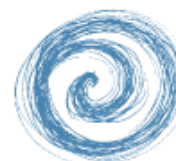


OCEANS POLICY SECRETARIAT

WORKING PAPER NINE
14 March 2003



OCEANS POLICY

ADAPTING TO FUTURE CHANGES

Contents

<i>Introduction</i>	2
<i>Adapting to future changes</i>	2
Population: Growth, spatial concentration and demographic changes	2
Increased competition for marine space	3
Increasing impacts on marine ecosystems and natural capital	4
Global warming	5
Planning for future changes: Adaptability of the management framework	6
<i>Conclusions</i>	8

Introduction

1 The marine environment is in a state of constant change. Natural and human influences on the oceans vary over time and space to produce a highly dynamic environment.

2 One of the challenges for the Oceans Policy project is to design flexible, forward-looking policy capable of dealing with future challenges. The Government's Sustainable Development Programme of Action has identified the need for policy that ensures the well-being of current and future generations. It also reflects the Government's commitment to the principle of considering the long-term implications of government decisions.

3 This paper discusses a number of possible changes to the ocean environment that may arise in the future to demonstrate the adaptability of management systems and identify any resulting policy problems.

Adapting to future changes

4 Humanity's influence on the sea has increased markedly over time. Growing populations, patterns of urbanisation and technological advances have enlarged our ecological footprint at a rapid rate and have led to increasing conflict over the use of scarce resources.

5 One means of planning for the future is to assume a continuation of current trends, and extrapolate the policy requirements that will eventuate. This paper examines four trends that may have a profound influence on the future state of the marine environment:

- population: spatial concentration and demographic changes
- increasing competition for marine space
- increasing impacts on marine ecosystems and natural capital
- the potential impacts of global warming.

6 This paper is not intended to present an exhaustive list of future trends; the discussion in this paper focuses on the general adaptability of decision-making frameworks. There may be other trends, not identified here, that have significant effects on marine management.

Population: Growth, spatial concentration and demographic changes

7 The demographic and geographic distribution of New Zealand's population is changing over time and placing increasing pressure on the marine environment, particularly the coastal fringe and the near-shore ocean – which features the majority of recreational uses and infrastructural requirements (e.g. sewage/stormwater disposal, ports).

8 New Zealand's population is increasingly concentrated in urban areas, which increases the load on contingent environments. The Auckland Regional Council's submission to Stage One of the Oceans Policy project cited population growth as the leading pressure on Auckland's marine environment.

9 Even in rural and peri-urban areas, population pressures are concentrating on the coastal fringe. Coastal residential development is popular for those in pursuit of the 'Kiwi Dream', and factors such as coastal hazards do not seem to diminish the value of coastal land¹

10 The demographic structure of populations can also affect resource use and development patterns. For example, New Zealand's aging population could result in changing patterns of urban development, such as increased demand for seaside retirement housing.

11 Population pressures have seasonal variations. The summer months see an influx of people to popular holiday areas, often in isolated communities with small rating bases and infrastructures unable to cope with sudden peaks in usage.²

Future state of the environment

12 The implications of the population trends for the future state of the environment are summarised below:

- Marine pollution from land sources will increase, due to increased sewage load, run-off and sedimentation from inland activities such as farming.
- There will be a requirement for increased infrastructural development, particularly over the land–sea interface (e.g. sewerage systems, ports, telecommunications cables).
- The effects of other activities may compromise the economic values of the ocean, e.g. damage to aquaculture through increased sewage outfall.
- The load of recreational users upon amenity areas (e.g. beaches) will increase.
- Recreational values will be diminished due to overcrowding of the coastal fringe and near shore ocean.

Increased competition for marine space

13 Pressures of population growth, and growing interest in activities such as marine farming, have placed increasing pressure on near-shore space. The future will see increasing clashes of sometimes incompatible activities, ranging from recreational uses to commercial operations. The clash of activities could extend further offshore in the future, as near-shore space becomes crowded and technological advances enable new uses of the oceans.

¹ pers comm. Department of Conservation 3/2/2003

² pers comm. Territorial authorities focus group meeting 11/2/03

Future state of the environment

14 The implications of increased competition for marine space are summarised below:

- The future marine environment will be crowded, and various property rights may have their value eroded due to an inability to access the necessary space. For example, commercial fishers may be unable to fully implement their quota management system rights if other commercial/recreational uses are carried out in the same area as fishing activities.
- A clash of incompatible activities may, therefore, make it hard for New Zealand to achieve ‘best value’ from the oceans.
- New Zealanders have a perception of our oceans and beaches as common areas open to all ‘as a birthright’. New Zealanders have been afforded such ready access in the past with enough space to accommodate all users and uses, but pressures are increasing in this area.
- Increasing effects of individual activities, and the cumulative effects of different activities, may have negative effects on marine ecosystems.

Increasing impacts on marine ecosystems and natural capital

15 The marine environment is a rich source of resources, such as fish and minerals. Exploitation of these resources has increased over time with growing demand and technological innovations. Extractive uses place pressure on marine ecosystems, both in terms of the resource being taken, and in terms of flow-on effects on the wider ecosystem (e.g. habitat destruction, by-catch).

16 Natural capital is those characteristics of natural systems that provide tangible and intangible goods and services of economic value to people. A healthy environment underpins much of the wealth generation capacity of the oceans. For example, the fishing industry would collapse if marine ecosystems were heavily stressed through overfishing, or the effects of other activities. Ecosystem impacts can, therefore, have implications for the economic uses of the oceans, as well as intrinsic and amenity values.

17 The marine environment is used as a sink for human pollution. Sewage, river-borne agricultural run-off and sedimentation all end up in the oceans, as do localised discharges from vessels and marine structures.

18 Marine ecosystems are also disturbed by activities not directly extractive or depository; for example, the establishment of coastal structures, or the passage of boats.

19 The load of these activities on marine ecosystems has increased over time, due to factors such as demographic changes, increased demand for marine resources, and technological innovations.

20 Threats to the integrity of marine ecosystems also affect the wealth-generating capacity of the oceans. Some industries, such as fishing or aquaculture, require a healthy marine habitat to sustain their livelihood. Some non-extractive activities, such as ecotourism, are directly dependent on the intrinsic/amenity values of a clean and healthy environment.

21 Developments in technology and better management techniques also offer the opportunity to reduce environmental impacts in some cases. Better sewage treatment facilities, or technologies to avoid fishing by-catch, are examples of technological developments that lessen adverse effects on the environment.

Future state of the environment

22 The implications for the future of the trend of increasing impacts on the marine ecosystem and its natural capital are summarised below:

- Increased demand for marine resources will place pressure on their sustainable utilisation.
- There will be increased impact on the ecosystem because of the secondary impacts of activities (e.g. by-catch from fishing).
- Threats to ecological integrity also threaten the ocean's economic potential, which is underpinned by a healthy environment.
- New technologies will create new stresses on the marine environment, but also provide opportunities for better management and wealth creation (discussed later).

Global warming

23 The Kyoto Protocol is the international community's response to the threat of human-induced climate change. This paper does not examine how the development of an Oceans Policy could interface with climate change mitigation policy; rather, it examines the possible implications of global warming for the marine environment.

Future state of the environment

24 The implications of global warming are summarised below:

- A large amount of human development is concentrated in coastal areas, which will be vulnerable to rising sea levels.
- Weather patterns may change, and extreme events such as storms may become more common.
- Climate change has the potential to influence the geographic location of ecosystems, species diversity, and ecosystem services through variations in temperature, sea level, and so on.
- Ecosystems are dynamic and undergo change as a function of time in response to a variety of stressors, including climate. While ecosystems are capable of adapting to change, global change may occur at such a rapid rate that ecosystems are unable to keep up and are therefore vulnerable.

Planning for future changes: Adaptability of the management framework

25 It can be argued that some aspects of New Zealand’s management framework are not sufficiently adaptive and flexible to effectively deal with future trends.

Resource Management Act

26 The Resource Management Act is responsible for managing many of the issues associated in the previous discussion of trends. The RMA sets out the framework for assessing the environmental effects of resource uses on land and to the extent of the territorial sea³. In terms of adaptability to change, the RMA process has the following drawbacks.

27 A fundamental philosophy of the Resource Management Act is that the environmental effects of activities should be managed, as opposed to focusing on the type of activity in question. This essentially makes the RMA a reactive system, not well-suited to planning for future pressures or needs. The assessment of individual activities on a case-by-case basis can lead to cumulative problems, such as the recent ‘goldrush’ for aquaculture space. The RMA proved ineffective at dealing with this rapid spread of marine farms, and a two-year moratorium has been placed over further applications until regional coastal plans can be modified to accommodate future sustainable aquaculture development.

28 Key policy instruments under the Resource Management Act, such as regional policy statements and regional/district plans, have taken a long time to create. The slow plan-making and amending process makes it difficult to react quickly to changing circumstances. Resource consent decisions on individual activities can also take a long time to resolve, especially if matters are referred to the Environment Court.

29 Decision-making processes under the Resource Management Act are politicised by the nature of local government decision-making. Decision-makers bound to a three-year electoral cycle may often focus on short-term gains while discounting long term effects. This issue is demonstrated by current concerns over investment in coastal residential development, at the expense of coastal natural character and public access to the sea, or under-investment in expensive water management infrastructure. Often community pressures, or the economic implications of ‘tough’ decisions, can be as important as the RMA planning framework.

30 Central government has provided ineffective guidance to councils to assist them with forward-looking planning. The New Zealand Coastal Policy Statement (NZCPS) is currently under review, and recent workshops have revealed, for example, that “the NZCPS does not provide councils with sufficient guidance for addressing the adverse effects of the aquaculture boom” and “With demand for use of the coast increasing, there was also a significant increase in incidents involving conflicting

³ There are some exceptions, e.g. the Fisheries Act controls effects of fishing activity on fish stocks both within and outside the territorial sea.

uses. NZCPS policies on public access have provided little guidance on how to manage these conflicts.”⁴

Other legislation

31 Some legislation is more adaptive to changing circumstances. The Fisheries Act, for example, has an adaptive approach to stock management, allowing changes to quota limits when a fish stock is under pressure. Issues around the adaptability of council planning may be improved by recent changes to the Local Government Act to provide for strategic community planning. This may allow a more integrated system providing for the interface between economic, social and environmental issues, and thus better adaptability to future changes.

Areas of uncertainty in the policy framework

32 In cases where the Resource Management Act does not apply, such as decisions on the use of space or the assessment of environmental effects outside the territorial sea, the policy framework is too incomplete to provide for any kind of forward-looking, strategic planning. If, for example, a deep-sea aquaculture development and petroleum pipeline were proposed for the same area of marine space, there would be no formal process to assess and reconcile the potential conflicts between the two activities. It could also be argued, however, that the very lack of a formal decision-making framework makes the system adaptive and able to respond to individual issues as they arise (albeit at the cost of certainty and consistency).

‘Point of intervention’ issues

33 Changes in activity patterns are driven by a number of economic and social factors (e.g. the aquaculture boom, local elections, desirability of coastal property). Environmental management frameworks are often disconnected from these processes, which means that people can often not plan for, or influence, drivers for change, and have to respond to changing circumstances as they arise, after a certain amount of ‘lag’ time.

Lack of information

34 Good information is a cornerstone of accurate decision-making. Uncertainty about the components and interactions of the complex marine environment, and the individual and cumulative effects of activities, presents problems for planning. These issues are discussed at greater depth in the information issues paper.

⁴ Young, D. (2002) *Monitoring the Effectiveness of the New Zealand Coastal Policy Statement: Views of Local Government*. Unpublished report, Department of Conservation, pp 3,4.

Conclusions

35 A management framework ill-suited to adaptability presents the following problems for an Oceans Policy to address:

- Changes to the marine environment, and the human activities in and around it, can occur quickly, and problems may arise if the management regime is not adaptive, flexible and capable of timely change. The nature of the current management system, particularly the Resource Management Act, does not promote forward-looking and adaptive planning. This could result in negative impacts on natural and human value, and prevent the achievement of ‘best value’ from the oceans.
- Increased use of the oceans for different purposes will result in growing conflicts between users. These conflicts could be between different commercial uses (e.g. fishing versus aquaculture), but could also involve the erosion of public good uses such as swimming or recreational fishing. The current management framework is not well-suited to planning for a range of different activities and resolving conflicts when they arise.
- Marine ecosystems, and natural capital for future uses, will face increasing pressure over time, and accurate management of the marine environment may be hampered by lack of knowledge about the individual and cumulative effects of current and future activities.
- The current management system does not interface well with many of the underlying economic, social and political drivers for change, meaning that instruments such as the Resource Management Act are often in ‘catch-up’ mode.