THE CONSERVATION VALUES

of the

NEW ZEALAND COAST

A First Order Appraisal
from the Coastal Resource Inventory

Edited by

Jeremy Gibb

CONSERVATION
TE PAPA ATAWHAI

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Omamari

At dusk,
with the tide running out
and the gulls leaving the cliffs
in noisy packs
to worry uncovered flotsam
then, history stirs me.

And again on windy mornings
at first light
while a heavy surf
pounds the shore line,
a sorrow is born
as I remember that
my ancestral canoe,
Mamari,
founded on this beach.

Evelyn Patuawa-Nathan (1979)

Head Office,
November, 1991
Department of Conservation,
P.O. Box 10-420,
Wellington, New Zealand.

ISBN **********

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CONTENTS

EXECUTIVE SUMMARY

To be completed.

CHAPTER 1 INTRODUCTION

New Zealand is a South Pacific island nation and most of its people live in close proximity to the seacoast. The coastal zone is a unique and diverse environment enjoyed by everybody for the opportunities it presents for recreation, inspiration and commercial uses. In recent times most New Zealanders have become increasingly aware of the life supporting functions of the coastal zone and the vulnerability of this important environment to damage and destruction from pollution and over exploitation. The Coastal Resource Inventory (CRI) Programme provides essential information to assist resource consent authorities to manage and protect the resources of the coastal zone of New Zealand for the benefit of both present and future generations.

In this report an appraisal is made for the first time of conservation values within the coastal zone of New Zealand. The appraisal is based on an analysis of information contained in the thirteen volumes of the CRI First Order Survey compiled by Department of Conservation (DoC) staff for each of the conservancies with a seacoast (Department of Conservation 1990a).

The report sets out the methods and assumptions used in the First Order Survey and reports the results of a national overview of the conservation values of the coastal zone (Fig. 1). In the light of the Resource Management Act 1991 and the present Conservation legislation, new directions for coastal management and the CRI Programme are discussed.

FIG.1 MAP OF NEW ZEALAND SHOWING THE AREA COVERED BY THE FIRST ORDER COASTAL RESOURCE INVENTORY SURVEY. ALL CONSERVANCIES EXCEPT TONGARIRO/TAUPO COMPLETED THE FIRST ORDER SURVEY.

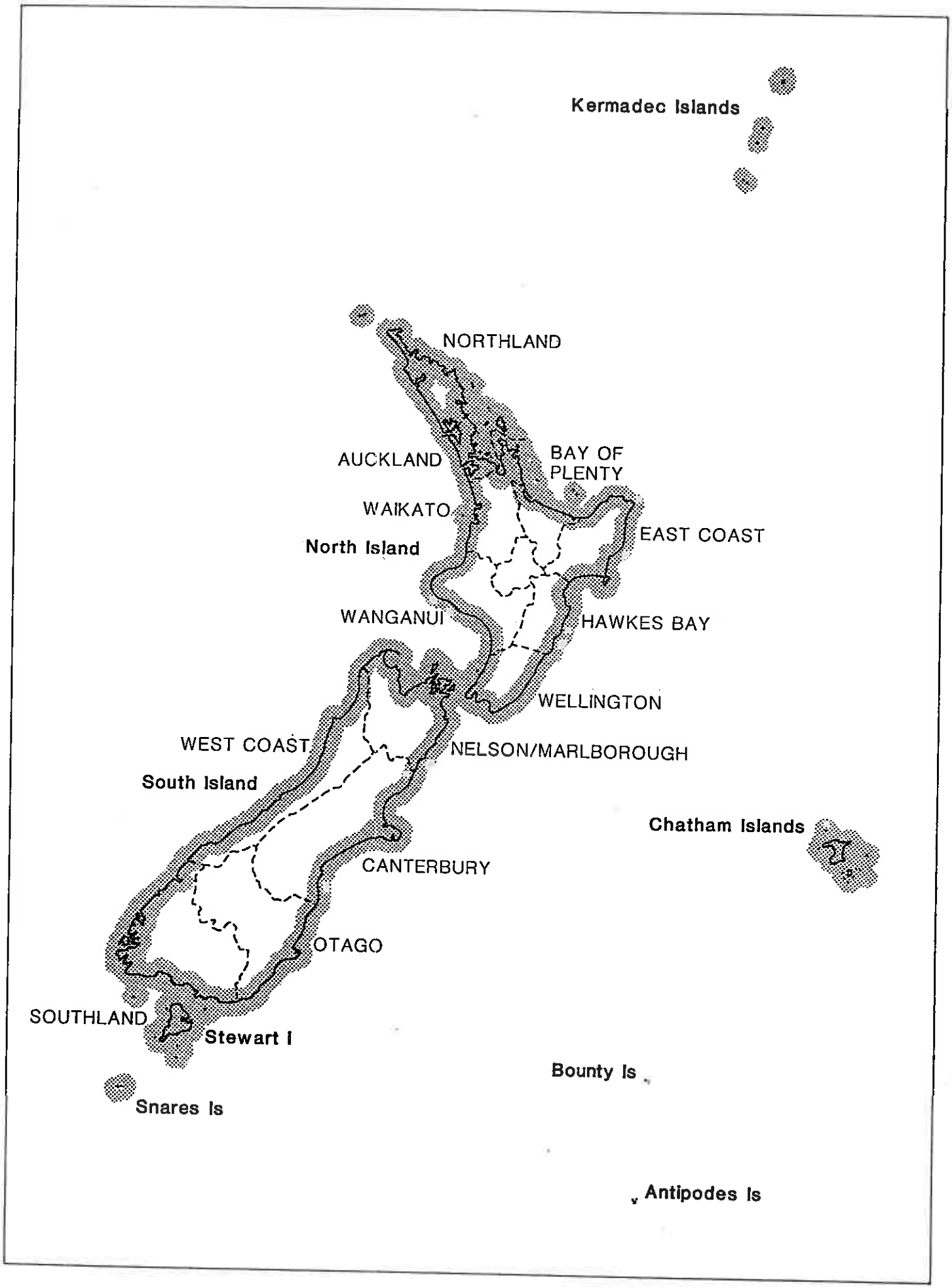

Kermadec Islands
NORTHLAND
AUCKLAND
BAY OF PLENTY
WAIKATO
EAST COAST
North Island
WANGANUI
HAWKES BAY
WELLINGTON
WEST COAST
NELSON/MARLBOROUGH
South Island
Chatham Islands
CANTERBURY
OTAGO
SOUTHLAND
Stewart I
Bounty Is
Snares Is
Antipodes Is

FIG 1

CHAPTER 2 COASTAL MANAGEMENT

Past Coastal Management

During the past century the coastal zone was managed by more than 20 different agencies controlled by a total of 43 statutes (Ministry for the Environment, 1991). In many places poorly planned coastal subdivisions, damaging reclamations and protection works, pollution by rubbish and toxic waste dumps and industrial and urban waste water discharges resulted, destroying some beaches and leaving others unsafe for both swimming and the collection of seafood (Department of Conservation, 1990b). In general, many people have regarded the coast as a place to exploit and dump waste in an effort to keep the land clean and habitable. Many decisions on the use of the coastal zone and its resources were made without regard to existing information on the sustainability of sensitive ecosystems and the conservation values of the coastal zone.

Figure 2 Photograph of stuffed up coast.

Present Coastal Management

The Resource Management Act 1991 (the Act), which came into force on 1 October 1991, restates and reforms the law relating to the use of the sea, air and land within the coastal environment of New Zealand. The overriding purpose of the Act is the promotion of the sustainable management of natural and physical resources which include all land-based structures, land, water, air, soil, minerals, energy and all forms of plants and animals.

In Section 5.2 of the Act **"sustainable management"** means;

> **"managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while-**
>
> **(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and**

(b) **Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and**

(c) **Avoiding, remedying, or mitigating any adverse effects of activities on the environment."**

The IUCN (1991) uses the word **sustainability** in several combinations including **sustainable use** and **sustainable development**, both relevant to the definition of **sustainable management** in the Act. **Sustainable use** is applicable only to renewable resources, using them at rates within their natural capacity for renewal. **Sustainable development** means improving the quality of human life, while living within the carrying capacity of supporting ecosystems (IUCN 1991).

If the quality of human life in New Zealand is to improve then an understanding of **ecological sustainability** is required. According to the NZ Ecological Society (1991) **ecological sustainability** is defined as "use of components of an ecosystem in ways that allow for the perpetuation of the character and natural processes of that ecosystem. Ecosystems have the ability to change and adapt to management impacts within certain limits. Sustainable management of these ecosystems must not exceed these limits".

This means that the finite renewable resources of the coastal zone such as plants, animals, water, the atmosphere and some sediments and detrital minerals of commercial importance, should only be harvested within the limits allowed by nature. In essence, humanity must take no more from nature than nature can replenish.

The Resource Management Act 1991 complements the Conservation legislation and together these laws provide the framework for sustainable management of the coastal zone. The Conservation Law Reform Act 1990 requires the preparation of Conservation Management Strategies to implement general policies and establish objectives for the integrated management of natural and historic resources. These resources include any species managed by DoC under the Wildlife Act 1953, Marine Reserves Act 1971, Walkways Act 1975, Wild Animal Control Act 1977, Reserves Act 1977, Marine Mammals Protection Act 1978, National Parks Act 1980 and the Conservation Act 1987. They also include historic places managed by the Historic Places Trust under the Historic Places Act 1980.

The CRI First Order Survey provides baseline information on the natural and historic resources of the coastal zone. The information provides a basis for advocating the conservation of these resources and promoting the benefits to present and future generations as required under Section 6 of the Conservation Act 1987. It also provides a basis from which future changes to ecosystems can be monitored and the effectiveness of resource management consents issued under the Resource Management Act 1991, assessed.

Central Government Role

Under Section 28 of the Resource Management Act 1991, the Minister of Conservation is required to prepare and recommend New Zealand Coastal Policy (NZCP) Statements, approve regional coastal plans and make decisions on applications for coastal permits in relation to restricted coastal activities. In addition, the Minister is required to monitor the effect and implementation of NZCP statements and coastal permits issued by him or her.

The NZCP statements cover the **coastal environment**, but regional coastal plans and coastal permits are restricted to the **coastal marine area**. Although the term **coastal environment** is not defined in the Act the **coastal marine area** is defined in Section 2(1) to mean that area of foreshore and seabed lying between the outer limits of the territorial sea and MHWS.

The Crown Law Office of New Zealand has recently provided guidance to the Director-General of Conservation on the meaning of the term **coastal environment**. In their opinion, each area of the coast will need "to be considered on its merits". As a guide they say that the coastal environment should include the coastal marine area and that part of the land "where the coast has an influence". **Environment** is defined in Section 2(1) of the Act to mean ecosystems and their constituent parts including people and communities; all natural and physical resources, amenity values; and the social, economic, aesthetic, and cultural conditions which interact with these matters. The Crown Law Office caution against extending the landward boundary of the coastal environment "too far inland".

Under Section 56 of the Act, the purpose of NZCP Statements is;

> **"to state policies in order to achieve the purpose of this Act in relation to the coastal environment of New Zealand."**

Under Section 58 of the Act the NZCP Statements may include policies concerning:

"(a) **National priorities for the preservation of the natural character of the coastal environment of New Zealand, including protection from inappropriate subdivision, use, and development:**

(b) **The protection of the characteristics of the coastal environment of special value to the tangata whenua including waahi tapu, tauranga waka, mahinga maataitai, and taonga raranga:**

(c) **Activities involving subdivisions, use, or development of areas of the coastal environment:**

(d) **The Crown's interest in land of the Crown in the coastal marine area:**

(e) **The matters to be included in any or all regional coastal plans in regard to the preservation of the natural character of the coastal environment, including the specific circumstances in which the Minister of Conservation will decide resource consent applications relating to -**

(i) **Types of activities which have or are likely to have a significant or irreversible adverse effect on the coastal marine area; or**

(ii) **Areas in the coastal marine area that have significant conservation value:**

(f) **The implementation of New Zealand's international obligations affecting the coastal environment:**

(g) **The procedures and methods to be used to review the policies and to monitor their effectiveness:**

(h) **Any other matter relating to the purpose of a New Zealand coastal policy statement."**

The area of coastal zone covered by the CRI Programme encompasses the coastal marine area and the landward limit of marine influence. The information contained in the First Order CRI Survey is therefore relevant to the coastal environment covered by the NZCP Statement

Regional Council Role

Under Section 30 of the Resource Management Act 1991, Regional Councils are the primary coastal management agencies. They are responsible for the day to day management of the coastal marine area and must prepare a regional coastal plan within two years of the new legislation coming into force (by 1st October 1993). Under the Act both regional plans and regional coastal plans must be consistent with the NZCP Statement. The former plans cover the landward part of the coastal environment and the latter the seaward part.

Regional Councils will handle all planning applications and make the final decisions on the great majority of coastal developments (Department of Conservation, 1991). They will be responsible for water management, soil conservation and controlling the use of land for the purpose of the avoidance or mitigation of coastal hazards. In respect of the area seaward of MHWS that control is exercised in conjunction with the Minister of Conservation who is given special powers over this area under Section 30 of the Act on matters such as the extraction of sand and shingle, water extraction and pollution, the effects of natural hazards and hazardous substances, and the occupation of land.

Territorial Authority Role

Under Section 31 of the Resource Management Act 1991, Territorial Authorities are responsible for detailed planning and decision making above MHWS. Under the Act, district plans like regional plans, must also be consistent with the NZCP Statement.

The Act makes provisions for areas below MHWS that have significant conservation value to be protected through regional coastal plans and those above MHWS through heritage orders and regional and district plans.

Natural Character

Under Section 6a of the Resource Management Act 1991, **"preservation of the natural character of the coastal environment and the protection of it from inappropriate subdivision, use and development"**, is a matter of national importance that must be recognised and provided for by all consent authorities in order to achieve the overriding purpose of the Act of sustainable management of natural and physical resources. The draft NZCP Statement (Department of Conservation, 1990b) set out national priorities which aimed to achieve this. **Natural character** was defined as **"the qualities of the coastal environment which in their aggregate give the coast of New Zealand its recognisable character. These qualities may be ecological, physical, spiritual, cultural or aesthetic in nature".** It is of interest that this definition of **natural character** includes spiritual, cultural and aesthetic aspects as well as ecological and physical qualities.

Figure 3 A. Photo of pristine underwater area.

B. Photo of unmodified pristine above MHWS area.

The Thirteen First Order Surveys held by the Conservancies of DOC provide a summary of useful information on areas where the coast has a relatively high degree of natural character compared to other areas where human activity has extensively modified natural values.

CHAPTER 3 METHODS AND ASSUMPTIONS

Coastal Resource Inventory Programme

The CRI Programme began in 1987 as DoC's principal tool for breaking the traditional cycle of reactive coastal management. The Programme was established under Section 53(2) of the Conservation Act 1987 which gives the Director-General of Conservation, amongst other things, a discretionary right to **"prepare and carry out, or commission the carrying out of, surveys, investigations, and inventories"**, of the natural and historic resources of New Zealand.

The CRI Programme is divided into three phases of which the First Order Survey is designed to provide a national overview of the conservation values of the New Zealand coast. The Second Order Survey is designed to focus at a regional level, providing more detailed overviews of the conservation values of each conservancy's coast. Third Order Surveys are designed to provide detailed site specific information for issues such as marine reserves or areas proposed for developments such as small boat facilities or marine farms.

Each of the three phases requires different levels of survey detail and different time scales for completion. First Order is a general survey and was designed to be completed before the enactment of the Resource Management Act 1991 and to provide a basis to assist with the drafting of the New Zealand Coastal Policy Statement. A standard map series at a scale of 1:250,000 was adopted.

Although on-going, Second Order is to be completed in time for its findings on coastal conservation values and impacts such as natural hazards to be incorporated into regional coastal plans. These plans have to be publicly notified in October 1993. A standard map scale of 1:50,000 is recommended.

Third Order is to be ongoing depending on which priority issues on the coast require detailed information. Map scales appropriate to the issue are recommended. It is planned that both First and Second Order can be updated each year as new information comes to hand and that such information will naturally translate in scale from Third to Second to First Order overviews.

First Order Survey

The First Order Survey commenced in mid 1989. The Survey was a record of what was currently known about coastal areas with conservation values.

The primary mission of the First Order Survey was:

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

The following specific tasks developed to achieve the mission were:

1. **"To identify coasts with important natural, scientific, historic, cultural and spiritual values; and**

2. **to identify coasts currently protected and warranting protection; and**

3. **to identify coastal conservation values susceptible to existing and potential threats; and**

4. **to identify human modification and uses of coasts."**

In addition, the First Order Survey contributed to the longer term objectives of the CRI Programme of providing for:

1. **"A classification of coasts according to their conservation values; and**

2. **a basis from which to monitor changes to the natural character and quality of coasts"; and**

3. **a basis from which to promote the conservation values of coasts; and**

4. **a basis from which to define natural boundaries of the coastal zone."**

Each of the thirteen survey volumes included a description of the conservancy's coastal zone, a summary of its conservation values, a list of major issues of concern and recommendations for further inventory work. Information about specific sites with conservation values was compiled on site record sheets and plotted on maps. The entire survey included over 700 detailed site record forms and about 540 maps.

Coastal Zone

The boundaries adopted for the coastal zone for the CRI Programme, particularly the First Order Survey, were the landward limit of marine influence and the seaward limit of the New Zealand Territorial Sea, 12 nautical miles offshore. Although the seaward boundary is a constant distance from the shoreline, the landward boundary varies from place to place according to each physical, biological and human element. For example, within the Wellington Conservancy the landward limit of marine influence was found to extend about 35 km inland from the south Wairarapa coast compared to about 3 km inland along the Wairarapa east coast. Along Wellington's west coast the foredune (physical element) was found to extend 30 to 150m inland, coastal flora and fauna (biological element) about 8 km inland and historic and archaeological sites of early Maori occupation (human element) up to 18 km inland (Wellington Conservancy, Department of Conservation, 1990a).

Observations reveal that the land-sea-atmosphere boundary is frequently crossed by many species. For example, fish such as flounder, whitebait, eels, herring, kahawai, mullet and salmon frequently cross the seawater-freshwater boundary. Marine mammals, seabirds and saltmarshes frequently cross the land-sea boundary. Beaches are the collection places for sediments derived from terrestrial sources as distant as the mountain tops and marine sources up to several kilometres offshore. Even the shoreline is unlikely to remain in the same position, advancing and retreating up to several tens of metres each year.

These observations indicate that a coastal zone defined from the natural boundaries of natural, cultural and historical elements will vary significantly from place to place around New Zealand.

Information Categories and Sources

The information categories adopted for the First Order CRI Survey were **natural, cultural, historic, existing threats, human modification and use**, and, **existing protection**, criteria for which are set out in Appendix 1. For these categories the information used was based almost entirely on existing data from regional and national databases held by DoC, published and unpublished reports, limited field surveys and, personal and anecdotal information supplied by various experts.

Databases referred to included Sites of Special Wildlife Importance (SSWI), Wetlands of Ecological and Representative Importance (WERI), Protected Natural Areas (PNA), Historic Places Trust County Inventories (HPT), the New Zealand Geopreservation Inventory (Geopreservation) and databases held by other agencies such as universities and local authorities. Apart from WERI, most, if not all, of the above databases only cover the landward part of the coastal zone above MHWS.

Conservation Values

The expression **"conservation value"** is used with increasing frequency in New Zealand but it is not easy to find an agreed definition of what it means. The following definitions and criteria, however, influenced the methods and assumptions adopted for the First Order Survey to determine both **conservation value** and **significant conservation value.**

Conservation is defined by the International Union for Conservation of Nature and Natural Resources (IUCN) and by the Conservation Act 1987. The IUCN (1980) define conservation as; "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations". **Living resource conservation** is specifically concerned with ecosystems and has the objectives of; maintaining essential ecological processes and life-support systems; preserving genetic diversity, and ensuring the sustainable utilization of species and ecosystems (IUCN 1980).

The Conservation Act 1987, as introduced by the Conservation Law Reform Act 1990, defines **nature conservation** as; "the preservation and protection of the natural resources of New Zealand, having regard to their intrinsic values and having special regard to indigenous flora and fauna, natural ecosystesm, and landscape"; and, **conservation** as; "the preservation and protection of

natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations."

In terrestrial conservation biology, the science of evaluating sites for nature conservation is well developed. This usually involves the use of a series of criteria to determine or evaluate the "conservation value" of a site. Criteria include such things as ecological representativeness, diversity (of both individual species and habitats), rarity and distinctiveness (of both species and habitats), naturalness (or lack of human modification), area and spatial configuration and long-term viability (Usher, 1986; O'Connor *et al.*, 1990). These and related criteria are usually applied when comparing the relative merits of two or more sites to determine which is the preferred site for a nature reserve or protected area. The New Zealand Protected Natural Areas Programme has set a precedent by using these criteria when identifying areas to be recommended for protection (Myers et al. 1987; Kelly and Park, 1986).

In a recent paper, Collier and McColl (in press) discuss several criteria for assessing the natural values of New Zealand rivers, including ecological representativeness or rare type of ecosystem, degree of modification, diversity and pattern, rarity and unique features or species, and long-term viability. In other studies where the focus is primarily on natural values or nature conservation, other attributes such as archaeological interest are also included (Usher, 1986).

A tentative description of **significant conservation values** was provided in the first draft of the New Zealand Coastal Policy (NZCP) statement published by the Department of Conservation (1990b). The draft policy was prepared during the passage of the Resource Management Bill for public comment. The Bill, which became the Resource Management Act 1991 on 1 July 1991, requires the Minister of Conservation under Section 28 to prepare a New Zealand Coastal Policy Statement. The present draft NZCP is being reviewed and redrafted for public release early in 1992.

In the draft NZCP Statement **significant conservation values** included significant ecological values; Maori cultural and traditional values; scientific values; heritage values, including those associated with important historic places and archaeological sites; values protected by other legislation, including marine reserves, esplanade reserves, wildlife refuges, nature reserves, and

taiapure regulations; significant landscape features; and, values protected by international agreements to which New Zealand is a party (Department of Conservation, 1990b).

Criteria for the CRI First Order Survey

For the First Order CRI Survey, conservation values included the natural, cultural and historic values of the coastal zone. Criteria used to identify sites with **natural values** included several of the well established conservation biology criteria (e.g. **"high degree of naturalness; representativeness; rare/unique species, communities or habitats"**), and also criteria which identified unique or unusual landforms. For **cultural values**, some of the criteria, including **"traditional sites"** and **"sites used for educational purposes"** were based on factual information supplied by the tangata whenua and Education Advisory Service or Board respectively, while others such as **"landscape value", "aesthetic value"** were often assessed from a landscape plan by a landscape planner for the region. Criteria used to identify sites with **historic value** were primarily from the New Zealand Historic Places Trust Inventories and the New Zealand Archaeological Association register.

The First Order Survey also collected and mapped information about **existing threats, human modification and use** of the coast, and **existing protection** of conservation values in the coastal zone. Many human activities cause **threats** to the conservation values of the coastal zone, particularly by damaging the functioning of natural systems from, for example, water pollution from waste water and industrial discharges. Other threats to the coast were caused by natural hazards such as erosion, flooding and landslip from the action of physical coastal processes (see Appendix 1).

There were also human activities in the coastal zone which were not apparently causing any obvious threat to conservation values in the area. These included such activities as appropriate land development, small boat harbours and moorings and certain types of recreation. In the CRI these were described as **human modification and use**. Where conservation values were **protected** by reserve status or some other protection mechanism the CRI recorded and mapped the protection status of the area (see Appendix 1).

Mapping and Recording Conservation Values

In the CRI First Order Survey sites with natural values, cultural values and historic values were mapped on separate layers at 1:250,000 scale (Figure 4). Sites with **conservation values** were then determined by combining sites with one or a combination of these three values where they overlaid each other, as shown in Figure 5. A separate conservation value overlay was produced from the integration of the natural, cultural and historic overlays to record the areas within the coastal zone of conservation value. Each area of conservation value was described on a site record form which also included information on existing threats, human modification and use, and existing protection.

FIG. 4 AN EXAMPLE OF THE WAY NATURAL VALUES WERE MAPPED IN THE FIRST ORDER SURVEY FOR THE GOLDEN BAY AREA OF NELSON-MARLBOROUGH CONSERVANCY

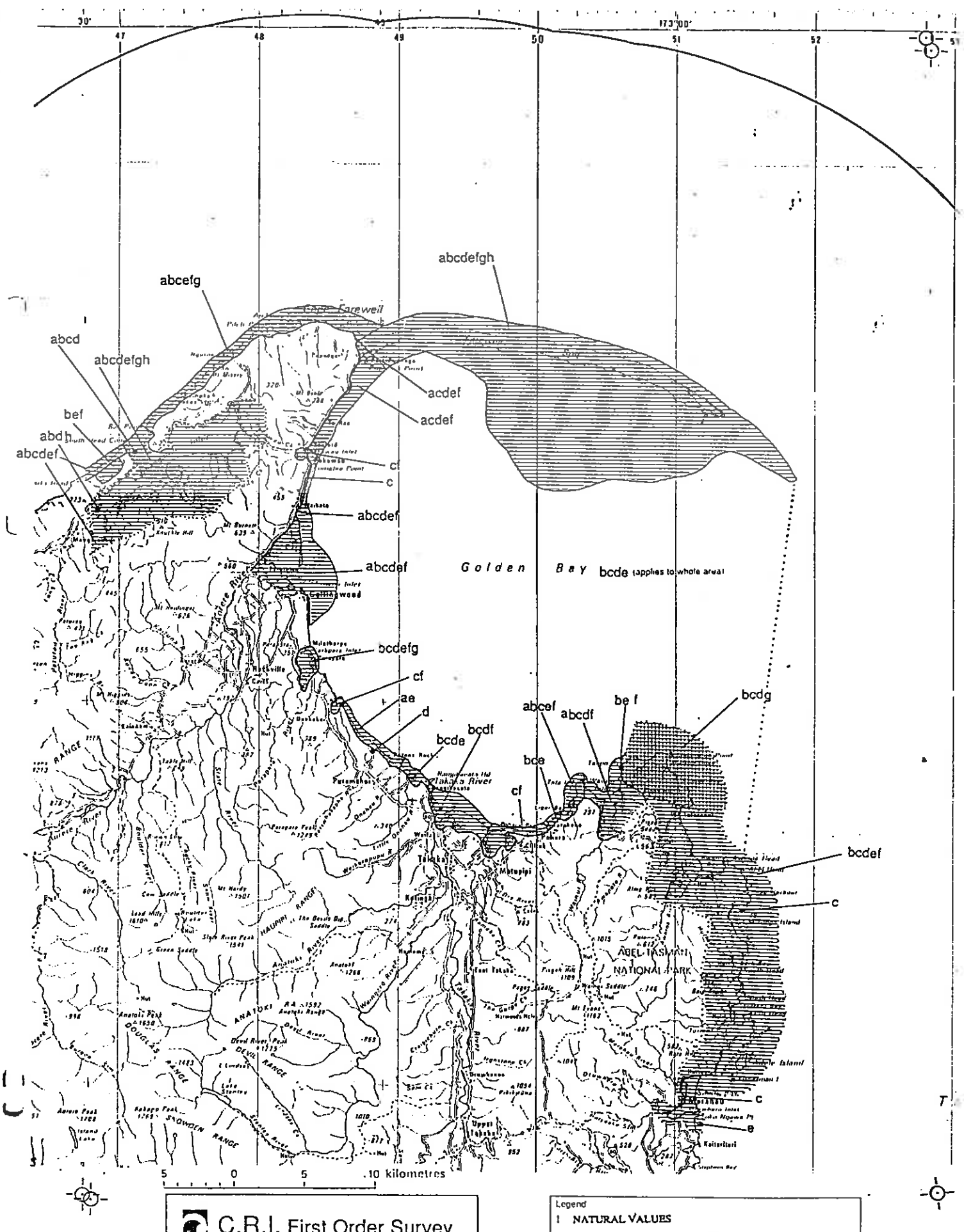
FIG. 5 OBTAINING THE OVERVIEW: INTEGRATING THE OVERLAYS

Significant Conservation Values

All Conservation Sites were evaluated as having either **international, national, regional or local importance** from existing published or unpublished information. Sites were classified as having international or national importance only where there was an established method for making such an evaluation in the existing literature, or where the site had previously been evaluated by expert opinion (see Appendix 3). For the First Order Survey a site was ranked as having **significant conservation value** if it contained within it one or more features classified as having national or international importance. The degree of importance was recorded on the Site Record Form together with the source of the information (see Appendix 2).

Geographic Information System

All information on the seven map overlays included in the 13 Conservancy First Order Surveys (see Fig. 3 for layers), was digitised by the Department of Survey and Land Information (DOSLI) at a scale of 1:250,000 in a Geographic Information System (GIS). For this overview plots at 1:1,000,000 of each of the seven mapped layers were printed, and measurements made by cartometer of the total length of coastline, and lengths of coast with natural, cultural and historic



C.R.I. First Order Survey

Sheet .....1.....

Conservancy ..NELSON/MARLBOROUGH

Map No. .....9.2..... 9.2

Category .....NATURAL VALUES.....

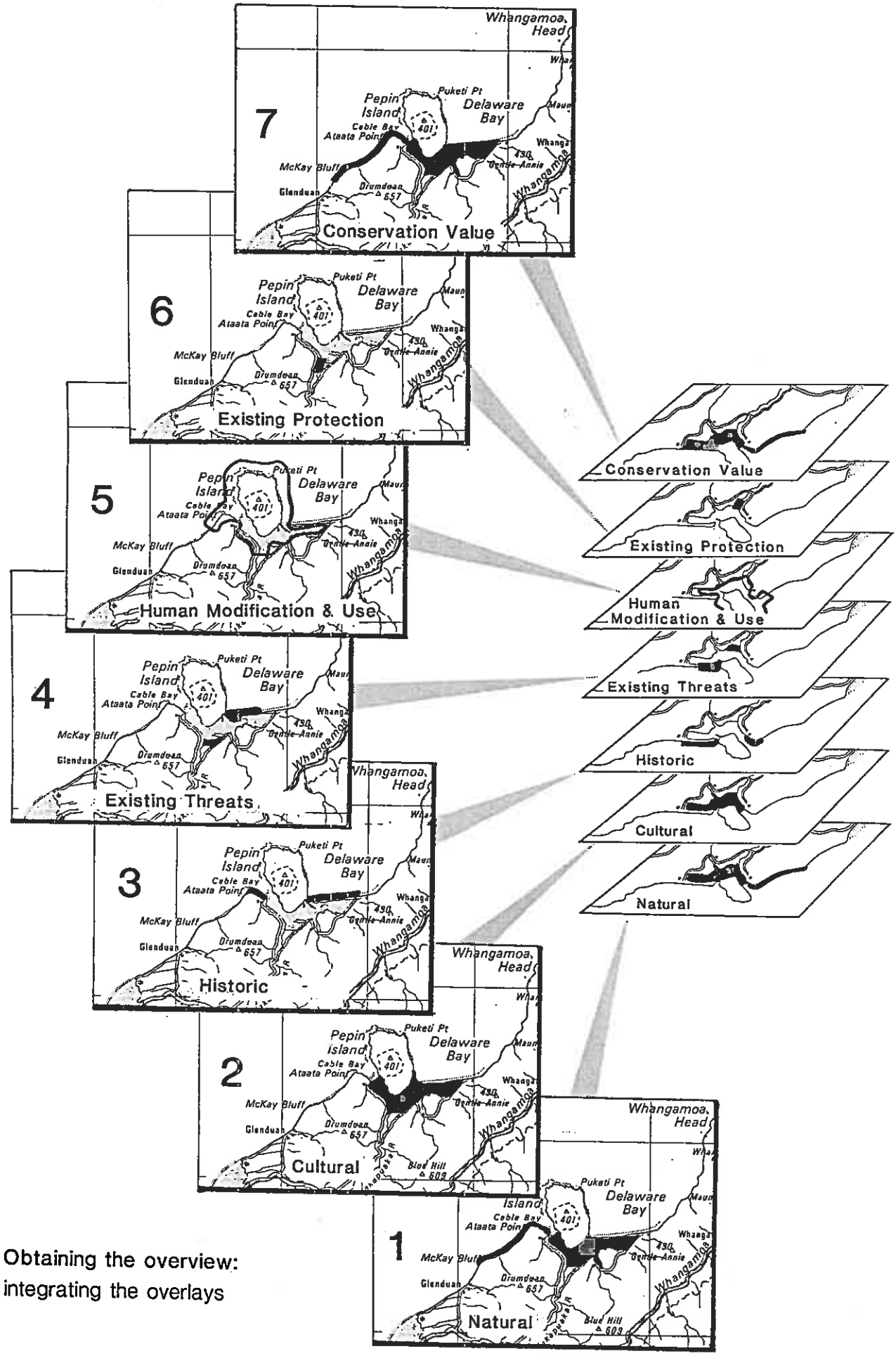
Legend

1 NATURAL VALUES

Features of Important Natural Value:

(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)	known national or international importance
(i)	other

FIG 4



Obtaining the overview:
integrating the overlays

FIG 5

values, as well as those with overall conservation values, threats, modification and use, and protection.

Length estimates were made by measuring the length of coastline which passed through, or was parallel to, any site with such values that occurred within the coastal zone straddling the coastline. To determine the length of coasts with significant conservation values, separate plots were made showing sites with nationally and internationally important natural and historic values and the lengths of these sites were measured. Relative percentages of coast with the various values, threats, uses and protection were then calculated with respect to the actual length of coast measured by cartometer at 1:1,000,000 scale. The statistics from these measurements are presented in Table 1A and B and discussed below.

When measuring the length of coast covered by various forms of protection no attempt was made to separate protection which only covers the landward side of MHWS from that which only covers the seaward side. It is known, however, that compared to the landward part of the coastal zone, less than 1% of the seaward part is currently protected as reserves.

CHAPTER 4 NEW ZEALAND COASTAL CONSERVATION VALUES

Table 1A shows that the total length of New Zealand coastline of the major islands was approximately 15,000km. The 15,000 km included the coastline covered by the CRI from the Kermadec Islands to the north to Stewart Island in the south, and the Chathams Islands to the east.

For the New Zealand coast there are about 10,240km (68%) with natural values, 11,050km (74%) with cultural values and 9,100km (61%) with historic values. Sites identified as having conservation values cover about 11,800km (79%) of the total coast and those with significant conservation values (that is, values of national or international importance) occur over about 7,670km (51%) of coast (Table 1A).

Existing threats to conservation values presently occur over about 11,350km (76%) of the total length of New Zealand coast indicating that most, if not all, coastal conservation values are presently threatened to some degree or other by natural or human-induced hazards. Human modification and uses which do not currently threaten identified conservation values cover about 11,670km (78%) of the coast (Table 1B).

For existing protection of coastal conservation values, Table 1B makes a comparison between "**all types**" of protection and "**national**" protection. **All types** of protection includes those areas of the coastal zone presently administered by the Crown, local government and other non-government agencies, whereas **national protection** includes only those areas administered by the Crown (see Appendix 1 for protection categories).

Table 1B shows that about 10,320 (69%) of New Zealand coastline has existing protection of which about 5,950 km (40%) has areas with national protection. For more details of these alluring statistics the reader should refer to the 13 First Order CRI Survey Volumes held by the Conservancies.

Comparing the Islands

It is interesting to compare the coasts of the main islands of New Zealand. The length of the North Island coast is approximately 7040km, of which a minimum of 70% has natural values, 69% cultural values, and 55% historic values. Sites with conservation value cover 88%, and those with

significant conservation values occupy 41% of the total North Island coast (see Table 1A and Figure 6).

The length of the South Island coast is approximately 7530 km, of which a minimum of 67% has natural values, 79% cultural values, and 67% historic values. A relatively lower proportion (71%) of the South Island coast identified has conservation values than in the North Island, but a higher proportion (61%) has significant conservation values (Figure 7) compared to the North Island (41%) (Table 1A).

The full 44km (100%) of the Kermadec Islands coast has significant conservation values. By comparison only 53% of the 215km coast of the Chathams Islands has been determined to have conservation values, with only 45% having significant values (Figure 8).

TABLE 1: PERCENTAGE LENGTHS OF NEW ZEALAND COASTLINE WITH:

A: Conservation and significant conservation values.

B: Existing threats to and protection of conservation values and human modification and use.

A	Length of COAST-LINE	Length with NATURAL VALUES		Length with CULTURAL VALUES		Length with HISTORIC VALUES		Length with CONSERVATION VALUES		Length with SIGNIFICANT CONSERVATION VALUES	
	km	km	%	km	%	km	%	km	%	km	%
NORTH ISLAND	7,040	4,930	70	4,835	69	3,880	55	6,215	88	2,875	41
SOUTH ISLAND	7,532	5,055	67	5,981	79	5,079	67	5,329	71	4,568	61
KERMADEC ISLANDS	44	40	91	25	57	25	57	44	100	44	100
CHATHAM ISLANDS	400	215	54	210	53	112	28	215	54	178	45
NEW ZEALAND	15,016	10,240	68	11,051	74	9,096	61	11,803	79	7,665	51

B	Length of COAST-LINE	Length with EXISTING THREATS		Length with HUMAN MODIFICATION AND USE		Length with EXISTING PROTECTION			
						ALL TYPES		NATIONAL	
	km	km	%	km	%	km	%	km	%
NORTH ISLAND	7,040	6,215	88	6,280	89	4,270	61	2,590	37
SOUTH ISLAND	7,532	5,005	67	5,166	69	5,890	78	3,293	44
KERMADEC ISLANDS	44	40	91	25	57	44	100	44	100
CHATHAM ISLANDS	400	90	23	195	49	120	30	20	5
NEW ZEALAND	15,016	11,350	76	11,666	78	10,324	69	5,947	40

In the North Island 88% of the coast is exposed to existing threats of one kind or another, while in the South Island only 67% of coasts are threatened. However, 91% of the Kermadecs' coast is shown to be exposed to threats, while as little as 23% of the Chathams' coast is recorded as experiencing threats.

Human modification and use has altered the natural character of 89% of coasts in the more densely populated North Island, compared with 69% of South Island coasts. Only 57% of the Kermadecs', and 49% of the Chathams' coasts are identified as being modified by human activities.

Protection mechanisms of all kinds cover 61% of North Island coasts with 37% having protection administered by a Crown agency (national protection). Figures for the South Island are 78% and 44% respectively, the latter figure including those coasts within the Fiordland, Westland, Paparoa and Abel Tasman National Parks. While the whole of the Kermadec Islands have recently been protected as a marine reserve, only 30% of Chathams Islands coasts are protected and as little as 5% have been identified in the First Order Survey as having protection administered by the Crown.

FIG 6	MAP OF NORTH ISLAND SHOWING ALL SITES IN THE COASTAL ZONE WITH IDENTIFIED CONSERVATION VALUES AND AREAS WITH SIGNIFICANT CONSERVATION VALUES.
FIG 7	MAP OF SOUTH ISLAND AND SHOWING ALL SITES IN THE COASTAL ZONE WITH IDENTIFIED CONSERVATION VALUES AND AREAS WITH SIGNIFICANT CONSERVATION VALUES.
FIG 8A	MAP OF THE KERMADEC ISLANDS SHOWING ALL SITES IN THE COASTAL ZONE WITH IDENTIFIED CONSERVATION VALUES AND AREAS WITH SIGNIFICANT CONSERVATION VALUES.
B	MAP OF THE CHATHAMS ISLANDS SHOWING ALL SITES IN THE COASTAL ZONE WITH IDENTIFIED CONSERVATION VALUES AND AREAS WITH SIGNIFICANT CONSERVATION VALUES.

Figure 9 shows the southern part of the North Island (Wellington Conservancy) as an example to show in more detail some of the information in Figure 6. All sites with conservation values are identified, and sites with significant conservation values are highlighted. Figure 9 is included to illustrate the versatility of the GIS which can plot information at a range of scales, from the scale at which the information is recorded (in this case 1:250,000) to any smaller scale. Similar maps can be plotted from the GIS or flexible scales to illustrate any of the categories of information described in Appendix 1.

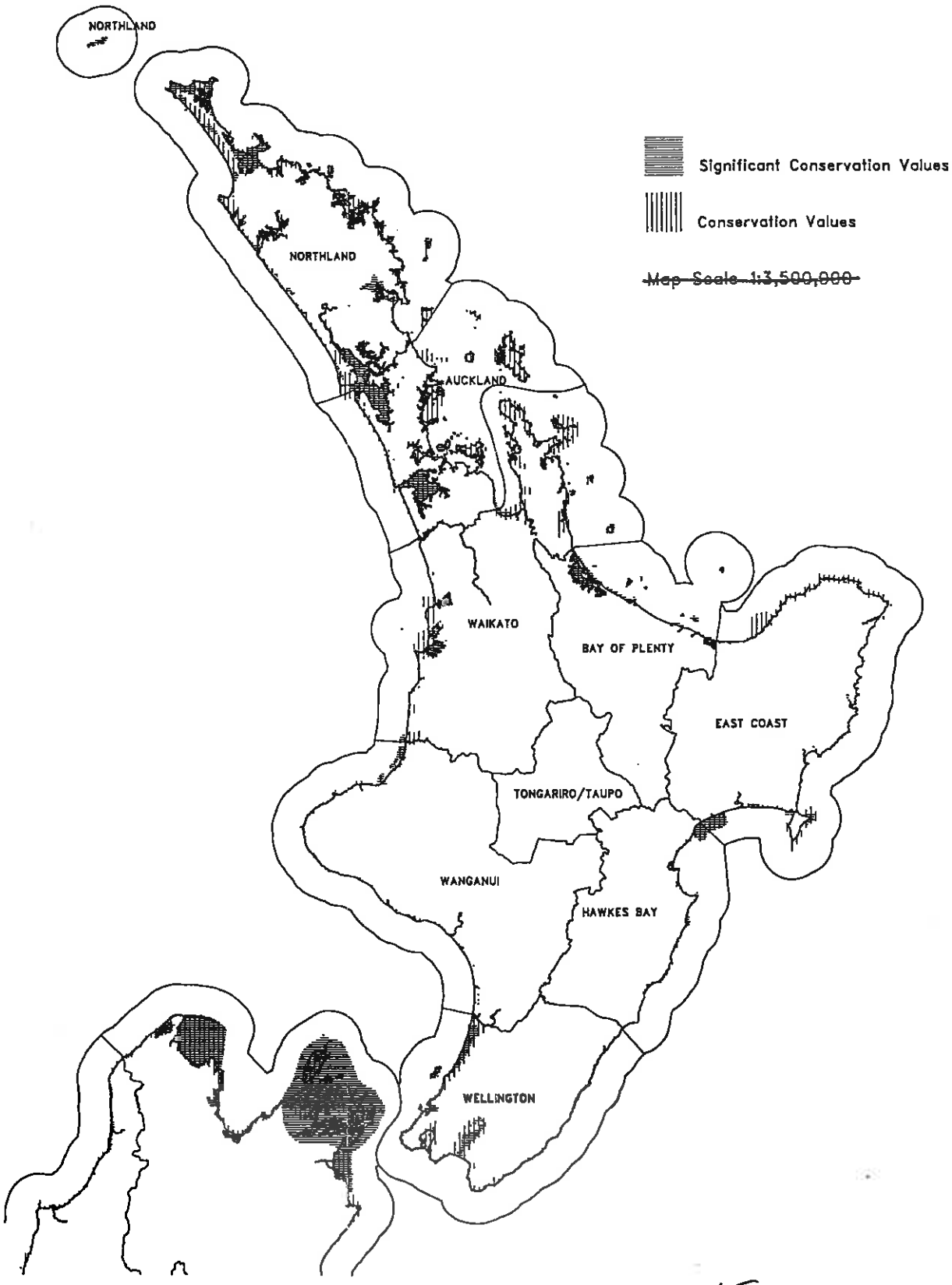

NORTHLAND
NORTHLAND
AUCKLAND
WAIKATO
BAY OF PLENTY
EAST COAST
TONGARIRO/TAUPO
WANGANUI
HAWKES BAY
WELLINGTON
Significant Conservation Values
Conservation Values
~~Map Scale 1:3,500,000~~

FIG 6

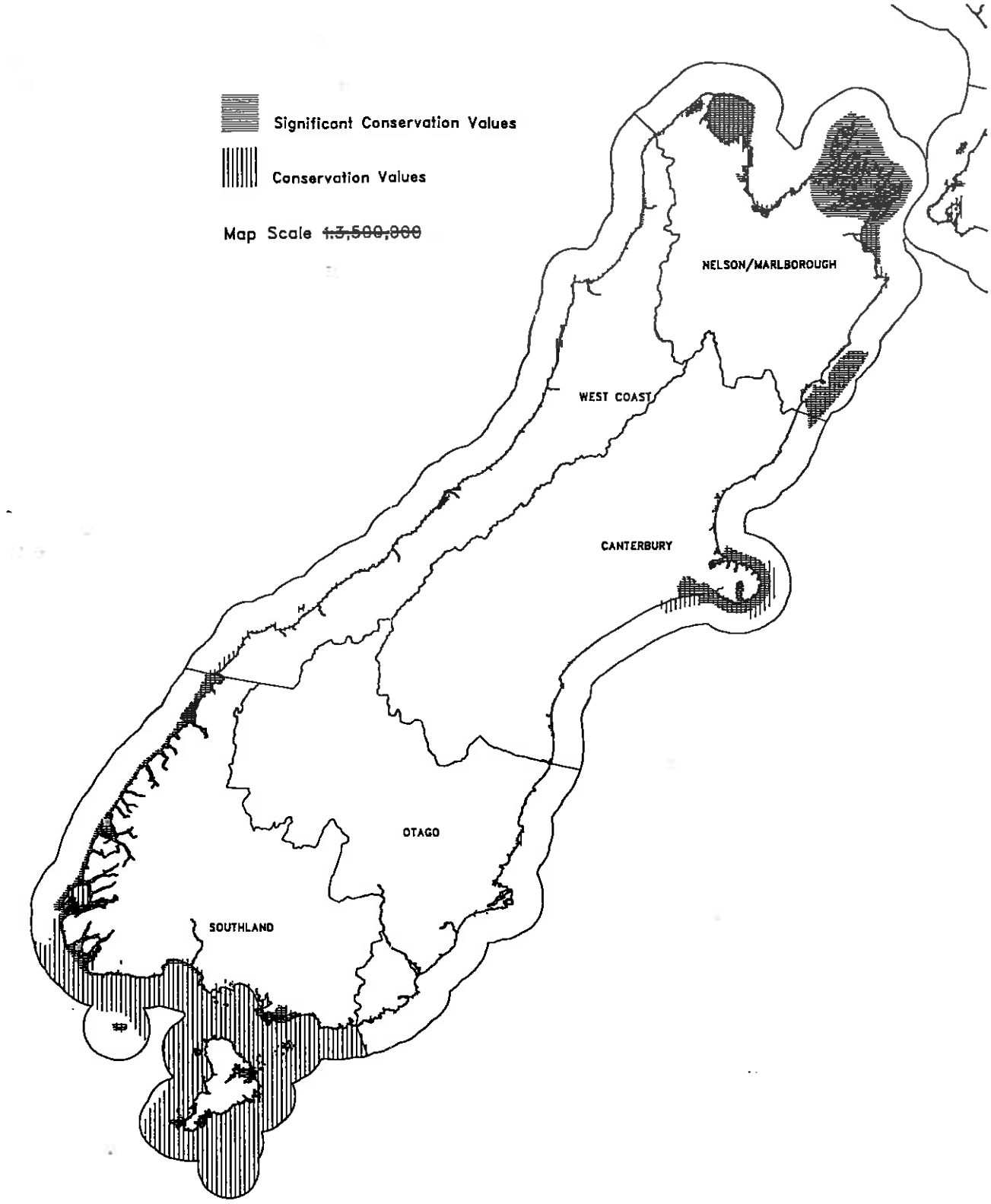
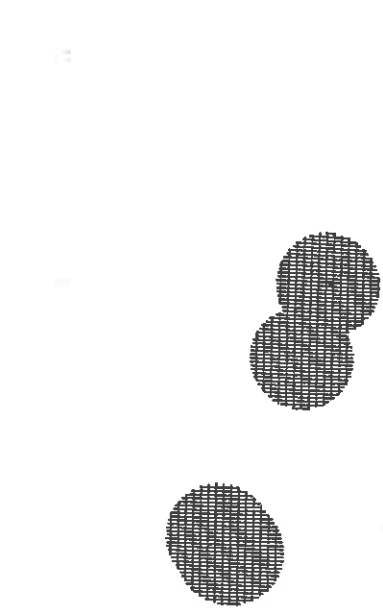

Significant Conservation Values
Conservation Values
Map Scale ~~1:3,500,000~~
NELSON/MARLBOROUGH
WEST COAST
CANTERBURY
OTAGO
SOUTHLAND

FIG 7



Significant Conservation Values

Conservation Values

Map Scale 1:3,500,000

A

Significant Conservation Values

Conservation Values

Map Scale 1:750,000

B

FIG 8

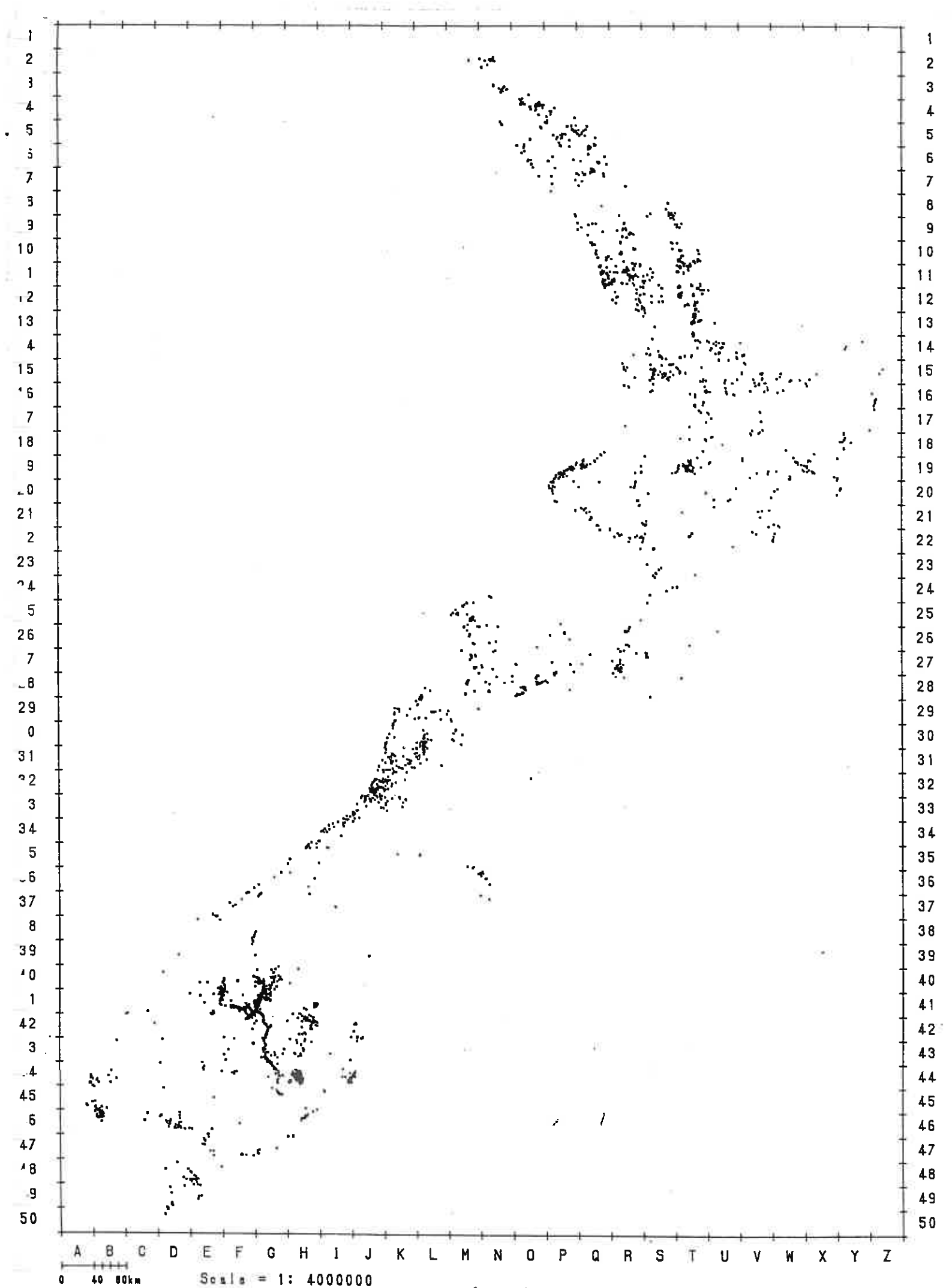
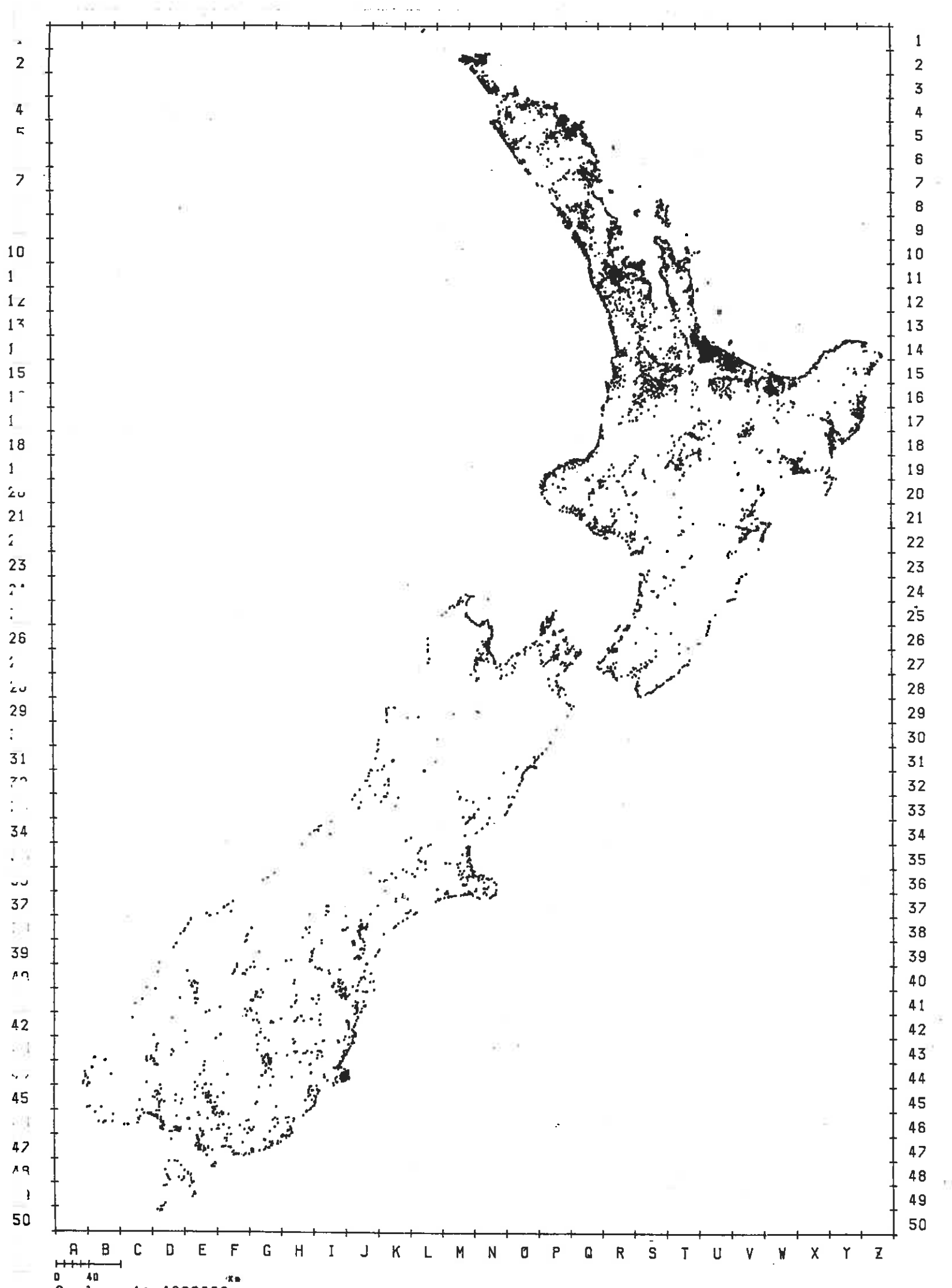


Fig 10

FIG 10

Archaeological sites recorded as historical



Maori archaeological sites

FIG 11

FIG 9 EXAMPLE OF PART OF FIG. 4 AT A LARGER SCALE. SOUTHERN NORTH ISLAND SHOWING ALL SITES IN THE COASTAL ZONE WITH CONSERVATION VALUES. SITES WITH SIGNIFICANT CONSERVATION VALUES ARE HIGHLIGHTED.

Archaeological Values

Archaeological values are illustrated separately by a plot of all sites from the New Zealand Archaeological Association's (NZAA) Register of Archaeological Sites which is managed by the Department of Conservation' Science and Research Division (Figs. 10 and 11). The NZAA Register is the main source of information about archaeological sites and at present contains approximately 43,000 site records from throughout the country. These plots are included because different conservancies recorded archaeological information in different ways in the First Order Survey.

Figures 10 and 11 indicate clearly the importance of the coastal zone to both Maori and early European settlers. Even though the coastline is not shown on these plots, the edge of New Zealand is distinguishable, especially in the plot of Maori archaeological sites. According to McFadgen and Williams (ibid.)

> **"the vast majority of recorded pre-European sites lie along the coast and up river valleys".**

It is of interest to note that present New Zealanders still regard the coastal zone as important today as their ancestors did in the past.

FIG 10 MAORI/PREHISTORIC ARCHAEOLOGICAL SITES OF NEW ZEALAND PLOTTED FROM THE NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION'S REGISTER OF ARCHAEOLOGICAL SITES.

FIG 11 HISTORIC ARCHAEOLOGICAL SITES OF NEW ZEALAND PLOTTED FROM THE NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION'S REGISTER OF ARCHAEOLOGICAL SITES. (HISTORIC REFERS TO THE PERIOD AFTER EUROPEAN CONTACT).

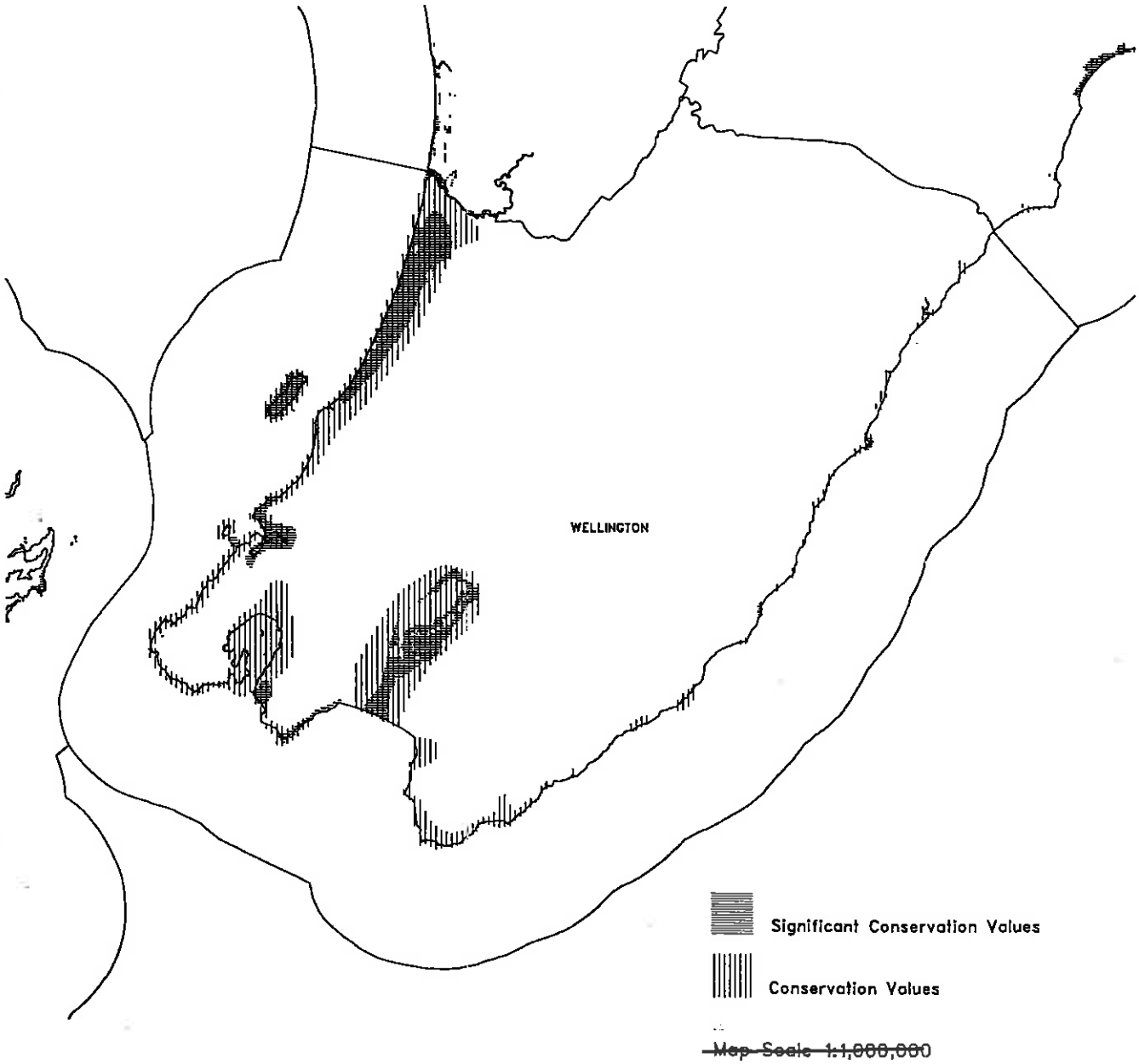

WELLINGTON
Significant Conservation Values
Conservation Values
~~Map Scale 1:1,000,000~~

FIG 9

CHAPTER 5 DISCUSSION

The CRI First Order Survey was completed in less than 12 months (1989-1990) by more than 50 dedicated DoC Conservancy and CRI Taskforce staff. Despite the time and information limitations of the survey a precedent has been set and a useful framework established for identifying and recording conservation values and other information within the coastal zone of New Zealand.

The First Order Survey has achieved its primary mission (see Chapter 3), identifying coasts with important natural, scientific, historic, cultural and spiritual values and showing where these conservation values are susceptible to existing threats. Human uses and modifications of the coastal zone which are not currently threatening conservation values are also identified as are areas where conservation values are protected.

The First Order Survey shows that about 80% of the 15,000 km-long coastlines of New Zealand have sites of conservation value and about 50% have areas of significant conservation value of national or international importance. Although the former are spread along both the open exposed coastlines and sheltered coastlines, the latter are generally found to concentrate within sheltered coastal areas such as the fiords, inlets, harbours, estuaries and saline lagoons (see Figs 6 and 7). The percentages of coast with conservation value derived in this study should be regarded as **minimum** values. The percentages are likely to increase when further information is made available about the natural values of the coastal marine area (below MHWS) and cultural values over the entire coastal zone.

The biological productivity of all ecosystems involves the life-supporting capacity of photosynthetic production using energy from the sun, together with air, water and nutrients. Coastal ecosystems are some of the most productive in the world and the richest areas of all are the sheltered harbours and inlets, estuaries and swamps, including the mangrove swamps in the north (Doak, in Matthews *et al.*, 1989). It is essential that these highly productive coastal systems are properly conserved as they are the source of energy for many other ecosystems. For example, some two-thirds of New Zealand's inshore fish species are dependent on estuaries and harbours for part of their lives (Ibid.) and in summer New Zealand estuaries attract upwards of 150,000 wading birds (Atkinson, in Robertson, 1985). The mudflats of estuaries and lagoons are a rich source of shellfish, crabs and other invertebrates for these waders, most of which are Arctic-breeding migrants. The

sheltered coastal areas are highly sensitive to the adverse affects of certain human activities that lead to, for example, water pollution, rapid sedimentation or erosion. The richness of coastal habitats in terms of biomass depends on their ecological health and stability being properly conserved and protected. The sheltered coastal areas around the 15,000 km long coastlines of New Zealand were all identified in the First Order Survey as areas of significant conservation value.

Figure 12 Photograph of the edge of an unmodified pristine estuary.

The overriding purpose of Resource Management Act 1991 is the promotion of the sustainable management of natural and physical resources which include all land-based structures and the renewable and non-renewable resources of the coastal zone. Preservation of the natural character of the coastal environment, including protection from inappropriate subdivision, use and development is a matter of natural importance under the Act. Without a knowledge and understanding of what makes up the **"natural character of the coastal environment"** of New Zealand, including the limits of ecological systems to sustain themselves, coastal management will not be effectively sustainable as required by the Act.

The CRI First Order Survey can assist that understanding by providing a baseline of information from which it will be possible to monitor future change. An enhancement of the natural character of the coast in the eyes of the public of New Zealand will be the most obvious outcome of effective coastal management under the Act.

Limitations

Time and information constraints placed limitations on the extent, quality and quantity of information used for the CRI First Order Survey. Apart from the WERI database most, if not all, other DoC databases used by the First Order Survey encompass only the landward part of the coastal zone above MHWS. As highlighted in Figures 6 to 9 the result is generally a paucity of information on the conservation values of the marine area compared to the land. Despite this fact most sheltered coastal areas like Fiordland, the Marlborough Sounds, harbours, estuaries and saline lagoons are covered. The Conservancies of Auckland, Nelson/Marlborough and Southland were able to obtain some information about the marine areas in their regions for the open exposed coastal areas whereas the other ten conservancies obtained very little.

The First Order Survey also highlighted variations in the quality and coverage of information between conservancies. This is highlighted in Figure 8 which shows 100% of the Kermadec Islands coastlines with conservation values compared to only 45% for the Chatham Islands. A possible explanation is that the amount of knowledge available for the marine area for the Kermadecs presently exceeds that for the Chathams.

Figure 13 Photos of Kermadec and Chathams coasts.

Other major gaps in information included both Maori and Pakeha cultural values and information about public access to and along the coast. Despite the fact that most New Zealanders use the coastal zone for recreation, little is known nationally about recreational pursuits and values. The First Order Survey provided little information on coastal processes and the physical resources of the coast.

As the First Order Survey was mostly concerned with identifying sites of conservation value and areas of significant conservation value, little emphasis was placed on obtaining quantitative information. The requirements by the Resource Management Act 1991 for sustainable management of natural and physical resources suggests that such information will be required, especially on the natural capacity of ecological systems to sustain themselves under various management scenarios.

It is important to stress that information presently exists on cultural values and ecological values of the coastal marine areas, including their sustainable limits, but it is scattered widely throughout New Zealand. Access to this information will be an important task for the completion of the CRI Second Order Survey and updating of the First Order Survey.

Site Evaluation

There is general agreement that most if not all of the New Zealand coastal zone possesses some conservation value, but it is not easy to evaluate which areas have greater value than others. The following extract from West Coast Conservancy illustrates the problem:

> **"All parts of the coastline contain some value to conservation, whether it be for natural, cultural or historic purposes. Some values are purely intrinsic or**

> **personal, and may not be widely shared by society, yet even these deserve recognition. Other values, such as historic or recreational sites and rare species or habitats are more easily defined. Clearly, some parts of the coast hold a higher conservation value than others."** (West Coast Conservancy, Department of Conservation, 1990a.)

For some natural ecological values there are well established ways of determining relative significance. For example, in the case of **terrestrial** flora and fauna (including mammals, birds, reptiles and amphibians, as well as certain arthropods and molluscs), the conservation status of threatened species is known and published in periodically updated lists (see Bell, 1986; Given *et al.*, 1987; Wilson and Given, 1989). This allows for the evaluation of sites in which threatened species occur, using the criteria of the IUCN (1988) (see Appendix 3). For landforms and other geological sites the Geopreservation Inventory provides classifications based on geological opinion (see Appendix 3). Similarly, for certain historic sites (other than archaeological sites) evaluations, which have been published elsewhere, are used in the CRI.

There is as yet no established method for comparing the relative ecological values of sub-tidal sites. For example, there is no conservation status list available for marine habitats and species. Thus, it is easier to evaluate the ecological values of land-based sites than sub-tidal sites. As a consequence most sites identified in the First Order Survey as having nationally or internationally important natural values (significant conservation values) are on land. With greater knowledge of the ecology and natural values of the marine area of the coastal zone, areas of significant conservation value requiring protection under the Resource Management Act 1991 would be identified.

For archaeological sites no method for assessing comparative importance is recognised, and under the Historic Places Act 1980, the authority to make such an assessment rests with the New Zealand Historic Places Trust, for the purposes of regulating site damage (Brian Sheppard, pers. comm.1990). For these reasons no attempt was made in the CRI First Order Survey to assess the comparative importance of archaeological sites. Similarly, there is no recognised method for assessing the comparative importance of sites with cultural value, and they have not been evaluated in the CRI First Order Survey.

Major Issues

The following major issues of concern discussed below were identified by conservancies in the 13 First Order Survey reports:

Maori Issues

From the point of view of Maori spiritual, cultural, and historic values, it can be argued that no portion of the coastal zone is without value. The entire coast has deep significance to all Maori. For example, on the North Island East Coast the seven Iwi retain;

> **"strong and vibrant links with the entire coastline....It must be stressed that, to the Maori, all the coast, every rock and bay, is known and held in the highest esteem and considered culturally and spiritually important and therefore of the highest conservation value"** (East Coast Conservancy, Department of Conservation, 1990a).

The values placed on the coast by the tangata whenua have not been fully recognised and taken account of in the past. These values must be recognised and taken into account for present coastal management under the Resource Management Act 1991 and Conservation legislation. The limited time involved in the preparation of the CRI First Order Survey strongly highlighted the need for more time to be given to this important area of assessment in the future, particularly for inclusion in some form acceptable to Maori in the CRI Second Order Survey.

The iwi are quite clear on the fact that the only mana they have left is their reo (language) and their knowledge. The traditional Maori process is to **guard** knowledge in toto (or critical elements of it), and by doing so, **preserve** its mana (Eru Manuera, pers. comm. 1991).

Before Maori cultural resource information is obtained, recorded and published it will be essential to first go to the Maori with the kaupapa (the why) in order to do the task (the what). (Te Aniwa Hona, pers, comm. 1991). A possible kaupapa, or mission for the CRI Programme could be:

> **"To identify and record areas of significant conservation value so that they can be effectively managed and protected for the health, wellbeing and sustenance of future generations."**
>
> [CRI Taskforce, pers. comm. 1991]

The meaning of **areas of significant conservation value** would include not only those areas of natural values but those of Maori spiritual, cultural and historic value. The meaning of **future generations** would include not only humanity but also the natural capacity of ecological systems within the coastal zone to sustain and review themselves.

Figure 14 Photo of tangata whenua and coast.

Threats from Human Activities

A major concern in many parts of New Zealand is the continual modification of coastal ecosystems including sand dunes, harbours and estuaries, coastal forests and rocky reefs by various human activities. For this reason, the protection of typical and unique coastal ecosystems below MHWS as marine reserves is an important priority for the Department of Conservation. Not all the coast can be protected in reserves. Therefore, it is important that future management of the coastal zone makes provision for the prevention or mitigation of further modification wherever possible, thereby preserving the natural character of the coast.

The national importance given in both the Reserves Act 1977 and the Resource Management Act 1991 to the **preservation of the natural character of the coastal environment of New Zealand**, emphasises the need for integrated planning and management of coastal lands and waters, because of the impacts of certain land uses on the coastal marine area. Several of the issues raised in the CRI First Order Survey related to threats to the natural character of the coast caused by human use of the territorial environment. For example water pollution, soil erosion, sedimentation and coastal erosion are often caused by inappropriate land uses, sometimes occurring in river catchments many kilometres inland.

Figure 15 Photo of polluted coastal water

Introduced pests and weeds also threaten the natural character of the coast in many areas. For example, *Spartina anglica* is a problem invasive saline dwelling plant in many estuaries and

sheltered coastal waters, such as the Manawatu River estuary and parts of Queen Charlotte Sound (Wanganui and Nelson/Marlborough Conservancies, Department of Conservation, 1990a).

Figure 16 Photos of spartina

Most Conservancies also referred to the ubiquitous problem of plastics pollution on beaches. Much of the plastic comes ashore after being dumped out at sea by foreign and local vessels, especially fishing boats. Apart from detracting from the natural character of the coast, plastic debris indiscriminately kills fish, seabirds and marine mammals.

Figure 17 Photo of plastic pollution on beach

Even recreation can have a devastating effect on certain ecosystems. For example, on the Coromandel Peninsula where there may be as many as 140,000 visitors during the summer, **"the fragile dune systems have been particularly modified by human interference"** (Waikato Conservancy, Department of Conservation, 1990a).

Figure 18 Photo of battered foredune

Destruction of marine ecosystems caused by various fishing techniques and the impact on fish and shellfish populations caused by overfishing are other common concerns. The CRI identifies places where certain fishing methods threaten conservation values of marine ecosystems. For example, in Golden Bay where **"inappropriate fishing techniques in the past have decimated commercial fishing stock"**, and in Queen Charlotte Sound, where **"fishing techniques, particularly dredging and trawling, have a profound effect on the marine environment"** (Nelson/Marlborough Conservancy, Department of Conservation, 1990a).

Threats from Natural Hazards

Other issues of concern raised in the First Order Survey relate to threats from actual and potential natural hazards to human values of the coastal environment. Such hazards arise when natural coastal processes damage or destroy human property and assets, and conservation values. Coastal processes that may become natural hazards include erosion, flooding, landslip, sedimentation, subsidence and sea-level rise. By far the greatest potential natural hazard likely to occur next century is from the effects of climatic change from an enhanced greenhouse effect. A global atmospheric warming of 3°C is predicted to occur which could cause sea-level to rise up to about 1m next century, above the present level (IPCC, 1990). Such a rise would lead to an enhancement of existing hazards and the occurrence of others in coastal areas presently regarded as stable. The CRI provides information about areas of the coast threatened by coastal hazards, which will be valuable for local authorities implementing the Act when considering appropriate options for preserving the natural character of the coastal environment and protecting human property and assets. Quantitative information on coastal hazards is a matter to be addressed in the CRI Second Order Survey.

Figure 19 Photo of polluted coastal water

Public Access

The question of public access to and along the coast, is of paramount importance to all New Zealanders and was another matter raised in First Order Survey. Under Section 6 of the Resource Management Act 1991, maintenance and enhancement of public access to the coastal marine area is a matter of national importance that must be recognised and provided for by consent authorities. Under Section 3 of the Reserves Act 1977 it is also a matter that should be recognised and provided for.

In approaching the issue of public access it will be important to determine ownership of the coastal hinterland. There are areas where the beach and even parts of the seabed are held in private ownership and access is only at the owner's consent. There are also areas where esplanade reserves appear on maps which have been destroyed by coastal hazards. In other areas landowners have built fences and gardens across legal reserve land between their property and the coast, thus

denying others their rightful access to and along the coast. Detailed information about ownership and access to the coast is a matter to be provided for in the CRI Second Order Survey if the Reserves Act and Resource Management Act are to be effectively implemented.

Figure 20 Photos of good and bad public access

Future Directions

Who should maintain the CRI Programme?

Under Section 35 of the Resource Management Act 1991 local authorities are required amongst other things, to gather appropriate information, monitor the whole or any part of the coastal environment, and keep records of the information gathered. In contrast, under Section 28(d) of the Act the Minister of Conservation is required to monitor the effect and implementation of New Zealand Coastal Policy Statements and coastal permits issued by him or her.

With respect to future directions for the CRI Programme, Sections 28 and 35 of the Act raise important questions about firstly, whose responsibility it is to run the Programme and, secondly, the meaning in practice of the words **"to monitor the effect and implementation of".**

At face value the most obvious interpretation of Sections 28 and 35 is that local authorities should be entirely responsible for an inventory of coastal resources and monitoring the coastal environment. DoC's role would be limited to standing back and observing the effects of the NZCP Statements etc. The Department would not have a role in gathering information unless it was commissioned by a local authority.

Such an interpretation may not be realistic on several counts. **Firstly**, under Section 53 of the Conservation Act 1987 the Director-General of Conservation may carry out surveys, investigations, and inventories of the coastal zone. Under Section 4 of the Reserves Act 1977 surveys may be made of **"scenic, historic, cultural, archaeological, biological, geological, or other scientific features or interest, or indigenous flora or fauna, or wildlife, or recreational or natural environment interest"** of any land, including foreshore that should be reserved or otherwise protected. On this basis DoC has a clear discretionary mandate to maintain the present Coastal Resource Inventory Programme.

Secondly, DoC already gathers information and monitors elements of the coastal zone under other Acts that it administers. Under the Historic Places Act 1980 information is gathered on historic places such as archaeological sites, Maori traditional sites, and historic buildings; under the Marine Reserves Act 1971 information is gathered on typical and unique marine species and habitats; under the Marine Mammals Protection Act 1978 information is gathered on marine mammals and their habitats; under the Native Plants Protection Act 1934 information is gathered on both terrestrial and marine flora; under the Wildlife Act 1953 information is gathered on seabirds, reptiles, amphibians and insects; and, under the National Parks Act 1980 information is gathered on ecological systems, distinctive scenery, archaeological and historic sites, and natural features of special quality or scientific importance; and under the Reserves Act 1977 ecological information is collected for the PNA Programme and other information and the natural, historic or scientific features and their recreational potential and public access to the coast is contributed through the Coastal Reserves Survey completed in 1986.

At present, therefore, DoC is gathering information on selected coastal resources under eight Acts that it administers. Most, if not all, of this information is relevant to the coastal management requirements of local authorities for information under the Resource Management Act 1991. The CRI Programme currently uses this information to determine areas of significant conservation value and is likely to continue to do so.

Thirdly, if the national overview of coastal conservation values and other information presented in the First Order Survey is to be effectively maintained it will need updating as new information comes to hand. For effective updating national standards will need to be maintained to ensure consistency of information. If such standards were not maintained then each local authority is likely to observe its own standards making it extremely difficult to achieve spatial consistency of databases. Further, it would be impractical for a local authority to take on the role of maintaining a national overview. It would be most cost effective if this was done by a central government agency like DoC. The CRI First Order Survey could then be used as a tool to monitor the effect and implementation of NZCP Statements and coastal permits issued by the Minister of Conservation.

Fourthly, under the present circumstances DoC will continue to maintain its own databases. If local authorities gather similar data there will be a duplication of effort and a likely conflict of

standards that could spill over into the planning process producing conflict and confusion at hearings. This would not be cost effective. The most effective solution would be for DoC and local authorities to identify their relative strengths and deficiencies with respect to the gathering of information and the monitoring of the coast and share information and resources. From the Department's viewpoint this would provide a more hands-on approach towards monitoring the effect of NZCP Statements etc., and be more cost effective. At present neither DoC nor local authorities have the full range of expertise necessary to do the job hence sharing of expertise and information is the most practical approach.

Fifthly, DoC has now established the CRI programme and has, and is in the process of developing standard criteria and methods to identify and record sites of conservation value and areas of significant conservation value. It would seem a sensible use of national resources to build on this experience and use the CRI Programme to satisfy the needs of both the Department and local authorities.

It is concluded from this analysis that DoC should continue to own, direct and manage the CRI Programme but that the gathering of appropriate information and the monitoring of the coastal environment should be a cooperative venture between DoC Conservancies and local authorities.

What information should the CRI Programme now collect?

The CRI Programme was initiated in 1987 under the Conservation Act 1987, and therefore included databases gathered by DoC under the Acts that it administers. The CRI First Order Survey, initiated in 1989, attempted to anticipate the requirements of the Resource Management Act which came into force on 1 October 1991, by identifying sites of conservation value and areas of significant conservation value within the coastal zone of New Zealand. Now that the Resource Management Act 1991 is in force local authorities are primarily responsible for coastal management. Therefore, if the CRI Programme is to be managed and maintained by DoC it should provide information in a user friendly form that satisfies the requirements of both levels of government. Local government, therefore, will need to have an input into the selection of appropriate information categories for the CRI Programme.

The CRI First Order Survey identified some major information gaps that will need to be filled if a comprehensive coverage of the conservation values of the coastal zone of New Zealand is to be

achieved. More information is clearly required on the cultural values (Maori and Pakeha) over the entire coastal zone and on natural values for the seaward part of this zone below MHWS.

Much of this information presently exists with various agencies and individuals. It would be a wiser use of resources to fully access existing information through effective consultation rather than carrying out new surveys of resources where inventories already exist. For example, the Coastal Reserves Survey completed by the Depqrtment of Lands and Survey in 1986 has important information on the status of public access to and along the coasts.

For sustainable management of natural and physical resources of the coastal environment a detailed knowledge of the natural capacity of ecological systems to replenish themselves will be required. Once a baseline inventory of these resources has been completed it will be essential to monitor their condition to ensure that sustainable management is working in practice and to detect changes in condition in response to events such as natural hazards.

It is concluded that the CRI Programme should focus on gathering both qualitative and quantitative information by way of inventories on the **natural and cultural resources** of the coastal zone. [Note that in the context used here, **cultural** includes the category **historic**.] The information should be used to identify **areas of significant conservation value** and the actual and potential threats such areas are subject too from natural and human-induced hazards. The CRI Programme should continue to be a receptacle for appropriate databases presently collected by the Department and other agencies and be available and accessible to interested users.

CHAPTER 6 CONCLUSIONS

1. The CRI First Order Survey, completed between 1989 and 1990 by more than 50 dedicated DoC staff, achieved its primary mission of providing information for the maintenance, enhancement and restoration of the natural character and qualities of the coastal zone of New Zealand, and for its sensitive use.

2. The First Order Survey covered the coastal zone of the islands of New Zealand ranging from the landward limit of marine influence out to the seaward limit of the Territorial Sea, 12 nautical miles offshore. The coastal zone identified ranged from about 20 km in width to more than 50 km depending on the landward limit of natural, cultural and historic values at different sites.

3. The First Order Survey identified about 80% of the 15,000 km-long New Zealand coastlines having sites of conservation value and about 50% having areas of significant conservation value. For the 7,000 km-long North Island coast about 90% has conservation values and about 40% significant conservation values, compared to about 70% and 60% respectively for the 7,500 km-long South Island. Based on limitations of the Survey these figures are regarded as **minimum** values.

4. The major coastal issues identified by the First Order Survey to be addressed by policy makers, planners and managers included Maori cultural values, threats from human activities, threats from actual and potential natural hazards and public access to and along the coast.

5. The First Order Survey was generally limited by a lack of information on the natural values and resources of the seaward part of the coastal zone below MHWS, including physical coastal processes, and on Maori and Pakeha cultural values over the entire coastal zone. Although qualitative information was provided on maps and site forms there was a general lack of quantitative information now necessary for sustainable management of coastal zone resources.

6. The First Order Survey highlighted the fact that although there are existing criteria for determining areas of significant conservation value for terrestrial flora and fauna, geological features and some historic sites, no such criteria presently exists for the marine resources below MHWS. Similarly, criteria do not exists for determining the relative importance of archaeological sites and other sites of cultural value to both Maori and Pakeha. These criteria should be developed for the CRI Programme.

The Department of Conservation has successfully tested and established the CRI Programme through the First Order Survey and has acquired the expertise to maintain the Programme effectively.

7. The Department should retain ownership, direction and management of the CRI Programme and utilise the First Order Survey, including the established standardised 1:250,000 digitised map series and GIS computer facility, to monitor trends each year in the condition of the natural character of the coastal environment, the effect and implementation of New Zealand Coastal Policy Statements, and coastal permits issued by the Minister of Conservation.

~~CRI Second Order Survey~~

8. Information within the 13 volumes of the CRI First Order Survey is currently being used by DoC, local authorities and other agencies for planning and management purposes. The CRI Programme has also attracted interest from other South Pacific Nations. The CRI Programme should be tailored for use by district and regional plans and regional coastal plans prepared by local authorities. The Programme should also be tailored to continue to assist DoC's conservation functions such as the development of Conservation Management Strategies, the establishment of terrestrial and marine reserves, and for advocating coastal conservation generally and promoting the benefits to present and future generations.

9. With respect to the requirement for sustainable management of the resources of the coastal zone it will be necessary for the CRI Programme to provide quantitative information on the capacity and limits of renewable resources to sustain themselves, together with information on those resources that are non-renewable.

10. The CRI Programme should not only act as a receptacle or focal point for the databases collected under the Conservation laws administered by DoC but be expanded to accommodate databases collected by local authorities and non-government organisations where these are relevant to the requirements of all aspects of coastal management.

11. The CRI Programme should focus primarily on filling the information gaps identified by the First Order Survey. The gaps to be filled include Maori and Pakeha cultural values over the entire coastal zone, ecological resources and values below MHWS, natural hazards, and the status of public access to and along the coast.

12. DoC should continue to be responsible for developing internally consistent national standards for data collections used by the CRI Programme, including quality control at all levels, and for the continued development of an efficient computer information management system for storing, analysing and retrieving resource inventory information.

13. DoC and local authorities should collaborate and share resources on the collection of information for the CRI Programme and the monitoring of the coastal zone.

~~52~~ 36 etc

CHAPTER 7 RECOMMENDATIONS

Please add your recommendations for the CRI Programme here.

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APPENDIX 1 CRITERIA USED IN FIRST ORDER SURVEY

1. NATURAL VALUES:

Map the extent of known areas of biological, physical or ecological value on coasts. Ideally, some of the features listed below such as representativeness, rarity and uniqueness need to be considered within an overall framework (cf. the ecological district of the PNA programme). We can however contribute to the future development of this framework for coastal and marine areas purely by observing and documenting important coastal environments as in the first order survey.

(a) High Degree of Naturalness: - Identify terrestrial and aquatic communities or habitat little modified by human influence or where there is only isolated development or modification (e.g. estuaries which contain intact zonation sequences from coastal forest to waters edge). Factors which detract from naturalness include **changes** to water quality (including current flow), substrate, species assemblages, ecosystem structure, or the surrounding environment. In many cases the importance of naturalness is partly that of scarcity value of dwindling or threatened habitat.

(b) Rare/unique species, communities or habitat: - Identify areas containing rare or unique terrestrial and aquatic species or species assemblages, communities or habitat.

(c) Important breeding/feeding/roosting/haulout/nursery areas: - Identify areas which are breeding, feeding, nursery, haulout or roosting sites for rare species or which support large numbers of common species.

(d) Fragile/environmentally sensitive areas: - identify areas containing particular habitats, communities, species, landforms, which are very sensitive to any form of environmental change (e.g. brachiopods, black coral, or areas significantly involved in coastal sediment systems such a dune systems, etc).

(e) Unique or unusual landforms: - Identify unusual reef and shore platforms, fossiliferous outcrops, raised beaches, faulting or folding features present in rock faces, sea caves etc - refer to Geopreservation Inventory of NZ Geological Society (e.g. Moeraki Boulders, Cape Turakirae, etc).

(f) Representativeness:- Identify representative habitats, communities, and/or features from existing sources of information. **It is important that the source of this information is recorded on the site recording sheet.**

(g) Known scientific value: - Identify areas/features for which there is a recorded history of scientific investigation or observation, areas which may be important for monitoring environmental change and/or areas which are of a unique or unusual nature (e.g. Kaikoura Peninsula, Deleware Inlet, Cape Turakirae, Leigh Marine Reserve, etc).

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(h) National or international importance: - Identify natural areas either recorded in existing literature or known by experts to be of national or international importance e.g. Cape Turakirae, Farewell Spit, Fiordland, etc.- For plant and animal species on shoreland areas you should refer to the publications "Threatened and Local Plants of New Zealand", by D.R. Given, W.R. Sykes, P.A. Williams & C.M. Wilson, Botany Division, DSIR (1987); and "Conservation Status of New Zealand Wildlife" by Brian D. Bell, Occasional Publication No.12, N.Z. Wildlife Service (1986).

For assessing the national or international importance of marine species and habitats you should determine whether the species are endemic and their relative abundance. The functional importance of a site should also be considered in this assessment, e.g. estuaries are often important recruitment areas for fish and the start of food chains or large sea areas.

Where a site is not recorded as being of national or international importance it will be assumed that it is of local or regional importance. **It is important that the source of this information is recorded on the site recording sheet.**

(i) Other: - Identify features of important natural value other than those listed above (a-h).

2. HISTORIC VALUES

Map the extent of areas of important historic and archaeological value in coastal areas. This will include areas which have played an important role in the history of New Zealand: political, social, economic, cultural.

(a) Known Historic value: - Identify sites or features such as buildings or structures of historical, architectural or technological interest, e.g. early lighthouses, wharf structures, submerged early coastal protection works etc.

(b) Archaeological value - Maori origin: - Identify sites or groups of sites of Maori origin which provide information about past settlement, e.g. settlement sites, Maori fish ponds below sea level, etc.

(c) Archaeological value - non-Maori origin: - Identify sites or groups of sites of non-Maori origin which provide information about past settlements, e.g. sites of early sealing, whaling and trading stations etc.

(d) Shipwrecks and wreck sites: - Identify important wreck sites, e.g. "Mikhael Lermontov", "Rainbow Warrior", "Hyderabad". "Fusilier", etc (consult the book "New Zealand Shipwrecks, 1795 - 1982" by C.W.N. Ingram, 6th Edition 1984).

(e) Known national or international significance: - Identify areas recorded in existing literature or recognised as of national or international significance. Where a site is not recorded as being of national or international significance it will be assumed that it is of local or regional significance. It is important that the source of this information is recorded on the site recording sheet.

(f) Other: - Identify features of important historic value other than those listed above (a-e).

3. CULTURAL VALUES

Cultural values include areas of known traditional, landscape, aesthetic and spiritual values associated with coastal areas, and include both Maori and non-Maori values. The sensitive nature of some of this information, particularly the traditional and spiritual values associated with the coast, is appreciated. The role of iwi as the most appropriate body to identify and classify waahi tapu areas is accepted and they may or may not wish to disclose information. For this exercise you should contact kaumatua (elders) from the local iwi, ensure they are aware the CRI programme and establish a contact person. The time limitations of the first order survey are also appreciated.

(a) Traditional values: - Identify areas where traditional values are known to exist, e.g. places which were occupied or used in former times, such as pa or kainga, whaling stations, landscape features such as cliffs, rocks and rivers which determined the boundaries of iwi or hapu; rocks placed a markers or memorials; trees planted as commemorations; areas set aside for the conservation and selected use of a particular resource, e.g. mud, stone, plant species, kaimoana; tauranga waka (canoe landing sites). Sites of traditional value also include places associated with tapu (waahi tapu).

(b) Aesthetic value: - Identify ares of known aesthetic value, e.g. Abel Tasman National Park, Fiordland, Stewart Island, Parengarenga Harbour, etc. These are areas which enhance human appreciation, understanding and enjoyment of nature, or are of considerable scenic beauty.

(c) Landscape (seascape) value: - Identify coastal landscapes with particular visual qualities, distinctiveness, or vulnerability to change (e.g. Kaikoura Peninsula, landform projecting into the sea with a distinctive coastal fringe; Ninety Mile Beach, open coast and distinctive dune systems; and Whanganui Inlet surrounded by distinctive landforms in terms of vegetative cover and geological features, etc).

(d) Spiritual value: - Identify objects, features or areas of spiritual significance to people. Spiritual values are subtle relationships people have with land and water. These areas are characterised by the presence of a particular energy (mauri) which restores the spiritual balance of people from time to time.

(e) Education value: - Identify those areas of coastline which are used on a regular basis for educational or interpretative purposes by schools, universities or the general public, e.g. the Leigh Marine Laboratory, Edward Percival Marine Laboratory, Outward Bound - Anakiwa, etc.

(f) Other: - Identify features of important cultural value other than those listed above (a-e).

4. EXISTING THREATS

Map the extent and types of known threats to coasts listed below. Threats may be natural or human induced. Natural threats include both physical and biological processes that are, and have a history of damaging or destroying coastal resources. Human induced threats include those activities that also are, and have a history of damaging or destroying coastal resources.

(a) Erosion, flooding, landslip: - Identify lengths of coast subject to known sea and wind erosion, sea and river flooding, coastal landslides.

(b) Siltation: - Identify areas of nearshore seabed and intertidal foreshore subject to adverse effects of known siltation from excessive runoff.

(c) Noxious or invasive exotic plants: - Identify areas of coast where exotic or noxious terrestrial and aquatic plants have invaded coastal zone communities; and/or coastal waters subject to seasonal occurrence of algal blooms detrimental to marine life.

(d) Noxious or farmed animals: - Identify areas of coast where noxious or farmed animals are damaging or destroying coastal resources.

(e) Water pollution: - Identify coastal areas affected by excessive and harmful pollution (e.g. waste and storm water discharges, leachates, industrial effluent etc).

(f) Mining: - Identify areas of coast where mining operations are damaging or destroying coastal resources especially those that are non-renewable by coastal processes (e.g. sand and gravel extraction, mineral and hydrocarbon extraction etc).

(g) Shore stabilisation works: - Identify lengths of coast where protection works are damaging or destroying coastal resources such as the prevention of natural beach sedimentation (e.g. groynes, seawalls, river training walls, offshore breakwaters, etc).

(h) Aquaculture: - Identify areas of nearshore waters and seabed adversely affected by types of aquaculture and associated practices (e.g. fish farming, oyster/mussel rafts, etc).

(i) Fishing techniques: - Identify areas of the NZ Territorial Sea where certain fishing techniques are damaging or destroying important coastal and marine resources (e.g. bottom trawling, scallop dredging, gill netting, paua gathering etc).

(j) Spoil and refuse dumping: - Identify areas of nearshore seabed and intertidal foreshore where dumping of spoil and refuse has and is taking place and is damaging or destroying important coastal resources (e.g. disposal sites for harbour maintenance dredgings, rubbish tips etc).

(k) Recreation: - Identify coastal areas adversely affected by intensive recreational uses (e.g. trail bike and dune buggies, trampling of sensitive plant and animal communities, recreational fishing etc).

(l) Coastal Subdivision: - Identify coastal areas where residential, commercial or industrial beachfront subdivisions have damaged or destroyed important coastal resources (e.g. levelling of foredunes, loss of "Queens" chain, loss of beaches etc).

(m) Other: - Identify areas of coastal zone affected by threats other than those listed above (a-l).

5. HUMAN MODIFICATION AND USE

Map the extent and types of known human modifications and uses of coasts listed below. Human modification refers to those activities which have permanently altered the natural character and qualities of coasts. In most cases such activities no longer pose threats to coasts as the ecosystems have adapted to change since the modifications took place. In some cases some of the human induced threats listed above in Category 4 (Threats) may qualify for the Human Modification

Category. Human use refers to those activities in the coastal zone that have not resulted in significant modifications or threats to the natural character and qualities of the environment.

(a) Land development: - Identify areas of shorelands modified by developments for rural, recreational, residential, industrial and commercial purposes (e.g. agriculture, horticulture, forestry, parks and reserves, camping grounds, housing, factories etc).

(b) Reclamations and causeways: - Identify areas of nearshore seabed and intertidal foreshore modified by reclamations and causeways (e.g. roading causeways, airfields, industrial/commercial sites, property encroachment etc).

(c) Commercial port areas: - Identify coastal areas modified by port facilities through reclamation, wharves, breakwaters and infrastructures (e.g. major and secondary ports - Auckland, Wellington, New Plymouth, Westport, etc).

(d) Small boat harbours and moorings: - Identify coastal areas modified by marinas and other types of small boat harbours, pile and buoy moorings.

(e) Outfalls, major pipelines and cables: - Identify nearshore seabed and foreshore areas crossed by outfalls, major pipelines and cables (e.g. long and short ocean outfalls, Maui oil and gas pipeline, Cook Strait transpower cable, etc).

(f) Artificial cuts - Identify foreshore areas permanently or periodically cut to release imponded waters (e.g. Lakes, Forsyth, Ellesmere, Onoke, Clutha and Waikanae river mouths, entrance to Nelson Haven, etc).

(g) Beach replenishment: Identify foreshore areas where sand or gravel has been artificially placed to replenish dwindling supplies (e.g. Oriental and Ballaena Bays, Westshore, etc).

(h) Shoreland-based recreation: - Identify shoreland areas important for recreational uses such as camping, walking, picnicking, hang-gliding, fossicking, swimming, surfing, diving, fishing, etc.

(i) Water-based recreation - Identify nearshore waters important for recreational uses such as yachting, cruising, fishing, SCUBA diving, etc.

(j) Traditional Maori use: Identify coastal areas important for traditional Maori uses such as pingao harvesting (sand dunes), shellfish gathering (foreshore, nearshore), eel trapping, flax harvesting, traditional fishing, etc.

(k) Other - Identify areas of the coastal zone affected by human modifications and uses other than those listed above (a-j).

6. EXISTING PROTECTION

Existing protection refers to shorelands, foreshore and seabed which already have a significant form of statutory or voluntary protection over them. A very useful guide providing a comprehensive table of protections mechanisms is the publication by the Protected Ecosystems and species Directorate, "A Guide to Protection mechanisms" by A.E. Sutton and L.J. Daniel, March,

1989. This publication should help you to decide which categories particular types of protected areas should be placed in.

(a) National protected areas: - Includes protected areas which are administered by the Crown, (e.g. set up under the National Park Act, Marine Reserves Act, Marine Mammal Protection Act, etc).

(b) Regional protected areas - Includes protected areas which are administered by Regional Councils (e.g. Regional Parks).

(c) Local protected areas - Includes protected areas which are administered by District Councils or Boards.

(d) Protective zoning: - Refers to zones which protect specific coastal features by statute, e.g. protective zoning under the Town and Country Planning Act (through District and Maritime Schemes), fisheries Act, Conservation Act, Maori Affairs Act and others. The type of zoning may include estuarine protection zones, coastal hazard zones, foreshore protection zone, zones for exclusion of commercial trawlers, etc.

(e) Marine parks: Refers to parks which are set up under the Fisheries Act in combination with Grants of Control where species are protected by fisheries regulations and by-laws.

(f) Private protected areas: - Includes covenants under the Conservation Act, QEII National Trust Act, Reserves Act and Wildlife Act.

(g) Voluntary protection of areas - Includes those areas which receive protection on a voluntary basis, e.g. the voluntary protection zone off Kapiti Island set up in 1987 by the Kapiti Boating Club.

(h) Rahui: - Includes a temporary form of protection placed over an area or species which is observed by tangata whenua and others.

(i) Other: - Identify significant forms of protection of coastal areas other than those listed above (a-h).

APPENDIX 2 **Example of a Site Record Form**

Site Names: Preservation Inlet **Site No: 140049**

Recorders Name: Simon Hayes **Conservancy:** Southland

Map/Grid Ref: NZMS 262 (SHT 16) 20220 54410 **Date:** 30 03 90

Brief Description of Site:

While Preservation Inlet is similar to other northern fiords, with a glacially formed 'U' shape and basins formed behind a shallow entrance (a morainic rock sill), it's entrance is different to the northern fiords, being very wide and noticeably less precipitous. The fiord extends about 36 km inland where it is divided up into Isthmus Sound to the north and Long Sound to the south. The rocky shoreline, with rugged points at Gulches Head and Cavern Head, is broken by gravel beaches and sandy bays; the main bed rock being greywacke and argillite/hard mudstone. Gniess walls make up the sides of Long Sound. While beach forest is the dominant vegetation here, there is a fringe of rata and lowland podocarps around the coast. In all, Preservation Inlet covers an area of 93 sq. km. with a maximum depth of 371m. The hydrology within the fiord is estuarine with a large fresh water run off on the surface and a very slow deep sea water circulation underneath.

Conservation Values: **Natural:** abcdgh **Cultural:** abcd **Historic:** babc

Comment:

This is a remote area with a high degree of naturalness. The subtidal communities living on the fiord walls are unique in NZ and consist almost entirely of sessile suspension feeders in the depths between 5 and 40m. The light-absorbing fresh water layer restricts algal growth and has allowed normally deep water species to become established in shallow depths. Brachiopods and black coral (*Antipathes fiordensis* - threatened interationally by I.U.C.N. D.O.C., 1989) dominate the associations, accompanied by crinoids, sponges, bryozoa, tube worms and diverse coelenterate species. The unique and fragile nature of these communities and their dependence on the terrestrial surroundings is of international scientific interest (Grange 1990, and Wells). At the sill to Narrow Bend (Long Sound) there are large numbers of the brachiopod *Neothyris lenticularis lenticularis*.

In Fiordland this species has only been recorded in these middle shallower reaches of Preservation Inlet. Sea pens (*Sarcophyllum sp.*) have also been recorded in diving depths in this area, and these appear to be a different undescribed species to those found in Doubtful Sound (Grange, 1990). The most northerly sighting of a Southern pigfish (*Congiopodus leucopaecilus*) on the Fiordland coast has been at Steep-To Island. In the shallow area between Steep-To and Coal Island there is a large and extensive tua-tua (*Paphies spp.*) bed (Shaw). Historically Blind Passage was known as an area where crayfish assembled in their millions (Beattie).

NZ falcon (*Falco novaeseelandiae*) have been sighted at the mouth of the Richard Burn (Long Sound), Dawson Burn and Trevacoon Head (this is a threatened species). S.I. kaka (*Nestor meridionalis meridionalis* - regionally rare) have been recorded at Cromarty and Coal Island in coastal forest. Yellow head (*Mohoua ochrocephala* - threatened) have been recorded at the mouth of the Dawson Burn. Sooty shearwaters (*Puffinus griseus*) have been recorded breeding at the Spit Island, Round Island, and a islet off the south west end of the Cording Islands. Mottled petrels (*Pterodroma inexpectata*) are known to be breeding off a small stack in Isthmus Sound. Variable oyster catchers (*Haematopus unicolor*), a rare species, has been recorded in large numbers on a small islet south west of the Cording Islands. Fiordland crested penguins (*Eudyptes pachyrhynchus pachyrhynchus*) breed on Cording, Weka, Round and Coal Islands (McGovern-Wilson, 1985). Small dune systems with the rare native sand sedge pingao (*Desmoschoenus spiralis*) present occur at Welcome Bay, Te Whara beach and on the Spit Islands. Another rare dune plant - sand spurge (*Euphorbia glauca*) - is recorded on the Spit Islands, Te Oneroa, and Kisbee Bay. Hutu (*Ascarina lucida*), a plant found at Kisbee Bay, is at its southern limit here and Sand Daphne (*Pimelea lyallii*) is found here at its northern limit (Johnson, 1979).

There is an exceptional assemblage of filter feeders on steep walls under Trevacoon Head and around Last Cove (Long Sound), including large numbers of *Liothyrella neozelanica* (a white brachiopod), pink, red and white hydro corals (*Order Stylasterina*) and large gorgonians (Grange).

As with all of Fiordland this area has high aesthetic and landscape value (see site record sheet for the outer coast of the northern fiords).

The Maori name for Preservation Inlet was Te Rama or Rakituma. The meaning of this has not been established. The overview of Fiordland's cultural values details the Maori legend of how the god Tu created the fiords; in Preservation this task was finished by Maui. The Preservation area appears to have had extensive Maori usage. Evidence from archaeological sites in old sea caves shows the Foveaux Strait Maoris made seasonal expeditions to Preservation. The Cuttle Cove area is a very celebrated place in Maori history. It was known as Te Whara after a chief. The island at the cove,s end, Matauira, was named after another famous chief who visited here; here Tarewai the renowned fighting chief of the Kai Tahu, was killed, about 1780AD. The fort or pa on this island was known as Te Pa-a-te-whara.

There are two counts of petrified men being found - one at Cuttle Cove and one at Cavern Head. At Cavern Head the petrified man (reportedly Tarewai) and a mere were found in a cave in 1877. However, the body was removed and reburied soon after the body was reported. At Weka Island and Steep-To Island there are some large caves with middens showing signs of early Maori occupation. A large number of early Maori sites of occupation in this area are of particular importance due to the fact they remain undisturbed (McGovern-Wilson, 1981).

Preservation Inlet is rich with early European history and prehistoric Maori history, reflected in the 69 sites that have been recorded to date within the area. Cuttle Cove near Isthmus Sound entrance is the site of NZ's first European whaling station built for George Bunn & Co. in 1829. The station continued whaling until 1840. The station and surrounding land from Dusky Sound to the southern head of Preservation Inlet were purchased from Tuhawaiki and this is the first documented European land purchase from the Maori in the South. Te Oneroa and Cromarty were two small settlements set up on the southern side of Preservation Inlet in response to a gold rush that occurred in the area just before the turn of the century. One of the most productive mines was the Morning Star mine which operated from 1894-1913. McIntyre's sawmill was built in 1894 and provided timber for local gold mines and Invercargill, from just south of Cromarty (McGovern-Wilson, 1981).

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

Comment:

The unique biological subtidal communities are of international scientific interest (Grange). As part of Fiordland National Park which is part of a nomination for World Heritage status and because of its high natural and historic values, this site is of international importance (D.O.C., 1989).

Existing Threats:

Type and Comment: cdfj

Johnson (1979) recorded 29 species of weeds around the historic gold mining townships at Kisbee Bay, including gorse (*Ulex europaeus*), broom (*Cytisus scoparius*) and blackberry (*Rubus fruticosus agg.*). Marram grass (*Ammophila arenaria*) has been recorded at Te Whara beach. Johnson also notes heavy deer and pig browsing in various areas around the mouth of the Inlet (Johnson, 1979).
There is an allocated fuel and rubbish dump utilised by local fishermen at Weka Island (Shaw). Seabed prospecting across the mouth of the Inlet has been sought, gained and carried out in recent years (D.O.C.).

Human Modification and Human Use: adhi

This area (notably the entrance to the Inlet) is under heavy pressure from commercial rock lobster fishing (Voller). There are a number of anchorages within the Inlet that are utilised mainly by local fishing vessels. Most significant

are those at Useless Bay (Long Sound), entrance to Isthmus Sound, Cuttle Cove, Otago retreat and Weka Island (Ward). A recent "resort" has been set up on the private land in Cromarty offering time-share accommodation (Hayes - pers. obs.). Many tourist charter vessels stop in Preservation Inlet to allow visitors to see: the Morning Star Mine, Cuttle Cove whaling station site, Cromarty and Te Oneroa, historic mining sites on Coal Island, Puysegur Point lighthouse and an old pa site at the Spit Islands. Recreational fishing occurs around Cromarty (Shaw).

Existing Protection:

Type and Comment: ad

With the exception of several small sections at Cromarty, this site borders entirely on the Fiordland National Park, though this protection does not extend below the mean high water mark. Whitebaiting is prohibited in Fiordland National Park by West Coast Fisheries regulations.

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	

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

Comment:

This area has been surveyed for archaeological and historic sites (McGovern-Wilson, 1981).

Source 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 filed 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

Comment:

Recorded on Existing Databases: Comment:

1	WERI
2	SSWI
3	PNA Preservation Ecol. Dis. 1904 National Park
4	Geopreservation
5	HPT County Inventories
6	Other
7	None

Other Considerations:

Seabed prospecting could occur in the near future (D.O.C.).

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Accompanying Maps and Photographs:

Refer to Fiordland National Park visitor centre.

APPENDIX 3

CRITERIA USED FOR SITE EVALUATION

Plant and Animal Species

The criteria used for site evaluation in relation to plant and animal species are those used by the International Union for the Conservation of Nature and Natural Resources (IUCN) in the Red Data List (1988).

1. If an endemic species of plant or animal is listed as endangered then the place(s) where that species still remain are of **international importance.**

2. If a plant species is classified as vulnerable or rare, then any site where it naturally occurs is of **national importance.** Similarly if an animal species is classified as threatened or rare then the site where it occurs is of **national importance.**

3. Where an animal species is classified as regionally threatened, the site has **regional importance.**

4. Where sufficient information allowed, the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat was used to determine wetland sites of **international importance.** This 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". (IUCN, 1980)

New Zealand species of endangered, threatened and rare fauna are given in Bell (1986), and of endangered, vulnerable and rare flora, in Given et al. (1987), and Wilson and Given (1989).

Landforms

Unique or unusual landforms were evaluated according to the Geopreservation Inventory in which a given classification (international, national or regional importance) is based on the consensus opinion of geologists familiar with the site.

Historic Sites

Historic sites were evaluated as having national or international significance if such evaluation is published elsewhere, for example the classified buildings in the Historic Places Inventories (currently compiled by Science and Research Division, Department of Conservation).

Archaeological Sites

Archaeological site information is presented in the First Order Survey without any evaluation of comparative importance (See Chapter 5).

APPENDIX 4

GLOSSARY OF MAORI TERMS

Kōhatu or toka -	stone, rock.
Mahinga kai -	methods of harvesting kaimoana according to tribal customary values.
Mahinga maataitai -	areas from which food resources from the sea can be gathered.
Taiapure -	an area of coastal waters set aside under the Maori Fisheries Act 1989 as a local fishery because of its special significance to an iwi or hapu, either as a source of food or for spiritual or cultural reasons.
Taonga raranga -	plants which produce material highly prized for use in weaving.
Tauranga waka -	original canoe landing site.
Urupa -	a burial place.
Waahi tapu -	especially sacred.