Coromandel Peninsula Blueprint:

Biodiversity and Natural Heritage Profile Statement

Biodiversity and Natural Heritage Statement

1 Introduction

The purpose of this profile statement is to:

1. Describe the current state of the biodiversity of the Coromandel Peninsula;
2. Summarise the statutory and non-statutory mechanisms for managing biodiversity on the peninsula;
3. Identify the pressures on ecosystems, habitats, and species and the issues arising from these pressures; and
4. Identify strategic opportunities for the protection and management of biodiversity in future planning.

The paper aims to identify the sources of information on biodiversity and assess their usefulness in preparing maps and overlays for integration with information, issues and opportunities identified in the other profile statements.

1.1 Definition of biodiversity

The Resource Management Act 1991 (the RMA) defines 'biological diversity' as "the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems."

Genetic diversity refers to the varied genetic make-up among individuals of a single species. Species diversity is the variety of species within a particular geographic area, such as the birds, fish, insects, bacteria and plants that live, for example, within a wetland. Ecological diversity is the variety of ecosystem types such as forests, deserts, wetlands, grasslands, streams, lakes and oceans and the communities within them. These communities interact with each other as well as with the non-living environment such as sunlight, air, water, minerals, and nutrients.

The complex web of living organisms interacts with the non-living environment to support life on earth by providing ecosystem services (for example, maintenance of hydrological cycles, regulation and stabilising water runoff and underground water tables, acting as a buffer against extreme events such as flood and drought), biological functions (for example, providing food), and social functions (for example, providing recreation and tourism facilities).

1.2 International obligations to biodiversity

Under the International Convention on Biological Diversity 1992 signatory nations are required to prepare national strategies to conserve and sustainably use biodiversity. New Zealand ratified the convention in 1993.

New Zealand fulfilled the commitments made under the International Convention on Biological Diversity by introducing the New Zealand Biodiversity Strategy (NZBS) in 2000. The NZBS sets out national goals for conserving and sustainably using New Zealand's biodiversity. The Biodiversity Strategy has a twenty-year vision and seeks to

provide an integrated approach to halt the decline of New Zealand's indigenous biodiversity.

New Zealand is a signatory to the Ramsar Convention (1971) which promotes the conservation of wetlands. None of the six Ramsar sites in New Zealand are located on the Coromandel Peninsula, but one site located between Kaiaua and the Waihou River in the Firth of Thames, has relevance to this project. As a Ramsar site of international importance for its bird life, this area of the Firth does not have special protection but is recognised through mechanisms implemented through the Resource Management Act 1991 (RMA) and the Hauraki Gulf Marine Park Act (2000).

2 Legislative Requirements and Agencies Responsible for the Protection and Management of Biodiversity

The responsibilities for managing indigenous biodiversity in New Zealand are assigned by the governing legislation. A number of agencies are involved, including the Department of Conservation, local authorities, the Ministry of Fisheries, the Ministry for the Environment and the Ministry of Agriculture and Forestry.

2.1 Resource Management Act 1991

The purpose of the RMA is to promote the sustainable management of natural and physical resources. Sustainable management includes 'safeguarding the life-supporting capacity of air, water, soil, and ecosystems' (section 5(2)(b)).

In order to protect and manage the biodiversity sustainably, all persons exercising functions and powers in relation to managing the use, development and protection of natural and physical resources under the RMA must recognise and provide for as matters of national importance the preservation of the natural character of the coastal environment (including coastal marine area), wetlands and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development (section 6(a)) and the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna (section 6(c)). In addition, all persons shall have particular regard to the maintenance and enhancement of amenity values, intrinsic values of ecosystems, maintenance and enhancement of the quality of the environment, and any finite characteristics of natural and physical resources (sections 7(c), (d), (f), and (g)).

RMA sections 9, 12, and 13 set out duties and restrictions on the use of land, rivers and lakes, and the coastal marine area respectively. Each section refers to restrictions on use where use includes the destruction of, damage to, and/or disturbance of plants or animals or their habitats. Sections 9 and 13 apply to the terrestrial part of the coastal environment and section 12 to the coastal marine area.

Amendments specific to biodiversity were made by the Resource Management Amendment Act 2003, (RMAA2003), since the current plans were drafted. In addition to the insertion of the definition of biological diversity noted earlier, the RMAA2003 also inserted new sections 30(1)(ga) and 31(1)(b), which give regional and district councils

functions in respect of maintaining indigenous biological diversity; and section 62(1)(i), which states that a regional policy statement must state the local authority responsible in the whole or any part of the region for specifying the objectives, policies, and methods for the control of the use of land to maintain indigenous biological diversity These sections state:

s30(1)(ga) *the establishment, implementation, and review of objectives, policies, and methods for maintaining indigenous biological diversity*

s31(1)(b) *the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of-*

(iii) the maintenance of indigenous biological diversity

s62(1)(i) *the local authority responsible in the whole or any part of the region for specifying the objectives, policies, and methods for the control of the use of land-*

(iii) to maintain indigenous biological diversity; and

These RMA provisions mean councils are required to consider the maintenance of biological diversity when preparing their plans and policies.

Additional amendments were made by the RMA Amendment Act 2005 (RMAA2005). It provides for more leadership from central government, including national policy statements and standards, to guide decision making at the national, regional and territorial levels. Plans will be required to give effect to any initiatives arising from the government in respect of policy statements or standards.

2.1.1 NZCPS

The New Zealand Coastal Policy Statement (NZCPS) is prepared under section 28 of the RMA. Its purpose is to state policies in relation to the coastal environment of New Zealand. NZCPS Policy 1.1.2 states that it is a national priority to preserve the natural character of the coastal environment by protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna. Policies 1.1.3, 1.1.4, and 1.1.5 are also listed as national priorities and collectively refer to characteristics of natural character of the coast which may include biodiversity components or ecological processes. Policy 1.1.3 seeks to protect the collective characteristics which give the coastal environment its natural character including wild and scenic areas; Policy 1.1.4 protects the integrity and functioning of the coastal environment including natural biodiversity, natural movements of biota and intrinsic values of ecosystems; Policy 1.1.5 states it is a national priority to restore and rehabilitate the natural character of the coastal environment.

The NZCPS is administered by the Minister of Conservation. The policy is currently being reviewed and it is expected that a reviewed policy statement will be notified for public submission in 2007.

When the current district and regional plans were notified they were to not be inconsistent with the NZCPS. As a result of the RMAA2003 amendments regional and district plans are now required to give effect to the NZCPS.

2.1.2 Environment Waikato

EW regulates activities by implementing policies and rules in the Waikato Regional Policy Statement, Waikato Regional Plan and the Waikato Regional Coastal Plan. Activities on land and in the CMA which require a resource consent may have conditions imposed which seek the protection of biodiversity.

EW monitors water quality and biodiversity to determine how ecosystem health changes over time and to make appropriate management decisions. The council has also commenced identification of catchments that are impassable to fish through artificial barriers (culverts and dams), offering the potential to re-instate fish passage through the consenting or re-consenting process.

Regional Policy Statement (RPS)

The RPS provides direction for an integrated approach towards resource management in the Region. Section 3.11.4 seeks to maintain or enhance biodiversity of the region. Methods to achieve this include:

- Identify areas of significant indigenous vegetation and significant habitats of indigenous fauna in conjunction with territorial authorities, other agencies and interested parties (using the criteria in Appendix 3 of the Regional Policy Statement).
- Use existing information to develop and maintain a regional database and indicative map of sites known to meet the criteria for significance in Appendix 3. In developing this provide an opportunity for territorial authorities to store sites of local importance on the database.
- Maintain a regional database of threatened species in the Waikato Region.

Appendix 3 of the RPS contains criteria that provide guidance in determining significant Indigenous Vegetation and significant habitats of indigenous habitats of indigenous fauna.

Regional Plan (RP)

The RP is relatively limited in its reference to biodiversity. Controls on clearance of vegetation, for example, are for the purposes of soil erosion and water quality, rather than biodiversity *per se*, because council did not have functions in respect of biodiversity at the time the plan was notified. The plan does control, however, matters which affect integrity and functioning of ecosystems, including structures (such as culverts which affect fish passage), riparian management (stock in waterways) and wetland management. These contribute to maintenance of significant vegetation and habitats.

The RP contains Water Classes which reflect the values for which that water is used. Streams for which fish records are available are generally classified as Fisheries Class and standards relating to water quality and fish passage apply in these locations. Many of the headwaters of these streams will be classified as Natural State, reflecting the relatively unmodified catchments within the land administered by DOC.

Regional Coastal Plan (RCP)

The RCP contains objectives and policies which seek to protect significant indigenous vegetation and significant habitats of indigenous fauna from adverse effects.

In order to promote the integrated management of the coastal marine area, a regional coastal plan approved by the Minister of Conservation must be in place at all times. The current RCP is not inconsistent with the NZCPS, but when the RCP is reviewed it will be required to give effect to the NZCPS.

The Minister of Conservation is also the consent authority for decisions on applications for coastal permits which are restricted coastal activities, as identifed in the RCP.

Statutory promotion under the RMA

EW promotes that territorial authorities have strong biodiversity and natural heritage provisions in district plans, growth strategies and structure plans, particularly with respect to areas such as dunes and wetlands which are highly sensitive to damage and/or have particular biodiversity importance.

2.1.3 Thames Coromandel District Council

The Thames Coromandel Proposed District Plan identifies biodiversity as one of the significant resource management issues for the District. The Plan identifies objectives, policies and rules to enable sustainable management of natural heritage resources of the District.

The policies make reference to the need to control pests; ensure protection, restoration and regeneration; and to recognise the quality and intrinsic values of ecosystems in relation to indigenous vegetation and fauna habitat. Policies also relate to the provision of linkages, buffering and corridors and to ensure biodiversity is not adversely affected by subdivision, use and development.

TCDC's plan sets out rules, standards and activity status for the clearance of indigenous vegetation, wetland and dune vegetation. There is also provision for conservation lot subdivisions, involving creation of additional lots in exchange for the protection of an existing area of native bush, landscape or wetland, or the retirement from primary production (including the regeneration) of an area of land or an area of land containing a site of cultural or historical significance.

The provisions currently in the plan are for the sustainable management of natural resources in accordance with the RMA as it was written at the time the plan was proposed. They were not for the maintenance of biodiversity *per se,* even though biodiversity is identified as an issue, as the requirement to maintain biodiversity was not a council function at the time. The provisions inserted by the RMAA2003 and RMAA2005 will require a review of biodiversity provisions when the district plan is reviewed.

2.1.4 Aquaculture law reform 2004

The Aquaculture Reform (Repeals and Transitional Provisions) Act 2004 introduced a new management framework for aquaculture. The accompanying amendments to the RMA (Resource Management Amendment Act (No. 2) 2004) provide clearer direction to regional and unitary councils regarding responsibilities for managing all effects of aquaculture, and require all marine farms to be located only within an Aquaculture

Management Area. The reform act also repealed the Marine Farming Act 1971 and amended the Fisheries Act 1983.

2.2 Biosecurity Act

Environment Waikato prepares a Regional Pest Management Strategy (RPMS) under section 80A of the Biosecurity Act. The current strategy sets out management programmes for 85 plant and 22 animal pests (or classes of pest) until 2007. Through the RPMS, Environment Waikato carries out monitoring, surveillance, enforcement, and limited control work, and gives advice and information to wider community and landowners, on prioritising pest control, designing control programmes, and promoting pest control. The RPMS complements biodiversity conservation by protecting and enhancing native bush and wetland areas on private land through planned and professional pest control.

The RPMS is a species-led approach, but within the strategy EW also manages a site-led approach to work in partnerships with interested landowners to achieve biodiversity protection and enhancement under the Council's broader Key Ecological Sites (KES) Programme.

The KES programme is concerned with privately owned, regionally ecologically significant areas (e.g. wetlands, rare forest remnants). These sites are determined by criteria based on uniqueness or representativeness of habitat types, land form and assemblages of native flora and fauna. Thirty six sites are located within the Coromandel Ecological Region. Protection and enhancement of the biodiversity values on the sites is through assistance with stock-proof fencing and pest control. Section 3.3.4 also comments on KES.

2.3 Conservation Act 1987

The Conservation Act 1987 (CA) promotes the conservation of New Zealand's natural and historical resources. It requires the Department of Conservation (DOC) to manage for conservation purposes all land and all other natural and historic resources held under the Act, in accordance with approved statements of general policy and conservation management strategies, conservation management plans, and freshwater fishery management plans. Approximately one third of the Peninsula is managed by DOC, under the guidance of the Waikato Conservation Management Strategy (1996-2006) and the Conservation Land Management Plan for the Coromandel Peninsula (2002). The Conservation Management Strategy (CMS) is currently under review.

The CMS identifies 11 sites or groups of sites having strategic importance for conservation within the Waikato Region, called 'strategic management clusters'. The clusters are essentially priority sites that receive active, sustained management over the life of the CMS. Six of these clusters are within the Coromandel peninsula, highlighting the importance of the area in terms of its conservation values.

DOC functions under the CA also include (but are not restricted to) to preserve all indigenous freshwater fisheries, protect recreational freshwater fisheries and freshwater fish habitats, to advocate the conservation of natural and historic resource generally, to promote the benefits to present and future generations of conservation, and to foster the

use of natural and historic resources for the recreation and tourism purposes to the extent that the use of any resource is consistent with its conservation.

2.4 Hauraki Gulf Marine Park Act 2000 (HGMPA)

The HGMPA seeks to achieve the integrated management of natural, historic, and physical resources across the Hauraki Gulf, its islands, and catchments. All of the area to which this profile statement applies lies within the Hauraki Gulf and its catchment.

Section 10 of the HGMPA states that for the coastal environment of the Hauraki Gulf, sections 7 and 8 of the HGMPA must be treated as a New Zealand coastal policy statement under the RMA. Plans or policy statements must give effect to sections 7 and 8 of the HGMPA. If there is a conflict between sections 7 and 8 of the HGMPA and the provisions of NZCPS, the NZCPS prevails.

The HGMPA establishes a Park consisting of all areas which are held, managed, or administered under the CA, reserves controlled by councils and all foreshore and seabed. Private land may be added by owner agreement to the Park, but none has been added to date.

The HGMPA does not refer to biodiversity, but recognises that the ability of the interrelationship between the Hauraki Gulf, its islands and catchments to sustain the life-supporting capacity of the environment of the Gulf is a matter of national significance. Policies and plans are required to give effect to the HGMPA.

2.5 Local Government Act 2002 (LGA)

The LGA provides a broad mandate for local authorities to involve themselves in economic, social, environmental and cultural issues. The LGA is outcome focused, meaning that councils are required to plan for, and report on, specific and measurable results in communities and their environments. The main instrument used to promote outcomes is the Long-term Council Community Plan (LTCCP) which provides the framework for the direction and priorities of each local authority, including the Council's role in biodiversity management. The LTCCP has a 10 year horizon.

As a requirement of the LGA, TCDC facilitated a process to identify community outcomes, which are statements of what the District's communities want the District to be like in the future. Outcome statements which relate directly or indirectly to biodiversity are:

- *Our communities will recognise and value the natural environment.*
- *The natural values of our coast and beaches are respected and enhanced.*
- *The Peninsula's long and rich history is valued and preserved.*
- *The diversity and character of our communities and the uniqueness of the Peninsula is a valued part of our lifestyle.*
- *The needs of both local and visitor communities is met through sound planning, ahead of growth and development.*

Council has identified that over the next three to five years it will work in accordance with the following key work programme:

- *Safeguarding our environment and ensuring the sustainability of the district's natural and physical assets.*

Key goals which relate to this include:

- *Maintain a planning and regulatory framework that achieves community environmental outcomes and values.*
- *Improve the biodiversity of the Peninsula and management of rivers and their catchments.*
- *Ensure that Council activities are undertaken in an environmentally sustainable manner*

The development of a Biodiversity Strategy has been identified as a specific initiative in the Council's work programme to address these goals.

The 2006-2016 LTCCP contains references to biodiversity management in its activity overviews including the need to protect and enhance natural features/systems and to balance growth with the protection of natural resources/systems. A number of key projects identified through the LTCCP signal Council's current and ongoing contribution to biodiversity management including:

- Biodiversity Strategy
- Peninsula Project (includes river and catchment management in conjunction with Environment Waikato)
- Coromandel Peninsula Blueprint Project (Growth Strategy)
- Landscape Assessment Project
- District Plan Review

TCDC's Biodiversity Strategy is anticipated to be completed in draft format by the end of the 2006/07 financial year. The purpose of the Strategy is to consolidate and outline the Council's key goals and approach to working with other agencies to advocate and promote biodiversity enhancing initiatives within the District. The Strategy will have links to a number of other projects including the Peninsula Project, Coromandel Peninsula Blueprint Project, Landscape Assessment Project, and District Plan review, as well as the Council's ongoing service delivery functions. It is anticipated that the adoption of the Strategy may result in defining the Council's levels of service for biodiversity and noting new projects and initiatives which could be implemented via the 2009 LTCCP.

In addition to developing a Biodiversity Strategy, the Council's involvement in biodiversity management is also presented in the Thames-Coromandel District Reserve Strategy 2002 and the Thames-Coromandel District Tree Strategy 2003. The Council is also currently working towards the completion of reserve management plans and tree master plans for each of the Community Board areas which take into consideration these District wide strategies.

2.6 Marine Reserves Act 1971 (MRA)

The MRA provides for the setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat

of marine life for scientific study. There is one marine reserve within the Peninsula area, Te Whanganui-a-Hei Marine Reserve at Hahei.

The marine reserve is administered by DOC. A snorkel trail within the reserve demonstrates its importance as a recreational asset, as well as its scientific and biodiversity value. Size and abundance of species within the reserve are monitored annually.

The MRA is currently being reviewed. The Marine Reserves Bill 2002 states that the focus of the Bill is at the level of protecting marine communities and ecosystems and that establishment and management of reserves is the main mechanism for protecting outstanding, rare, distinctive or important communities and ecosystems. The Bill also notes that to effectively protect biodiversity it is as important to securely protect sites representative of typical communities and ecosystems, as it is to protect those that are rare or distinctive, but that means other than the MRA will be used to protect typical sites and to help achieve conservation goals and an effective network.

2.7 Other National Strategies or Policies

There have been several significant recent policy developments which will be relevant to the review of district and regional plans in respect of how biodiversity and natural resources are managed. They include:

- New Zealand Biodiversity Strategy 2000
- Strategy for Managing the Environment Effects of Fishing (2005)
- Marine Protected Areas Policy (2006)
- Sustainable Water Programme of Action (ongoing)

The NZBS has been in place for six years and future planning strategies for the Peninsula may identify opportunities to address its policies and actions. The others are recent initiatives or still in development, the outcomes of which are not fully known but which will need to be considered, or may have implications for, future plan development.

2.7.1 NZBS

This strategy was prepared in response to the state of decline of New Zealand's biodiversity. Goal Three of this strategy states:

Goal Three: Halt the decline in New Zealand's indigenous biodiversity

Maintain and restore a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhance critically scarce habitats, and sustain the more modified ecosystems in production and urban environments; and do what else is necessary to

Maintain and restore viable populations of all indigenous species and subspecies across their natural range and maintain their genetic diversity.

This goal is supported by objectives and actions.

The Biodiversity Strategy sets out action plans to achieve the goal of halting biodiversity decline. Many of the actions in the NZBS identify territorial authorities and DOC as key players. This report does not attempt to summarise the actions.

The New Zealand Biodiversity Strategy is currently under review. The outcomes of the review may have implications for management of the coastal environment.

2.7.2 Strategy for Managing the Environmental Effects of Fishing (2005)

This strategy has been prepared by the Ministry of Fisheries as a consequence of the ministry's intention, signalled in its 2005-2008 Statement of Intent, to make progress in the area of managing environmental effects associated with commercial, customary and recreational fishing. The strategy provides policies for the ministry to meet its obligations under the Fisheries Act 1996. It is intended that government will work with all the stakeholders to set limits around the effects of fishing.

2.7.3 Marine Protected Areas Policy

This policy initiative, jointly led by the Ministry of Fisheries and DOC, has the purpose of addressing Objective 3.6 of the New Zealand Biodiversity Strategy. This objective states:

Objective 3.6 Protecting marine habitats and ecosystems

Protect a full range of natural marine habitats and ecosystems to effectively conserve marine biodiversity, using a range of appropriate mechanisms, including legal protection.

The Marine Protected Areas Policy was launched in January 2006. Implementation of the policy will be based on a consistent approach to classification, currently being developed. A report has been prepared by DOC Waikato Conservancy for marine areas worthy of protection, as part of the implementation of this policy. This is discussed in more detail in Section 3.3.6 of this report.

2.7.4 Sustainable Water Programme of Action

This government programme is coordinated by the Ministry for the Environment and the Ministry of Agriculture and Forestry and also involves other agencies. The focus is on freshwater, but the programme will also have implications for coastal water and for biodiversity in the coastal environment. This programme may result in development of national policy statements or environmental standards, and identification of important values, among other outcomes, which address freshwater quality and biodiversity issues. Coromandel waterways of national importance identified through this project are discussed in Section 3.3.8.

3 Assessing Biodiversity Status of the Coromandel Peninsula

The Coromandel Peninsula has small, steep, and forested catchments with the Coromandel Range which forms the spine of the Peninsula. Mount Moehau dominates the landscape at the northern end of the Peninsula. The east coast of the Peninsula comprises rolling hill country, flood plains and associated estuaries and sand spits which include Coromandel, Mercury Bay, Tairua, Pauanui and Whangamata. Cuvier, Mercury, Alderman, Ohinau, Slipper, and Clark are off-shore islands and island groups on the east and Motukawao island groups on the west. The southern area lies on the edge of the Hauraki Plains.

A significant portion of indigenous vegetation protected as public conservation land within the Waikato Region is in the Coromandel Peninsula. Almost 60 percent of the Thames Coromandel district is covered in terrestrial indigenous vegetation, much of it recovering from past clearances and logging, but with some significant ecosystem representation. The Peninsula retains significant areas of high quality forest, although little of this remains in coastal areas. The Moehau ecological area supports an almost complete altitudinal sequence of plant and animal communities from near sea level to sub-alpine conditions.

Information on habitats and species on the Coromandel Peninsula is contained in numerous different reports, plans and databases held by different agencies and groups. This report does not attempt to summarise all of that information, but provides information about key references or databases that can be utilised more fully either by mapping the information (GIS layers) for the peninsula or that can be considered more fully when site-specific locations are considered.

There is also a range of new terminology and tools available, since current plans were drafted, which may provide alternative approaches or tools for assessing biodiversity or to assist in integrating biodiversity information with information from other profile statements.

3.1 New terminology and assessment tools

Biodiversity management in New Zealand has been augmented in the last decade by a range of new terminology, assessment tools and classification systems. Developments relevant to this project are outlined below.

3.1.1 Threatened species classification system and database

This threatened species classification system[1] was specifically developed for New Zealand. It was developed to assist DOC in its species management programmes, but it was also recognised that a threat classification system would be of value in environmental monitoring, determining research priorities, biodiversity protection under the RMA, evaluation of sites for any purpose, and for general advocacy for species conservation. The department also manages a threatened species database. This classification system and its associated database may provide an alternative system to the IUCN classification system that has been used, for example, for wording in the NZCPS.

3.1.2 Land cover frameworks

Developments in the frameworks available to assess New Zealand's land environments and changes in indigenous vegetation cover include the development of Land Environments of New Zealand (LENZ) and its use together with the Land Cover Database information for terrestrial vegetation classification and analysis of changes in vegetation cover. The 500 environments at LENZ Level IV have ascribed to them a threat classification status based on proportion of that vegetation type remaining. Walker *et al*.

1 Molloy, J; Bell, B; Clout, M; de lange, P; Gibbs, G; Given, D; Norton, D; Smtih, N; Stephens, T. 2001. Classifying species according to threat of extinction. A system for New Zealand. Department of Conservation, Wellington.

2005[2] used these databases to identify land environments most vulnerable to biodiversity loss. Their analysis showed that the Thames-Coromandel District had relatively less indigenous cover not protected than did many other districts, but some 4077 ha of indigenous cover not protected was identified to be acutely threatened, chronically threatened or at risk.

3.1.3 Marine Environment Classification (MEC)

This classification[3] is a spatial framework covering New Zealand's Exclusive Economic Zone at a 1 km^2 resolution and the Hauraki Gulf region at a more precise scale (250m^2 resolution). The classification uses physical variables such as slope, depth, tidal current, salinity and temperature to classify areas, on the basis that ecosystem properties are broadly determined by the biophysical processes and physical factors that exist in the marine environment. MEC is intended to be used as a predictor of the biological communities likely to exist in an area and a predictor of potential impacts of events and resource uses based on ecosystem characteristics and susceptibility.

A key limitation of the MEC is that it does not include seabed sediment or substrate (e.g. rocky reefs) as defining variables. These are variables which vary over a small scale and which may be a specific cause of habitat diversity. Validation of the MEC in the Hauraki Gulf using biological data showed that the MEC does not classify shallow, near shore and estuarine environments particularly well. The MEC does not provide information on changes that have occurred in biodiversity over time.

3.1.4 Nearshore Marine Classification and Inventory (NMCI)

This inventory[4] has been developed by DOC to assist in the development of a representative network of marine protected areas. It is a compilation of the available physical and biological information about the New Zealand coast and nearshore marine area to a depth of about 200m and within 12 nautical miles of the shore. It identifies eight biogeographic regions at the meso-scale and within these, units at the micro-scale, based on the distribution of species, and geological and oceanographic features. The Coromandel Peninsula area is described by six coastal units contained within the Northeastern Biogeographic Region. These can be mapped.

The NMCI provides a text description of habitats, species and species assemblages including reference to common and rare species.

3.1.5 Ocean Survey 20/20

This project being coordinated by Land Information New Zealand involves the Ministry of Research, Science and Technology and other government departments and agencies[5]. The vision of Ocean Survey 20/20 is to complete by 2020 a survey covering the seabed, water column and airspace of New Zealand's Exclusive Economic Zone and extending

2 Walker, s.; Price, R.; Rutledge, D. 2005 New Zealand's remaining indigenous cover: recent changes and biodiversity protection needs. Landcare Research Contrct report LC0405/038 prepared for Department of conservation. Wellington
3 The New Zealand Marine Environment Classification. Ministry for the Environment, Wellington 2005
4 Walls, K. 2005 Nearshore Marine Classification and Inventory. A Planning tool to help identify marine protected areas for the nearshore of New Zealand. Department of Conservation, Wellington
5 LINZ, 2005. Ocean Survey 20/20 - Launching the next era of New Zealand discovery. www.linz.govt.nz

out to the edge of the continental shelf. The survey will provide information and inventory on minerals exploration, fisheries, maritime safety, oceanographic science (including geological hazards), protection, conservation, resource management and where appropriate recreation and tourism, to be used to:

- demonstrate our stewardship and exercise our sovereign rights;
- conserve, protect, manage and sustainably utilise our ocean resources; and
- facilitate safe navigation and enjoyment of the oceans around New Zealand.

The timetable for this survey probably puts it outside of the current project but it may provide useful information at a later stage.

3.2 Current state of biodiversity

The most recent assessment of the state of the biodiversity environment on the Coromandel Peninsula is contained within the Hauraki Gulf Forum's State of the Environment Report 2004[6].

This report is a selective analysis of the Hauraki Gulf's biodiversity associated with coastal, island and marine habitats. It does not describe biodiversity of the terrestrial catchments of the Gulf, and is otherwise limited because the data may be inclusive of an area wider than the Coromandel Peninsula, and were typically collected for a purpose other than that of describing biodiversity *per se*. These purposes included setting/monitoring commercial quotas, estuarine monitoring to assess effects of sedimentation and pollution, and threatened species management. Despite these limitations, however, the report does provide a snapshot showing rich diversity of marine, foreshore and bird life, and in particular notes the values of the Gulf for commercial and recreational fishing, migratory birds, and threatened species.

A feature of some of the islands off the Peninsula (and throughout the Hauraki Gulf) is their use as a refuge for threatened native fauna species (for example, Tuatara and Whitaker's skink) or as a 'bank' for nationally threatened plants. Some of the species are no longer present on the mainland and the islands represent the last remaining populations. Intense effort has gone into pest eradication on these islands so that they provide pest-free habitat. Cuvier, Red Mercury, Double, Stanley, Korapuki, Middle, Green and the Alderman islands have pest-free status.

3.3 Sources of biodiversity information

3.3.1 Protected Natural Areas Programme

The Protected Natural Areas Programme (PNAP) aims to preserve the natural character and ecological diversity of New Zealand. Ecological Districts (ED) provide the framework and reference for the programme. New Zealand is divided into 268 ecological districts, each characterised by geology, topography, climate, soils, and biological

6 The Hauraki Gulf State of the Environment Report 2004 Hauraki Gulf Forum

features. The Coromandel Peninsula consists of three ecological districts: Colville, Thames, and Tairua.

Within each ED, the PNAP surveys identify ecosystems or areas worthy of protection. Some will have protected status (Protected Natural Areas, PNA) through the Reserves Act, covenants etc. The remaining areas are listed as areas recommended for protection (RAP-Recommended Area of Protection) based on significant wildlife habitat values and the catchment protection they provide, and factors such as the types of vegetation, species communities, scenic values, and altitudinal variation. RAPs are located both on Crown-owned and private land.

The survey report for the Coromandel PNAP[7] contains descriptions of the ecological units classified under each ecological district. These descriptions can be used to identify threats and opportunities available for the conservation of biodiversity of each unit.

The Colville ED (CED) has 18 PNA, mostly terrestrial, totalling 4,200 ha and accounting for about 5 percent of the total CED area. A deficiency in the reserves is inadequate representation of estuarine and freshwater wetlands, sand dunes, and offshore island ecosystems. Twenty two RAPs are identified with most lying in the coastal zone. Much of the RAP area is crown owned.

The Thames ED has 10 PNA including four lowland and montane ecological areas, a forest sanctuary, and a number of very small, coastal, scenic reserves totalling 9,600 ha. Salt and freshwater wetlands and alluvial terrace forest within the ecological district are not protected. Seven RAPs are identified representing lowlands forest, semi coastal and coastal forest and some coastal and freshwater wetlands, mostly on crown-administered land.

The Tairua ED contains 20 PNA totalling 4,460 ha and protecting about 5 percent of the ecological district. These protected areas include scenic reserves in the coastal zone, a wild life refuge (Opoutere sand spit), and a wildlife sanctuary (an island off Whangamata). Seventeen RAPs are identified including large areas of lowland forest on both crown and private land and including in the coastal zone.

The location of each RAP is available in GIS, but values are not indicated. Paper records provide its location and a checklist of component ecological units, a brief description of landform and vegetation character, and evaluation/discussion and summary about the quality of the area and its features for protection.

Opportunities may exist to map the RAPs when considering factors such as growth trends, development areas, and subdivision potential, particularly since the RAPs highlight deficiencies in protection of coastal ecosystems including dunes and salt and freshwater wetlands.

3.3.2 Biodiversity Information Management (BIM) Database

The Waikato BIM database is a repository for local Conservancy biodiversity information that is at risk of being lost, is inaccessible or is ineffectively managed. Biodiversity

7 Humphreys, E.A; Tyler, A.M. 1995 Coromandel Ecological Region. Survey Report for the Protected Natural Areas Programme. Department of Conservation, Hamilton

information regarding ecosystems, species, site disturbances, biodiversity management and supporting information or references are recorded against locally defined BIM units (sites).

BIM units are spatially defined by key local area biodiversity staff to be meaningful in terms of ecology or biodiversity management. In many cases a BIM unit is the same spatial extent as existing conservation units, however, there are several instances where conservation units have been split or amalgamated to form meaningful BIM units. BIM units are not limited to terrestrial environments and may include marine and freshwater habitat.

All BIM units in the Waikato Conservancy have been digitised as shape files available as a local GIS layer. The data can be interrogated in a number of ways. For example, a BIM unit output report (which provides all information captured for a specified unit or spatial area) and a species output report (which identifies presence, abundance and trends in species for a specified unit) is available to all users. In addition, ad-hoc data enquiries can be conducted if requested through the local Conservancy Information Management Unit.

3.3.3 Threatened Species List

The Waikato conservancy compiled in 2002 a list of the threatened species in each of the three areas (Hauraki, Waikato and Maniapoto) of the Waikato conservancy. The list includes birds, bryophyte, freshwater fish, frogs, fungus, microalgae, marine fish, marine invertebrates, marine mammals, reptiles, marine mammals, terrestrial vertebrate and vascular plants.

3.3.4 Waikato Coastal Meta-database

The Waikato Coastal Meta-database is a coastal marine information database jointly developed by Environment Waikato and the Department of Conservation. The information includes biological, geological, physical, chemical, social, and recreational data for the west and east coast of the Waikato region. The main objective of the database is to collate all available coastal and marine information for the Waikato region and make it accessible through the website: www.waikatocoastaldatabase.org.nz (password required).

The database exists as a set of metadata sheets, each of which provide information about a report or research project including:

- the purpose and a brief summary of the research,
- the organisation or person who carried out the research,
- the date when the research was carried out,
- specific reports and related information,
- availability of the information, and
- contact details to source the information.

Database searches can be made based on location, keywords, organisations or themes. The database is updated with information on an ongoing basis. Currently 33 reports contain biodiversity information. The meta-database is not a map-based tool.

3.3.5 Inventories of Natural Areas (EW)

EW has developed databases and inventories to measure change in extent and/or condition of natural resources, and to identify significant natural areas and prioritise them for a range of management activities. The inventories of relevance to the Coromandel Peninsula include:

- freshwater wetlands
- waterways
- maps showing current and historic (1840)[8] indigenous vegetation cover
- areas managed by the Department of Conservation
- areas protected as QEII National Trust covenants.

In addition, EW hold inventories by geographic area. These mainly focus on terrestrial ecosystems (forest, scrub, alpine) and freshwater wetlands. Some have been, or are being developed by local authorities, others by Environment Waikato, or in partnership. In addition, the Biosecurity Group has developed an inventory of priority areas for pest control (Key Ecological Sites, KES) in three administrative districts within the Region, including the Thames-Coromandel.

Many of these inventories use the criteria in Appendix 3 of the Regional Policy Statement. However it is important to note that the inventories are seldom a comprehensive inventory of all natural areas that meet the criteria. In particular, KES are not a substitute term for 'significant natural area' under the terms of the RMA. They are priority areas for pest control, and as such use a different suite of criteria.

Most of these databases are stored in GIS, which allows rapid identification of location, physical viewing of the site on aerial photographs, and assessment of context in the surrounding landscape (for example, connection to other natural areas, extent of catchment development).

Information varies with the databases but generally includes (where relevant):

- type
- location
- key native species
- relative significance
- legal status
- management issues.

The major information gaps are the current condition (health) of the site, including aspects such as:

- presence and abundance of non-native species (weeds, pests)
- stock damage / fencing status
- detailed current native species presence/abundance
- hydrological regimes and connectivity.

8 Leathwick, J., Clarkson, B. and P. Whaley 1995 Vegetation of the Waikato Region: Current and Historic Perspectives. Landcare Research Contract Report LC9596/022. Landcare Research, Hamilton.

3.3.6 New Zealand Freshwater Fish Database

The New Zealand Freshwater Fish Database is a computer-based system that stores all the records of freshwater fish found throughout the country, including major offshore islands. The database is maintained by NIWA. Access to the database requires registration.

The database contains records for those streams which have been surveyed, and which have been entered into the database. The database records the fish species found, its abundance and size, and date and site location. It also contains a physical description of the site such as an assessment of the habitat type, substrate type, available fish cover, catchment vegetation, riparian vegetation, water widths and depths, and some water quality measures.

Not all streams on the Coromandel have been surveyed, and for those with records, the records may be several decades old and no longer accurate. However, the records indicate that streams of the Coromandel peninsula contain longfin and shortfin eels, lamprey, koaro, inanga, banded, shortjaw and giant kokopu, indicating diverse indigenous fish fauna including threatened species.

The records can be mapped for a particular location and could be readily incorporated into a GIS layer. Thus for any area for which a structure plan is being prepared, the layer could be used to indicate whether local streams have been surveyed and which species are present, or that there are no records in that area.

3.3.7 Department of Conservation Coastal and Marine Environment Data

In 2004, DOC contracted NIWA to identify Areas of Significant Conservation Value (ASCV) that cover a range of representative habitats including typical, rare, and unique biological and physical features within the Waikato coastal and marine environment and which may be worthy of protection. The work was carried out to meet the requirement to establish a network of marine protected areas under the marine Protected Areas Policy. NIWA identified the areas based on biological and physical data and excluded economic, social, and political factors.

Note that Environment Waikato in its RCP also use the term ASCV. EW included biological, physical, geological, historical, and cultural data in these ASCV. The RCP areas may overlap with DOC's ASCV but the information used to derive them differs and for biodiversity purposes the NIWA report is more up to date for future planning exercises.

DOC Waikato has compiled the NIWA and EW data, together with additional references from the Waikato Coastal Meta-database, in a single report[9]. Though the document does not provide terrestrial biodiversity information adjacent to the coastal areas, it provides references for this information.

The document includes biological information on benthic communities, fish, birds, and marine mammals. In addition, the database contains the physical characteristics/data

9 Bouma, S. 2006: Biological and physical data for identified areas of significant conservation value (ASCVs) in the Waikato coastal and marine environment; Department of Conservation, unpublished

such as water area to MHWS and catchment areas in certain cases that include land cover details such as mangrove, forest, and indigenous vegetation.

The ASCVs identified are Manaia Harbour, Coromandel Harbour, Colville Bay, Fantail Bay, Cape Colville to Port Jackson to Sandy Bay, Waikawau Bay (including estuary), Little Bay, Whangapoua Harbour, Kuaotunu Peninsula, Whitianga Harbour, Purangi estuary, Te Whanganui-A-Hei Marine Reserve, Opoutere sand spit, Wharekawa Harbour, Tairua Harbour, Whangamata Harbour, Otahu estuary, Cuvier Island, Mercury Island Group, Ohinau Island Group, Slipper Island, Alderman Island Group, and Clark Island.

The biological and physical data of the Coromandel Peninsula ASCVs are available in a text format. ASCVs are mapped.

3.3.8 Fish and Game Data

Auckland-Waikato Region of Fish and Game New Zealand hold information on trout in Coromandel rivers and streams obtained through 7 yearly angler usage surveys, and drift dive surveys carried out in some rivers. The most recent angler usage survey was carried out in 2001/02. Rainbow and/or brown trout are present in rivers south of Whitianga. Absence of trout in some rivers is attributed to high water temperatures.

Coromandel rivers popular for trout fishing include the Waihou, Komata, Hikutaia, Ohinemuri, Waitawheta, Waitekauri, Waiwawa, Mahakirau, Kaimarama, Kapowai, Tapu, Kauaeranga, and Tairua rivers. Access to some rivers requires landowner permission as not all rivers have esplanade reserves.

Development of structure plans can use this information to recognise the recreational value and economic input to the district that fishing may provide. Protection of habitat and safeguarding or making provision for access to recreational fishing rivers will complement protection and access for biodiversity and conservation purposes, as these rivers may also support indigenous fisheries.

3.3.9 Waters of National Importance

The Sustainable Development Programme of Action for Freshwater was established by Government to reconcile competing demands for freshwater. DOC was tasked to identify a candidate list of nationally important aquatic systems for freshwater natural heritage. DOC's assessment catered for two objectives:

- maintenance of viable populations of all freshwater species and subspecies; and
- protection of a full range of remaining freshwater habitats and ecosystems.

The streams/catchments identified for the Coromandel are: Kaitoke Creek, North East Tutaweka, Waiharakeke Stream, Manaia River, East Tataweka, Wangamaroro River, Kauaeranga River, West Tataweka, Tairua River, Tuateawa Creek, Stony Bay catchment, Okanutahi Stream, Mangatu-Mataiterangi Streams10.

10 Chadderton, W.L.; Brown, D.J.; Stephens R.T. 2004 Identifying freshwater ecosystems of national importance for biodiversity. Criteria, methods, and candidate list of nationally important rivers. Department of Conservation, Wellington

Further work and refinement of the WONI work occurring as part of the development of a broader framework being established to describe freshwater environments (FWENZ; Freshwater Environments of New Zealand) and expected to be finished in July 2007.

3.3.10 Assessment of Environmental Effects (AEE) Information

EW and TCDC hold AEE documents prepared by applicants for resource consents. These AEE will, in some situations, provide information on the state of biodiversity in a particular location, or alternatively, conditions of consent may require additional information to be obtained on species present at a location.

The Tairua marina application, for example, provided site specific and updated information on bird species utilising the lower reaches of Tairua Harbour.

Forest harvesting consent applications may also yield useful information. For example, Ernslaw One Limited holds approximately 10,553 ha of Crown-owned Whangapoua Forest. In addition to production forestry, the forest contains indigenous vegetation and is considered to provide habitat for North Island Kiwi, long-tailed bat, Hochstetter's Frog, Archey's frog, and some lizard species. Survey work is required to establish locations of the se species.

3.4 Management of Biodiversity - plans and projects

As well as exercising functions under the legislation set out in Section 2, DOC, EW and TCDC manage the natural resources of the Coromandel Peninsula using a range of other mechanisms, such as species recovery plans, and advice and information. These may target public or private land, and they often involve the community. An awareness of these will be useful for future planning because they may have local but significant implications for management of particular species, community involvement and for more general advocacy.

3.4.1 Management Plans

There are various management plans relating to species and sites, including species recovery plans site management plans, including island management plans. The plans are non-statutory and provide guidance for management activities at a detailed level.

The purpose of a species recovery plan is to provide information and direction for programmes aimed at protection of certain threatened plants and animals. A plan generally looks at the population status and biology of a species and describes adverse factors affecting the species. These plans provide special protection for a period of 5 to 10 years and may be carried out with the active participation of communities.

Species recovery plans are managed by the Department of Conservation. A Recovery Group oversees the preparation of the schedule of programmes which include collecting background information, outlining actions required, and prioritising activities.

National level species recovery plans relevant to Coromandel Peninsula include plans for Middle Island Tusk Weta, northern New Zealand Dotterel, Kiwi, Native Frogs, and Brown Teal.

Two species and site management plans are relevant to the protection and management of biodiversity specific to Thames Coromandel, the Te Whanganui-A-Hei Marine Reserve Management Plan and the Moehau Kiwi Sanctuary Operational Plan.

A number of islands are managed by DOC, managed through the CMS or by a separate island management plan. The islands are managed for threatened species, and may have restricted or no access consistent with maintaining the island in a pest free state.

3.4.2 Peninsula Project

The Peninsula Project is a collaborative project between EW, TCDC, DOC and Hauraki Maori Trust Board. The project includes stream and catchment works to improve flood management and control, and pest control operations designed to improve the vegetative cover and reduce erosion. Improved health of indigenous species will be one outcome from the pest control works. These works are being carried out on both public and private land, and monitoring the vegetation after the pest control operations may provide additional information of use to future planning exercises.

Areas subject to works could be readily identified and mapped if that information was required for particular locations or to provide an overall indication of the coverage of pest control operations under this project. Note that the pest control funded by this project is additional to that already carried out by DOC on other areas of the Peninsula.

3.4.3 Covenanted Areas

Certain public and private land areas can be legally protected through Nature Heritage Fund covenants, Nga Whenua Rahui covenants, and Queen Elizabeth II National Trust covenants[11].

QEII covenants enable landowners to protect special features in perpetuity and also support them with monitoring programmes. There are 87 registered covenants on the Coromandel Peninsula, with the largest registered covenant being 404 ha in size.

The Nga Whenua Rahui Fund protects indigenous ecosystems on Maori owned land. Three thousand six hundred hectares of regenerating coastal forest on the Coromandel Peninsula at Harataunga is protected and managed through this fund. The land contains remnant kauri and rimu forest.

QEII covenanted areas are mapped within EW's GIS system, or could be incorporated into a schedule of sites.

3.4.4 Education, information and assistance

EW actively supports community groups that aim to enhance natural areas in the region and educate people about the value of biodiversity. Actions include fact-sheets to help landowners manage natural areas; voluntary guidelines and codes of practice; a stream enhancement and monitoring technique learning programme for students (Stream Sense); Environmental Initiatives Fund; promotion of catchment management activities that protect estuarine and coastal ecosystems; education campaigns; working with major

11 QE II National Trust (2006) http://www.nationaltrust.org.nz/

land management groups and individuals (farming/forestry) to find better ways of reducing land use effects on biodiversity resources; supporting care groups; supporting initiatives for riparian protection of water bodies (fresh and marine) and for keeping stock out of water bodies; assessing the extent of stream structures (such as culverts) which inhibit fish migration, and working with farmers, Territorial Authorities and Transit to ensure removal of obstacles.

DOC assists communities through its Conservation with Communities programme. Local initiatives, actions and groups may need to be considered when future planning at the community level.

3.4.5 Summary of Information Sources

Information source	**state**	**who holds**
Threatened species classification and database	text	DOC
LENZ/LCDB I and II	digital	DOC, EW
MEC	digital	MfE
NMCI	digital plus text	DOC
PNA/RAP	digital plus text	DOC
BIM	text	DOC
Hauraki Threatened species list	text	DOC
Coastal Meta-database	text	EW
Inventories: wetlands; waterways; 1840's cover; areas managed by DOC; covenants	digital	EW DOC
NZFFD	digital plus text	NIWA; DOC has access
ASCVs (DOC)	text	DOC
Fish & Game	text	AWF&G
WONI	digital	DOC
AEE	text	EW, TCDC
Management Plans	text	DOC
Peninsula Project	?	EW, DOC, TCDC

4 KEY ISSUES

4.1 Introduction

Habitat loss and ongoing modification threaten New Zealand's biodiversity. Invasive introduced species threaten our natural ecosystems and habitats and already threatened natural species.

There are more than 90,000 indigenous species in New Zealand. Of these, DOC has investigated and categorised about 6,000 species and found that about 2,400 are threatened. These threatened species are divided into three major divisions[1]:

- 25% are acutely threatened (Nationally Critical, Nationally Endangered and Nationally Vulnerable)and face a high risk of extinction in the wild;
- 9% are chronically threatened (Serious Decline and Gradual Decline) and face extinction but are buffered slightly by either a large total population or a slower rate of decline; and
- 66% are at risk (Range Restricted and Sparse) and vulnerable to fire, loss of habitat, predation, disease etc.

4.2 Factors Causing Biodiversity Decline on the Coromandel Peninsula

The Hauraki Gulf State of the Environment Report (HGSER)[6] provides a summary of the pressures on the biodiversity of the Gulf, including pressures on fish stocks and marine resources due to commercial and recreational fishing, habitat loss and modification in coastal and estuarine waters, the impacts of introduced plant and animal pests, and impacts on marine mammals. Although this report addresses all of the Gulf, it is relevant to the Firth of Thames and the east coast of the Peninsula. Detail from the report is summarised here, rather than repeated in full, with the intention that the HGSER is used as a reference document. The Hauraki Gulf report does not address terrestrial decline in biodiversity.

4.2.1 Terrestrial and Freshwater Biodiversity

Terrestrial biodiversity loss is directly related to the loss or modification of habitat directly through human activities or through introduction and spread of plant and animal pests. Pest plant and animal species alter ecosystems by invasion, colonisation, and predation. They can also introduce diseases to local species.

Possums, rats, feral goats, and mustelids are the major animal pests of the Peninsula. Possums cause significant canopy collapse of native forests. Feral goats browse and alter under-storey species composition in addition to causing soil erosion. Mustelids are predators of ground dwelling and hole nesting birds such as kaka, kakariki, and kiwi. Rats raid nests and eat invertebrates. Dogs and cats, including feral cats, also impact on species such as kiwi.

Invasive plant pests such as woolly nightshade, gorse, pampas, wilding pines, and hakea colonise and slowly dominate indigenous species.

A number of islands are maintained in an animal pest free state. There is a constant risk that visitors to islands will re-introduce mammalian pests to these islands, or that the pests may swim there and re-establish a population. A visiting dog or cat could also have a disastrous effect.

Many of the indigenous fish species are diadromous in that they move between freshwater and marine environments to complete their life-cycle. Key threats to these fish are on-going loss of upstream habitat through urbanisation and modification of the catchments, and barriers to migration. The Coromandel Peninsula has a relatively high proportion of streams classified as Natural State and Fisheries, but lowland stretches of the waterways may be compromised and/or provide barriers to passage. Culverts which prevent fish passage are a significant issue on the Peninsula. In Coromandel, for example, 75% of the culverts pose barriers to migration of fish[12].

Storm water pipes, drainage structures, and stream channelisation also adversely affect fish migration, as do elevated temperature and suspended sediment and turbidity.

4.2.2 Coastal and Marine Biodiversity

Subdivision and urbanisation

Over 70% of Coromandel beaches and dunes have houses on them. Increased demand for development and subdivision near the coast has increased the movement of people, vehicles, and animals in coastal areas, increasing the likelihood of detrimental effects on dune and intertidal habitats and species associated with those habitats.

The remaining undeveloped Coromandel beaches are constantly under pressure for subdivision development. New Chums Beach and Kereta have recently been sold for development. Waikawau and Otama Beaches are two of the few sites that are protected from coastal development.

Subdivision and its associated development directly affects habitat and biodiversity due to clearance of vegetation, increased fragmentation of remaining vegetation, introduction of plant and animals pests, and increased human activity such as vehicles on dunes and the presence of pets.

Increased urbanisation may also cause a decline in water habitat quality within coastal areas due to discharges from wastewater treatment plants, commercial premises, septic tanks, and storm water, including road run-off.

Changes in Land Use

Accelerated sediment loading from catchments is a problem on the peninsula. Historically accelerated sedimentation arose from forest clearance and gold mining activities. More recently sedimentation arises from urbanisation, production forest harvesting, roading and other activities. Accelerated sedimentation has caused changes in habitat quality and biodiversity values of estuaries and harbours. Organisms that can adapt to the changed environment establish in the new environment, but other species

12 Spiers, D; Kelly J. 2001 Fish Passage at Culverts – A Survey of the Coromandel Peninsula and Whitianga Catchment (11/00 – 04/01). Environment Waikato, Hamilton

are lost or displaced. The expansion of mangrove habitats in Coromandel in the last sixty years can be attributed to increased sediment loads in the estuaries.

Infrastructure

Some of the wastewater treatment plants which discharge into the coastal marine area are old and do not function efficiently. These facilities do not have the capacity to handle the increases in population that occur in the summer, and coastal waters may get polluted in such situations.

On-site septic tank systems at Hikutaia, Matatoki, Puriri, Thornton Bay, Te Puru, Waiomu, Tapu, Te Mata, Manaia, Kikowhakarere Bay, Koputauaki Bay, Oamaru Bay, Little Bay, Whangapoua, Kuaotunu West, Opito, Hahei, Hot Water Beach, and Opoutere communities are suspected to be functioning inadequately and the discharges have the potential to adversely affect the water quality.

Dredging and structures in the coastal marine area

There is increasing pressure for facilities such as marinas, boat ramps and seawalls, which may involve dredging basins and canals, reclamations, and siting of structures in intertidal areas. These all potentially impact in both the short (construction effects) and long term on water quality, natural character, benthic and bird habitat, and integrity and functioning of the coastal marine area. They may also restrict access to and along the beach.

Some locations have been subject to resource consent application but consents have been declined, indicating that the scale of effects arising from those particular proposals were considered inappropriate. For example, marina developments at Coromandel Harbour and at Paku Bay, Tairua.

Aquaculture

Aquaculture activities currently comprise mussel and oyster farming, predominantly on the west coast of the Peninsula. Effects of aquaculture include local phytoplankton and zooplankton depletion, changed sediment characteristics of the seafloor, and changed nutrient dynamics. However, aquaculture facilities provide habitat for a variety of opportunistic species which enhance fishing activity.

The new aquaculture provisions requiring all marine farms to be located in an Aquaculture Management Area (AMA) mean that the process for locating new farms requires full assessment of suitability of the site by both the regional council as consenting authority, and Ministry of Fisheries when it carries out its Undue Adverse Effects test. EW is currently proposing to identify areas to be excluded from an AMA, which offers the potential to identify sites considered not suitable for aquaculture, for example due to high biodiversity values.

Commercial Fishing

Commercial fishing occurs in the Firth and around the Peninsula. In addition to its direct effects on target species, some of which are managed by the quota system, some of the methods adopted (trawling, pair trawling, Danish seining, long lining, set netting, and purse seining) have a direct impact on non-target species and habitats through bycatch and destruction of the seafloor.

There are various restrictions on methods and species in various locations around the Firth and the peninsula. A summary of these can be found in Bouma (2006)[9]. These are

restrictions imposed through fisheries and other legislation and don't have a direct impact on activities which come under the jurisdiction of the regional and district council, but the restrictions could be noted, or mapped, if thought relevant to any location when looking at restrictions within the coastal marine area.

Marine Invasive Species

Invasive introduced aquatic species threaten ecosystems, natural character, fisheries, recreational and spiritual values and human health. These species arrive through various means such as ballast water and attachment to ships' hulls, transfer with aquaculture equipment, fish food for aquaculture, and release of aquarium species. They may also arrive naturally via currents, debris and birds' feet.

Detecting incursions of aquatic pests is the responsibility of Biosecurity NZ. While there may be mechanisms to minimise transfer through methods in the regional coastal plan, this will not deal with all the routes of transfer (e.g. transfer by recreational boats). While there are known locations of aquatic pests around the Coromandel (for example, undaria and sea squirt are present on Wilson Bay mussel lines), distribution of the pests has not been determined throughout the area.

Estuarine plant pests are also present in Coromandel harbours, including spartina and saltwater paspalum. DOC and EW are responsible for the eradication of spartina and locations of spartina and the state of their control should be taken into account in this project when looking at management of biodiversity in specific locations.

4.2.3 Accelerated Climate Change

Climate change, including warming and sea level rise, is likely to impact on indigenous biota and their ecosystems. Possible changes include movements of species south or upwards to cooler areas, more severe weather events, changes in productivity and nutrient cycling, and drying of streams and wetlands. The most serious issues may arise through weeds and pests, and the impacts will be greatest on small, fragmented habitats.

The timeframe for measurable impacts of climate change are likely to be outside that for upcoming plan reviews. However, the importance of maintaining wildlife corridors, reducing barriers to natural movements of biota, and encouraging expansion of forests and wetlands can be identified now. The potential impacts of sea level rise on estuarine communities such as saltmarsh and mangroves is also closely related to how coastal hazards are dealt with.

4.3 Recognition of ecosystem services

There is a general lack of recognition of the role ecosystems play in providing ecosystem services such as buffering extreme events, flood mitigation and nutrient recycling. These services can be ascribed an economic value and it may be appropriate to consider this value within the economy profile statement. This would give a broader perspective to the protection of biodiversity and natural heritage, rather than just focusing on particular species or habitats.

5 Strategic Opportunities

This section identifies opportunities to use information on the current state of biodiversity, pressure and threats, and current management with land use and coastal planning.

5.1 Using this profile statement to protect and manage biodiversity

This profile statement has collated sources of information from a range of agencies. This offers the opportunity to:

- Integrate the information into future planning exercises, by mapping information already in digital format as overlays, and to decide whether to digitise other information sources when planning at a district-wide or local level or use the data in some other way.
- Highlight statutory requirements in respect of biodiversity, to assist agencies identify where and for what purpose they need to address biodiversity and natural heritage.
- Identify "biodiversity hotspots" based on species diversity or abundance or current management priorities, or to prioritise sites for their values.
- Assist with the development of the TCDC Biodiversity Strategy.
- Assist with the implementation of the marine protected areas (MPA) policy by facilitating the incorporation into statutory planning documents of sites for marine habitats worthy of protection. This would allow the agencies to explore mechanisms for how the RMA can assist in meeting MPA targets and/or in protecting MPAs as part of sustainable management under the RMA.
- Provide communities with information about species and habitats, and threats to those species and habitats. It can be used to assist communities understand the values of particular terrestrial and marine habitats and inform local community plans.
- Highlight where future developments or use may provide a mechanism to improve or restore biodiversity, such as to address current issues with infrastructure which impedes fish passage, or restore bush fragments or ecological corridors.

5.2 Integrating Biodiversity with Other Development

The biodiversity profile statement offers a tool to help guide for planning open space and recreational facilities, locating infrastructure requirements, and guiding/directing population growth of the Peninsula. Identifying key areas for biodiversity may assist with a constraints mapping exercise to enable better integration of biodiversity values with use and development.

5.3 Identify Gaps in Knowledge

Use of the databases and other information will identify gaps in knowledge. These may be site specific, for example examination of the Freshwater Fish Database will indicate that particular streams have no known records on them, or they may be more generic

and apply district-wide, such as our state of knowledge on abundance and distribution of invertebrate species.

It may be necessary to address knowledge gaps through targeted research in order to address particular issues in future planning scenarios or strategies.

Some of these knowledge gaps may become critical for particular reasons. For example, gaps are often identified when applicants lodge resource consent applications.