes*) mainland breeding areas, South Island, New Zealand". Report to Yellow-eyed Penguin Trust and RF&BPS

**Recorded on Existing Databases: Comment:**

- 1 WERI - 2 sites, Andersons Lagoon (Stony Creek) 1982, regional importance: Pleasant River estuary, 1982, regional importance
- 2 SSWI - 4 sites, Pleasant River estuary, 1982, moderate/high importance: Bobbys Head colony, 1982, outstanding importance: Andersons Lagoon (Stony Creek), 1982, moderate/high importance: Anderson Road colony, 1982, potential importance. Surveyed by Fauna Survey Unit, NZWS.
- 3 PNA - no records
- 4 Geopreservation - no records
- 5 HPT County Inventories - 12 sites, 1986

**Other Considerations:****Accompanying Maps and Photographs:**

Site Name/s: Pleasant River to Warrington Beach

Site No: 130007

Recorders Name: Rob Forlong/Dave Houston

Conservancy: Otago

Map/Grid Ref: NZMS 260 J43; I44/J44; I43 23271 55039

Date: 26.02.90

**Brief Description of Site:** The northern boundary of this site the Pleasant River. It is followed by coastal cliffs which lead to a rocky headland known as Cornish Head. This is followed by a sandy beach which terminates at the Waikouaiti River estuary. On the south bank of the estuary is the township of Karitane. East of Karitane is the Karitane Peninsula which is the site of the former Huriawa Pa. South of the peninsula is a sandy beach known as Karitane Beach which is bordered by coastal cliffs and rock outcrops. The coastal cliffs extend south to the southern boundary of the site at Warrington Beach. The site is approximately 25 km in length.

**Conservation Values:** Natural: b,c,d,e Cultural: a,b,c Historic: a,b,c

**Comment:** There are two significant coastal wetlands in the site, Hawksbury Lagoon and Karitane estuary. Both of these wetlands are important for coastal birds and waterfowl (Nelson pers comm) and support a diverse range of species (SSWI). There is a report of yellow-eyed penguins (*Megadyptes antipodes*) nesting on Cornish Head (SSWI) however a recent survey (Seddon et al 1989) did not find the colony. The estuarine saltmarshes contain important entomological and botanical communities (Partridge and Wilson 1988, Patrick pers comm.) The Karitane peninsula has a number of small offshore stacks and reefs on its southern side which provide habitat for sea birds and underwater reef communities (pers obs). The dominant macroalgae here are *Macrocystis pyrifera* and *Durvillaea* spp. The peninsula is of some geological interest as it shows the folding and faulting of volcanic rocks and has significant exposed fossils (Landis pers comm). There are breeding terns along the cliffs and rock stacks south of Karitane beach (Loh pers comm). Green point has been identified by the SSWI as a breeding area for shag species. North of Warrington township there is a site of active crustal deformation and some volcanic explosion sediments which are of geological interest (Landis pers comm). The area surrounding Huriawa Pa is of cultural significance to the Huirapa runanga. A cemetery and pa are reputed to be found on Brinns Point (Stewart pers comm). There was an early sealing/whaling station, north of Warrington (Stewart pers comm). The coastal cliffs and blowholes at Karitane give the area high landscape and aesthetic values (Petrie pers comm).

**Site Importance:** International National Regional Local Unknown

**Comment:** The area is of regional significance biologically. It is also important culturally as the home area of one of the three coastal Otago runanga (Huirapa). However, this has yet to be fully assessed.

**Existing Threats:** a,c,d,e,k,l

**Type and Comment:** *Spartina* has invaded both estuaries and represents a significant threat to the wetlands (Pearce pers comm). Grazing is a problem in a number of areas especially around the wetlands and saltmarshes bordering the estuaries. The Waikouaiti estuary is significantly enriched (Robertson pers comm). Recreational dune buggies are a threat to the beach between Cornish Head and Karitane (Stewart pers comm). There are significant landslips and erosion between Karitane Beach and Warrington (pers obs).

**Human Modification and Use:** a,b,d,f,h,i,j

**Type and Comment:**

The site has been cleared of native vegetation and parts reclaimed for agriculture (pers obs). There is a fishing fleet based in the Waikouaiti River estuary (pers obs). Hawksbury Lagoon is periodically opened by the Dunedin City Council (Houston pers comm). The area is extensively used for recreation as it is close to a major population centre (Dunedin). The site is the traditional home of the Huirapa runanga and hence is used by Huirapa people.

**Existing Protection:** a

**Type and Comment:** Hawksbury Lagoon is a 61 ha wildlife management reserve. There is a small (6.3 ha) wildlife management reserve in the Waikouaiti estuary. The Karitane Peninsula is a 12.8 ha historic reserve (Huriawa Pa). Waikouaiti Bay has a 116.5 ha recreation reserve.

**Availability of Information:****Comment:**

Natural	①	2	3
Cultural	1	②	3
Historic	①	2	3
Threats	①	2	3
Human Mod. & Use	①	2	3

- 1 Well documented.
- 2 Limited information (general).
- 3 Little information (if any).

**Sources of Information:**

Natural	1	②	3	4	5	⑥	⑦
Cultural	1	②	3	4	5	⑥	7
Historic	1	②	3	4	5	⑥	7
Threats	1	②	3	4	5	⑥	7
Human Mod. & Use.	①	2	3	4	5	⑥	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

D Houston, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

Dr C A Landis, Associate Professor Department of Geology, University of Otago, Dunedin.

G Loh, Conservation Officer (Protected Species and Habitats), DOC, Dunedin.

J M Neilson, Senior Conservation Officer (Fish and Game), DOC, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

J Pearce, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

A Petrie, Landscape Architect, DOC, Dunedin.

Dr B Robertson, Barry Robertson and Associates, Dunedin.

C Stewart, Field Centre Manager, Dunedin Field Centre, DOC, Dunedin.

**References:**

Historic Places Trust (1986) "Historic Places Inventory: Dunedin City; Maniototo, Silverpeaks and Waihemo Counties".

Partridge T R and J B Wilson (1988) "Vegetation Patterns in Salt Marshes of Otago, New Zealand" NZ Journal Botany 26: 497:510.

Seddon P J, Y M Van Heezik and J T Darby (1989) "Inventory of Yellow-eyed penguin (*Megadyptes antipodes*) mainland breeding areas, South Island, New Zealand". Report to Yellow-eyed Penguin Trust and RF&BPS

**Recorded on Existing Databases: Comment:**

- 1 WERI - 2 sites Hawksbury Lagoon, 1977, regional importance: Waikouaiti River estuary, 1983, regional/local importance.
- 2 SSWI - 4 sites, Hawksbury Lagoon, 1983, moderate/high importance: Waikouaiti estuary, 1983, moderate importance: Karitane Point, 1982, moderate importance: Puketeraki rock stack, 1983, moderate importance. Surveyed by Fauna Survey Unit, NZWS.
- 3 PNA - 2 sites: Merton tidal arm, Government Purpose Reserve (GPR), 1984: Hawksbury Lagoon, GPR, Wildlife Management Reserve (1984). In Register of NZ Protected Natural Areas.
- 4 Geopreservation - no records
- 5 HPT County Inventories - 26 sites including a major pa site, 1986
- 6 Other
- 7 None

**Other Considerations:**

There has been some support through the "Southern Coasts" package for parts of this site to be a marine reserve.

**Accompanying Maps and Photographs:**

Site Name/s: Portobello Peninsula and Halfway Islands Site No: 130011

Recorders Name: Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260 144/J44 22261 54840

Date: 03.03.90

**Brief Description of Site:**

This site in Otago Harbour marks the boundary between the much modified upper harbour and the more rural lower harbour. Portobello Peninsula is a steep sided grassy peninsula which juts out into Otago harbour opposite Port Chalmers. At the end of the peninsula is the Portobello Marine Laboratory which is run by the University of Otago. Pudding Island (Titeremoana) is a small (0.8ha) island immediately south of the marine laboratory. It is accessible by foot at low tide. Quarantine Island is the largest of the halfway islands and is a retreat for a small religious community. It is grazed except for a small (2-3 hectare) area of regenerated bush. Goat Island is a 4.6 ha island between Quarantine Island and Port Chalmers. It is steep sided, accessible by boat and covered with regenerating bush. The total length of this site is approximately 7 km.

Conservation Values: Natural: a,c,d,g Cultural: a,b,c,e Historic: a,b

**Comment:** Portobello Peninsula is of scientific and educational value as it is the site of the Portobello Marine Laboratory. The peninsula is the type locality for a number of species (J Jillet pers comm) including the Noctuids *Hydriomena paucita* and *Scoriodyta patricki* (B Patrick pers comm). Black backed gulls (*Larus dominicanus*), black shags (*Phalacrocorax carbo*) and little shags (*Phalacrocorax melanoleucos*) breed on the Halfway Islands (Ward and Munro 1989, Allen 1978). Although they have been burnt in the past, Pudding Island and Goat Island have above average botanical values (Ward and Munro 1989, Allen 1978). The Halfway Islands have very high scenic values (Ward and Munro 1989, Allen 1978) and represent a boundary between the inner and outer harbours. There are seventeen archaeological sites known from the Portobello Peninsula (HPT 1986) and none from the Halfway Islands. Quarantine Island was once a quarantine station for diseases such as scarlet fever and smallpox (Maclean 1964) and so has historical value.

Site Importance: International National Regional **Local** Unknown

**Comment:** The site is of local importance because of its scenic, educational, scientific, natural and historic values (Patrick pers comm).

**Existing Threats: c**

**Type and Comment:** Because the site is close to the major port in Otago there is always a small risk of the water around the site becoming polluted. Grazing animals are a threat to vegetation and habitats on Portobello Peninsula and Quarantine Island (Stewart pers comm).

**Human Use and Modification a,e,i**

**Type and Comment:** The Portobello Peninsula and Quarantine Island have been modified for grazing. A major aerial cable links Portobello Peninsula with Port Chalmers. Most recreational use is by boats passing through the site.

**Existing Protection: a**

**Type and Comment:** The 0.8 hectare Titeremoana (Pudding Island) and the 4.6 hectare Goat Island are scenic reserves. Quarantine Island and the end of the Portobello Peninsula are recognised as needing additional protection (Stewart pers comm).

**Availability of Information:**

Natural	①	2	3	
Cultural	1	②	3	1 Well documented.
Historic	①	2	3	2 Limited information (general).
Threats	①	2	3	3 Little information (if any).
Human Mod. & Use	①	2	3	

**Comment:**

**Sources of Information:**

Natural	1	2	3	4	5	6	7	1	Derived information from existing literature and databases.
Cultural	1	2	3	4	5	6	7	2	Derived information as above and field check.
Historic	1	2	3	4	5	6	7	3	Derived from existing maps and aerial photographs.
Threats	1	2	3	4	5	6	7	4	Recent DOC survey including sampling and analysis.
Human Mod. & Use.	1	2	3	4	5	6	7	5	Recent DOC survey excluding sampling and analysis.
:								6	Experience.
								7	Expert Opinion.

**Contacts:**

Dr J B Jillet, Director, Portobello Marine Laboratory, University of Otago.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

C Stewart, Field Centre Manager, Dunedin Field Centre, DOC, Dunedin.

**References:**

Allen R B 1978. "Scenic Reserves of the Otago Land District". Biological Survey of Reserves Report 4. Department of Lands and Survey.

Macleay F S (1964) "Challenge for Health" Government Printer.

Ward G and C M Munro (1989) "Otago II" Biological Survey of Reserves Series No. 20. DOC

**Recorded on Existing Databases:    Comment:**

- 1    WERI - no records
- 2    SSWI - no records
- 3    PNA - 1 site: Titeremoana Scenic Reserve, 1984. Published in Register of NZ Protected Natural Areas, Department of Lands and Survey
- 4    Geopreservation - no records
- 5    HPT County Inventories - 17 sites on Portobello Peninsula, 1986.
- 6    Other
- 7    None

**Other Considerations:****Accompanying Maps and Photographs:**



Recorders Name: Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260 144/J44 23245 54831

Date: 22.03.90

**Brief Description of Site:** The Otago Harbour is a drowned valley system which is surrounded by the greater Dunedin area. Generally the harbour is very shallow although there is a shipping channel which is maintained with dredging by Port Otago Limited. Port Chalmers is located at the eastern border of the site and the port of Dunedin is in the south western end of the harbour. The upper harbour is the area where most of the urban development is concentrated. The site is approximately 26 km long.

**Conservation Values:** Natural: c,d Cultural: a,b,c,e Historic: a,b

**Comment:** The Otago Harbour although highly modified has significant conservation values. A number of the tidal sandflats are important feeding areas for wading birds and waterfowl (Loh pers comm). These habitats are sensitive to environmental change and should be managed accordingly. The harbour is considered by the populous of Dunedin to be of aesthetic and landscape value. As it is close to a major urban centre the harbour is extensively used for educational purposes. The site has a number of historic values. A sea wall virtually surrounds the harbour and this was built by prison labour in the 19th century.

**Site Importance:** International National Regional **Local** Unknown

**Comment:** The site is locally important because of its natural, cultural and historic values (Patrick pers comm).

**Existing Threats:** a,b,e,k

**Type and Comment:** There are a large number of threats to the upper harbour. Generally the harbour is silting up and it is regularly dredged, however erosion is a problem in some localised areas particularly in the lower harbour (Jillet pers comm). The city represents a significant threat in terms of water pollution (from sewage, etc) and reclamation (Robertson pers comm). There is some pressure from recreationalists to create artificial beaches, and carparks, through reclamation (Jillet pers comm).

**Human Modification and Use:** a,b,c,d,e,f,g,h,i

**Type and Comment:** The site is modified for urban development and contains, a number of reclamations, two commercial port areas, a number of small boat mooring areas, sewage outfalls, artificial cuts and artificial beaches. The site is extensively used for both shore and land based recreation.

**Existing Protection:** c

**Type and Comment:** There are a number of Dunedin City Council administered coastal reserves.

**Availability of Information:**

**Comment:**

Natural	①	2	3
Cultural	1	②	3
Historic	①	2	3
Threats	①	2	3
Human Mod. & Use	①	2	3

1	Well documented.
2	Limited information (general).
3	Little information (if any).

**Sources of Information:**

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use.	1	2	3	4	5	6	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

G Loh, Conservation Officer, Protected Species and Habitats, DOC, Dunedin.

Dr J B Jillett, Director, Portobello Marine Laboratory, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

Dr B Robertson, Barry Robertson and Associates, Dunedin.

**References:**

HPT (1986) "Historic Places Inventory" Dunedin City, Maniototo, Silverpeaks and Waihemo Counties"  
Historic Places Trust.

**Recorded on Existing Databases:    Comment:**

- 1 WERI - 1 site, Otago Harbour, Aramoana, 1982, national/international importance
- 2 SSWI - 1 site - the Otago Harbour, Aramoana, 1982, high importance. Surveyed by Fauna Survey Unit, NZWS
- 3 PNA - no records
- 4 Geopreservation - no records
- 5 HPT County Inventories - 34 sites, 1986
- 6 Other
- 7 None

**Other Considerations:****Accompanying Maps and Photographs:**

Recorders Name: Rob Forlong

Conservancy: Otago

Map/Grid Ref: NZMS 260, 144/J44 145 22985 54657

Date: 22.03.90

**Brief Description of Site:** Most of this site is a long sandy beach with a number of rocky outcrops and small coastal cliffs interspersed along it. The Taieri River flows into the sea near the southern end of the site. Offshore from Taieri Mouth is the Taieri Island Scenic Reserve. The site is approximately 28 km long.

**Conservation Values:** Natural: b,c,d,e,g Cultural: b,c Historic: b,c

**Comment:** Near the township of Ocean View an interesting plant *Pimelea prostrata* is found (Patrick pers comm). The Taieri River estuary is an environmentally sensitive area which is used extensively by wading birds at low tide (G Loh pers comm). Taieri Island Scenic Reserve has a colony of sooty shearwaters (*Puffinus griseus*) (Allen 1978). There is an active fault running northeast from south of Taieri Mouth and out to sea past Taieri Island which is being monitored by scientists (C Landis pers comm). Further north Bruce Rocks and the rocks around Brighton are used for educational purposes by the Geology Department of Otago University as they demonstrate a number of geological features (C Landis pers comm). The site has significant aesthetic values and is a popular scenic drive for the citizens of Dunedin. There was significant coastal coal mining at Ocean View. Taieri Island once had a whaling station on it and some relics remain (Wilkins pers comm). There are 20 archaeological sites within this site (HPT 1986: a,b).

**Site Importance:** International National Regional **Local** Unknown

**Comment:** This site is of local importance as it has a number of natural, cultural and historic values which are uncommon in the area (Patrick pers comm).

**Existing Threats:** a,f,j,k

**Type and Comment:** There is some localised erosion around Taieri Mouth. Illegal sandmining occurs sporadically south of Brighton. Recreational motorbikes have in the past caused damage to the low dune communities around Taieri Mouth. Occasionally rubbish is dumped on the foreshore.

**Human Modification and Use:** a,d,h

**Type and Comment:** This coast has been modified for pastoral farming and a road abuts the foreshore in many places. There is a small fishing fleet based at Taieri Mouth. The coast is used extensively for recreation especially beach walking, swimming and boating.

**Existing Protection:** a,

**Type and Comment:** There are recreation reserves at Westwood (4.2 ha), Ocean View (31 ha) and Brighton (8.2 ha) and a recreation reserve at Taieri Mouth (10 ha). Taieri Island is a 6.9 ha scenic reserve. It has been recommended that Taieri Island become a wildlife sanctuary (Wilkins pers comm).

**Availability of Information:**

**Comment:**

Natural	①	2	3
Cultural	①	②	3
Historic	①	2	3
Threats	①	2	3
Human Mod. & Use	①	2	3

1 Well documented.  
2 Limited information (general).  
3 Little information (if any).

**Sources of Information:**

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use.	1	2	3	4	5	6	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

Dr C Landis, Associate Professor, Department of Geology, University of Otago, Dunedin.

G Loh, Conservation Officer (Protected Species and Habitats), DOC, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

D Wilkins, Conservation Officer, Dunedin Field Centre, DOC, Dunedin.

**References:**

Allen R (1978) "Scenic Reserves of Otago Land District" Biological Survey of Reserves No. 4, Department of Lands and Survey.

HPT (1986)a "Historic Places Inventory - Dunedin City, Maniototo, Silverpeaks and Waihemo Counties" Historic Places Trust.

HPT (1986)b "Historic Places Inventory - Bruce, Clutha and Tuapeka Counties" Historic Places Trust.

**Recorded on Existing Databases:    Comment:**

- 1 WERI - no records
- 2 SSWI - 2 sites: Black Shaggery, 1979, moderate/high importance; Lower Taieri River, 1979, high importance. Surveyed by Fauna Survey Unit, NZWS
- 3 PNA - 1 site: Taieri Island Scenic Reserve, 1984. Published in Register of NZ Protected Natural Areas.
- 4 Geopreservation - no records
- 5 HPT County Inventories - 20 sites, 1986
- 6 Other
- 7 None

**Other Considerations:****Accompanying Maps and Photographs:**

Recorders Name: B Murphy

Conservancy: Otago

Map/Grid Ref: NZMS 260 H 45 H46 22731 54309

Date: 31.03.90

**Brief Description of Site:** The coast between the Matau branch of the Clutha River and the Tokomairiro River consists of steeply sloped beaches of medium to coarse sand backed by heavily modified sand dunes with short spaces of low sandstone. Further south is Molyneux Bay which includes Puerua Channel wetlands an area of 25 hectares which is in the Clutha River delta over approximately 6½ kilometres of sand dunes. This site is 28 km long. This area is extensively modified by development for agricultural purposes.

**Conservation Values:** Natural: b,c,d,e Cultural: a Historic: b,d

**Comment:** A small but healthy rare (Given et al 1987) pingao (*Desmoschoenus spiralis*) area exists just south of the Clutha River. Fossilised shellfish of unknown determination are present at Mitchells Rocks (pers obs). Considerable numbers of birds feed and settle around Measley Beach (pers obs). Various shipwrecks occurred in early European history at the mouth of the Clutha River, the most notable being "South Australian" which was wrecked at Coal Point in 1867. Little is left of these wrecks today. Maori settlements are known to have existed at both Tokomairiro Mouth and Wangaloa Creek Mouth (Locherbie pers comm). There are also Middens at Tokomairiro Mouth (HPT 1986). The Clutha River delta has a large number of wading birds breeding in the wetland area behind the dunes (Hughey et al 1986). Maori occupied the southern end which later became the settlement of Port Molyneux (Locherbie pers comm). There are interesting dune slack communities south of the Tokomairiro River Mouth (Patrick pers comm).

**Site Importance:** International National Regional Local Unknown

**Comment:** Fossil remains may be of regional importance. The Puerua Wildlife Management Reserve is valuable for wading birds and waterfowl. The Clutha River is an important whitebait fishing area (Hughey et al 1986). Generally the site is of regional importance (Patrick pers comm).

**Existing Threats:** a,c,d,e,f

**Type and Comment:** This area is subject to extensive heavy grazing by sheep down to the beach line. Low dunes have lost grass species and are liable to blow out (pers obs). Gorse is present in various areas as are lupin and marram grass (pers obs). The lupin at present is subject to severe dieback. One area of sand extraction from the rear of a shallow dune has been identified. Various small dumping areas are mainly from farmyard type refuse (timber, old machinery). Because of the low narrow dune system, it is subject to trail bike damage particularly at the Tokomairiro River end of the pingao site (pers obs). Erosion is caused by the continually moving river mouth (ORC 1990). The Otago Regional Council are attempting to control the shifting river mouth with coastal protection works. Gorse and broom are invading the wetland area (pers obs). Sewage and industrial discharge into the Clutha River are known to occur (ORC 1990). Trail bikes use the beach front for access to the river mouth (pers obs).

**Human Modification and Use:** a,f,h,i,j

The site has been modified for grazing. There is recreational use (boating, fishing, etc) around the river mouths. In an effort to prevent the problems associated with a shifting Clutha River mouth the now defunct Otago Catchment Board has undertaken some coastal protection works at the mouth. There was traditional use of the Tokomairiro Mouth area (Locherbie pers comm).

**Existing Protection:** a

**Type and Comment:** The Puerua wetland area is a wildlife management (government purpose) reserve.

**Availability of Information:**

**Comment:**

Natural	①	2	3
Cultural	1	②	3
Historic	1	②	3
Threats	1	②	3
Human Mod. & Use	1	②	3

1 Well documented.  
2 Limited information (general).  
3 Little information (if any).

**Sources of Information:**

Natural	1	2	3	4	5	6	7
Cultural	1	2	3	4	5	6	7
Historic	1	2	3	4	5	6	7
Threats	1	2	3	4	5	6	7
Human Mod. & Use.	1	2	3	4	5	6	7

- 1 Derived information from existing literature and databases.
- 2 Derived information as above and field check.
- 3 Derived from existing maps and aerial photographs.
- 4 Recent DOC survey including sampling and analysis.
- 5 Recent DOC survey excluding sampling and analysis.
- 6 Experience.
- 7 Expert Opinion.

**Contacts:**

L Locherbie, Archaeologist (retired), Otago Museum, Dunedin.

B Patrick, Conservancy Advisory Scientist, DOC, Dunedin.

**References:**

Given D R, W R Sykes, P A Williams and C M Wilson (compilers) (1987) "Threatened and local plants of New Zealand : A revised checklist". DSIR Botany Division Report. 17 pp.

HPT (1986) "Historic Places Inventory - Bruce, Clutha and Tuapeka Counties" Historic Places Trust.

Hughey KFD, L A Smith and D C Preston (1986) "Birds of the Lower Clutha River: their distribution and habitat use" NZ Wildlife Service occasional publication No. 11.

Otago Regional Council (ORC) (1990) Submission to "Southern Coasts - Worth Protecting" DOC file MAR 38/5

**Recorded on Existing Databases:    Comment:**

- 1 WERI - 1 site: Port Molyneux, 1982, insufficient information.
- 2 SSWI - no records
- 3 PNA - 1 site, Puerua Estuary Government Purpose Reserve, 1984. Published in Register of NZ Protected Natural Areas.
- 4 Geopreservation - no records
- 5 HPT County Inventories - 3 sites, 1986
- 6 Other
- 7 None

**Other Considerations:****Accompanying Maps and Photographs:**