



Integrating Catchment and Coastal Management - A Survey of Local and International Best Practice

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Integrating Catchment and Coastal Management – A Survey of Local and International Best Practice

Clare Feeney
Peter Gustafson

Prepared for
Auckland Regional Council

Contents

Glossary i

Acronyms ii

1	Executive Summary	1
2	Introduction	3
2.1	Defining catchment management and integrated catchment management	3
2.2	Background and project objectives	5
2.3	Methodology	5
3	International literature review	7
3.1	Literature selected and selection rationale	7
3.2	Developing best practice ICM and ICCM	11
3.3	Review findings	15
3.3.1	Planning scale	15
3.3.2	Institutional frameworks and governance	16
3.3.3	Legislative frameworks	20
3.3.4	Collaboration – public and private sector roles	22
3.3.5	Capacity building	25
3.3.6	Investment and resourcing	26
3.3.7	Addressing biophysical, social and economic variables	28
3.3.8	Monitoring, evaluation and adaptive management	31
4	The evolution of catchment and coastal management in New Zealand	33
4.1	Literature selected and selection rationale	33
4.2	The evolution of New Zealand’s catchment and coastal management	33
4.2.1	First feet: Maori occupation 1200s-1300s	34
4.2.2	Forest felling: European colonisation 1700s on	35
4.2.3	Flooding, drainage and water allocation: 1800s on	35
4.2.4	Town planning to the 1950s	37
4.2.5	Catchment control: 1940s-1960s	37
4.2.6	Pollution control to the 1950s	38
4.2.7	Catchment-based water and soil conservation: the 1960s reforms	39

4.2.8	Coastal management: early beginnings	40
4.2.9	Regional planning: the 1970s reforms	42
4.2.10	Division and decentralisation: the 1980s institutional reforms	43
4.2.11	Maori aspirations for the environment	44
4.2.12	The legislative reforms of the 1990s and 2000s and the current legislative and institutional frameworks for catchment and coastal management	45
4.2.13	Proliferation, isolation and the drive towards integration	53
4.2.14	Summary	56
4.3	The evolution of integrated catchment management in New Zealand	56
4.3.1	The catchment concept	57
4.3.2	A rural focus	58
4.3.3	Urban ecosystems and infrastructure	58
4.3.4	The journey to integration	62
4.3.5	Participatory models	67
4.4	The challenges for integrating catchment and coastal management	73
4.4.1	The split between land and freshwater	74
4.4.2	The split between land, freshwater and the sea	74
4.4.3	Summary: from Māori to Mauri	77
5	The evolution of catchment and coastal management in the Auckland region	79
5.1	The evolution of coastal management in the Auckland region	79
5.2	The evolution of integrated catchment management in the Auckland region	81
5.2.1	Hydrological data collection and water allocation plans	82
5.2.2	The Upper Waitemata Harbour Catchment Study	83
5.2.3	The Manukau Harbour Action Plan	86
5.2.4	TP10 and the network consents	88
5.2.5	The three-waters vision of the utilities	89
5.2.6	The Auckland Regional Policy Statement (RPS)	90
5.2.7	The Boston report and the formation of the SWAT team	91
5.2.8	The Proposed Auckland Regional Plan: Air, Land and Water	93
5.2.9	The Auckland Sustainability Framework and One Plan	94
5.2.10	Collaborative and community-based initiatives	97
5.2.11	Iwi engagement: an overview	99
5.3	Integrating catchment and coastal management in the Auckland region: the current situation	100
5.3.1	The planning framework	100

5.3.2	Plans and players	106
5.3.3	The existing planning framework and its implementation	107

6 Towards integrated catchment and coastal planning: learnings and applications 111

6.1	Scale	112
6.2	Legislative and organisational frameworks and the incorporation of regional planning issues into catchment planning	116
6.3	Financial structures and resourcing	118
6.4	Progressive integration of wider biophysical, economic, social and cultural issues into ICCM	118
6.4.1	Applicability to both rural and urban land uses	119
6.4.2	Applicability to both greenfield and brownfield developments	119
6.4.3	Progressive phasing in of related issues	120
6.5	Planning and implementation	122
6.6	Monitoring, evaluation and adaptive management	122
6.7	Collaborative models	124
6.7.1	Auckland Sustainability Framework	125
6.7.2	Urban ICM projects	126
6.7.3	The Integrated Kaipara Harbour Management Group	126
6.7.4	Factors of success	129
6.8	Capacity building	131
6.9	Learning and review	133
6.10	Summary and conclusions	133
6.10.1	Building industry capacity and collegiality	134
6.10.2	Building community capacity	134

References 138

7 Appendix A: International Literature Review – matrix of best practice ICM 148

8 Appendix B: Coastal/Catchment Planning – relevant provisions of the statutory documents for the Auckland region in 2008 156

Glossary

Hapu	Sub-tribe: a community of related Whanau (http://www.Māori.org.nz).
Iwi	Tribe: a traditional collective of related Hapu.
Kaitiaki, kaitiakitanga	A Kaitiaki is a Guardian. The Māori concept of guardianship for the sky, the sea, and the land is a strong ethos. The process of protecting and looking after the environment is called 'kaitiakitanga' and Guardianship over resources and territory important to the Hapu or Iwi
Kaumātua	A Kaumatua is an elder, either male or female, identified by others based on their mana or standing. They display honesty and integrity through their spoken word and actions and have great knowledge of Tikanga, history and Te Reo, together with the wisdom to balance the sharing, teaching and guiding of people (http://www.Māori.org.nz).
Mana Atua	The authority of the gods.
Mana whenua	The exercise of traditional authority over an area of land (whenua).
Mauri	Essential life force, the spiritual power and distinctiveness that enables each thing to exist as itself and to sustain life (http://www.Māori.org.nz).
Mahinga kai	Food-gathering places.
Ngāi Tahu	Ngāi Tahu are the iwi comprised of Ngāi Tahu whānui; that is, the collective of the individuals who descend from the five primary hapū of Ngāi Tahu, Ngati Mamoe and Waitaha, namely Kati Kuri, Ngati Irakehu, Kati Huirapa, Ngāi Tuahuriri and Ngāi Te Ruahikihiki (http://www.ngaitahu.iwi.nz/About%20Ngai%20Tahu).
Quango	Quasi-autonomous national governmental organisation
Rohe	Territory or boundary that defines the area within which a tangata whenua group claims traditional association and mana whenua.
Tane and Tangaroa	For Māori, reality is constructed of interrelated and interconnected domains of Atua – the gods of the respective domains who are the original kaitiaki. Tane Mahuta has Mana Atua (authority) over the forests and Tangaroa over the oceans and inland waters – a recognition of the interconnectedness of waters. Among other Atua and their domains are Papatuanuku (land), Rangi (sky) and Ruaumoko (earthquakes) (Wellington Regional Policy Statement, 1995 http://www.gw.govt.nz/section1236.cfm).
Tangata whenua	Literally, a person of the land ("people of the land", from tangata, 'people' and whenua land) or people belonging to a tribal region;

	hosts as distinct from visitors. In relation to a particular area, means the hapu, or iwi, that is Māori and holds mana whenua (customary authority) over that area (history-nz.org/glossary.html and www.fish.govt.nz/en-nz/Publications/Statements+of+Intent/SOI-2005-2008/Glossary.htm).
Taonga	Highly prized possessions or holdings (http://www.natlib.govt.nz/about-this-site/glossary/taonga).
Tikanga	Tikanga are the customs and traditions that have been handed down through the passages of time. They come from “tika”, meaning things are true (http://www.Māori.org.nz).
Waahi tapu	Sacred site (can include burial places).
Whanau	Immediate and/or extended family (http://www.Māori.org.nz).

Acronyms

ABARE	Australian Bureau of Agricultural Resource Economics
ARA	Auckland Regional Authority (the precursor of the ARC)
ARC	Auckland Regional Council
ARWB	Auckland Regional Water Board (a part of the ARA)
ASF	Auckland Sustainability Framework
CFI	Cultural framework index
CHI	Cultural Health Index
CMA	Coastal marine area
CMP	Catchment management plan
CRI	Crown Research Institute
DoC	Department of Conservation
DSIR	Department of Scientific and Industrial Research (precursor to the CRIs)
ERMA	Environmental Risk Management Authority
ESD	Ecologically Sustainable Development
GPA	Global Programme of Action
GUEDO	Government Urban and Economic Development Office
ICCM	Integrated catchment and coastal management or management plan/s

ICM or ICMP	Integrated catchment management or management plan
IGNS	Institute of Geological and Nuclear Sciences
IKHMG	Integrated Kaipara Harbour Management Group
IWRM	Integrated water resource management
KERP	Kaipatiki Ecological Restoration Project
KPI	Key performance indicator
LAWMAP	Land and Water Management Plan
LGA	Local Government Act
LGAAA	Local Government Auckland Amendment Act (2004)
LTCCP	Long term council community plan
MAP	Mahurangi Action Plan
MfE	Ministry for the Environment
MHAP	Manukau Harbour Action Plan
MHWS	Mean High Water Spring
MOW(D)	Ministry of Works (and Development)
NIWA	National Institute of Water and Atmospheric Research
NGO	Non-government organisation
NMP	Network management plan
NPD	National Policy Document
NPS	National policy statement
NRM	Natural resource management
NWASCA/NWASCO	National Water and Soil Conservation Authority/Organisation
NZCPS	New Zealand Coastal Policy Statement
OECD	Organisation for Economic Co-operation and Development
PARP:ALW	The Proposed Auckland Regional Plan: Air, Land and Water
PCE	Parliamentary Commissioner for the Environment
PUCM	Planning under co-operative mandates
RMA	Resource Management Act 1991

RPC	Auckland Regional Plan: Coastal
RPS	Auckland Regional Policy Statement
SCRCA	Soil Conservation and Rivers Control Act (1941)
SCRCC	Soil Conservation and Rivers Control Council
SMARTER	Specific, Measurable, Affordable, Realistic, Time-based, Endorsed and Relevant
SWAT	Auckland Regional Council Stormwater Action Team
TA or TLA	Territorial authority (the same as a territorial local authority)
TCPA	Town and Country Planning Acts (1953 and 1977)
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Social and Cultural Organization
UWHCS	Upper Waitemata Harbour Catchment Study
WASRMP	Water and soil resource management plan
WSCA 1967	Water and Soil Conservation Act 1967

1 Executive Summary

Catchment and coastal management are rapidly developing fields in which reactive and visionary responses constantly overtake each other. In order to assess the current situation with respect to catchment and coastal management in the Auckland region in light of international best practice, this report reviews the key developmental phases in New Zealand including the legislative and other arrangements in the Auckland region.

The report's objective is to identify best practice integrated coastal and catchment management planning in order to inform the discussion on best practice implementation for the Auckland region and its freshwater and saline receiving environments.

Integrated catchment management is a globally established concept, operating in numerous countries around the world. There are also numerous models for coastal management, and both of these have been utilised internationally for over 100 years. More recently there has been a growing appreciation of the need to more fully integrate the planning and management of catchments with that of their coastal receiving environments. This is generally supported as being the most beneficial and appropriate model. Given the global variation in geography, social, political, institutional, legal, biophysical and ecological variables, there is a remarkable parity of experience in terms of successes and shortcomings in the development and implementation of integrated catchment and/or coastal management plans. Internationally, several 'best practice' elements for integrated catchment and/or coastal management are identified. These include political leadership; cross sector collaboration; improved capacity building; provision of adequate resourcing for both planning and implementation phases; good governance and clear institutional frameworks; monitoring and evaluation of outcomes that leads to adaptive management; and the presence of a strong catchment manager or champion.

Based on New Zealand, Auckland and international findings, the report shows that integrated catchment and coastal management (ICCM) is fundamentally a point of view. Over time, a growing understanding of the benefits of stakeholder engagement in management has occurred. This has paralleled a shift towards a multiple bottom line approach that better reflects real world tradeoffs in environmental management. A progressively widening focus from flooding to ecosystem health is another significant shift, along with a growing appreciation of urban ecology and its potential for native biodiversity. Even the view that a catchment focus is the only constant has shifted as managers realise they are managing land uses for the purposes of ecosystem health in the ultimate saline receiving environments.

In New Zealand in particular, there has been a view that integrated catchment and coastal management is a predominantly rural process, despite its comparatively long urban history in Auckland. This view is shifting, with a growing realisation that the integrated management process has much to offer both rural and urban catchments, as well as those with mixed uses.

The report identifies several key elements that could be included in future discussions about planning for the Auckland region. These include:

incorporating rural areas in Auckland's integrated catchment management plans;
aligning asset management and integrated catchment management plans in a more proactive way for greening brownfields developments;
progressively aligning integrated catchment more closely with other management strategies; aligning actions so as to demonstrate and document how integrated coastal and catchment planning can contribute to the achievement of all the goals of the Auckland Sustainability Framework (Auckland Regional Growth Forum, 2007).

Best practice local and international research indicates that joint partnerships are the most effective model for integrated catchment and/or coastal management. They have the greatest capacity for long-term sustainability, based on the finding that partnerships that share resources and decision-making power lead to the most effective long-term commitment to changing environmental management outcomes.

Such a joint approach is highly congruent with the multiple bottom line approach to ICCM, where social and cultural outcomes are valued – and in fact become a key part of the vehicle for delivering the desired environmental outcomes.

However – this means that the capacity of all parties to genuinely engage needs building.

Consequently, and informed by contemporary discussion regarding governance and institutional management, the report frames two aspirational goals – building industry capacity and collegiality; and building community capacity. By aiming for these objectives, it is strongly believed that the full spectrum of coastal and catchment management stakeholders can transcend silos and work within and between organisations, plans and processes in order to achieve truly integrated catchment and coastal management. his style is called body.

Introduction

He manga wai koia kia kore e whitikia.

It is a big river indeed that cannot be crossed.

This report has collated international, New Zealand national and Auckland local information to assess:

1. best practice integrated catchment planning and management (ICM); and
2. integrated catchment and coastal planning and management (ICCM) with respect to the Auckland region.

The project reviewed current international best practice, historic and current catchment and coastal management in New Zealand, and current practice in the Auckland region. The work identifies for the Auckland region:

1. catchment planning and management / collaborative models that are in use; and
2. where closer integration of catchment-coastal planning and management may be beneficial and how this may be achieved.

The project has assessed a body of work with a solid theoretical foundation coupled with real world practice and experience including an assessment of selected collaborative models for integrating catchment and coastal planning and management and their application to the Auckland region.

2.1 Defining catchment management and integrated catchment management

The terms catchment management and integrated catchment management have been distinguished from each other in New Zealand, where catchment management traditionally focused on soil conservation and flood control only. In the Auckland region, the term is used to refer to the systematic management of water quantity issues in urban catchments by the use of catchment management plans (CMPs).

Integrated catchment management (ICM) is a more holistic approach to managing natural resources such as land, water, soil and vegetation within a defined geographic catchment area. It ensures that individual resource management issues such as flooding, soil conservation, land stability, water quality, soil quality, erosion and sediment control, water extraction, wastewater, waste, stormwater and other discharges and aquatic and terrestrial biodiversity and ecology are not considered in isolation, but in an integrated plan of management that also considers the environmental, social and economic impacts of activities in the catchment. It generally seeks to engage the community, business and local and regional government in a partnership that incorporates sustainable management actions across all sectors of the community.

Over most of New Zealand, ICM still retains a rural focus, although in Auckland (and more recently in some other regions also subject to rapid urban growth), it has an urban focus. In Auckland, the term integrated catchment management plan (ICMP) is used in two main ways: firstly it is used in a narrow sense to refer to plans that address matters of stormwater quality as well as water quantity, to distinguish them from the older water quantity-only CMPs.

Secondly, it is used in a wider sense to refer to plans that encompass some of the wider issues listed above as well as water quality and quantity.

In the Auckland region, ICM refers to the process of identifying and quantifying the water-related issues for each catchment and developing management strategies that address these. ICM is a process which encompasses the management of land use and water resources on a catchment scale; it is a multi-sectoral approach to catchment management that may consider all parts of a water source from the freshwater catchment to estuarine and coastal receiving environments. Unlike some overseas models, Auckland's ICMPs are non-statutory statements of intent: they have no authority of their own, and achieve their objectives by way of influencing other instruments that control or respond to development, environmental, social and cultural needs.

Schedule 9 of the Proposed Auckland Regional Plan: Air, Land and Water (as at 12 July 2007) defines an integrated catchment management plan for the Auckland region as:

A plan for management of the stormwater and wastewater discharges, diversions and associated activities within the catchment or District which is prepared in accordance with this Plan and identifies:

- i. the stormwater or wastewater issues facing the catchment and the range of effects from those discharges, diversions and associated activities;*
- ii. strategic objectives for the management of stormwater and wastewater discharges, diversions and associated activities within the catchment or District;*
- iii. a range of management options and the preferred management approach for avoiding, remedying or mitigating environmental effects and risks;*
- iv. roles and responsibilities of implementation of the management approach;*
- v. tools to support implementation of the management approach; and*
- vi. a process for review.*

While ICM in some overseas jurisdictions (refer section 2) has a wider mandate, this report will use the terms as defined below with reference to the Auckland region:

- catchment management plan (CMP): a plan for managing water quantity in urban catchments;
- integrated catchment management plan (ICMP): a plan for managing water quantity and water quality, with a focus on the urban areas of catchments and the matters identified in the Proposed Auckland Regional Plan: Air, Land and Water (PARP:ALW); and
- integrated catchment and coastal management (ICCM): a process (which may or may not be encompassed in a single plan) that considers the effects of land uses, water infrastructure and other activities or services in many catchments on the larger saline receiving environment.

Worldwide, views on and drivers for more ecologically sustainable development (ESD) have refocused attention on the opportunities offered by a stronger focus on integrated catchment management.

For successful integration of catchment with coastal management, the following integrations are needed (the following summary has been adapted from Brookes' modification of Vallega's (2000) elements of successful integrated coastal zone management, together with additions from Hellberg (2007) and Chrystall (2006)):

- inter- and trans-disciplinary: integrating a wide range of expertises across the biophysical, social and engineering sciences, including planning and economics and other disciplines is essential in order to provide for the other integrations;
- spatial: holistic management of all the land catchment areas from the ridge top to the coast, coastal land, brackish and estuarine areas and other coastal waters and the marine area, addressing all land and water uses with management areas defined on the basis of holistic and meaningful geographic and ecosystem boundaries;
- temporal: the current tendency towards short term actions and strategies need to be framed into longer term prospects and programmes such as the 100 years envisaged by the ASF;
- natural and built services (green and grey): integrating built water and other services into the natural environment by using and mimicking natural biophysical tools and principles;
- legal and jurisdictional: the legal and administrative frameworks need to provide appropriate regulations to support integrated management;
- regulatory: the actions of all decision makers should be vertically and horizontally co-ordinated and reflect the aspirations of local communities for good outcomes across all wellbeings;
- management: outcomes, objectives, methods and monitoring need to reflect the four wellbeings (social, economic, environmental, and cultural) and sustainable development promoted under the LGA as well as the more bio-physically-focused sustainable management outcomes promoted by section 5 of the RMA. These are comparable with the triple or quadruple bottom lines referred to in overseas literature; and
- social and cultural: “top-down” and “bottom up” processes need to be harmonised to optimise the participation of stakeholders, local communities and iwi in identifying issues, outcomes and methods for integrated catchment and coastal management.

Reflecting these trends, this project arises from ongoing development of the ICM concept in the Auckland region, in particular the growing focus on marine receiving environments and the need to more closely integrate catchment management with the management of coastal waters.

2.2 Background and project objectives

The major objective of this project is to identify best practice ICM and ICCM and inform the discussion on their implementation for the benefit of catchments and freshwater and saline receiving environments of the Auckland region. This will promote the ongoing achievement of more sustainable catchment and coastal outcomes envisaged by key stakeholders for future ARC programmes.

The project has the potential to improve the ICMP process and its integration with coastal planning and management in the Auckland region. Project outcomes may lead to further improvements in environmental and social, cultural and economic outcomes, including more cost-effective, participatory and inclusive ICCM processes – and the fostering of a community of people committed to maintaining ICCM principles and approaches over the long term.

2.3 Methodology

This project recognises that effective ICM and coastal planning and management requires robust frameworks and processes to engage with all stakeholders and use best practice

engagement, planning and management instruments. To identify these best practice frameworks, processes and instruments, a selection of papers for the international and local literature review was identified. Furthermore, a number of dimensions of best practice catchment planning and management as well as its integration with coastal planning and management were identified. The literature was then surveyed for these in order to:

- document best international practice and benefits of integrated catchment-coastal planning and management (Chapter 2);
- summarise historical and current catchment and coastal management in New Zealand (Chapter 3);
- document current practice in the Auckland region (Chapter 4), highlighting collaborative models and assessing their strengths and weaknesses for the Auckland region; and
- summarise the findings of the assessment (Chapter 5), including a gap analysis with respect to international best practice versus current Auckland and New Zealand practice, along with the project's learnings and possible applications.

Following the literature review and resultant gap analysis, a scope of work analysis was undertaken to determine what components of ICM and ICCM are most successful and can be categorised as 'best practice'; the findings and recommendations of this analysis, including discussion focussing on local Auckland outcomes with reference to regional, national and international experiences, are presented in Chapter 5 of this report.

International literature review

Kei pikitia te aroaro o te tohunga.

Do not trample the advice of a wise man.

The scope and aims of this section are to review published literature of international best practice in the areas of integrated coastal and catchment management and planning. In particular, a large volume of international literature exists that documents the evolution of integrated coastal and catchment planning across various geographic, political, environmental, social and economic scales.

The aim of the international literature review is to document outcomes and recommendations from overseas experiences as they relate to the Auckland region. Of particular importance is the need to identify successes and failures internationally and how these have driven the development of best practice integrated coastal and catchment management and planning (hereafter referred to as ICM and/ or ICCM).

Key findings were that the following were critical elements of 'best practice' ICM:

- political leadership and appropriate legislative, institutional and governance frameworks;
- adequate resourcing to develop and implement ICM and the ICMP over time;
- collaboration between and within the public and private sectors with genuine community participation;
- ICM champions, including succession planning;
- capacity building between and within the public and private sectors;
- clearly articulated roles, goals and responsibilities;
- monitoring and evaluation of ICMP outcomes; and
- adaptive management that is driven by monitoring and evaluation outcomes – a feedback loop to ensure that ICM evolves to meet new or emerging issues.

Other factors that were considered were:

- scale (micro, meso or macro);
- the range of biophysical and other variables considered, including social, cultural and economic aspects;
- wider aspirations about sustainability; and
- whether the research was conceptual or place-based, in a real catchment.

The international literature review then documents how these best practice recommendations apply in the broader New Zealand context and in the Auckland region.

3.1 Literature selected and selection rationale

A review of international literature was undertaken to identify best practice integrated coastal and catchment management planning. The literature selected for this review was determined from several sources. These include advice from:

1. the ARC Stormwater Action Team;
2. Parsons Brinckerhoff, including PB's International Review Group; and
3. New Zealand ICM and land use planning experts.

The composition of the review list was intended to incorporate articles from the European, North American, South American and Australian jurisdictions. Several of the selected articles covered multiple geographies, including additional examples from Asia. Wherever feasible, the articles identified for the review were chosen on the basis that they covered cross-boundary management, incorporated a best-practice or lessons learned review of integrated catchment and coastal management and wherever possible, encapsulated a truly integrated planning and management approach where multiple natural resource management issues were included in the issues discussed.

Several papers reviewed are government policies relating to integrated catchment planning and/ or natural resource management; these were chosen as relevant to the Auckland situation as they represent the culmination of lengthy policy debate and build on practical implementation experiences of integrated catchment management within that jurisdiction. In several cases as the papers being reviewed were by the same author and included the same issues and spatial coverage, a collated review was undertaken. Where this occurs, the reader will see papers referred to as (a), (b), (c) in the text or supporting tables.

Table 3-1: International literature review list

Title	Author/s (abbreviated)	Year	Region/ Jurisdiction covered
Ecosystem-based management: markers for assessing progress	United Nations Environment Programme	2006	Global
Integrated river basin governance and key performance indicators	Dr B Hooper	2006	USA
The EU Water Framework Directive - a key to catchment-based governance	Dr. Fritz Holzwarth	2002	Europe
Water Financing and Governance	Global Water Partnership	2008	Global
Effective Water Governance	Global Water Partnership	2003	Global
Integrated Water Resources Management	Global Water Partnership	2000	Global
Integrated River Basin Management Through Decentralisation	Karin E Kemper, William Blomquist, Ariel Dinar	2007	Global
Integrated water resource management, institutional arrangements, and land use planning	Bruce Mitchell	2005	USA
Integrated Catchment Management: Learning from the Australian Experience for the Murray-Darling Basin	Bellamy, J., Ross, H., Ewing, S., Meppem, T.	2002	Australia
Planning and Implementing Integrated Catchment Management	Bellamy, JA., McDonald, GT., Syme, GJ. And Walker, GH.	1999	Australia
Sustainability Criteria for Water Resource Systems	American Society of Civil Engineers (ASCE)	1998	USA, UN
Coastal Planning and Management	Robert Kay, Jacqueline Alder	2005	USA and Global
Disciplined Planning, Structured Participation and Collaborative Modelling: Applying Shared Vision Planning	Richard N Palmer, Hal E Cardwell, Mark A Lorie, William J Werick	2007	USA
National Framework for Natural Resource Management - Standards and Targets;	Natural Resource Management	2003	Australia

Monitoring and Evaluation; Capacity Building	Ministerial Council		
Alternative policy approaches to natural resource management - background report to the Natural Resource Management Taskforce	ABARE	2001	Australia
Integration of stormwater and associated activities in catchment management plans - DHI	Murray Menzies, Bruce Hooper	2008	New Zealand, Global case studies
Integrated Water Resources Management and Water Sharing	Matthew D Davis	2007	Global, with USA and Europe case studies

Table 3-2 summarises a brief outline of each paper and some reviewer comments. Methods were collated into a matrix of international best-practice integrated coastal and catchment management. The matrix allows for the comparison of international best-practice with the current status of ICM in New Zealand and Auckland.

Table 3-2: Reviewers' overview of international literature review papers

Title	Author/s (abbreviated)	Spatial or conceptual paper	Reviewers comments on purpose of the paper
Ecosystem-based management: markers for assessing progress	UNEP	Spatial and conceptual	Discusses a practical tool (order of outcomes framework) for assessing the progress in integrated coastal and river basin management (ecosystem); highlights the needs and benefits of integrated management, and provides guidance in establishing management links.
Integrated river basin governance and key performance indicators	Hooper	Conceptual	Discusses aspects of Integrated Water Management and Integrated River Basin Management governance and role of key performance indicators in integrated river basin management.
The EU Water Framework Directive - a key to catchment-based governance	Holzwarth	Conceptual	Framework for catchment based river management governance.
Water financing and governance	Global Water Partnership (4)	Spatial and conceptual	To bring together integrated catchment management, good water governance and financing so that a more coordinated, coherent approach to water financing is adopted. Focuses on the need to fund the water resources functions that are essential for security and sustainability and to examine the relationship between the different governance and organisational structures in the sector and their ability to secure funding for essential goods and services.
Effective water governance	Global Water Partnership (5)	Spatial	Status report prepared for presentation at the 3rd World Water Forum in Kyoto, Japan, March 16-23, 2003. It brings together the experience gained after conducting the Dialogue on Effective Water Governance over the previous year. The Dialogue on Effective Water Governance was designed to be as broad based as possible and constructed

			through country and regional workshops and roundtables that brought together parliamentarians, government agencies, key water practitioners, community groups, NGOs, UN agencies, donors, the private sector and others.
Integrated water resources management	Global Water Partnership (6)	Conceptual	Integrated Water Resources Management
Integrated river basin management through decentralisation	Kemper et al	Spatial and Conceptual	Investigates whether river basin management at the lowest appropriate level works (decentralisation) and what the outcomes are when it is applied; development of an analytical framework to capture the factors likely to be related to the river basin management success and generation of hypotheses to be tested in actual case studies.
Integrated water resource management, institutional arrangements, and land use planning	Mitchell	Neither spatial or conceptual	Literature review - lessons learned: examines the implications of different interpretations of a system, ecosystem, or holistic approach related to Integrated Water Resources Management (IWRM), and to consider how institutional arrangements can be designed to facilitate IWRM; how IWRM can benefit from a closer connection to land use planning.
Integrated catchment management: learning from the Australian experience for the Murray-Darling Basin	Bellamy et al	Spatial	Identify flexible, best practice approaches for Integrated Catchment Management in the Murray Darling Basin, Australia.
Planning and implementing integrated catchment management	Bellamy et al	Conceptual	Identifies guiding principles for the role of community-based Integrated Catchment Management including factors likely to influence success; makes recommendations on planning and implementation.
Sustainability criteria for water resource systems	ASCE	Conceptual	Use of sustainability indicators as evaluation criteria for water resource systems.
Coastal planning and management	Kay and Alder	Spatial and conceptual	Introduces importance and uniqueness of the world's coastal areas and outlines coastal issues and planning and management tools.
Disciplined planning, structured participation and collaborative modelling: applying shared vision planning	Palmer et al	Spatial and conceptual	Looks at technique of shared vision planning as an approach to collaborative decision-making and the support of computer models in water resources systems.
National Framework for Natural Resource Management - standards and targets; monitoring and evaluation; capacity building	NRM Ministerial Council	Conceptual	The (3) National Frameworks establish the principles and requirements for natural resource management (NRM) to guide investment through national NRM programs, particularly investment.
Alternative policy approaches to natural	ABARE	Conceptual	The consideration of economic costs to different NRM policy approaches and how

resource management - background report to the Natural Resource Management Taskforce			economic considerations can assist decision makers to choose the right policy mix to achieve their stated objectives.
Integration of stormwater and associated activities in catchment management plans - DHI	Menzies and Hooper	Spatial and conceptual	Investigation into the incorporation of associated activities into integrated catchment management plans.
Integrated water resources management and water sharing	Davis	Spatial and conceptual	Summarises Integrated Water Resource Management concepts and issues and illustrates successes and challenges with case studies from two different geographic areas with differing legal and institutional arrangements.

3.2 Developing best practice ICM and ICCM

ICM is a globally established concept, operating in numerous countries around the world (Bowden, 1999). Alternative names are used in different places: Total Catchment Management (Australia); Integrated Catchment Management (New Zealand); Integrated Watershed Management (USA); Integrated River Basin Management (UK); and Integrated Water Resource Management (UK) but they all share the same elements – “engaging stakeholders through a partnership approach, coordinating action across jurisdictions, systems thinking, and using a balanced approach to weigh concerns for sustainability against development” (Menzies and Hooper, 2008). The process, whatever the name, has had a different history in each country depending upon the institutional framework and associated environmental legislation put in place to manage and control the country’s natural resources (Chrystall, 2006).

Interestingly, while ICM and related planning and management processes have been utilised internationally for over 100 years and are generally supported as being the most beneficial and appropriate model for catchment or coastal planning and management, examples of successful long term ICM programmes remain infrequent (Davis, 2007). Moreover, despite this history and general consensus as to its benefits, ICM is still an elusive process, with many jurisdictions not utilising the concept (especially in developing nations) or only partly implementing the plan’s management actions (Davis, 2007).

The concept of ICM and its application to diverse water and natural resource management issues has however come to the fore in recent years as a way of ensuring the equitable, economically sound and environmentally sustainable management of natural resources including water (Global Water Partnership, 2003).

Given the wide variation in geography, social, political, institutional, legal, biophysical and ecological variables between the subject geographies covered through the international literature review, it is perhaps remarkable that there is such parity of experience between each jurisdiction in terms of successes and shortcomings in the development and implementation of ICMPs. Several key themes recur amongst the reviewed literature, suggesting, either obliquely or explicitly, a number of critical factors that should be considered in developing a successful ‘best practice’ ICM process:

- political leadership to ensure ICM is integrated across institutional boundaries and within realistic timeframes;
- appropriate legislative, institutional and governance frameworks;

- adequate resourcing (including long term funding streams or income generation opportunities), to both develop and implement the ICM and ICMP over time;
- collaboration between and within the public and private sectors;
- genuine community participation – ideally a bottom-up approach, although mixed models are also successful;
- an ICM champion for each ICM spatial/ geographic unit;
- capacity building between and within the public and private sectors which encompasses short and long term time scales to ensure succession of knowledge when key participants step away from the ICM process;
- from the start of the process, clearly articulated goals and objectives, roles and responsibilities of public and private sector partners involved in the ICM process;
- specific, measurable and time bound targets for determining change resulting from the ICMP – where possible these should be both quantitative and qualitative;
- monitoring and evaluation of ICMP outcomes; and
- adaptive management that is driven by monitoring and evaluation outcomes – a feedback loop to ensure that ICM evolves to meet new or emerging issues.

A more comprehensive review of the international literature is summarised in Table 3-3. The full results of the review, as collated in a matrix derived from the review spreadsheet are presented in Appendix A.

Table 3-3 lists key elements of best practice that reflect these critical factors, as well as some additional items that otherwise characterise ICM research and application. These elements were collated from a preliminary review of the papers, and were then used to assess the key findings of each one in terms of best practice ICM.

These findings and those from the more detailed analysis in sections 2.3.1-8 overleaf will be analysed for their application to the Auckland region in Chapter 5 of this report.

Table 3-3: Summary of international best practice for integrated catchment and coastal management

ICM element	Best Practice Approach	Alternative Accepted Practice	Application to Auckland Region	Comment
Scale	Macro	Meso	Yes	Macro scale ICM allows for full integration of natural resource issues including coverage of surface water, groundwater and coastal environments.
Legislation	1. ICM planning 2. Management Authority enabling	Supporting natural resource management	Yes	While ICM specific legislation may not be critical, enabling legislation for ICM related issues is generally necessary, The Resource Management Act enables ICM processes.
Institutional framework	Identified ICM authority	Cross sector/ jurisdictional agreements	Yes	Auckland Regional Council fill the role of the lead ICM authority.
Governance framework	1. International policy framework 2. National policy framework	Clear public and private sector roles	Yes	Development of a national or regional ICM policy approach is beneficial to achieving on-ground resource improvement and minimises conflicting programme development.
Financial / investment structure	1. Combined public and private sector investment sources 2. Performance driven investment strategies	User pays/ market based instruments	Yes	Any investment strategy or funding source must consider both short and long term income generation that reflects both the resource planning and environmental improvement timeframes.
Collaborative approach	Bottom-up	Mixed model	Yes	Shared Vision Planning and other participatory methods should be investigated to engage all stakeholders (both public and private sector); this will ensure the relevant stakeholders have 'ownership' buy-in during the planning and implementation phases of ICM. Collaboration must occur both within and between sectors.
Capacity building	Capacity building framework	Knowledge building, training and communication strategies	Yes	Targeted capacity building initiatives including education, training, communication and research. Succession planning for all participants is critical to achieving the ICM continuum.
Biophysical variables	Dependent on scale and local variables but should include consideration of: • river flow (hydrology)		Yes	The list of variables for consideration under ICM is extensive and must be carefully considered so as to target those which can be realistically benefited

	<ul style="list-style-type: none"> • water quality • soil condition/ health/ erosion • surface & groundwater connectivity • freshwater and saline connectivity • rainfall and runoff • vegetation, especially endemic vegetation • land use including greenfield and brownfield • threatened species and communities • dependent ecosystems • climate change 			under the resourcing and implementation timeframes for the ICMP. Better integration of climate change considerations is likely to be an emerging issue for future ICM programmes.
Socio - economic variables	Dependent on scale and local variables but should include consideration of: <ul style="list-style-type: none"> • behavioural change • recreational values • property rights • market failures • intergenerational equity • third party impacts • price (market) incentives • resource asset trading • private sector implementation cost • cultural and heritage values 		Yes	The list of variables for consideration under ICM is extensive and must be carefully considered so as to target those which can be realistically benefited under the resourcing and implementation timeframes for the ICMP.
Indigenous values	Cultural Framework Index	<ol style="list-style-type: none"> 1. Targeted engagement 2. Indigenous specific goals and objectives 	Yes	The incorporation of Māori interests is critical in the New Zealand context. The existing CFI is an outstanding tool to assist in the incorporation of Māori interests in ICM programmes.
Sustainability	Inclusion of Ecologically Sustainable Development (ESD) principles		Yes	ESD principles must be incorporated in all ICM programmes.
Implementation	<ol style="list-style-type: none"> 1. An ICM champion 2. An ICM business plan using S.M.A.R.T.E.R principles 		Yes	Most experiences of successful ICM have been achieved through the dedication of ICM champions in conjunction with a specific business plan that incorporates Specific, Measurable, Affordable, Realistic, Time bound, Endorsed and Relevant goals, objectives and targets.
Monitoring and evaluation for adaptive management	Monitoring, evaluation and reporting framework	Identified review periods	Yes	Monitoring and evaluation frameworks result in targeted, regular assessment of ICM outcomes that consider changes in resource condition and emerging issues or new science to achieve a flexible, adaptive management approach.

3.3 Review findings

3.3.1 Planning scale

The geographic or spatial scale of an ICM process is critical to defining the issues which should be addressed, the public and private sector participants that should be involved and the goals, objectives and timeframes for developing, implementing and adapting an ICMP.

A definition of planning scales is described by Hooper (2006) for Integrated Water Resource Management (IWRM). The focus of IWRM is coordinated decision-making about NRM and is cross-sectoral, participatory and adaptive. This approach is also strategic, focusing on what needs to be done first, rather than on all-embracing efforts (Hooper, 2006). This definition by Hooper applies equally to ICM, hence his definitions of planning scales (refer to Table 3-4), being macro, meso and micro have been adopted for review purposes in this report. The text in Table 3-4 represented in brackets is a suggested adaptation for the ICM/ICCM process in New Zealand given the differences in geographic scale and political/jurisdictional boundaries compared with the USA where Hooper's analysis focused. Further refinement of these principles could allow this table to be applied in New Zealand and the Auckland region.

Table 3-4: ICM planning scale, adapted from Hooper (2006) to reflect ICM planning processes

Natural System and Resources	Macro Level Part of a geographical zone such as a river basin or ecological zone	Meso Level Regional or local ecological resource system	Micro Level Areas with relatively uniform ecological conditions
Mapping scale	>1:1,000,000 [> 1:500,000]	1:100,000 - 1:500,000	1:10,000 – 1:1,000
Mapping unit	Provinces [Connected river, aquifer, estuarine and coastal systems ("harbour catchments")]	Land systems [River and coastal catchments. Aquifers]	Land units, land facets [Subcatchments; specific estuary, wetland or ecological assets]
Level of decision making	National Level [National or Cross-regional]	Regional Level	Local Level and Individual [as above plus regional and territorial. Developers are a driver for new developments that influence the need for ICM in Auckland and some other parts of NZ)
ICM organisation example	Highest political decision-making, international agreements. International commissions [Regional Councils]	Province, State, District or Territory Inter state basin commission/ authority/ association [Regional Councils]	Village cooperative, farm, factory, forest, individual. Local land and water management group [Territorial Authorities]
ICM document examples	International agreement [National policy or Framework; an ICMP]	River basin management plan [ICMP or issue specific management plan e.g. stormwater]	Land and water management plan. [As above, plus district and structure plans]

		management plan]	
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While the international literature reviewed for this report covers many different jurisdictions and utilises differing nomenclature to describe ICM, ICCM and related processes, most of the papers reviewed provide a recurring discussion relating to the application of a macro scale for facilitating the ICM process (ASCE, 1998; Global Water Partnership, 2000 and 2008; Holzwarth, 2002; NRM Ministerial Council, 2003; Hooper 2006; Kemper et al, 2007; Palmer et al, 2007; Davis, 2007; Menzies and Hooper, 2008).

This is perhaps to be expected as a macro scale ICMP allows several benefits:

- effective coverage of multiple biophysical, social and economic variables in order to achieve holistic planning processes;
- coverage across political/ jurisdictional boundaries in order to achieve integrated management outcomes; and
- avoiding uncoordinated management responses at smaller scales.

Another factor that is favourable to the use of a macro scale approach is the need to design and implement ICCM programmes that address the complex linkage between marine systems, coastal regions and their connected river basins (UNEP, 2006). The UNEP (2006) has developed a framework for assessing progress of ecosystem based management that integrates catchment with coastal management, termed the Orders of Outcome Framework. It can be applied at a range of spatial scales to document and analyse the results of ecosystem-based management initiatives from simple, local efforts to multiple issues the effects of which are expressed in complex estuarine receiving environments.

The small number of papers that refer to micro- and meso-scale planning (Global Water Partnership, 2008; Bellamy et al, 1999; NRM Ministerial Council, 2003; ASCE, 1998) refer to these scales more as recognition that elements of ICM can fit these smaller scales, or that certain elements of best practice can be incorporated at these scales rather than a recommendation that this spatial scale is best practice.

3.3.2 Institutional frameworks and governance

The key to achieving sustainable management through ICM outcomes, and perhaps the most universal area of discussion amongst the international literature reviewed for this report, is the need to develop robust institutional and governance frameworks to support ICM development and implementation. A recurring theme in the international literature is the need to improve co-ordination, consultation, collaboration and to avoid single-purpose strategies in order to successfully develop ICMPs (Global Water Partnership, 2003). ICM requires a governance framework where the different and often competing interests that exist within the targeted geographic area find common ground and where multi-sectoral stakeholder issues are regulated and balanced (Global Water Partnership, 2003).

To facilitate a robust and workable governance framework, Kemper et al (2007) suggest the implementation of decentralised institutional arrangements operating at a macro scale; in particular, the establishment of an authority (such as a River Basin management authority or commission or similar) that is empowered to create and modify institutional arrangements within the geographic management area. Establishing this type of institutional arrangement at a macro scale is most likely to allow the effective functioning of the ICM process through the ability to

tailor ICMP management responses to the particular physical, social, and economic setting of each management area (Kemper et al, 2007).

A key element cited by Kemper et al (2007) is the extent to which local communities can design and implement their own institutional arrangements via a collaborative approach. This collaboration with regard to institutional frameworks has the dual benefit of attracting increased stakeholder involvement from the commencement of the ICM programme and through this participation, the ability to transfer local knowledge back to the delegated management authority.

Contrasting this decentralised approach, Hooper (2006) suggests that ICM decision making, while being made via a similar authority or commission manager as endorsed by Kemper et al (2007), is most successful when it occurs within an overarching, national natural resource management framework that includes defined objectives and investment strategies. In this approach, decision making is consensual and coordinates across the public and private sectors of the nominated management area. The Authority or Commission body has a well defined business plan that identifies ICM priorities, focuses on efficiency, links vertically to governments and provides stakeholders with access to government (Hooper, 2006).

This form of national, cross-jurisdictional natural resource management framework has been established and operational in Australia for several years. Several National Framework documents have been developed by the Australian Natural Resource Management Ministerial Council with the aim of providing coordinated, targeted management programmes and strategies for improving natural resource management including ICM (NRM Ministerial Council, 2003).

Three of the National Frameworks were reviewed as part of this report:

1. National Framework for Natural Resource Management - Standards and targets;
2. National Framework for Natural Resource Management - Monitoring and evaluation; and
3. National Framework for Natural Resource Management - Capacity building.

The Frameworks represent the broad operational policy objectives for all NRM programmes across Australia and are designed to operate across different scales and to respond to integrated or specific NRM issues. All of the Frameworks establish targets and objectives to achieve NRM outcomes. Table 3-5 briefly summarises the objectives of each Framework.

Table 3-5: National natural resource management frameworks, Australia

Framework	Standards and targets	Monitoring and evaluation	Capacity building
Objective	Articulates the specific, measurable, achievable, realistic and time bound (SMARTER ¹) principles for achieving on-ground NRM improvements	Sets out the requirements for assessing and measuring NRM goal completion with regard to specified standards and targets	Provides a comprehensive best practice approach to the implementation of capacity building for Governments, NRM Managers; Investors; the Community and private landholders/ stakeholders.

The NRM Frameworks provide clear direction for all NRM programmes in Australia and clearly articulate targets, standards, monitoring and reporting requirements over multiple timeframes and differing geographic scales and for diverse NRM issues. By providing this clear policy direction, the Australian Federal and State governments, as signatories to the Frameworks, collectively aim to

¹ SMARTER - Specific, Measureable, Affordable, Realistic, Time bound, Endorsed and Relevant goals, objectives and targets.

improve the governance and institutional arrangements in order to deliver gains in on-ground resource condition and improve investment outcomes for NRM bodies. It should be noted that these NRM Frameworks were reviewed and updated by the NRM Ministerial Council in June 2008 but analysis of these revised NRM Frameworks has not been included in this report.

Another critical linkage of the institutional arrangements supporting ICM is the development and unrestricted access to a well developed, accurate, up-to-date information and monitoring system (Hooper, 2006) to inform management bodies and support the decision making process. This information management system and the institutional arrangements relating to ownership and access to the data are critical to efficient ICM. This is especially important where the ICM process needs to coordinate between different public sector agencies or private sector organisations, where there may be resistance to the sharing of data across organisational boundaries. Achieving this unrestricted data access and effective data management is important in informing the ICM process because, as Hooper (2006) identifies, good science informs a planning authority through modelling and spatial representation of ICM options, which are costed and linked to the authority's decision system, options are then implemented through strategic planning and decision making; further, the supporting information management system details how the ICMP is being managed and how resources are consumed and protected (Hooper, 2006).

The horizontal integration of NRM governance systems is identified by Bellamy et al (2002) as an issue for achieving robust ICM outcomes. Establishing strong collaborative management and performance operational relationships that are formalised through regulatory or voluntary instruments (such as a Memorandum of Understanding) is essential. It ensures that the large number of public and private sector stakeholders within an ICM area that have ICMP responsibilities, achieve these responsibilities in a coordinated, strategic manner, avoiding incremental, ad hoc programme delivery which may result in poorly coordinated and measured ICMP outcomes.

Bellamy et al (2002) highlight the significant shortcomings in many areas of ICM planning and implementation due to a lack of coordinated organisational design. In many cases there are several agencies or bodies responsible for specific ICM activities (e.g. water management, land use planning, vegetation management, catchment management) meaning that truly integrated catchment management can be difficult unless these responsibilities are rationalised or robust governance systems are established. Bellamy et al (2002) propose a "best practice framework" which recommends "fostering institutional arrangements that are enabling" including empowering collaborative governance and integration of governance systems; it is recommended that institutional arrangements must enable the achievement of ICM outcomes. A significant part of the best-practice ICM framework describes the requirement for cross boundary participation and recognition of issues in order to achieve successful ICM. This is a particular issue in many jurisdictions where varying legislative and policy objectives for the various Governments or their agencies have the potential to confound ICM or ICCM outcomes in downstream or adjacent jurisdictions.

Throughout the review of international literature it becomes evident that effective governance is one of the most significant challenges to achieving successful, long-term ICM. The challenge of achieving good governance is well framed by the following statement:

Putting IWRM [or ICM] into practice is a long-term process that will often require significant changes in the interactions between politics, laws, regulations, institutions, civil society, and the water user. The capacity to make these changes depends on establishing better governance systems.

Global Water Partnership (2003)

Effective governance of Integrated Water Resource Management (IWRM) has been defined by the Global Water Partnership in their 2003 paper as being open and transparent; inclusive and communicative; coherent and integrative; equitable and ethical; accountable and efficient. These same elements apply to ICM. Table 3-6 identifies the key elements for establishing a robust governance system as described for IWRM but that can be applied to ICM processes.

Table 3-6: Key governance elements for IWRM

Distributed governance in water
Water governance is linked to governance in society at large
Distributed governance and IWRM go together
How to make distributed governance effective
Establishing the enabling environment
Avoid over regulation and excessive or complex legislation
Effective regulation – laws turned into working rules
Need to involve and to inform players of regulation
Introduction of ‘apex’ bodies
Economic instruments and financing
Overcome under-funding of even basic functions
Introducing ‘decent business’ principles
Creating value by good water governance
Checks and balances on expenditure
Building capacity for better water governance
Capacity building for individuals and institutions
Inform all players – including decision makers
Need for new skills
Decentralisation
Put the subsidiarity principle in practice (subsidiarity is the principle which states that matters ought to be handled by the smallest (or, the lowest) competent authority)
Decentralisation is a trend that needs to be put into a viable framework
Local issues are different from regional or national issues
There is a large lack of capacity that needs to be addressed
Basin management including shared waters
Only start river basin management where it is most required and link with coastal management where appropriate
Treat river basin management as a useful new element of the governance system
Increasingly seen as a solution due to pressure on water but need to learn and understand what it means in practice
Need to take account of political feasibility
The process of change
Need to build as much as possible on existing arrangements
Capitalise on opportunities and be realistic
Open processes and policy making with all stakeholders as far as practical

Source: Global Water Partnership (2003)

Davis (2007) outlines the benefits of robust institutional frameworks via the vertical integration of law, policy and agency responsibility for designing and implementing IWRM that are also applicable to ICM. In California, USA, he describes how Federal, State and Local governments operate to achieve vertical integration; this is despite a lack of specific federal IWRM legislation. This occurs through the establishment of key policies or laws which establish frameworks for each progressive level of government to work within. In France, Davis (2007) documents that IWRM is undertaken by River Basin Commissions at a macro scale, but sub-basin plans can be prepared at a more local level provided they are consistent with the Basin Plan. Despite this, the national government retains veto powers for IWRM outcomes if necessary. He notes that in practice, the horizontal integration of legislation and policy appears to be less successful (or at least more resistant to change) in many jurisdictions. Historically, because IWRM has evolved from a need for improved coordination across numerous water management issues, horizontal integration may have been impaired due to government agencies and stakeholders resisting change and endeavouring to "protect their patch". Due perhaps to these historical conditions relating to water management; Davis supports coordination including horizontal integration across all levels of government and their agencies and between public and private entities. Importantly there is acknowledgement that integration should also occur across technical disciplines so that collaborative approaches result from well integrated institutional arrangements.

While the preceding discussion has focussed on the broader definitions of ICM and how strong institutional frameworks facilitate improved ICMPs, Kay and Alder (2005) have noted a different situation with respect to coastal management. They note that coastal management involves many and varied stakeholders, often from a much wider geographic area than freshwater or terrestrial based ICM areas. These stakeholders include those charged with the legal responsibility for managing coastal areas, including different levels of government with land under their direct control and coastal industries which may be required by law to restrict pollution into coastal waters. Kay and Alder document that it is generally acknowledged that there is no commonly accepted best institutional arrangement for managing coastal resources. Coastal programmes must have an institutional identity (it is identifiable as either an independent organisation or a coordinated network of organisations linked together by functions and management strategies). Wherever possible, the institutional arrangements for new coastal management programmes must tailor administrative structures to take advantage of the particular cultural, social, political factors within their jurisdiction as they interact with the issues being addressed.

From the preceding discussion, it is evident that establishing workable institutional and governance arrangements before the ICM process starts is one of the most critical elements in achieving successful ICM.

3.3.3 Legislative frameworks

It would seem that having identified the importance of institutional and governance frameworks to achieving successful ICM, that it would be equally critical to establish a strong legislative framework within which the governance arrangements can operate. However the international experience is somewhat divided as to the necessity of a legislative framework, or at best, the requirement to undertake ICM within the framework of a specific, tailored ICM legislative instrument.

For example, Davis (2007) demonstrates that IWRM can occur without a specific legal mandate to facilitate implementation (e.g. in California, USA), however even when the IWRM process itself is not enabled by law, the implementation of it is generally dependent on the establishment of legal frameworks that outline responsibilities, requirements for IWRM and in some cases prescribe environmental and socio-economic priorities that must be considered throughout the planning and implementation phases of IWRM. Davis notes that historically, IWRM has had to cope with piecemeal legal and institutional frameworks that evolved from separate water management issues (e.g. flood control, water quality management, water rights/ extraction, recreational requirements, water supply etc) and that are managed by different levels of government and different agencies. These factors contribute to the inertia that can weigh down the necessary institutional and legal change that is often necessary to facilitate a more integrated, streamlined IWRM process.

In Australia there has been a varied approach to the use of legal instruments to facilitate or mandate ICM. Bellamy et al (2002) outlines the varying approaches to legislation for ICM/NRM planning within Australia; including that some states have dedicated ICM/National Resource Management (NRM) legislation while others rely on a policy framework. Both systems work, depending on the context. Conflicting with this outcome is however the fact that in some cases, where legislation exists, there is a disconnect between the organisations tasked with preparing ICM plans and those implementing them, meaning that any legislative basis for planning is eroded due to the lack of integration between the agencies having these different roles (Bellamy et al, 2002).

Bellamy et al (1999) note that a robust, integrated legislative base is an important factor for developing and implementing ICM. They note that in the Australian context, there is often a fragmented, poorly aligned suite of legislation which may confound the ICM process. There is a strong recommendation that legislative tools must enable ICM but have a compliance/enforcement component should this be required. The authors strongly recommend that regulatory tools relating to land use planning are linked with ICM planning outcomes and objectives. It is noted that historically this is not always the case.

More commonly, ICM is seen as requiring a strong legislative framework within which to operate (Holzwarth, 2002). For example, the European Union (EU) has a legislative framework for integrated planning for catchment-based river basin governance, the Water Framework Directive, which became law in 2000. Holzwarth (2002) comments that the legislation itself is only a framework for supporting river basin planning and will only work successfully if the policy context it operates within is agreed to by all river basin planning participants. In other words, to achieve successful river basin or ICM planning, Holzwarth reports that there needs to be community and political ownership of the catchment management issues and the legislative mechanism present for the ICMP to operate effectively.

In the EU context where river basin boundaries may cross multiple political boundaries, it is critical that any ICM legislation can be recognised and enforced across these jurisdictional boundaries, for example by way of a framework that is not solely dependent on a single jurisdictional legislative requirement. This is achieved through an inter basin agreement signed off by the EU Commission and a Ministerial Council (Holzwarth, 2002). This approach has been widely used with successful examples also occurring in Australia through the Murray-Darling Basin Agreement and in the Mekong River catchment with Thailand, Lao, Cambodia, Myanmar and Viet Nam participating cooperatively through the Mekong River Basin Commission (G Fishburn, pers. comm., July 2008). This approach ensures that policy and legislation between jurisdictions are agreed and compatible

– the approach is worthy of consideration in all jurisdictions, including Auckland, where catchments cross TA boundaries.

While the mechanism described by Holzwarth (2002) in the EU achieves this agreement between nations through an “apolitical” Commissioner and Ministerial Council, the approach should be successful on smaller scales as in Auckland where the ARC can potentially take the ‘apolitical’ leadership role of the EU Commissioner and the relevant territory authorities and other relevant government agencies form the equivalent of the Ministerial Council. The ARC would effectively broker an agreement by all participants to work within the existing legislative framework, the Resource Management Act, in order to develop and subsequently implement the ICMP outcomes.

3.3.4 Collaboration – public and private sector roles

Collaboration between and within the public and private sectors (including the general community, stakeholders and business) is critical to achieving successful ICM as it ensures that all participants are engaged in and “own” the ICM process. Resoundingly, the results of the review of international practice indicate that a genuine collaboration between government and its agencies and all parts of the private sector is more likely to achieve greater long term benefit and outcomes when utilised from the start of the ICM process. Most commonly, a bottom-up participative approach is advocated, although a hybrid model comprising some bottom-up and some top-down is also suggested as being necessary in cases where the private sector either lacks the capacity to engage in the ICM process (for example in poorer nations) or the social importance of an ICM issue (e.g. access to high quality drinking water) requires a greater degree of public sector ownership of the ICM process.

A key finding in a number of papers is that public and private sector roles and responsibilities should be clearly articulated at the start of the planning process (e.g. ABARE, 2003, Global Water Partnership, 2000; Kay and Alder, 2005; Hooper, 2006). Moreover there should be a high degree of trust between the participants in the ICM process (Kemper et al, 2007). While trust may be difficult to achieve in the early stages of ICM as different participants bring their various (and possibly conflicting) issues and requirements to the ICM planning table, several authors (Kemper et al, 2007; Palmer et al, 2007; Menzies and Hooper, 2008) highlight that there needs to be clear communication and a willingness to participate openly without pushing specific agendas – this goodwill is seen as imperative to achieving a collaborative ICMP.

Using a stepped, engaged, interactive process with stakeholders, that is driven by trust and partnership building, and supported by rigorous science, is essential to achieving a collaborative ICM process (Menzies and Hooper, 2008). Similarly Bellamy et al.’s (2002) best practice principles recommend achieving ICM goals through participatory goal setting that incorporates all parts of the community and which is backed by a management framework that focuses on enabling implementation to achieve agreed outcomes. These observations of international best-practice collaborative, participatory approaches warrant strong consideration for the Auckland region.

There is an acknowledgement that historically, ICM processes have been suboptimal where organisational and institutional frameworks have been unclear (Bellamy et al, 1999). It is strongly recommended that ICM is completed at a local level through community based, but government supported regional bodies (Boards, Committees or similar). Bellamy et al (1999) note that ICM is most successful where a committed, experienced and knowledgeable catchment coordinator or ICM champion (or both), drives the process for the community, but within a clear and defined policy framework.

In most of the papers reviewed for this report, the role of government in establishing an ICM policy framework is viewed as essential, given that policy approaches will determine private sector responses to ICM issues – especially those driven by financial or market based mechanisms (ABARE, 2003). The ABARE paper identifies that it is a government's role to set and implement policy, with the private sector responding to that policy through market mechanisms. While this is not a collaborative approach per se, it is an important statement of responsibility. Depending on the individual or suite of policy approaches that are utilised to address an ICM issue, the role of government may further include ongoing monitoring and evaluation of the ICM programme to ensure the policy approach is operating efficiently (ABARE, 2003), although this is one area where greater engagement of the private sector can occur, as it will foster further collaboration.

Kay and Alder (2005) note that in an integrated coastal management setting, the process of selecting management targets and implementation priorities is often heavily influenced by local languages and cultural settings. In these cases, consensual planning techniques are used to emphasise the importance of learning to these communities; provide empowerment; and effective communication to engage stakeholders in the planning process. Consensual planning is widely used across to develop management plans through the building of consensus between the various stakeholders taking part in the planning process (Kay and Alder, 2005).

Several groups of issues are important in this collaborative approach to integrated coastal management and which also apply for ICM more broadly (Kay and Alder, 2005):

1. integration among sectors: among coastal/marine sectors; between coastal/marine sectors; and with other land-based sectors such as agriculture;
2. integration between the land and the water sides of the coastal zone;
3. integration among the levels of government (national, sub national, local);
4. integration between nations; and
5. integration among disciplines e.g. natural sciences, social sciences and engineering.

Where possible the Global Water Partnership (2003) recommends a move away from insular, top-down organisational management and planning structures that fail to adopt a holistic approach to ICM and towards structures that favour a gradual bottom-up approach. In particular, there is strong support for stable political and legislative frameworks, achieved through international/ national/ cross-basin agreements that facilitate and enable the development of integrated, holistic management (Global Water Partnership, 2003).

Bottom-up approaches are recommended, but there is a strong recognition that this is dependent on the maturity of the local circumstances; in some (mostly impoverished) communities, bottom-up will only work successfully following a concerted capacity building program (Global Water Partnership, 2003). Similarly, Bellamy et al (2002) identifies an "emergent bottom-up" approach where there is strong recognition of stakeholder collaboration in ICM as the heart of policy formulation for each catchment.

There is a strong emphasis on relationship-building, so that catchment communities are aware of and responsive to "duty of care" responsibilities to the environment and other stakeholders and so that government agencies need to adopt flexible approaches to facilitate and enable effective engagement of various stakeholder groups including indigenous groups (Bellamy et al, 2002). These authors also state that any devolution of power to local levels must occur at a pace commensurate with community capacity to accept this responsibility.

Mitchell (2005) describes two options for an IWRM plan (which is congruent with an ICMP) that incorporates a bottom-up approach:

1. identifying basic goals or directions, along with the initiatives necessary to achieve them; individuals and organisations explore how they can contribute to common goals or directions. In the process of shared vision exploration, participants have the opportunity to understand where, how, and why their values and interests diverge with those of other participants and where negotiation is needed to address and legitimise different aspirations; and
2. encourage individuals and organisations to identify their own goals and directions for the future. Then, when they come together, they see whether diverse perspectives can be coordinated.

Mitchell (2005) also highlights that researchers and practitioners of both ICM should both work more explicitly to determine how their analyses and professional practice can be used in a complementary manner. An opportunity exists for managers to link or connect river basin plans to land use planning processes to create a more holistic ICMP.

In the EU context, Holzwarth (2002) documents that the public sector is predominantly engaged to prepare both river basin plans and the legislative frameworks that support and facilitate ICM processes. Public sector organisations are also responsible for undertaking compliance by all participants to the regulatory requirements of a statutory plan (Holzwarth, 2002). The private sector, and in particular non-government organisations (NGOs) have a critical role to play by actively monitoring ICMP outcomes to ensure they accord with the shared visions and objectives agreed to during the ICM process (Holzwarth, 2002).

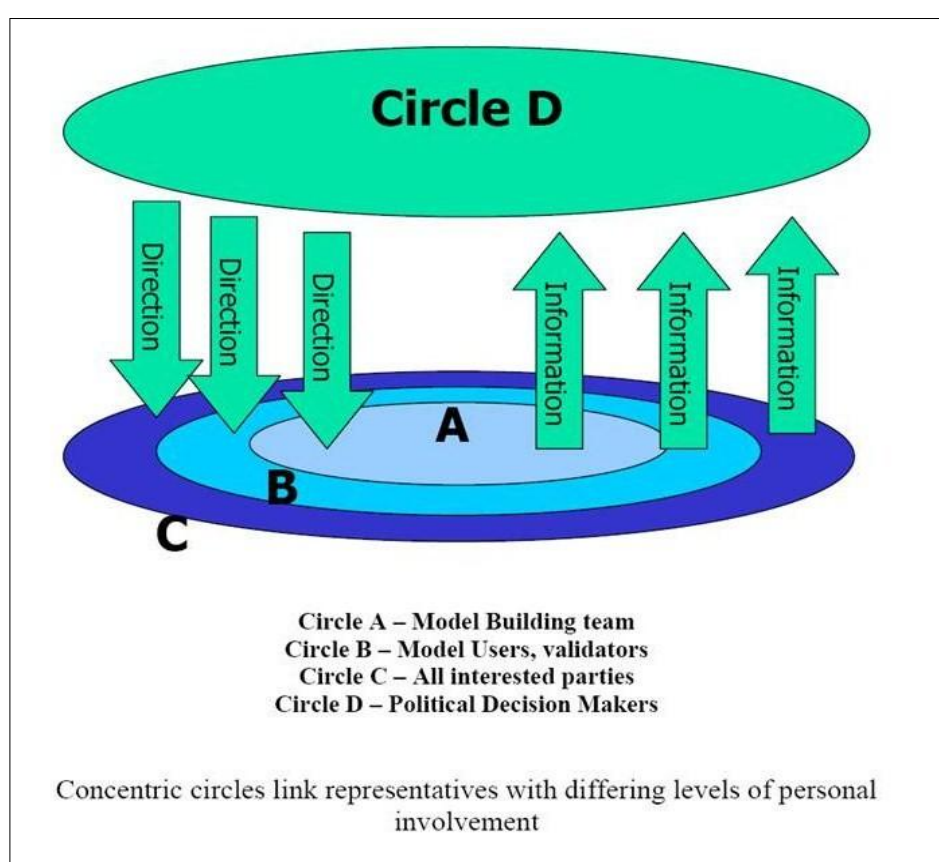
Shared Vision Planning or SVP is a combination of multi-objective planning, structured public participation and collaborative and technical analysis method to support ICM decisions e.g. the use of computer modelling - see Figure 3-1 (Palmer et al, 2007). SVP uses circles of influence as its primary public involvement process to balance the desire for broad participation in all planning activities with the need for planning efficiency – that is, SVP relies on traditional planning approaches (see Figure 3-1); the circles of influence approach organises stakeholders or subsets of

the community based on their interest and ability to be involved with technical details of the formulation and analysis of ICM alternatives. Public involvement is explicitly required through regulations and policy. In the initial stage of an SVP process a diverse team of participants is assembled and may comprise government agencies, policy makers, technical experts, individuals and stakeholder groups, that have an interest in the planning problem.

As shown in Figure3–1, the circle of influence forms a conceptual model that demonstrates the flow of information from all parties to the political decision-makers, which inform the policy response that then puts in place the framework within which participants take part in the ICM process. SVP emphasises the iterative and collaborative formulation of plans by stakeholders.

Figure3–1 The circle of influence

Source: Palmer et al (2007)



An important consideration is that collaborative participation by both the public and private sector in ICM should be ongoing and continuous; it does not stop following the finalisation of an ICMP, but should continue throughout the implementation, monitoring, evaluation and adaptation phases of ICM (Holzwarth, 2002).

3.3.5 Capacity building

An important extension of the collaborative approach to ICM is the need to build participant capacity through various mechanisms.

Davis (2007) notes that capacity building is recognised as an issue to be addressed on several levels; from the governance/ institutional level it is identified as a critical component of the

horizontal and vertical integration of ICM processes across private and public sector organisations (including technical capacity building); and in particular in less developed nations or amongst minority groups, capacity building is critical to ensuring that the full social, cultural and economic value of water is included in the ICM process in order to genuinely engage communities and stakeholders in a full participatory ICM process. Crucial to the success of integrated catchment management approaches is the building of institutional capacity to ensure that sustainable, ecosystem-based management programmes are achieved (UNEP, 2006).

Capacity building is particularly important for community-based ICM participants, practitioners, agencies and technicians (Bellamy et al, 1999) and should be an ongoing process throughout the lifespan of the ICM process as the planning and management needs and outcomes mature. Capacity building may occur either as direct, targeted extension or education programmes, or more organically through direct contact between experts and non-experts.

A key approach in any capacity building programme is easy access to information. Governments can address inefficient management of natural resources through the public provision of information through the sponsorship of research projects, communication strategies (including publicly available data sets) and education programs (ABARE, 2003).

It is critical to understand that capacity building is a two-way process, whereby technical or policy experts pass knowledge to political leaders, industry, NGO participants, individuals and the broader community but that knowledge is also transferred from these 'non-technical' participants back to the technical experts. Additionally, large gains need to be made in targeting capacity building with indigenous participants (NRM Ministerial Council, 2003).

An often overlooked component of capacity building is the need to incorporate succession planning for ICM community representatives and agency staff (Bellamy et al, 1999). This is driven by the recognition of "burn out", particularly by community based ICM participants who are often very community-minded and heavily engaged in multiple participatory roles. Succession planning is equally important for public and private sector technical experts, especially where organisational restructuring and ageing workforces conspire to remove respected practitioners from ICM practice. In both cases, the use of alternative or proxy participants in the capacity building process means that there is minimal loss of progress if critical participants step away from the ICM process at any time (Bellamy et al, 1999).

Capacity building for the community and professionals is also identified by the Global Water Partnership (2000) as a critical area that requires further effort

3.3.6 Investment and resourcing

It is widely recognised that ICM and ICCM processes are extraordinarily complex due to the integrated nature of the biophysical and human variables they must address. These processes require scientific, technical, social and economic inputs and can only be successful if they are implemented over appropriate timeframes and fully engage public and private sector participants. ICM/ICCM often requires physical, infrastructural, environmental and behavioural change. These changes may require large-scale readjustments in social, economic and environmental systems in order to achieve measurable on-ground outcomes. These requirements mean that the process requires sustained financial investment through the allocation of financial and human resources in order to achieve long term ICM programme outcomes (Bellamy et al, 1999; UNEP, 2006).

Additionally as most ICM/ICCM processes and outcomes operate over long time scales, it is critical that financial support extends over the lifespan of the planning and implementation

programme (Bellamy et al, 1999). It is acknowledged that funding sources are often implemented over a five to seven year timeframe, whereas perceptible changes to resource condition often occur on much longer timeframes (for example 20-50 years or more). The success of ICM is therefore susceptible to changes in funding arrangements and may be subject to political timeframes. Securing long-term commitment by government and community investors is therefore essential for ICM to succeed (Bellamy et al, 1999).

Additionally, Bellamy et al (1999) note that perceptible on-ground improvements resulting from ICM programmes may not become evident within the fading lifespan of an ICM programme. As a result, there is a risk that funding may be jeopardised unless funding bodies explicitly recognise that ICM outcomes may occur over longer timeframes. There is a specific recommendation that governments must recognise this aspect of ICM and allow for adequate funding to cover the ICM process from commencement, planning and implementation

There are multiple options to pursue financing or investment of ICM processes including:

- direct government funding for ICM programmes;
- indirect government funding including works programmes for associated ICM activities, the provision of physical resources (staff and equipment) and subsidies;
- user pays or similar market based mechanisms;
- private sector investment; and
- joint public and private sector partnerships or cost sharing.

The Global Water Partnership (2008) has identified three key funding streams for gaining access to and acquiring suitable funding to support the ICM framework and to deliver measurable on-ground outcomes:

1. user or beneficiary payments, which can either be in cash or through donations of labour or materials. Payments from some users may be used to cross-subsidise others;
2. government budgets derived from taxation or the sale of state owned resources, goods and services; and
3. grants and aid from donor agencies, NGOs and charities.

In the USA, river basin management programmes are financed through cost-sharing arrangements between all levels of government and the private sector (Hooper, 2006). By pursuing this approach, adequate financing is on-going, guaranteed and linked to national and state ICM priorities (Hooper, 2006).

A stable financial platform to investigate, plan and implement ICM requires management authorities to be given budgets that are protected from general government revenues (Global Water Partnership, 2000). This may be especially critical where small or remote local management bodies do not have access to external financial sources and need to rely on government funding sources, or else be tempted to over-exploit their natural resource base (Global Water Partnership, 2003). In pursuing government investment in ICM, a macro-economic approach is critical as it will drive integrated policies across government agencies and policies and the community broader community (ABARE, 2003; Global Water Partnership, 2008). In most jurisdictions, multipurpose management agencies have several potential income sources and could be self-financing if they were properly structured and empowered, and also had sufficient financial autonomy.

Mechanisms to get loans directly to small scale providers, such as the micro-financing institutions and credit pooling arrangements, are of vital importance (Global Water Partnership, 2008).

In many jurisdictions, the use of market-based mechanisms to achieve full cost recovery for ICM authorities is considered an important driver for attracting and retaining private investment in ICM programmes (ABARE, 2003).

Once investment is secured, the Global Water Partnership (2008) suggest that in terms of ICM institutional and governance arrangements, certain ICM functions may be best delivered by technically competent, independent public sector agencies or the private sector, either of which would be capable of economies of scale and able to attract commercial funding and equity finance. Further, the performance of individual water services is dependent on a whole range of water resources management functions which need to be financed, but will then facilitate access to finance for other functions and services (Global Water Partnership, 2008).

With regard to public funding and subsidising ICM, the Global Water Partnership (2008) state that public goods or services need to be state provided and funded. Defined simply these are services provided to benefit communities (or an economy as a whole) rather than specific individuals. The argument for public funding of ICM is that resultant environmental benefits are enjoyed collectively by the community and it is not equitable to charge beneficiaries directly through user pays fees. Although the public good concept enjoys wide currency, it has elements of ambiguity. There are different notions about what constitutes public goods and disagreement over whether they all need to be financed by subsidies from the public purse (Global Water Partnership, 2008).

ABARE (2003) identify that economic instruments can influence the behaviour of resource users affected by ICM processes to ensure that natural resources are used more efficiently. Appropriate instruments include price based mechanisms (e.g. taxes, charges, levies) or quantity based mechanisms (e.g. numerical constraints, quotas that create a market for trade). To most efficiently deploy these economic instruments generally requires the complementary use of property rights and a strong legislative framework. ABARE suggest that economic instruments to effect ICM policy are advantageous as they allow each user to adapt their management response to their individual situation in order to achieve cost efficiencies. However, it is critical that governments do not send ambiguous signals through lack of coordination across government programmes. An example of this occurred in Australia when some agencies were advocating the growth of farm forestry via taxation incentives while conversely several other agencies were encouraging water use efficiency through user pays market mechanisms. As a result there were confounding resource outcomes and market confusion as the growth in plantation forestry resulted in a net loss of stream flow through runoff interception by the plantations whereas part of the market was being encouraged to increase stream flow to provide water for the environment.

Any ICM funding scheme should therefore consider all market sectors – such as forestry, housing and land planning or agriculture so as to reduce direct pressures on funding streams that are applied directly to the ICM process (Global Water Partnership, 2008).

3.3.7 Addressing biophysical, social and economic variables

The very intent of integrated catchment and/ or coastal management and planning is to incorporate management actions that encompass and address a diverse multitude of biophysical, social and economic (multiple bottom line) variables within the process. Not surprisingly, addressing the array of catchment and coastal variables requires grounding at a local level so that relevant issues are considered and irrelevant or unimportant issues for the local context are disregarded.

The international literature includes reference to a multitude of issues that may be critical for ICM; the majority of these issues are likely to be common across most jurisdictions and geographies. Table

3-7 briefly summarises some of the key variables that should be considered and where appropriate addressed in the ICM process. These variables were summarised from the Literature Review Matrix shown at Appendix A and thus compile the issues presented by all of the literature reviewed for this report. It is not designed as a comprehensive list of every issue that will need to be considered under ICM, but to demonstrate that the suite of variables that must be considered is broad and the web of relationships between these variables adds to the complexity and challenge of developing a truly holistic ICMP.

The Global Water Partnership (2000) noted that ICM processes have historically focused on water quality and quantity but should also incorporate integrated land use management and planning in ICMP development due to the strong linkages between land use change and water resource management. Land use change is seen as a key area for potential conflict if land use planners and communities are not involved in ICMP from the beginning.

Water quality is identified as a key issue for ICM processes with water pollution, return flows and land use change as key drivers contributing to reduced water quality (Global Water Partnership, 2000; Davis 2007). Water quantity and allocation planning are critical considerations for ICM with return flows, extraction, land use change, climate change and increasing human demand are seen as the key drivers requiring consideration (Global Water Partnership, 2000; Davis 2007). Davis (2007) outlines that water sharing is a primary objective of ICM; water sharing mechanisms are designed to manage historic and future water management objectives but must also address often competing demands for water through mechanisms such as water trading, licensing, environmental flows, connectivity with groundwater and saltwater systems, basic water rights, infrastructure development and operational rules and socio-economic factors.

Integrated surface and groundwater management are identified as key (and emerging) issues, with ICM needing to address surface and groundwater connectivity from both a quantity and quality perspective (Global Water Partnership, 2000). Wastewater (return flows) is seen as a positive driver for adaptive management under an ICMP given that return flows and waste water have the potential to offset increasing water demand provided that appropriate regulation, financial drivers (price) and monitoring tools are in place (Global Water Partnership, 2000).

Table 3-7: Multiple bottom line variables for consideration during ICM

Biophysical	Social	Economic
<ul style="list-style-type: none"> ▪ sustainability ▪ climate change ▪ water quantity ▪ water quality ▪ flooding ▪ return flows ▪ hydrology and hydrogeology ▪ groundwater ▪ surface and groundwater connectivity ▪ freshwater - marine continuum ▪ estuarine environments ▪ coastal environments ▪ coastal erosion ▪ estuary flushing 	<ul style="list-style-type: none"> ▪ sustainability ▪ climate change ▪ equity ▪ recreational values ▪ aesthetic values ▪ spiritual values ▪ cultural values, including those of indigenous communities ▪ health ▪ heritage assets ▪ property rights including those for water entitlements ▪ third party impacts ▪ flood risk and management 	<ul style="list-style-type: none"> ▪ sustainability ▪ climate change ▪ equity ▪ property rights – changed asset value ▪ land use and planning ▪ resource allocation and availability ▪ asset management ▪ impacts to local economies ▪ market failures ▪ implementation costs to public and private sectors ▪ market based incentives for change (pricing, tax, levies)

<ul style="list-style-type: none"> ▪ rainfall ▪ runoff ▪ climate ▪ geomorphology ▪ vegetation communities especially endemic vegetation ▪ vegetation cover ▪ soil health, including salinity, sodicity and acidity ▪ soil types/ groups ▪ soil erosion ▪ aquatic and terrestrial fauna ▪ threatened species and ecological communities ▪ dependent ecosystems such as wetlands 	<ul style="list-style-type: none"> ▪ behavioural attitudes and change ▪ educational standards (capacity) ▪ communication ▪ ethnic diversity ▪ political boundaries ▪ intergenerational equity ▪ legislative requirements ▪ political environment 	<ul style="list-style-type: none"> ▪ investment strategies ▪ resource asset markets and trading ▪ competition
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There is recognition that IWRMP should recognise the freshwater-marine continuum. It is recommended that coastal managers are included in the IWRMP process to ensure connected outcomes. Climate change is briefly mentioned as an emerging issue that is likely to increase water scarcity and hence should be considered where possible during the IWRMP process. Further research/methods are required for valuing the benefits of ecological services provided by nature. There is an underlying theme that all issues affecting IWRMP could be better researched or supported by more appropriate, timely or robust data (Global Water Partnership, 2000).

Davis (2007) notes that property rights (or water rights) are a significant component in ICM and the careful consideration of water rights and their historic establishment during the development of an ICMP is necessary. He notes that in most jurisdictions water rights are defined differently and this can be problematic where different rights mechanisms exist within the same management unit (e.g. river basin). Socio-economic factors including providing the full value of water are critical components of ICM. Considering the needs of communities through shared vision planning will lead to a better recognition and identification of socio-economic factors to be considered in ICM. Davis (2007) cites the Model Water Codes used in the USA where socio-economic impact assessment, the no-harm rule and avoidance of third party impacts are key tenets for ICM.

Menzies and Hooper (2008) identify the importance of integrating wastewater activities into ICM development and implementation.

In his 2002 paper, Holzwarth documents how the European Union Water Framework Directive expands the scope of water protection to include estuaries and marine waters, thereby recognising the strong linkages between freshwater environments and dependent marine ecosystems and particularly how marine environmental and socio-economic conditions may be dependent on freshwater management. He also states that ICM planning must recognise the need for groundwater recharge; recognises that groundwater may be used more regularly as demand for water increases.

With regard to the potential socio-economic impacts of ICM, Bellamy et al (1999), note that many on-ground ICM processes require in-kind participation by landholders which comes at a cost to personal time and finance. Incentives need to be used to ensure that landholders participate in the ICM process. They recognise that many ICM processes are necessary for the broader community good, yet they often require individual landholders to implement them at a socio-economic cost to the landholder. These issues need to be considered in developing ICM strategies and supported

though proper funding and incentive programmes. Similarly, ICM has a greater chance of success if the socio-economic issues have been identified during the planning process and acknowledged and accepted by the community. More research/data is often required to identify these socio-economic issues.

Market instruments are designed to influence the behaviour of resource users to ensure that resources are used more efficiently (ABARE, 2003). Most economic instruments include price based (e.g. taxes, charges, levies) or quantity based (e.g. numerical constraints, quotas that create a market for trade) mechanisms and these are most efficiently deployed through the complimentary use of property rights and a strong legislative framework (ABARE, 2003). Economic instruments to effect ICM policy are advantageous as they allow users to adapt their response to a situation allowing for cost efficiencies. Adaptation will occur in light of the differing price signals implemented through the economic instruments (ABARE, 2003).

The ABARE paper (2003) suggests that well defined property rights provide an incentive to use resources for the greatest benefits to society. Well defined property rights clearly specify an entitlement and how this accrues to the holder and how the right can be transferred or secured. It is noted that the inefficient use of property rights will occur where this is information failure (as to the extent and value of the right) or the use of the resource generates public externalities (ABARE, 2003).

ABARE's (2003) discussion of benefits and costs of varying NRM policy approaches are applicable to ICM and the Auckland region and may be especially useful with respect to stormwater and waste water discharge. The varying policy approaches that are discussed include property right solutions; the provision of information; persuasive measures, economic instruments and regulatory instruments. The paper does not identify any of these as being "best practice" rather it acknowledges that ICM policy must adapt to suit the circumstances and to ensure that resource efficiency is maximised. A strong theme is to avoid unintended consequences (termed market failure) by selecting policies without full exploration of the primary, secondary and tertiary impacts of their implementation. A lack of examination of impacts is cited as being a major reason for NRM policy failure (or at least inefficiency in outcome).

Finally, several papers, most notably Davis (2007) recommend that ICMPs should be strongly linked to ecologically sustainable development (ESD). However ICMPs alone are not a panacea for delivering ESD, but are a component within larger management responses which should help achieve ESD. Davies (2007) notes that historically, water resource management undervalued the environment and hence ESD was not a significant consideration for management action. However future ICM processes must now redress this imbalance and support environmental restoration in order to achieve ESD.

3.3.8 Monitoring, evaluation and adaptive management

When preparing an ICMP and managing for its implementation, adaptive management responses are critical to ensuring that the ICM outcomes are sufficiently flexible to address and manage altered, new or emerging resource responses. Hooper and Menzies (2008) describe management as being adaptive when relevant stakeholders in a catchment assess the efficacy of different ICM options, test these in sub-catchments, learn from these experiences, then promote wider application. Assessing options with multi-criteria analysis techniques (Menzies and Hooper, 2008) helps to capture multiple bottom line dimensions of decision-making and monitoring. Robust adaptive management must incorporate regular monitoring, evaluation and reporting of ICM outcomes. Monitoring, evaluation and reporting must occur under targeted implementation

programmes and occur at regular intervals. It is important to recognise that any monitoring, evaluation and reporting programme incorporates change through both quantitative and qualitative data. Monitoring should also capture data that will assess changes to biophysical, social and economic variables.

In order to achieve adaptive management through monitoring, evaluation and reporting, an ICMP needs to first have clear goals, objectives and targets. The Australian NRM Ministerial Council's (2003) National NRM Frameworks for monitoring and evaluation and standards and targets are suggested as strong examples for establishing ICM key performance indicators (KPIs) and the subsequent programmes to monitor and evaluate these KPIs.

Figure 3-2 Australian Natural Resource Management monitoring and evaluation frameworks

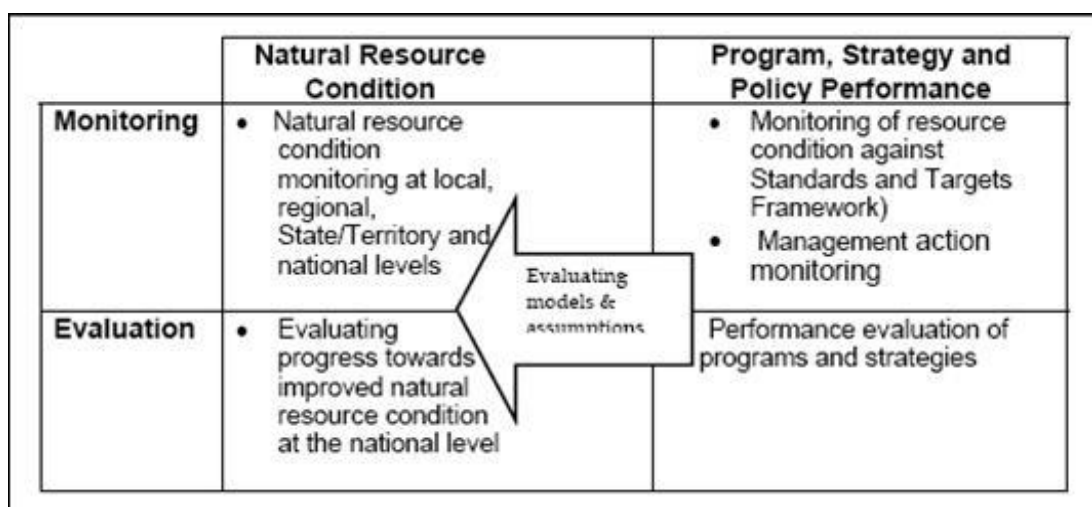


Figure 3-2 is sourced from the Australian NRM Monitoring and Evaluation Framework (NRM Ministerial Council, 2003) and outlines how monitoring and reporting can be used for adaptive management of a natural resource management programme.

Davis (2007) discusses the ongoing, feedback role of water resource assessment and that it supports both implementation of water resource actions, and institutional performance which in turn provides to adaptive management. This same approach is applicable to ICM. ICM by its very nature is a responsive decision-making process, as successful ICM development engages communities and decision makers to address water sharing issues with the view of improving/redressing competing demands for water. A strong theme within the paper is that IWRM when successfully implemented can address multiple, competing objectives for water use and as a result requires responsive, adaptive decision making.

There is an immense challenge for ICM to demonstrate the degree and extent to which environmental conditions change as a results of actions undertaken by under an ICMP (Hooper, 2006).

It is clear that in order to successfully implement an ICM programme, then a robust, targeted and well resourced monitoring and reporting programme is required. This monitoring and reporting framework must evaluate ICMP outcomes and feed back into an ICM adaptive management framework. Embracing this adaptive management approach is critical to demonstrating and 'future proofing' any ICM programme and ensuring that resource improvement occurs on both a short term and long term time scale.

4 The evolution of catchment and coastal management in New Zealand

Mō tatou, ā, mō kā uri āmuri ake nei. For us and our children after us. Te Rūnanga o Ngāi Tahu.

Scope and aims of this section

Catchment and coastal management are rapidly developing fields in which reactive and visionary responses constantly leapfrog each other. In order to assess the current situation with respect to catchment and coastal management in the Auckland region in light of international best practice, this report reviews their key developmental phases in New Zealand; and then reviews the current legislative and other arrangements in the Auckland region. It distils key themes from both the historical and contemporary reviews for further analysis with respect to the international best practice surveyed in Chapter 2 and the findings in Chapter 4.

Key findings were that human occupation of New Zealand and post-colonial development – one of the most recent examples in the world – demonstrates the adverse environmental impacts of people on natural environments. The tensions that arose during the development of environmental and land use legislation are still evident today: development vs. the environment; engineers vs. planners and scientists; territorial vs. regional agencies; town vs. country and centralised vs. decentralised controls.

4.1 Literature selected and selection rationale

The documents selected for review cover the early history of water and soil management in New Zealand (e.g. Acheson 1968; Poole 1983; ARWB 1983), the major organisational and legislative changes of the 1980s and 90s and their consequences for catchment and coastal management (e.g. Ericksen 1990, Roche 1994) and some contemporary reflections on the performance of today's arrangements (e.g. Davis 2006 and Peart 2007).

The current regulatory documents for the Auckland region are also reviewed. Where referenced sources are not available, the implications of the information reviewed have been interpreted by the author(s), who have worked in this field since the 1970s.

4.2 The evolution of New Zealand's catchment and coastal management

The evolution of New Zealand's catchment and coastal management is intimately linked with colonisation, resource extraction, land use planning and institutional and community development. These are summarised in a chronological narrative from which some key themes are later drawn.

A brief history of New Zealand's catchment and coastal management may be summarised into the following phases:

1. first feet: Māori occupation 1200s-1300s;
2. forest felling: European colonisation: 1700s on;
3. flooding and drainage, and water allocation: 1800s on;

4. town planning to the 1950s;
5. catchment control: 1940s-1960s;
6. pollution control to the 1950s;
7. catchment-based water and soil conservation: the 1960s reforms;
8. coastal management: early beginnings;
9. regional planning: the 1970s reforms;
10. division and decentralisation: the 1980s institutional reforms;
11. Māori aspirations for the environment;
12. the legislative reforms of the 1990s and 2000s and the current situation; and
13. proliferation, isolation and the drive towards integration.

4.2.1 First feet: Maori occupation 1200s-1300s

Radiocarbon dating of kiore (Pacific rat) bones and rat-gnawed native seeds suggests that rats and people reached Aotearoa in about 1280 AD. The earliest dates are “strikingly consistent with the oldest dates from archaeological sites, the first large clearances of forest by fire, and declines or extinctions of marine and land-based fauna” – all in a much shorter period than previously thought: the first people to arrive initiated an immediate and rapid transformation (Wilmshurst, 2008). At the time of Māori arrival, most of the country was covered in bush, wetland or subalpine and montane vegetation, with the only land mammals being two species of native bats, and the only other warm-blooded land animals being birds and marine mammals. The minimum land disturbance by Māori cultivation was offset by the effects of fires, which destroyed several million hectares of forest, especially in the drier parts of the country (Poole, 1983). Flora, fauna and landforms all changed, and as in other islands colonised by humans, all the large terrestrial birds became extinct before or shortly after the arrival of humans. Māori land clearance activities for settlements, gardens and travel and possibly deliberate and unintended fires, had already reduced forest areas from 80% to 50% by the time of European arrival (Roche, 1994).

To Iwi and Hapu, waterways were significant for their mauri – life force – and their source of identity for the tangata whenua. Water provided habitat and spawning grounds for plants, bird and fish life and traditional sources of food – tuna (eel), whitebait, shell fish, koura (crayfish), as well as watercress and many other plants. Wetland plants provided building and weaving materials; wetland plants and mud provide medicines and dyes. Waterways were used as traditional access routes – “gateways”, with catchment boundaries of streams, rivers, lakes and harbours often used to mark out traditional rohe (boundaries) between tribes. The traditional association of tribes with their mountain and river gave iwi their means of identification and mana. Iwi took seriously their role of kaitiakitanga – guardianship over particular water bodies, developing complex systems of rules and customs – Tikanga.

Many of these customs still exist today in modern Māori society, and, reflecting the ecological limits so rapidly approached, include (Ngapo, 2002):

- selective harvesting of food (areas, seasons);
- strict protocols relating to the harvesting of weaving and dye materials;
- strict rules for taking water, using water and disposing of waste;

- imposition of Tapu and Rahui (prohibitions and temporary bans) in certain circumstances; and
- a strict prohibition on mixing different bodies of water.

Reflecting its importance, water was classified in the following ways (Ngapo, 2002):

- waioara – water in its purest form;
- waimaori – normal or safe water;
- waipiro – slow water like wetlands that are good for fish and useful flaxes;
- waikino – the mauri has been diminished;
- waimate – the mauri has been altered or lost;
- waitapu – water with special significance making it unsafe for normal use; and
- waitai – salt water or sea water.

The discharge of any form of waste or contaminant into water is therefore offensive to Māori as it is likely to diminish the mauri of the receiving water. Discharge to land is more acceptable because the water is filtered through the earth (Papatuanuku), which is able to cleanse the water. The discharge of water from one water body into a different one is also offensive to Māori, because it is viewed as the mixing of two different Mauri or life forces (Ngapo, 2002).

4.2.2 Forest felling: European colonisation 1700s on

From the late 1700s and especially after 1840, European land clearance activities for settlements, farming and forestry increased apace, with burning of tussock lands for sheep, felling of forests for timber and drainage of wetlands for cropping (Poole, 1983). When settlers cleared the land for farming in the 1800s, they soon saw the problems caused by heavy rainfall. School inspector and naturalist Henry Hill recorded the effects of torrential rain near Gisborne, in December 1893: “When going through the district shortly after the floods took place, I was surprised to find how much the appearance of the country had changed. Thousands of breakaways or slips were to be seen, some of them of large extent.” Hill surveyed the affected areas, and estimated that a 4-inch (10-centimetre) layer of soil had been washed away (Nathan, 2008).

Concerns were being expressed in the 1860s about the devastation of forests and the dwindling of native bird populations. In October 1868, Canterbury MP Thomas Potts made what was probably the first conservation speech in Parliament, asking the government ‘to take steps to ascertain the present condition of the forests of the Colony with view to their better conservation’. He was supported by James Hector, director of the Colonial Museum, who reported that over 20% of forest had been cleared between 1830 and 1868. In the summer of 1873–74, Premier Julius Vogel toured the South Island and was disturbed to see the damage caused by the milling and burning of native forest. He made several attempts to pass laws controlling deforestation. His State Forests Act was passed in 1884, allowing forest reserves to be created, and a conservator to be appointed. However, within two years funding was withdrawn by the next government as an economy measure (Nathan, 2008).

4.2.3 Flooding, drainage and water allocation: 1800s on

It seemed that violent floods had always been common even in forested catchments, and in the early years of the colony, drowning was a common cause of death. As settlements grew, flooding

and erosion of good alluvial land became a concern to the provincial authorities of the time, in 1868 the first river boards were formed in the Hawkes Bay and Marlborough. By 1876 central government recognised several river boards, and passed the 1884 River Boards Act (Acheson, 1968).

However, drainage also proceeded apace, and such was the ease of conversion that in one case, a farmer drained 30,000 acres (12,150 ha) of the Longbeach estate in Canterbury (Acheson, 1968). But better coordination and financing of such works was needed, and the Land Drainage Act 1893 set up Drainage Districts and Boards for this purpose.

The English common law transferred to New Zealand allowed land owners to draw from adjacent water bodies for domestic and stock use, provided the natural flow was not diminished in quality or quantity – but growth in demand soon saw a number of provincial ordinances for mills and other water-powered activities (Roche, 1994).

Water demand for gold-mining led to the establishment of water rights under the 1862 Gold Fields Act, and subsequent Acts such as the 1877 Mines Act, 1882 Public Works Act and 1886 Mining Act and its 1891 Amendment consolidated government control of water in order to create the institutional basis for resource exploitation for the purposes of economic growth, individual advancement and community betterment (Roche, 1994).

Expansion of agriculture saw a 20-year clash between miners and farmers over water pollution and flooding. Two River Commissions noted that by the early 1900s, the value of gold extracted was far below the cost of damage by the floods it caused and that mining bore none of the costs. Remedial legislation was then passed (Roche, 1994).

The 1891 Water Supply Act set out procedures for controlling and managing water races, and the 1896 Electrical-Motive Power Act was passed to require government approval of hydro-electric schemes, which became bigger and more common in the 1900s. Again, water was seen to be there for human use, and the government played a central role in its allocation (Roche, 1994).

Ongoing intensification of agriculture saw growing concern at soil erosion, also termed land depletion or land deterioration, with overstocking, burning and clearance of land inherently unsuited to pastoral land uses eventually resulting in the passage of the Deteriorated Lands Bill which provided financial relief to farmers. However ongoing policies favouring land development meant that by the 1930s, there were serious problems with accelerated silt erosion, especially in the South Island High Country and North Island hill country (Roche, 1994).

In order to facilitate development, the Public Works Department was set up in 1840, but had only a minor role beyond Auckland until about 1870, when the government took over many major civil engineering works. In 1876, when the provinces were abolished, the Public Works Department became responsible for the major civil engineering works formerly done by the Provincial Governments, including railways; bridging; lighthouses; roads; mining water races; harbours; wharves; public buildings; town water supplies; and drainage (Furkert, 1953). It later became the Ministry of Works and was to play a major role in water and soil conservation and planning.

Since humans arrived in New Zealand, it has experienced one of the world's highest species extinction rates, with almost 2,500 threatened land and freshwater species and 444 threatened marine species. Up to 80% of our plant and animal species are marine, and 44% of these are not found anywhere else in the world. It is estimated that 90% of our wetlands have been lost, along with significant areas of native forest and other vegetation (Ministry for the Environment, 2007).

4.2.4 Town planning to the 1950s

Planning in New Zealand developed as a response to urban problems. Early legislation tried to ensure minimum building and health standards. In 1926 the Government passed the Town-Planning Act, requiring every town district, Borough Council and Town Board to make and enforce a town-plan. It provided the opportunity for Local Authorities to develop and enforce Town or County Planning Schemes and aimed to enable Councils to co-ordinate public and private works and development within their districts.

The Town Planning Amendment Act 1929 later included a mechanism for the optional preparation and operation of regional plans that it referred to as 'extra-urban' plans. They covered the rural as well as the urban areas of the local councils and their general purpose was the conservation and economic development of the region. The methodology used to achieve this outcome was by way of the classification of land and the determination of the purpose for which it would best be suited. A secondary but equally important purpose of the regional planning scheme was the requirement for it to be designed, and available, as a guide to local authorities engaged in the preparation on district schemes.

The 1926 Town Planning Act and its amendments were consolidated, and further amended, by the Town and Country Planning Act 1953, which included directives for the development of both Regional and District Planning Schemes. Only a few "district schemes" (as the town or county plans were called) were produced under the 1926 Act. However, the Act did not make it compulsory for Councils to produce such plans. It was not until 1953 that Councils were required to produce "district schemes". Most districts produced planning schemes between 1953 and the next revision of the Town and Country Planning Act in 1977.

4.2.5 Catchment control: 1940s-1960s

The growing number of boards and legislative amendments led to a consolidation in 1908, with a new 1908 Land Drainage Act and a new 1908 River Boards Act – parts of these acts are still in force today. However, the accelerated erosion caused by vegetation clearance continued to deplete the soils and clog up the rivers, causing flooding of early settlements that were often in places that allowed access by water (Roche, 1994). Despite the emerging knowledge from studies and experience elsewhere in the world about the relationship between plant cover, soil erosion and natural water, it soon became clear that the fragmented individual river boards could not manage the problems: sometimes there would be one on one bank and another on the other, with several others in the whole catchment and one or more drainage boards working in the lowland areas.

New legislation was needed (Poole, 1983). Growing concern saw the establishment of a Royal Commission in 1919 to examine the causes of channel silting, flooding, erosion and damage to land, and the feasibility and cost of preventing or minimising these. However no action was taken on its findings, and by the 1930s with widespread public concern heightened by the "dust bowl" problems in the USA, the government took steps towards legislation (Acheson, 1968). In February 1938, the Kopuawhara works camp near Gisborne was washed away with the loss of 21 lives. This was followed a few weeks later by floods in the Esk Valley of Hawke's Bay, which damaged hill country and buried downstream farmland under metres of silt. After more calls for action on flood control and a committee of enquiry, the Soil Conservation and Rivers Control Act was passed in 1941 (Nathan, 2008).

Parts of the 1941 Act are still in force. Entitled "*An Act to make provision for the conservation of soil resources and for the prevention of damage by erosion and to make better provision with respect to the protection of property from damage by floods*", its objects are (s10):

- (a) *The promotion of soil conservation;*
- (b) *The prevention and mitigation of soil erosion;*
- (c) *The prevention of damage by floods;*
- (d) *The utilisation of lands in such a manner as will tend towards the attainment of the said objects.*

The original Act set up the Soil Conservation and Rivers Control Council responsible to the Minister of Works, and the establishment of catchment districts, each administered by a catchment board, with some reorganisation or abolition of internal drainage and river districts. The Council had representation from the Ministry of Works, and the Directors General of Lands, Agriculture, Forest and Treasury. The catchment boards had a combination of elected representatives with local water and soil interests and public servants with regional experience in engineering, land management, agriculture, forestry or science – a new approach, but one that proved very effective (Poole, 1983).

The 1941 Act did not however make catchment boards mandatory and they were slow to evolve: by 1960 they only covered 60% of the country (Ericksen, 1990). By the late 1950s there were 13 catchment boards, followed by three catchment commissions (with representatives appointed by the local authorities rather than elected). The Waikato Valley Authority was set up in 1956 under its own Act, and the Wellington Regional Water Board and the Auckland Regional Authority became in effect catchment authorities by way of amendments to their enabling legislation in the 1960s. By this time, these 19 bodies covered 90% of the country with strong legislation that was only acceptable because of the extent of the problems and a century of evolution of management approaches (Poole, 1983).

The Ministry of Works carried out "central" planning and provided planning services at the regional level and for islands and areas not covered by catchment boards, while city and borough councils carried out local planning.

4.2.6 Pollution control to the 1950s

Water quality was the last aspect of water and soil conservation to attract public concern, a reflection of the persistent colonial belief in the inexhaustibility of and human right to use natural resources. Discharges of waste from flax mills, dairy factories, tanneries, wool scourers and towns were seen as an inevitable consequence of development and early legislation focused on protection public health and fisheries rather than preventing water pollution. However a successful 1912 civil action saw damages awarded in favour of a farmer complaining about flax mill refuse and discharges that caused flooding in the Oroua River and made its water unfit for his stock. The verdict was met with dismay by industry but led to one of the first statutory attempts to address water pollution, albeit in a limited way, with the 1912 Pollution of Water Bill.

However the Bill was criticised as being framed "to take away a right which every one of us has, the right to pure water", and for depriving individuals of the means to force a halt to water pollution. Growing concern about public health saw the introduction of a River Pollution Bill in 1937, but, being effectively in advance of political opinion, was not introduced to Parliament (Roche, 1994).

By 1953, however, the mood had shifted enough to assure the passage of the Waters Pollution Act 1953. The Act set up the Pollution Advisory Council under the Marine Department which was at that time responsible for freshwater and marine fisheries. The Council's role was to prevent the pollution of natural water "as far as possible" throughout New Zealand (Poole, 1983). In 1963 regulations were made under this Act to permit the Council to classify inland and coastal waters according to their established or potential uses. These classifications and water uses are shown in Table 4-1.

Table 4-1: Inland and coastal waters classifications

Source: McLintock, 1966

Fresh water	Saline water
A Controlled upland catchments used for public water supplies	SA Waters used for shell-fishing.
B Streams in lowland areas used for public water supplies.	SB Waters used for public bathing.
C Waters used for public bathing.	SC Enclosed waters such as bays, harbours, and estuaries not used specifically for bathing or shellfishing.
D Waters used for agriculture, wildlife, fishing, etc.	SD Waters along open coasts not used specifically for bathing or shellfishing.

These classes aimed to protect different uses of the receiving waters. Following the classification of any waters, all outfalls discharging polluting wastes into them had to be registered and covered by a permit setting out the conditions under which discharge may be made and the standard of treatment of the waste discharge which the Council considered necessary to maintain the prescribed standard in the receiving waters. It then became an offence to allow the discharge of waste likely to cause the quality of the receiving water to vary outside this standard (McLintock, 1966).

Based as that Act was on the assumption that natural water was there for the purpose of diluting and dissipating pollution, and with growing conflict over water availability, use and allocation and public concern about the quality of the New Zealand environment (Ericksen, 1990), it was not long before bolder legislation was called for.

4.2.7 Catchment-based water and soil conservation: the 1960s reforms

In 1962 the Government created the Nature Conservation Council to advise it on matters pertaining to the quality of the natural environment, including water. Conflict over resource development and conservation intensified throughout the 1960s as improved communication led to a widely informed public willing to challenge the plans of central government bureaucracies, and it was in this context that the Minister of Works set up in 1963 a committee involving ten government departments to examine water problems (Ericksen, 1990). This led eventually to the passage in 1967 of the Water and Soil Conservation Act. It was in its day the most constructive legislation in the world (Poole, 1983), drawing together all aspects of water and soil management in order to promote a national policy in respect of natural water and to provide for its conservation, allocation, use and quality. It was linked with the 1941 Soil Conservation and Rivers Control Act, and its long title (underlining indicates words inserted by the 1981 Amendment) was:

An Act to promote a national policy in respect of natural water, and to make better provision for the conservation, use and quality of natural water and for promoting soil conservation and preventing damage by flooding and erosion, and for providing for and controlling multiple uses of natural water and the drainage of land, and for ensuring that

adequate account is taken of the needs of primary and secondary industry, community supplies, all forms of water-based recreation, fisheries, and wildlife habitats, and of the preservation and protection of the wild, scenic and other natural characteristics of rivers, streams and lakes. ”

A far-reaching change was the Act’s vesting in the Crown of all rights to natural water, thereby avoiding the pitfalls of riparian rights. The obvious agencies to grant rights for the use of water were the already existing catchment authorities, and once their boundaries were redrawn to cover the whole of both main islands and the coastal waters, they became regional water boards for the purposes of administering the 1967 Act (Poole, 1983). A water classification system was retained, and 27 water bodies (including entire catchments and regions) were classified, including Lake Rotorua and the Kaituna River, the entire catchments of the Manawatu and Waikato Rivers, the waters of Southland, and other fresh and coastal waters (McBride and Davies-Colley, 1991).

However there were now two councils administering soil and water in New Zealand, the Soil Conservation and Rivers Control Council and the Water Resources Council (the later having been formed in 1971 from the merger of the Water Allocation and Pollution Advisory Councils). A new agency, the National Water and Soil Conservation Organisation (NWASCO) was thus set up to co-ordinate their policies and through NWASCO’s Chairman (the Minister of Works) to link them with the Government.

NWASCO and its two Councils were serviced by the Water and Soil Division of the Ministry of Works and Development, which had been providing services to the Soil Conservation and Rivers Control Council since 1941. Links were also built with the Department of Scientific and Industrial Research (DSIR), which had been set up in the late 1920s.

Sometimes known as the “water decade”, the 1970s saw serious national and regional attention given to water resource management and attempts to integrate soil and water plans. They also overlapped the IHD, or International Hydrological Decade (1965-75), giving a tremendous boost to river basin monitoring and research in New Zealand.

In 1973, the old Underground Water Act of 1953 was repealed and its provisions included in the 1967 Act, enabling integrated management of surface and underground water, while an upsurge in public interest in protection the natural qualities of water saw the passage of the 1981 “Wild and Scenic Rivers” Amendment to the 1967 Act (Roche, 1994).

4.2.8 Coastal management: early beginnings

- The summary below is taken from Brookes (no date) and Peart (2007a) and traverses:
- coastal access: the Queen’s Chain from the 1840s on;
- coastal development: growth from the 1950s; and
- coastal planning and Māori values from the 1970s.

4.2.8.1 Coastal access: the Queen’s Chain from the 1840s on

Coastal and other water body management in New Zealand has its origins in the 1840s with the requirement for a “Queen’s chain” to be laid off prior to disposal of any crown land. “Queen’s chain” is a popular term for a variety of land status types which provide public access and/or protect conservation values beside many, but certainly not all, water bodies in many different

places and under varying circumstances. The term has its origins in Queen Victoria's instructions to Governor Hobson in 1840. The instruction read:

"It is our will and pleasure, and we do strictly require and enjoin you, that you do not on any account, or on any pretence whatsoever, grant, convey or demise to any person or persons any of the land so specified as fit to be reserved as aforesaid, nor permit or suffer any such lands to be occupied by any private person or for any private purpose."

Provision for esplanade reserves, and more latterly esplanade strips, has been included in legislation ever since.

4.2.8.2 Coastal development: growth from the 1950s

In the 1950s and 60s the coastline was being transformed from remote rural landscape to a valuable commodity. Concern about coastal subdivision and development led the Lands and Survey Department to begin a survey of the country's coastline to identify areas which should be protected as national reserves through the Reserves Act 1953. These studies were driven by public access and landscape protection issues. Land was designated and acquired by the department and the surveys were used as a basis for advocating protection of areas through district planning schemes prepared under the Town and Country Planning Act 1953. At the time the Auckland Regional Authority was also grappling with the issue of loss of unspoiled coastal land and began to identify areas, which it considered should be protected as regional parks as soon as it had the ability to raise loans and purchase land. The objective of this exercise was to save prime coastal land from development and to make it available for enjoyment by the public.

Coastal management during this time was focussed largely on addressing the specific issues of public concern, such as coastal erosion, loss of public access and the loss of undeveloped coastal landscapes.

4.2.8.3 Coastal planning and Māori values from the 1970s

During the 1970s there was a growing concern for better management of the coast. This was reflected in a raft of legislation, which included legislation in respect of marine reserves (1971), marine farming (1971), marine pollution (1974), territorial sea and exclusive economic zone (1977), marine mammal protection (1978). This era included the first coastal policy statement, which had as its objective the provision of active and passive recreational opportunities and the preservation of coastal scenery.

In 1973 it was announced that the full powers of the Town and Country Planning Act 1953 would be used by the Government to protect coastal and lakeshore areas. Shortly afterwards Section 2B was inserted into the Town and Country Planning Act 1953 as one of the matters of national importance:

"The preservation of the natural character of the coastal environment and of the margin of lakes and rivers and the protection of them from unnecessary subdivision and development..."

This "directive" was carried through into the revised Town and Country Planning Act in 1977. This Act also made provision for maritime planning and the establishment of Maritime Planning Areas and Maritime Planning Authorities. Maritime Planning was generally undertaken by harbour authorities and generally in consultation with other central and regional government agencies. The planning focus was principally on uses of the harbour, including significant infrastructure. The

1970s also saw the introduction of Environmental Protection and Enhancement Procedures for new industries and developments in 1974, which aimed to minimise the adverse effects of new developments on the environment.

The legacy of the 1970s is that it began a move towards a specific planning focus on harbours and coastal areas with an analysis of a range of issues affecting the coast and an acknowledgement of the particular Māori interest in the health and management of the coastal environment. The first marine reserve was created.

4.2.9 Regional planning: the 1970s reforms

In April 1973, the Acting Minister of Works and Development issued a statement that the full powers of the Town and Country Planning Act would be used by the Government to protect coastal and lakeshore areas. The Ministry further emphasised that there was extensive power in the legislation to safeguard the public interest.

That same month Government introduced a national policy on land. The intention of the policy was not to decree how each part of the coastline was to be used, but to provide a series of principles on which Government policies and actions could be based when framing legislative changes; exercising its powers under existing legislation; or when allocating finance (Statement from Minister of Works and Development, 1974). It is likely that these national policy elements lent impetus to the wording of Section 2B of the Town and Country Planning Act 1953 as one of the matters of national importance:

The preservation of the natural character of the coastal environment and of the margin of lakes and rivers and the protection of them from unnecessary subdivision and development...

Many sectors of the community were becoming concerned about urban expansion and coastal development. The purpose of the 1977 Town and Country Planning Act was to consolidate and amend the law relating to the preparation, implementation, and administration of regional and district planning and to make provision for maritime planning.

It expanded the matters of national importance to form a clear set of principles, which were to be taken into account at both regional and district levels. These principles were:

- the conservation, protection and enhancement of the physical, cultural, and social environment;
- the wise use and management of New Zealand's resources;
- the preservation of the natural character of the coastal environment and the margins of lakes and rivers and the protection of them from unnecessary subdivision and development;
- the avoidance of encroachment of urban development on, and the protection of land having a high actual or potential value for the production of food;
- the prevention of sporadic subdivision and urban development in rural areas; and
- the avoidance of unnecessary expansion of urban areas into rural areas in or adjoining cities.

Before 1986, environmental responsibilities were scattered over a variety of government institutions. Some departments had responsibility for both the protection and exploitation of the resources under their control. For instance the New Zealand Forest Service was responsible for protecting indigenous forest and also for converting native forest into commercial plantation forest.

While this mixed mandate is not good in principle, such departments were well-funded, and were sometimes able to carry out large conservation works.

Other agencies with environmental administration functions were the Department of Lands and Survey, the Ministry of Works and Development, and the Wildlife Service of the Department of Internal Affairs.

The Commission for the Environment was set up in 1972 with the role of adviser and a researcher for the Government on environmental matters. It identified areas where there was an environmental problem, researched the problem, and then made suggestions to the Government about how the problem could be fixed. It carried out numerous environmental reports and audits including on the Synfuels plant at Motonui, the Martha and other Mines and the Bechtel Petroleum proposal. The commission thought both cultural and scientific factors were an important part of the value that people give the environment. Their reports to the Government emphasised the value that Māori people place on the parts of the environment of special importance to them (see sections 0 and 0). Despite its mandate as an advocate for environmental protection, it lacked influence or 'teeth': it was only an adviser to Government, and its advice could be ignored.

The legislative and institutional situation had a strong body of centralised expertise in the Soil Conservation and Rivers Control and Water Resources Councils of NWASCA, supported by the centralised expertise of the Ministry of Works Water & Soil and Town & County Planning Divisions and the DSIR, with considerable expertise now also housed in the catchment boards and commissions (and to a much lesser extent, the regional water boards).

4.2.10 Division and decentralisation: the 1980s institutional reforms

The enactment of the Fisheries Act 1980 recognised the need to manage and conserve fish stocks. The drive to manage and conserve coastal resources through the available legislation continued through the 1980s. Work continued on identifying marine reserves and it was clear that management of the catchment behind the reserve was of equal importance. Public sector reform from 1986 onwards saw the creation of the Department of Conservation in 1987 and the transfer of other government department responsibilities in respect of many aspects of coastal management to this new department. The Minister of Conservation initiated a review of coastal management legislation in 1987 and the findings were carried forward into the legislative and institutional review process that culminated in the Resource Management Act 1991.

In 1984, the Government undertook a radical reform of the economy and the state sector in response to underlying deteriorating economic performance which had led to severe borrowing difficulties. The government reforms were guided by market-oriented principles that called for a reduction in the size and role of government, greater economic efficiency and public accountability within the state sector, and greater freedom for private enterprise and local communities in making development decisions. Nine State Owned Enterprises were formed to manage the government's commercially productive assets (e.g. coal mines, leasehold land, electricity stations and lines, forests, railways, the national airline and the telephone system). These corporations were defined as commercial operations and required to show profits and demonstrate efficiency in the same way as private companies. The fragmented environmental responsibilities of the previous government departments were consolidated into three new agencies:

- Department of Conservation;
- Ministry for the Environment; and

- Parliamentary Commissioner for the Environment (Ministry for the Environment, 1997b).

There had been much debate about the need to reform NWASCO (some reforms had been done in 1983) and there was concern and confusion about its relationship with the Ministry of Works and the Ministry's cost-effectiveness. As a result of the reforms, the Ministry of Works, which had worked closely with regional and local council on their planning functions, was abolished in April 1988. Its policy functions, including the Water and Soil and Town and Country Planning Divisions, were disestablished or passed on to other Government departments, the commercial operations allocated to the Works and Development Services Corporation (a Government-owned trading enterprise), and the computing bureau and the buildings maintenance units sold (Nathan, 2008).

Water and Soil Division was transferred to the DSIR's Soil Bureau in 1988 and subsequently split up during the formation of the Crown Research Institutes (CRIs) in 1992 (Page and Wilde, 2006). There are now nine CRIs, with water and soil-related issues addressed by several of them, including the Institute of Geological and Nuclear Sciences, Landcare Research and the National Institute of Water and Atmospheric Research (NIWA).

After considerable discussion, the Conservation Act 1987 established the Department of Conservation (DoC) to oversee management of parks and reserves, and protect inland waters and native wildlife. Environmental assets, such as indigenous forests that had been managed by several different agencies (e.g. the Forest Service, the Wildlife Service and the Department of Lands and Survey) were all put in the care of the Department of Conservation (Ministry for the Environment, 1997b). This brought all government-owned land designated for conservation under DoC control.

Against these losses may be weighed the 1984-85 withdrawal by the new Labour government of land 'improvement' subsidies for conversion of so-called 'unproductive' land into farmland. This led to a halt in forest and scrub clearance, and a reduction in wetland drainage. Unintentionally, it may have been one of the most effective moves for environmental protection in the 20th century (Hutchings and Walrond, 2007).

4.2.11 Māori aspirations for the environment

In 1887, Horonuku Te Heuheu, paramount chief of Ngāti Tūwharetoa, gifted the peaks of Tongariro, Ngāuruhoe and Ruapehu in the central North Island as 'a sacred place of the Crown, a gift forever from me and my people'. The mountains became the nucleus of Tongariro National Park (1894), one of the world's earliest national parks. Egmont National Park, encompassing the upper part of Mt Taranaki (Mt Egmont), was created in 1900 (Nathan, 2008).

The Waitangi Tribunal was established in 1975 by the Treaty of Waitangi Act 1975 as a permanent commission of inquiry charged with making recommendations on claims brought by Māori relating to actions or omissions of the Crown that breach the promises made in the Treaty of Waitangi. There is a long history in New Zealand of Māori protest over instances where the Treaty of Waitangi was not observed. In 1975, protests about unresolved Treaty grievances were growing and, in some instances, taking place outside the law. By establishing the Tribunal, Parliament provided a legal process by which Māori Treaty claims could be investigated. The Waitangi Tribunal inquiry process contributes to the resolution of Treaty claims and, in that way, to the reconciliation of outstanding issues between Māori and Pākehā. The Waitangi Tribunal's vision is that, having reconciled ourselves with the past and possessing a full understanding of the Treaty of Waitangi, Māori and non-Māori New Zealanders will be equipped to create a future for two peoples as one nation (Waitangi Tribunal: <http://www.waitangi-tribunal.govt.nz/>).

A significant number of claims to the Waitangi Tribunal have focused on Māori concerns over water and have led to recommendations for legislative changes, such as the Te Atiawa, Kaituna and Manukau claims of the 1970s and 80s (Roche, 1994). The Te Atiawa claims were lodged because existing planning procedures seemed unable to take account of their concerns over pollution of traditional fishing grounds and reefs by industrial and sewage wastes. Although such matters were covered by the 1967 Water and Soil Conservation Act, the Waitangi Tribunal highlighted two specific limitations. Firstly, the Ministry of Works and Development had no statutory authority to insist that public health works such as wastewater outfalls, consider Māori conventions for waste disposal. Secondly, a 1981 decision by the Planning Tribunal case, which was the precursor of the Environment Court, said (Roche, 1994 p157) that the Water and Soil Conservation Act could not take into account the cultural, spiritual and metaphysical concerns of Māori in relation to water. Many subsequent actions taken by Māori to the Waitangi Tribunal were based on similar concerns, including the Kaituna claim, about which the Tribunal said the evidence was “highly charged with emotion and remarkably convincing” that “to mix waters that had been contaminated with human waste with waters that were used for gathering food was deeply objectionable on Māori spiritual grounds”.

However, Māori pursuit of environmental outcomes and related matters of justice and equity eventually had real benefits for resource management in New Zealand and Auckland, as evidenced in the Auckland example of the Manukau Harbour Action Plan. Discussed in more detail in section 2.7.3, the Plan acknowledges (ARA, 1990) that to a large degree the result of the Manukau claim to the Waitangi Tribunal by Nganeko Minhinnick and Te Puaha ki Manuka: the Tribunal ruled that there was a need for co-ordinated research aimed at developing management policy and an “affirmative action plan”.

The Māori holistic view of the environment summarised in section 3.2 fits well with the modern understanding of sustainability and the Resource Management Act’s purpose of safeguarding the life-supporting capacity of air, land, water and ecosystems equate to protection of mauri – life sustaining capacity. It has been said that current New Zealand law and Māori lore deal with water resources in a surprisingly similar manner (Ngapo, 2002).

Both the current and Proposed New Zealand Coastal Policy Statement (Department of Conservation, 2008) has extensive policies on the Treaty of Waitangi and tangata whenua, perhaps reflecting this view.

4.2.12 The legislative reforms of the 1990s and 2000s and the current legislative and institutional frameworks for catchment and coastal management

This subsection traverses the background to and current results of the passage of the Resource Management and Local Government Acts, and briefly lists some of the other acts and agencies relevant to catchment and coastal management.

4.2.12.1 **The Resource Management Act (RMA)**

The concepts underpinning the RMA were based on developments in both international and local thinking over the previous 20 years. The 1972 Stockholm United Nations Conference on Environment and Development provided the first forum for international debate on concepts such as integrated environmental management and sustainable development. A subsequent audit of New Zealand's environmental management by the Organisation for Economic Co-operation and

Development (OECD), in 1980, highlighted the need to improve environmental management locally.

In 1981, the Nature Conservation Council prepared a report titled Integrating Conservation and Development: A Proposal for a New Zealand Conservation Strategy. This was one of the first documents to identify how the key ideas underlying the concept of sustainable development could be applied in New Zealand.

At the same time, during the early 1980s, there was growing awareness that key environmental legislation, including the Water and Soil Conservation Act 1967 and the Town and Country Planning Act 1977, needed to be reviewed. Later that decade, the new Labour Government began to investigate and implement institutional reform for environmental management at both central and local government levels. Work began on formally reviewing a number of environmental statutes in July 1988 after the Labour Government was re-elected in 1987. In December 1988, the government issued a proposal for a single integrated resource management statute that would replace the many existing statutory procedures.

The system of environmental administration had developed in an incremental fashion over time. It included various government departments, local authorities (such as city and county councils), united councils, regional water boards and catchment authorities. A number of related statutes and their amendments had also developed. Development of the legislation had been a piecemeal process and the environmental outcomes were often confused. The explanatory notes attached to the Resource Management Bill (forerunner of the Resource Management Act 1991) identified the following problems in the previous resource management system which the Resource Management Act 1991 was designed to overcome (EDS, <http://www.rmaguide.org.nz/rma/introduction/historical.cfm>):

- “(a) there was no consistent set of resource management objectives;*
- (b) there were arbitrary differences in management of land, air and water;*
- (c) there were too many agencies involved in resource management with overlapping responsibilities and insufficient accountability;*
- (d) consent procedures were unnecessarily complicated and costly, and there were undue delays;*
- (e) pollution laws were ad hoc and did not recognise the physical connections between land, air and water;*
- (f) in some aspects of resource management there was insufficient flexibility and too much prescription, with a focus on activities rather than end results;*
- (g) Māori interests and the Treaty of Waitangi were frequently overlooked;*
- (h) monitoring of the law was uneven; and*
- (i) enforcement was difficult.”*

After an extensive consultation process, the Resource Management Bill was introduced into Parliament in December 1989, but the Labour Government lost power in 1990 before it was passed into law. The new National Government decided to continue with the Bill, but first gave it to a Review Group for further consideration. As a result of the review, the minerals section was dropped from the Bill (and enacted separately as the Crown Minerals Act 1991) and other changes made. A revised Act was passed by Parliament in August 1991. On its enactment the Resource Management Act (RMA) repealed 78 statutes and regulations and amended numerous others to provide a single piece of legislation for the management of land, water, soil and air throughout

New Zealand (Peart, 2007a). The RMA brought the management of natural and physical resources under the overarching concept of “sustainable management”. The Act provided a planning framework based on integrated management with a focus on ecosystems and the avoidance, remediation or mitigation of adverse effects.

The Resource Management Act is administered by the Ministry for the Environment which was set up by the 1986 Environment Act and is responsible to the Minister for the Environment. The Acts’ purpose (section 5) is the promotion of sustainable management of natural and physical resources. Section 5 also refers to the social, economic, and cultural wellbeing and health and safety of people and communities, sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations and safeguarding the life-supporting capacity of air, water, soil, and ecosystems.

Therefore, while the Act does not explicitly seek to achieve social or economic outcomes, decisions are to take into account the impact of the use of natural and physical resources on social, cultural and economic matters. In some cases, social, cultural and/or economic benefits can outweigh ecological effects (Peart, 2007a).

The Act also sets out matters of national importance, other matters and relationship with the Treaty of Waitangi – a specific remedy to the longstanding concerns of Māori under previous legislation.

Matters of national importance set out in section 6 are:

- kaitiakitanga
- the ethic of stewardship
- the efficient use and development of natural and physical resources
- the efficiency of the end use of energy
- the maintenance and enhancement of amenity values
- intrinsic values of ecosystems
- maintenance and enhancement of the quality of the environment
- any finite characteristics of natural and physical resources
- the protection of the habitat of trout and salmon
- the effects of climate change
- the benefits to be derived from the **use and development of renewable energy**.

Accompanying this new legislation, the 1989 reform of local government created:

- 12 regional councils, bringing together the functions of the former catchment and water boards and unitary councils under the Resource Management Act
- 73 territorial local authorities, including:
 - 16 city councils
 - 57 district councils
 - 4 unitary authorities that combine regional and territorial functions.

As a consequence of the reforms, primary responsibility for dealing with most environmental impacts on air, land, water and ecosystems is now in the hands of catchment-based regional councils and the various territorial authorities within each region – subject to national legislation

outlining the broad objectives and methods available to them for achieving sustainable management and apart from some issues in which there is a clear national interest (e.g. nature conservation on public lands and endangered species protection, ozone layer protection, and the introduction of hazardous substances and new organisms). Central government does, however, provide guidance on some matters, in some cases setting down national policies, standards or guidelines.

It is also significant that iwi may now prepare their own resource management plans for matters in their rohe, and that while regional and territorial councils are not required to give effect to them, they must have regard to them when preparing their own plans.

The key agencies are summarised below and their relationships, jurisdictions and respective powers in Figures 4-1 and 4-3.

The Ministry for the Environment provides policy advice, initiates the preparation of national policy statements and environmental standards, and compiles and distributes information on environmental matters.

The Ministry has in place only one national policy statement (NPS); a coastal one, which is the only mandatory NPS under the RMA and is the responsibility of the Minister of Conservation to prepare. A review of this is currently under way, led by the Department of Conservation on behalf of the Minister. The proposed NPS covers (among other things) the following matters that link to integrated catchment management:

- general principles for the sustainable management of New Zealand's coastal environment;
- national priorities for the preservation of the natural character of the coastal environment including protection from inappropriate subdivision, use and development;
- protection of the characteristics of the coastal environment of special value to the Tangata Whenua;
- activities involving the subdivision, use or development of areas of the coastal environment; and
- 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 consents.

The Ministry's current work national policy statement programme focuses on the following other topics of interest to integrated catchment management:

- renewable electricity generation;
- freshwater management
- flood risk management;
- urban design.

Alongside the Ministry's recently-released scoping document on an NPD for urban design is a discussion document jointly released with the Department of Internal Affairs and a number of other government agencies on Building Sustainable urban communities. While currently very weak on the environmental aspects of urban sustainability, this document does have potential implications for ICM.

The Ministry for the Environment also has a national environmental standard in effect for sources of human drinking water, with the following other ICM-related standards listed below at various stages of development, ranging from scoping to being legally drafted:

- measurement of water takes;

- ecological flows and water levels;
- electricity transmission;
- on-site wastewater systems; and
- contaminated land.

The Department of Conservation manages New Zealand's conservation estate, oversees the management of the coastal environment including the determination of restricted coastal activities, and more generally promotes the conservation of natural and historic resources. On behalf of all New Zealanders, it manages or administers:

- national parks and conservation parks (formerly called forest parks);
- reserves and conservation areas;
- protected indigenous forests, inland waters and wild and scenic rivers;
- indigenous/native wildlife;
- non-commercial freshwater fisheries;
- historic places on conservation land;
- marine reserves and protecting marine mammals; and
- offshore islands set aside for conservation.

As shown in Figure 4-1, the day to day responsibility for implementing the RMA is shared between regional councils and territorial local authorities (TA's), including city and district councils.

Regional councils are responsible for the integrated management of natural and physical resources of their region including the coastal marine area, the preparation of regional policy statements and plans. They also determine applications for water and discharge permits and matters relating to bores, land disturbing actions, and works in beds of lakes and rivers.

Territorial authorities are primarily responsible for controlling the impacts of land use within their district, including the preparation of district plans, and the determination of applications for land use and subdivision consent.

There are five unitary authorities which carry out the combined role of a regional council and a territorial authority.

Under the RMA, each regional council must prepare a regional policy statement and regional coastal plan, and may prepare other regional plans. Regional plans set out rules for when resource consents are required for the various activities under their control.

Under the RMA, each TA must prepare a district plan, which likewise set out rules for when resource consents are required for the various activities under their control.

All these instruments (including some resource consent applications) are open to public input, so the process of environmental management in New Zealand is essentially part of the democratic system.

Two independent agencies stand outside the regulatory system; the Environment Court and the Parliamentary Commissioner for the Environment.

The Environment Court has a pivotal role in the resource management process as an appellate court, mainly on plan and resource consent appeals.

The Parliamentary Commissioner for the Environment (PCE) reviews and provides advice on environmental issues and the government's environmental management systems. The office was set up by the 1986 Environment Act, to investigate and report on environmental concerns. When

set up in 1987, the PCE was the first independent environmental watchdog of its kind in the world. The PCE aims to maintain and improve the quality of New Zealand's environment, with a central focus is on environmental sustainability - how we can live within the ecological limits of the planet today and into the future. The PCE is a policy reviewer standing outside the system of environmental management and reporting on it. 'Independent' means independent of the Ministry for the Environment, and of the government of the day, so the PCE reports not to a Government Minister but to Parliament through the Speaker of the House and the Officers of Parliament Committee.

Other government agencies with some environmental management responsibilities include:

- Ministry of Agriculture and Forestry;
- Ministry of Fisheries;
- Ministry of Foreign Affairs and Trade;
- Ministry of Economic Development;
- Ministry of Research, Science and Technology;
- Ministry of Transport;
- Department of Internal Affairs (for the LGA);
- Environmental Risk Management Authority; and
- Energy Efficiency and Conservation Authority.

The early years of the 21st century also have seen an increased focus on coastal management through the Hauraki Gulf Marine Park Act (2000), the Foreshore and Seabed Act (2004) and Marine Transport Act (2000). A number of policy initiatives have also emerged – the Oceans Policy (2000), Marine Protected Areas (2005) and a review of the NZCPS (2006).

Figure 3-2 shows the hierarchy of the respective instruments under the RMA, showing how territorial instruments must align with regional ones and both of these with national ones.

Figure 3-3 shows the spatial extent of the various instruments of the relevant agencies under the RMA (it excludes the jurisdictions of agencies under other legislation listed above, such as the Ministry of Fisheries). It shows that only central government's national policy statements and environmental standards and the regional councils' regional policy statements have the mandate to cross mean high water springs and thus integrate catchment with coastal planning.

Figure4–1 Key environmental agencies and their relationships under the RMA

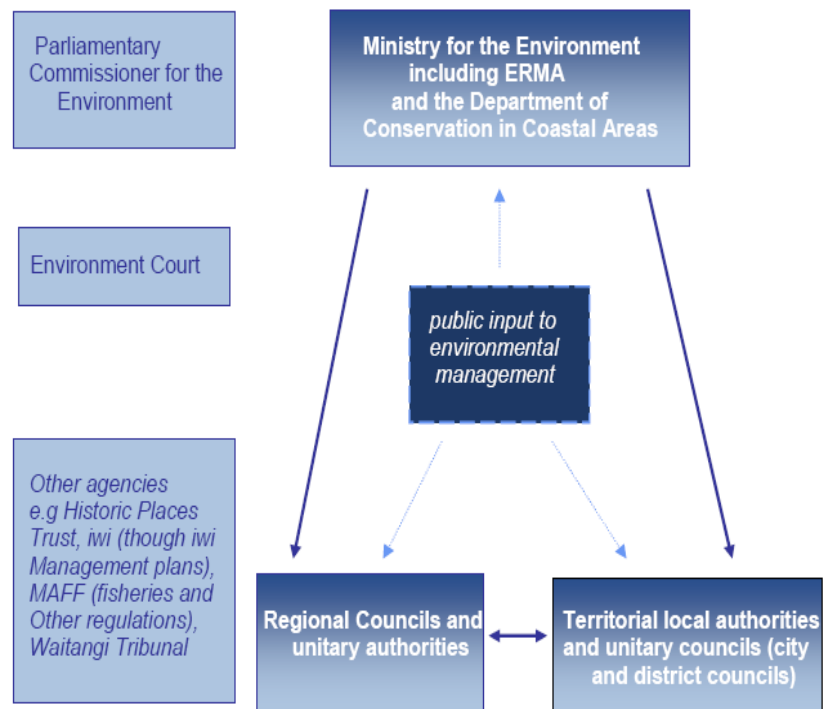


Figure4-2 The hierarchy of RMA instruments

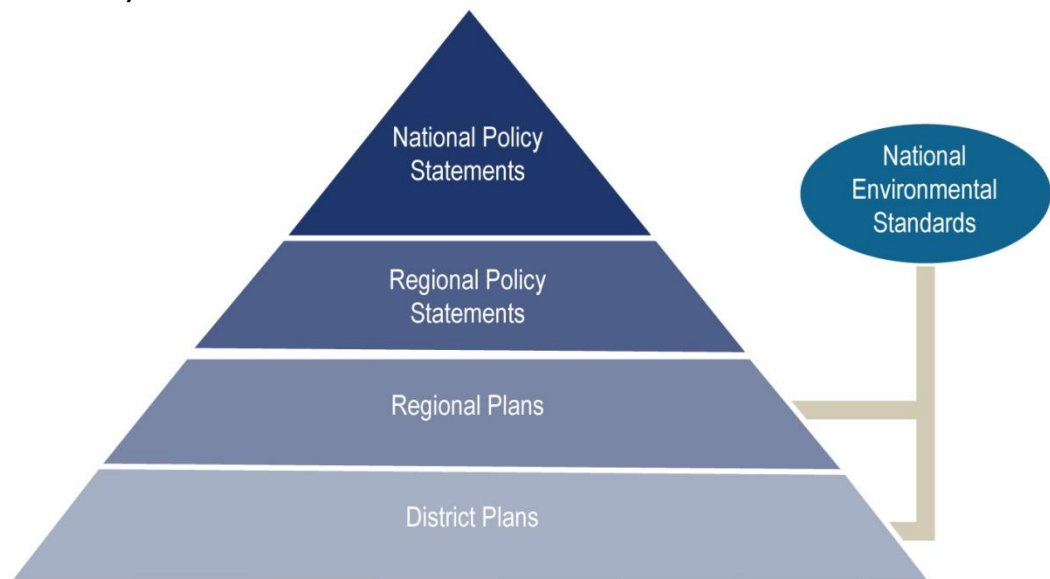
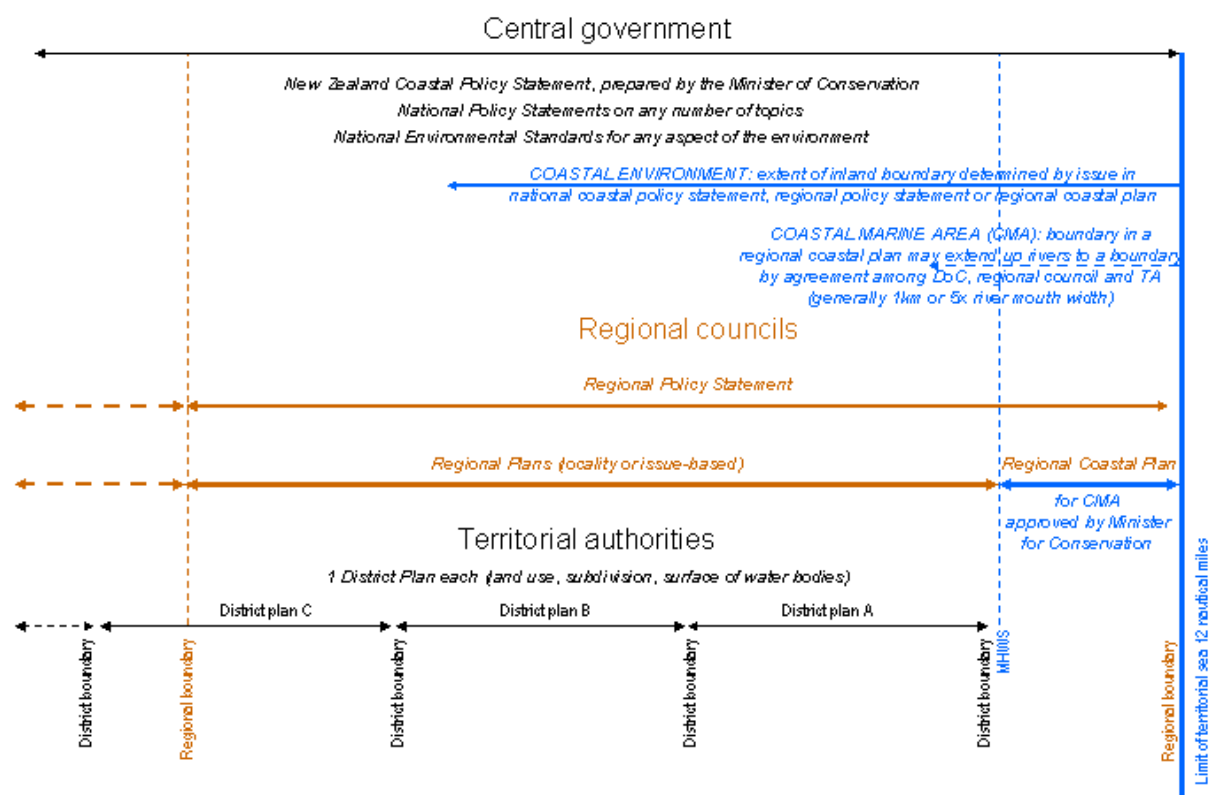


Figure4-3 The jurisdictions of central, regional and territorial agencies under RMA



4.2.12.2 The Local Government Act (LGA)

In addition to their role under the Resource Management Act, regional and territorial councils were given new and reviewed responsibilities under the 2002 Local Government Act, the purpose of which is “to provide for democratic and effective local government that recognises the diversity of New Zealand communities; and, to that end, this Act:

- (a) states the purpose of local government; and
- (b) provides a framework and powers for local authorities to decide which activities they undertake and the manner in which they will undertake them; and
- (c) promotes the accountability of local authorities to their communities; and
- (d) provides for local authorities to play a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach.”

There is still considerable debate about how the LGA and RMA and their respective requirements for sustainable development and sustainable management fit together. This has implications for ICM, given the many tools under the LGA that relate to land use, urban development and the water-related infrastructure that dominates urban catchments.

These tools include:

- the long term council community plans (LTCCPs) that require both regional councils and TAs to provide opportunities for communities to discuss their desired outcomes in terms of the present and future social, economic, environmental, and cultural well-being of the community; discuss their relative importance and priorities; and enable councils via annual plans to source the funding they need to put in place measures to manage and measure progress towards meeting these;
- waste management plans and activity (asset) management plans that TAs must prepare for services such as stormwater, wastewater and parks that set out levels of service to be provided in order to meet community outcomes, as well as how targets will be set, achieved, monitored and reported; and
- bylaws for matters relevant to ICM including:
 - for TAs: stormwater, waste management, trade wastes, solid wastes, onsite wastewater disposal systems, water races, water supply, wastewater, drainage, and sanitation and land drainage, and
 - for regional councils: flood protection, flood control and water supply works.

It can be seen that there is potential for further activities under the LGA to be included in the ICM process should TAs wish to do so. Inclusion of further activities under other legislation such as roading, reserves, biodiversity and others is discussed in section 0 and Chapter 0.

4.2.13 Proliferation, isolation and the drive towards integration

The reforms of the 1980s and 90s significantly streamlined the 70-odd statutes and 20 central government agencies as well as numerous quangos that dealt with environmental matters by 1980 (Ericksen, 1990). However, as the national, regional and local agencies struggled to come to terms with the reforms of the 1980s, the Ministry for the Environment’s funding to resource the

agencies to adapt to the new requirements was constrained by a new government. Despite the intent to streamline regulatory and governance arrangements, these circumstances lead to many agencies working in isolation which resulted in duplication around the country. By 2002, the Parliamentary Commissioner for the Environment (PCE) identified:

- 19 national environmental strategies;
- 8 environmental legislation reviews;
- 6 national economic strategies; and
- 5 national social strategies.

Many regional and territorial agencies were struggling with a proliferation of additional strategies to give effect to these and other legislative requirements. It was clear to the PCE and others that this was counter-productive and required further streamlining. Moves towards streamlining strategies can be seen in the production of a number of government sustainability strategies, including the:

- National Agenda for sustainable water management action plan (MfE, 2000);
- Sustainable development for New Zealand: a programme of action (DPMC, 2003);
- Growth and Innovation Framework (DPMC, 2003); and
- establishment of GUEDO, the Auckland-based Government Urban and Economic Development Office.

The Sustainable Development programme of action was aimed at encouraging central government to take action, and recognised that its decisions should ensure the wellbeing of current and future generations. It takes account of the economic, social, economic, environmental, and cultural consequences of its decisions by:

- considering the long-term implications of decisions;
- seeking innovative solutions that are mutually reinforcing, rather than accepting that gain in one area will necessarily be achieved at the expense of another;
- using the best information available to support decision making;
- addressing risks and uncertainty when making choices and taking a precautionary approach when making decisions that may cause serious or irreversible damage;
- working in partnership with local government and other sectors and encouraging transparent and participatory processes;
- considering the implications of decisions from a global as well as a New Zealand perspective;
- decoupling economic growth from pressures on the environment;
- respecting environmental limits, protecting ecosystems and promoting the integrated management of land, water and living resources;
- working in partnership with appropriate Māori authorities to empower Māori in development decisions that affect them; and
- respecting human rights, the rule of law and cultural diversity.

It had a number of undertakings related to water, including an overarching goal of adequate, clean freshwater available for all, with the following desired outcomes:

- freshwater is allocated and used in a sustainable, efficient and equitable way;
- freshwater quality is maintained to meet all appropriate needs; and

- water bodies with nationally significant natural, social or cultural heritage values are protected.

It aimed to use a holistic approach, recognising the integrated nature of water issues: one that considers water allocation and quality right through from individual land holdings, catchments, and regions up to the national level, also ensuring co-ordination with parallel strategies and work programmes for biodiversity and energy.

At a high level, the Growth and Innovation Framework takes environmental and social goals explicitly into account. It states that “the government does not believe we can put on hold social and environmental progress” and “Not only will social and environmental policy continue to be given high priority in their own right, but the choice of economic policy instruments will be influenced by their interaction with social and environmental factors. Sustainability will be paramount”. This is a clear statement that the government does not see economic development as preceeding, or being a precondition for, or being more important than, social or cultural development or environmental protection. The dimensions should, implicitly, all be advanced together. Where infrastructure development encounters short-term tensions between dimensions of well-being (e.g. between social well-being and economic development), there is no presumption that economic development should take priority (p 19).

Other moves towards vertical integration of environmental management and improved communication with the regions are indicated by the recent formation of GUEDO, the Auckland-based Government Urban and Economic Development Office, a cross-government initiative to improve the focus on Auckland-related policy development (http://www.med.govt.nz/templates/Page____3421.aspx). Four government agencies have established a shared policy office in Auckland to improve the incorporation of Auckland perspectives into the policy making process, and engagement with Auckland stakeholders. Personnel from the Ministry of Economic Development, Ministry for the Environment, Department of Labour and the Ministry of Transport, are now co-located in Auckland, with a shared focus on sustainable urban and economic development policy. The four agencies will be working to ensure that Auckland business and local government views are heard and taken into account in sustainable urban and economic development policy. The office acts as a hub for sharing information, coordinating stakeholder engagement, working on projects that relate to Auckland and the national interest, and is well-connected to central government in Wellington. Over time other central government agencies working in the area of urban and economic development policy may also join the office.

Examples of projects that the four agencies will work on together include the Sustainable Cities programme and the ownership and regulation of Watercare Services Ltd.

In addition, the Ministry for the Environment at GUEDO aims to:

- support regional partners to deliver commitments under the New Zealand Urban Design protocol;
- develop projects and partnerships to assist industry to compete and grow sustainably;
- facilitate and assist the Ministry's Sustainable Industry and Climate Change Group implement their work programmes and policy within the Auckland context;
- continue to work with the Auckland region on better integrating transport and land use planning using the RMA and other mechanisms;
- contribute to the on-going evolution and work of the Regional Growth Strategy; and
- promote better decision-making under the RMA with training and accreditation programmes.

4.2.14 Summary

This very brief historical review shows that:

- for most of its short history, New Zealand's environmental management focused on reacting to the adverse effects of rapid and comprehensive colonisation – soil erosion, flooding and the more extreme forms of water pollution from sewage and industry;
- the formalisation of proactive environmental management was hindered by the perception that the natural resources of the new nation were bottomless, and that any degradation was the unavoidable price to be paid for the benefits of progress and development;
- the tension – still active today – between the agencies managing land development and those attempting to manage its effects on the natural environment had its roots in those earliest colonial times;
- Māori aspirations for the environment have been longstanding and persistent, despite the outcomes of their needs and wishes being congruent with more sustainable use of natural resources – a benefit to the wider public;
- there are repeated cycles of proliferation, duplication and integration of environmental agencies and legislation; with stronger initiatives often weakened by subsequent governments;
- much planning effort has been expended on coastal management and the effects of land use and development on coastal waters and uses, effort that was confounded by the instruments provided in the RMA, which (despite the pleas of environmental managers) used MHWS as a demarcation line between land and saline waters; and
- the result, as shown in Figure 3-3, is that only national policy statements, national environmental standards and regional councils' regional policy statements have the mandate to cross mean high water springs and thus integrate catchment with coastal planning – and most of these are policy-only, with no regulatory powers.

4.3 The evolution of integrated catchment management in New Zealand

Although New Zealand's problems were highlighted by the rapidity of post-colonial vegetation clearance, soil erosion, flooding and water pollution, even in the late 1880s, few people reflected on the causes of flooding, with many considering flooding as "acts of God". However, a minority viewpoint recognised that imprudent forest clearance was adding to the flood problem, with WT Locke Travers and Arthur Dobson clarifying the relationship between vegetation, soil and flooding. Dobson's 1871 paper, "On the destruction of land by shingle-bearing rivers, and suggestions for protection and prevention", was one of New Zealand's first statements of an integrated approach to catchment planning, linking upstream land use to downstream flooding (Roche, 1994).

Later developments in New Zealand in the 1930s and 40s paralleled a growing international awareness of these problems, intensified in many places by higher populations and multi-national river basins. In New Zealand, "worldwide experience was simply being repeated showing that to change any part of a river or catchment affected other parts" (Poole, 1983).

However, the use of integrated catchment management (ICM) as a tool to manage natural resources in New Zealand has not been constant; the change in environmental legislation over time has seen ICM approaches used for a period, only to be lost in the restructuring of

government departments (Chrystall, 2006). The story of the rise and fall and resurgence of ICM reflects tensions between politicians, scientists, catchment managers and Māori and conservationists, in parallel with the development of New Zealand's environmental legislation and associated agencies.

New Zealand-wide trends over time are summarised under the following headings, with two key sources being the optimistic views of rural integrated catchment management (ICM) summarised by Chrystall (2006) and the more pessimistic views of Ericksen (1990) as he surveys the wider history of ICM:

1. the catchment concept;
2. a rural focus;
3. urban ecosystems and infrastructure;
4. the journey to integration; and
5. participatory models.

4.3.1 The catchment concept

The approach of the 1941 Act in using natural boundaries to define water and soil management units was "a world first" (Ministry for the Environment, 1997b).

From the early 1940s the catchment boards newly created by the 1941 Act "set to work to recruit river engineers and to train soil conservators." ...Soon comprehensive schemes for the control of flooding of the most troublesome rivers were being designed" (Poole, 1983) and many soil conservation schemes were under way: the boards designed, put in place or supervised schemes for river control, drainage, soil erosion and conservation, all on a catchment basis. Within thirty years of establishing the first catchment board in the Manawatu in 1943, around seventy river control and land drainage projects had been funded by the Soil Conservation and Rivers Control Council, and the eighteen catchment boards that covered 80% of New Zealand had completed 30,000 km of channel maintenance, 8,800 km of channel improvements, 3,040 km of stopbanking and 5,600 km of river bank protection (Ericksen, 1986, in Ericksen 1990). A further 55 major projects had been funded by 1988 and together they "protected" about 90 flood-prone urban communities. In addition, tens of thousands of rural floodplains had been drained and protected, dramatically increasing agricultural productivity, while on the hills, hundreds of thousands of hectares of erodible land had been protected (McCaskill, 1973 and Poole, 1983, in Ericksen, 1990).

With the passage of the 1967 Act, these regional agencies were also able to survey, measure and manage water resources and water quality and create water management plans, but it was noted that these were only for polluted catchments or catchments with water deficits (Fenemor, 1992, in Chrystall, 2006). Catchment managers generally do not appear to have integrated flooding, erosion, water availability and pollution issues together in the same plans (see 0).

The catchment basis for delineating major administrative boundaries survived the far-reaching local government reforms of the late 1980s, which combined many single-purpose authorities into regional multi-purpose agencies. At the same time the Resource Management Law Reform Core Group was reaching similar conclusions about the regional control of resource management based on catchment boundaries. In due course, as outlined in section 0, the Local Government Amendment Act 1989 was passed and the responsibilities of the 1941 and 1967 Acts handed over to the new regional councils, which together with the new territorial local authorities, subsequently became responsible for giving effect to the Resource Management Act in 1991 (Roche, 1994).

4.3.2 A rural focus

Managing catchments thus has a long history in New Zealand – but the discussion below (from Chrystall, 2006) shows that in keeping with New Zealand’s history of primary-production and rural population, catchment management too has had an overwhelmingly rural focus.

There seems to be a debate on the relative age of ICM in New Zealand. Robertson et al (2005) claim that “ICM is relatively new to New Zealand but has gained credibility rapidly as an effective methodology for holistic management in a sustainable development framework”, while other researchers such as Bowden (1999) and Phillips (1998) claim that ICM has had more of an extensive history in New Zealand’s management of land and water resources, but that the focus on the ICM approach was lost in the post-RMA era.

From 1964 through to 1975, New Zealand participated in UNESCO’s International Hydrological Decade (IHD). During this time New Zealand was split up into ninety distinct hydrological regions within which 76 representative basins were established (Bowden, 1999; Waugh, 1992). These representative basins are analogous to the catchment areas studied today. Studies within the catchments allowed an understanding of the physical hydrology of the landscape and provided information for planning, resource management, and environmental monitoring. Hence even through the IHD the need for studies on a whole catchment basis had already been realised in order to assess natural and anthropogenic impacts on land and water resources (Bowden, 1999).

Studies that observed the impacts of land use conversions to uses such as cropping, dairy farming and forestry on water resources were carried out after the IHD programme around 1975. Three of the remaining catchment studies are still in operation today (Glendhu, Maimai and Big Bush). Initially there were around ten catchments that were established nationwide and ran for a period of about ten years from the mid-1970’s to mid-1980’s (Bowden, 1999).

Chrystall concludes that in a sense ICM in New Zealand has been recently reborn, with greater cooperation amongst ICM players. Researchers from numerous institutions (Landcare Research, NIWA, IGNS and universities) are working more closely with regional and district councils and local communities on ICM, and are using improved technologies such as remote sensing and GIS to model and predict of the effects of various activities. The need for ICM has once again been realised in a time where environmental sustainability is so topical.

4.3.3 Urban ecosystems and infrastructure

ICM in New Zealand has only recently begun to focus on the issues facing urban catchments.

In 1981 a report by NWASCO detailed what was known about the effects of land use on water quality and made recommendations for further research and better land management methods to improve water quality. The main headings are summarised in Table B-1 in Appendix B.

The report noted that “In general, land management for water quality is currently either inadequate or in many areas non-existent in New Zealand. The level of understanding of the processes involved varies with the scientific discipline and with the land use. For example, this report clearly identifies the lack of appropriate hydrological knowledge as a major setback in formulating management recommendations for water quality in agriculture and forestry. On the other hand, the review of the impact of urban land use on water shows clearly that there is sufficient knowledge presently available for many effective techniques to be put in place.” One of the authors (Helen Hughes) went on to become New Zealand’s first Parliamentary Commissioner for the Environment (PCE).

Sixteen years later in 1997, the second PCE released a strategic plan indicating a future focus on “the urban environment and the enormous challenges of creating sustainable urban ecosystems” (PCE, 1998). A 1998 report (The cities and their people) focused on links between cities and sustainable development and the role of Agenda 21² and compared New Zealand with international practice in terms of ten key issues; governance, vision, partnership, the urban community, integrated management, liveability, environmental health, infrastructure, monitoring and research.

Following extensive consultation on the 1998 report, the PCE produced a report in June 2000 called “Aging pipes and murky waters: urban water systems for the 21st century”. It investigated the key sustainability issues and significant risks affecting the sustainable management of urban water systems.

It identified a number of challenges, including gaining multi-stakeholder agreement on their environmental, social and economic goals and values, and identified a number of issues and opportunities for progress:

- tikanga Māori in relation to urban water systems;
- improved management of urban ecosystems;
- integrated management of land and water;
- recognition and valuation of ecosystem services;
- sustainability reporting;
- integrated management of water services;
- eco-efficiency;
- integrated management of water supply catchments;
- water demand management and improved efficiency of use;
- wastewater management, including trade wastes;
- stormwater management;
- more research into new solutions;
- the legislative framework;
- risk management; and
- development of principles and systems for urban water management outcomes.

A follow up report (PCE, 2001) noted the following as one of four major areas of challenge for managing urban waters the “lack of appreciation of the need to manage waters in an integrated way according to ecosystem principles. This includes recognition that water is not an unlimited resource.”

In the 2003 Budget, the Government provided for a stocktake to give an accurate snapshot of the state of New Zealand's transport, energy, telecommunications and water infrastructure. It also aimed to establish a better understanding of the links between infrastructure, sustainable development and growth and to establish principles to guide government decision-making.

Reports produced by the Stocktake included:

² Agenda 21 is a programme run by the United Nations set up in 1992 as a comprehensive blueprint of action to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which human's impact on the environment.

- Infrastructure Stocktake - an Infrastructure Audit (and a subsequent reportback), by PricewaterhouseCoopers, containing infrastructure issues and the critical importance of functioning infrastructure to sustainable growth, including a 'snapshot' of the current state of New Zealand's infrastructure;
- Links between Infrastructure and Economic Growth, by Pinnacle Research;
- Sustainable Infrastructure: A Policy Framework, by the New Zealand Institute of Economic Research; and
- a report from Maarama Consulting (Chapman et al, 2003) Sustainable Development and Infrastructure, on the critical importance of functioning infrastructure to sustainable growth.

Findings from these reports that are of interest to ICM are summarised below. Key points to note are that they reflect:

- the need for both rural and urban catchment managers to keep up with the wider sustainability dialogue;
- growing interest in the application of natural principles to the design, development, maintenance and replacement of urban infrastructure in order to reduce the effects of cities on essential elements of the life-supporting capacity of their natural environment; and
- the very strong links between the asset management requirements of the LGA and catchment management, which has more focus on RMA outcomes.

The PricewaterhouseCoopers report (2004) contains a useful summary of national statistics for (among other infrastructure) reticulated water supply, surface and groundwater allocation and wastewater discharges, along with commentaries about their sustainability. It has less to say about stormwater, but comments on the extent of uptake of "integrated approaches to the management of water resources and associated infrastructure, such as the urban water cycle approach", wryly noting that "a great distance still separates us from this vision" (Chapman et al, 2003).

Interestingly, the report observes that "From a policy perspective, the legacy nature of the assets carries a number of implications. There are issues in terms of the value that should be ascribed to assets. Historical or acquisition cost is not necessarily a good measure of underlying value for assets which were acquired many years ago, but still have a useful economic life ahead of them. Depreciated replacement cost is not necessarily a good guide to value either if, in re-designing the system [by implication, from a sustainability point of view], the asset type, and their configuration would be much different to those in place today."

The Maarama report has much information of considerable interest, and summarises water and wastewater infrastructure as well as irrigation under the following headings:

- the legacy of the past;
- environmental aspects;
- economic and eco-efficiency aspects;
- social and cultural aspects;
- sustainability issues; and
- key policy instruments

Chapman et al (2003) also comment on stormwater management under the heading “Towards integrated urban water management” and note that the age of existing infrastructure opens a “window of opportunity” for reassessing past practices and design philosophies in light of key future trends.

Among these they identify the following trends for sustainable development and infrastructure:

- decarbonisation: the need to reduce fossil fuel emissions, which will affect transport technology and urban design as well as materials use, reflecting embodied energy content (see dematerialisation below)
- urban agglomeration and liveability: the growing trend in demand for more liveable and walkable cities, increasingly needed by a health-conscious and aging population that is less able to drive cars
- immaterialisation: the demand for knowledge-based goods and services and pressure to replace goods with services
- dematerialisation: growing concern with waste volumes, energy and materials usage, and a desire to increase eco-efficiency and change consumption patterns
- decentralisation and scale reduction: building on innovative, small scale, distributed infrastructure technologies, including renewables
- increasing impact of environmental factors: the ecological and economic importance of being clean and green is increasingly acknowledged, so policies and management need to protect natural and cultural capital while allowing development
- integrated management: growing acknowledgement of cross-sectoral interactions (such as streams with stormwater infrastructure or roads with biodiversity).

Consideration of the above helps to identify desirable and undesirable cross-sectoral interactions and possible future-proofing needs. The authors note that “the benefits of joined-up thinking are easily overlooked. It is difficult to think ‘outside the square’, but sometimes major gains accrue from consideration of apparently unconnected developments, such as roading and wastewater. It is only now becoming apparent, for example, how low-impact urban design – including roading design – can reduce the need for costly infrastructure such as wastewater, and improve social and environmental outcomes. Similarly, it is important that the funding assessment process and criteria for investment decisions take into account the full range of social, cultural and environmental considerations.”

In part 6, the authors examine infrastructure indicators, and endorse the use of the decoupling indicators proposed by Statistics New Zealand and the Ministry for the Environment (2002). However there seems little uptake of these so far.

The following notes from the NZIER (2004) report are listed below as they reflect some of the issues that have arisen throughout the development of ICM in New Zealand:

- [the Government’s drive for] Sustainable development is not basically at odds with approaches to policy that have applied hitherto, provided the analysis does not leave out attributes important for sustainability. The principal attributes are: taking a longer term view of effects on future generations, and extending the boundaries of consideration beyond the immediate resources used in providing infrastructure. In policy terms, these are both types of “externality,” effects arising from a market failure, for which there are established policy responses to be applied, if the effects are well defined. Long-standing approaches to policy

analysis can include sustainability with modifications to policy appraisal and interpretation of results, achieving an integrated policy framework reflecting issues other than those commonly in economic frameworks (page i);

- the use of quadruple bottom line outcomes and multi-criteria analysis is endorsed – although measures of achievement across the bottom lines should be set in broader policy settings rather than by infrastructure managers themselves, who monitor compliance with these;
- problems in infrastructure's ability to contribute to maximising well-being over time include failure to keep up with current or expected demands for the services it provides; failure of capacity to provide headroom or reserves to keep expected value of disruption by shocks to manageable levels; failure of capacity to adjust to megatrends like decarbonisation and persistence of unaddressed external effects; and
- causes of such failures include market dominance; information failures; co-ordination failures and failure to consider externalities and social objectives.

In response to the pressures of growth in the late 1990s and 2000s, some regions subject to particularly rapid growth have adopted an integrated catchment management approach to urbanising catchments, including in the Bay of Plenty, Wellington and Canterbury, demonstrating the effectiveness of the catchment-based approach for managing urban development, water services and environmental effects.

Urban sustainability is also the focus of a Landcare Trust project initiated in 2007. Together with Landcare Research, the Landcare Trust aims to incorporate urban sustainability into community-based catchment initiatives (New Zealand Landcare Trust and Landcare Research, no date). This new project aims to increase community awareness of urban catchments, stimulate behaviours that help people to live more sustainably in city environments and enhance water quality and biodiversity in city catchments.

Although not specifically and unambiguously stated in either the PCE reports or the Infrastructure Stocktake, it is clear from those reports and the recent interest in urban ICM that genuinely integrated catchment management is the way to address many of the issues and opportunities identified for urban catchments.

4.3.4 The journey to integration

Acknowledged best practice ICM integrates a wide range of resource management issues, but has taken a long time to appear in New Zealand.

Catchment boards under the 1941 Act were only created where the populace perceived they were needed – usually because of extreme flooding or erosion or both, arguments against including representation, costs and objections to the boards' powers. Moreover the Act's mandate was narrowly focused on erosion, flooding and drainage, with water use and pollution ignored (irrigation was controlled by the Ministry of Agriculture and Fisheries (MAF) until the passage of the 1967 Act). In the early days, MAF and the Ministry of Works provided support for the Soil Conservation and Rivers Control Council (SCRCC) and the fledgling catchment boards (Ericksen, 1990).

Ericksen notes that much more comprehensive schemes – catchment plans, in effect, could have been prepared under the 1941 Act but few were produced because of lack of resourcing to obtain the information needed for planning and management – as well as the professional demarcation and rivalry. Moreover, the boards were set up to deal with soil erosion and flooding and were therefore crisis-oriented and reactive rather than forward-looking and anticipatory. Funding

difficulties included the reluctance of upper catchment land owners to fund work of benefit to lowlanders and vice versa. Furthermore, the central government funding criteria slowed work and encouraged short-term piecemeal projects rather than longer term catchment-wide land use management planning.

Ericksen's 1990 analysis of past attempts at creating innovative water and land management structures show three common problems inhibiting comprehensive and integrated water and soil planning and management in New Zealand, the first two being professional biases of staff in responsible agencies and institutional demarcation between agencies with supposedly shared interests. The third is lack of finances to implement appropriate methods of analysis and management.

Acheson (1968) and McCaskill (1973) also notes that as staff numbers in the early catchment boards grew, so too did disciplinary or professional demarcation, with the division between river engineers and soil conservators being especially clear. Ericksen also notes the divide between river engineers and soil conservators. This division was at SCRCC level and in the regional catchment boards, and these professionals "rarely met on common ground".

The barriers between river engineers and soil conservators were not broken down until the early 1970s, largely through the process of a major review of progress in catchment management that the SCRCC initiated in 1969.

Planning for water use and quality follows a similar history, with major users and dischargers (including local councils) showing "political recalcitrance" and "cavalier attitudes" (Ericksen 1990).

Growing public concern was among the factors leading to several influential conferences of the New Zealand Institute of Engineers. In opening the first in 1964, the Hon PB Allen, Minister of Works, stated the need for new legislation to allocate functions for water conservation, water allocation, water quality, comprehensive research and pleaded for the scientists, engineers, water use experts, civil authorities and others... to "sink personal parochial differences" and help him create legislation that would "be of great assistance to generations yet to come". The result was the 1967 Water and Soil Conservation Act, which furthered New Zealand's reputation for producing innovative land and water management legislation (refer section 0).

However catchment boards took many years to take on staff to carry out the new functions (Ericksen, 1990) and there were also ongoing problems with linkages with planners at both the regional and territorial level.

It is not surprising that it was very difficult to get integrated catchment management from divided professions, especially when the allocation of functions between regional and territorial councils caused tension of its own.

The 1967 Act was a "commendable attempt at instituting integrated water management" (ibid) but was fraught with issues impeding efficient implementation, including:

- structural complexity;
- lack of a mechanism to collect funds to do research and employ new staff to take on the added responsibilities, leading to a perhaps understandable bias of elected and government-nominated representatives as well as council staff towards 1941 Act over 1967 Act duties; and
- the frequent addition of new statutory duties and non-statutory measures. The latter included water allocation plans, baseline water quality surveys and water and soil resource

management plans (WASRMPs) and acknowledging the lack of resources, NWASCA provided funding to induce regional water boards to implement these.

NWASCA's 1969-1972 review identified the need for WASRMPs to integrate land and water planning, including water use and quality, in a catchment-wide or sub-catchment basis, in order to meet the objectives of both the 1941 and 1967 Acts. By the mid 1970s, integrated planning was being discussed under a range of titles – Regional management plans, Regional water plans, Regional water and soil management plans and Water and soil resource management plans. By the late 1970s the MOWD Water and Soil Division was "vigorously promoting" the use of WASRMPs and subsidising their preparation. A key use for these plans would be to "provide an important framework for advising territorial regional and local authorities on water and land matters" (ibid).

In practice, WASRMPS were only prepared where large development projects created an immediate need and after 20 years, only eight of the 20 regional water boards had any. A major obstacle to this integrated planning was (ibid) "the continued myopia of the physical scientists and engineers". This tension is discussed in section 0.

According to Bowden (1999), the IHD catchment studies of the 1960s and 70s and later, failed to achieve true integrated management. The mid 1980s saw a combination of financial, political and institutional changes, and the subsequent reorganisation caused the loss of institutional motivations and individual efforts which were required to keep the studies going. Competition was created between science providers leading to an almost impossible situation for cooperative, long-term, national ICM.

The introduction of the RMA in 1991 exacerbated the situation, according to Phillips (1998) and Bowden (1999). Integrated catchment management became lost with the dissolution of the catchment boards and the framework of the new post-RMA organisations. There was no direct replacement of the catchment boards, and as functions became separated into different disciplines within these organisations, ICM was no longer practised.

This was a serious break with a long-established culture of training in science and engineering in New Zealand. During the 1870 development boom period, a large number of experienced engineers had migrated to New Zealand, mostly from Great Britain and the USA, to design and supervise the construction works. To these engineers were attracted a considerable number of cadets, who in due course became fully-fledged engineers. Many of them stayed with the Public Works Department, rising through its ranks to become management. Others left to work in the private sector or overseas, but there was almost universal acknowledgement that the training opportunities offered by the Department were second to none (Furkert, 1953).

And so the system became established where for over a century the Public Works Department (which in 1876 became the Ministry of Works) served as a training ground for a large proportion of the country's professional engineers. After the second World War, when the University degree became the principal mode of entry to the engineering profession, the Ministry of Works became a sort of "finishing school", within which graduate engineers could build up the range of job experience they needed, before being entitled to seek registration (Furkert, 1953).

The implementation of the 1941 Act triggered tremendous growth in the skills of meteorology, hydrology and soil conservation, including data collection (Acheson, 1968). Farmers were initially concerned that the Act would affect their livelihood and farming methods. In practice, however, a strong voluntary ethic evolved, reinforced by community pressure, farm demonstrations of wise husbandry and subsidies for approved remedial work on farms. There was university training for soil conservators (Nathan, 2008) and a flowering of expertise followed, producing a national

hydrological data collection network and tools such as the Land Use Classification that formed the basis for the Land Resource Inventory (NZLRI) and Land Use Capability still in use today.

There has been discussion but no detailed analysis of the 1980 government reforms on water and soil management and its effects on the capacity of the resource management sector generally (science, policy, regulation, community and electoral capacity for integrated sustainable water and soil management).

However, Ericksen (1990) observed that the demise of NWASCA and the Water and Soil Directorate of the MOWD saw some research functions go to the DSIR but “the functions of information, education and the synthesis of policy and methods seem to have been lost, or at best diffused to the regions. The Ministry for the Environment has picked up policy and funding matters, but seems to lack the resources and capacity to fill the void at national level. There is now no water and land planning at national level.” This concern was also voiced by other agencies concerned at the loss in the government reforms and new resource management legislation of focus on water and soil resources (Roche, 1994).

At its final meeting, NWASCA put on record its own achievements and those of its forerunners: progress in the areas of water and soil conservation was felt to have been significant, but largely unrecognised by public and politician alike. It regarded the widespread cutbacks in and restructuring of the public service and various advisory agencies since 1984 as quite contrary to the principles previously underlying national water and soil policy.

The breakup of the Town and Country Planning and Water and Soil Divisions and the DSIR into separate and competitively-funded crown research institutes split apart the previous centralised resources that had provided research and policy combined with practice, with little carried over to the new Ministry for the Environment, which was to be an exclusively policy-focused agency.

These changes also affected representation: the new councils had directly elected representatives only, compared with the nominees of relevant central government agencies on the previous catchment and water boards, including the District Commissioner of Works and the Harbour Board for the region. Such arrangement gave councils direct links with central government policy in ways that were subsequently lost.

Ericksen et al (2003) have extensively covered the transition to the new administrative arrangements, and conclude in brief that the Ministry was consistently underfunded to support the new devolved and co-operative mandate for resource management to the regions and districts after the reforms of the 1980s and the introduction of the Resource Management Act. They found limited capability-building for regional councils by central government and mixed results in the relationship between regional and territorial government. While they were expected to work together in partnership, there was an implicit hierarchy on the policy tools of the RMA, causing confusion about overlapping functions. Over time, some of these impediments have been overcome, but there are still many more ways councils could act in a more integrated manner for sharing resources.

Bowden (1999) believes that the practical application of the RMA 1991 has not generated the intended integral approach to environmental management for two reasons; “the decentralization of environmental management responsibilities to regional and district councils” and “the RMA’s focus on impact identification and mitigation rather than source area management”.

The resources available to most regional and district councils are limited in New Zealand and the decentralisation of environmental management and the requirements set by the RMA pushed councils beyond these. The RMA required councils to produce a series of significant new policy

and planning documents. Their production, while of some benefit, was time-consuming and expensive, leaving inadequate resources for implementation of any form of integrated environmental management (Frieder, 1997).

The decentralisation of environmental management set up information exchange barriers, where councils had no incentive to share information or experiences with each other. The dangerous result was that environmental management became inefficient, with councils working separately and with limited knowledge and experience.

The RMA is an effects-based Act, giving it an inherent focus on impact identification and mitigation rather than the sources or methods by which those impacts arise from the activities the Act regulates. For example, it is empowered to require identification and mitigation of environmental effects such as sedimentation and eutrophication, but has weaker powers to have direct input to the methods an applicant may adopt to achieve this. The effects-based approach is further weakened when coupled with limited resources that force resource managers to make consent related decisions based on inadequate information and in short time frames (Bowden, 1999).

In order to deal with these rushed decisions, councils try to remedy the effects by monitoring the approved activity so that any impacts will be seen as soon as they occur. This approach can be risky, because by the time monitoring identifies a problem, it may be too late to mitigate or remedy it, or to determine who is accountable (Bowden, 1999). Bowden suggests that in order to overcome this problem, resource managers should be looking to locate where the problems will come from before they eventuate, in a process of source area management.

Phillips (1998) agrees with Bowden, and comments that “the last decade of research supporting ICM tended to be less than well integrated”. Until recently, environmental managers have “focused on individual threads of the puzzle only, concentrating on sediment supply, sediment budgeting, characteristics of individual ecosystem processes, and various hydrological studies”. He goes on to comment that “although many regional councils are trying to maintain cohesion across various functions, the integration of policy, planning and on-ground management has been less than coordinated”.

However, in line with international trends and local pressures and aspirations, numerous ICM projects have been set up since 2000, including (http://www.landcare.org.nz/integrated_catchment_management/nzprojects.asp) the Taieri Trust (Otago), Motueka and Riwaka ICM (Tasman), Whatawhata Catchment Project (Hamilton), Whaingaroa Catchment Management Project (Raglan), Waipaoa Catchment Project (Gisborne) and Orari River Catchment Project (Canterbury). All of these projects recognise the need for a holistic, integrated, issue-driven, interdisciplinary approach to achieve sustainable management.

This is exemplified by a proposal from Greater Wellington (the Wellington Regional Council) for Total Catchment Management (TCM). TCM is (Gunn, 2008) “a process through which people can develop a vision, agree on shared values and behaviours, make informed decisions and act together to manage the natural resources of their catchment by considering the effect of the use of land, water and other environmental resources on all people within the catchment. It is an approach to sustainable resource management from a catchment perspective in contrast to a piecemeal approach that artificially separates land management from water management. Ecosystems are recognised and there is a focus to understand the role of ecosystems as habitat for flora and fauna. TCM seeks to take into account complex relationships within those ecosystems for example between flora and fauna, between geology and hydrology, soils and the biosphere and between the biosphere and the atmosphere. TCM will ensure sustainable

development occurs, create a vibrant environment for people and wildlife and integrate the management of land and water by:

- involving and listening to the community;
- implementing an integrated approach to catchment management;
- working closely with our partners and providing increasing opportunity for stakeholder involvement;
- aiming for environmental, social and economic benefits concurrently; and
- directing limited resources to bring about the greatest benefit.”

4.3.5 Participatory models

In many parts of New Zealand, Māori, community, farming and business groups have set up their own ICM initiatives and actively engaged with public sector catchment managers, while in other areas, catchment managers have been engaging with communities to a greater or lesser degree.

Māori have developed several environmental initiatives, including the Cultural Health Index (CHI) for rivers and streams. While not an ICM process in itself, the CHI enables Māori to achieve catchment-related outcomes of importance to them, and is also compatible with wider ICM programmes.

Based on pioneering work by Gail Tipa funded by the Ministry for the Environment as part of its Environmental Performance Indicator (EPI) Programme, the CHI is a tool that involves iwi in resource management processes. This work arose in an attempt to recognise and incorporate Māori values in river management and provide a tool that Māori can use to assess and manage waterways in their area. The index provides a diagnostic tool which identifies issues of concern to iwi. Remedial actions can then be prioritized using data gathered from field assessments that allow iwi / hapū to assess the cultural and biological health of a stream or catchment of their choosing and then communicate this information to water managers in a way that can be understood and integrated into resource management processes. Monitoring aspects of the freshwater resource can also be undertaken. Scientifically as well as culturally tested, the index is a response to and reflects the values, beliefs and aspirations of Māori. It is able to help resource managers not only fulfil their obligations stemming from resource management laws, but also to enhance current resource management practice.

The Motueka ICM programme considers that understanding and incorporating tangata whenua perspectives, values, and knowledge into ICM is essential for achieving sustainable land and water management goals in New Zealand and for state of the environment reporting. It has recently supported further tailoring of the cultural health index by the Nelson-Motueka pan-tribal regional resource management agency, Tiakina Te Taiao (Landcare Research, 2008). The agency has adapted the CHI using a cultural framework that stratifies the landscape into Atua domains (Māori gods such as Papatuanuku, Ranginui, Tangaroa, and Tane Mahuta), cultural themes, indicators, and descriptors. All the information described from field assessment is site-recorded using maps, aerial photos, and given precise grid coordinates – and sometimes located using a global positioning system (GPS). A scoresheet is then filled out by trained iwi members and can be entered into Tiakina Te Taiao’s Geographic Information System (GIS) based at Whakatu Marae in Nelson.

The Motueka ICM programme shows that a number of tools, techniques and lessons that have resulted from Māori environmental initiatives, including the Cultural Health Index (CHI) for rivers and streams, could be applied in other catchments both in New Zealand and internationally by:

- providing consistent methods and tools for cultural monitoring and assessment;
- measuring progress towards or away from tangata whenua goals, aspirations, and perceptions – such as ideals of desired states of environmental health and well-being;
- underpinning iwi projects such as cultural impact assessments and restoration projects;
- collating mātauranga Māori (Māori knowledge) for iwi knowledge and information systems such as GIS;
- providing information on trends – whether an environment or ecosystem is getting better or worse from a cultural perspective;
- articulating iwi Māori values, issues, and knowledge to stakeholders, such as councils, industry, communities, and science groups;
- complementing science indicator assessment and links cultural research to science research;
- providing information that can be used collectively for improved decision-making for sustainable land and water management and for state of environment reporting; and
- supporting modelling, visualisation and futures planning.

The Māori holistic view of the environment summarised in section 3.2 fits well with the modern understanding of sustainability. The Resource Management Act's purpose of safeguarding the life-supporting capacity of air, land, water and ecosystems equate to protection of mauri – life sustaining capacity.

Such examples demonstrate that community collaboration can lead to capacity and knowledge building of ICM principles which can then be applied directly to individual projects within the larger ICMP programme. For instance, the Motueka integrated catchment project is acknowledged as an example of global best practice (Menzies and Hooper, 2008). The project has four main research themes:

- land use - land use effects on surface and ground water resources;
- freshwater - habitat and water quality issues and associated riparian management;
- coastal and marine - the catchment's effects on Tasman Bay and the marine habitat, including marine farming activities; and
- human dimensions - issues of why and how stakeholders manage the conflicting resource needs within the community.

Source: http://www.landcare.org.nz/integrated_catchment_management/research/motueka_icm_project.asp

While this approach is not yet widespread, there are several examples of community collaborative projects that enhance ICM outcomes, albeit on an issue-specific and micro scale rather than a catchment-wide holistic scale.

For example, the Guardians of the Styx are a community-based environmental group with the objective of promoting the protection and restoration of the Styx River, Christchurch (http://www.landcare.org.nz/integrated_catchment_management/nzprojects.asp and <http://www.thestyx.co.nz/Guardians%20of%20the%20Styx.html>). The group works in partnership with Christchurch City Council's Parks and Waterways Unit, and the Council has developed an

Asset Management Strategy that uses a values-based approach to manage the city's surface water environment. The values are landscape, drainage, ecology, recreation, culture and heritage. Of particular interest is the use of the relevant Christchurch City ICMP to guide the vision for the river and the development of an integrated monitoring strategy that addresses outcomes under the RMA, LGA and the Styx Vision and will be implemented by Environment Canterbury (the Regional Council), the City Council and the community volunteers.

A "bottom up" community collaboration was also useful in Canterbury when preparing an urban development strategy for Greater Christchurch (Banwell, 2007). The strategy was initiated because of concerns at the lack of collaboration and co-ordination between councils to manage growth. Growth options were scoped with the community and an in-depth "inquiry by design" multi-stakeholder consultative process developed a preferred settlement pattern. Key to its success was a multi-disciplinary voluntary co-operative approach that maintained the valuable link to the community through partner forums and ongoing participation.

Greater Wellington is proposing (Gunn, 2008) a total catchment management approach based on 11 TCM principles, the first of which is: "Community led process which encourages active and early involvement of a broad group of stakeholders from within the catchment."

Care groups generally are effective vehicles for resource management, be they coastcare, stream (Wai) care or landcare groups or community, marae or school-based. Like Australia, the United States and the United Kingdom, there are agencies in New Zealand that seek to support groups carrying out the ICM process. "The ICM Project" is a Ministry for the Environment Sustainable Management Fund project aimed at sharing community level best practice in ICM nationally. The purpose of the ICM project is to create a network of people and institutions involved in ICM, and to provide opportunities for these people to share experiences, tools and approaches throughout New Zealand. One such demonstration project is the Motueka and Riwaka ICM, chosen as a case study as its issues are common to many catchments in New Zealand, and thus solutions to these issues, involving the "science of integration" and the "integration of science and management" can be transferable throughout New Zealand and the world (Basher, 2003).

The farming sector also advocates initiatives that make a good contribution to ICM: despite lobbying for changes to the Resource Management Act, dairy farmers support strong environmental initiatives for nutrient reduction and sustainable fresh water use such as those at <http://www.fedfarm.org.nz/water> and <http://www.fonterra.com> (see sustainability). Voluntary agreements such as the Dairying and Clean Streams Accord have the potential to make a valuable contribution to catchment health. Signed in May 2003 between Fonterra, the Ministries of Agriculture and the Environment and regional councils, the Accord aims to achieve clean healthy water, including streams, rivers, lakes, groundwater and wetlands, in dairying areas and sets out five targets for farmers to meet:

- dairy cattle to be excluded from 50% of streams, rivers and lakes by 2007, rising to 90% by 2012;
- 50% of regular crossing points to have bridges or culverts by 2007 (90% by 2012);
- 100% of dairy farm effluent discharges to comply with resource consents and regional plans immediately;
- 100% of dairy farms to have in place systems to manage nutrient inputs and outputs by 2007; and
- 50% of regionally significant wetlands to be fenced by 2005 (90 per cent by 2007).

While such initiatives may encourage farmers meet these targets, environmental and user groups such as Fish and Game with its “Dirty Dairying” campaign and the Royal Forest and Bird Protection Society will continue to play an active watchdog role – while also pursuing their own biodiversity objectives from ICM.

On a similar note, business interests are also becoming aware of water as a limiting factor to environmental growth and environmental quality. The New Zealand Business Council for Sustainable Development (NZBCSD) has recently published a report “Sustainable freshwater management – towards an improved New Zealand approach” in which it strongly advocates for integrated catchment management plans to become a statutory instrument for managing aquatic ecosystem sustainability, minor individual water uses, in-stream and public uses and consented abstractive uses.

Chrystall (2006) identifies the following critical success factors for resolving environmental issues satisfactorily with an ICM approach, sourced from Bowden et al (2004) and Fenemor (2002):

- accountability: a legal and institutional setting which facilitates resolution of the issues, so that both the process and its outcomes have accountability;
- forward planning: strategic planning to anticipate the issues, collect relevant information and initiate dialogue before the issue becomes a crisis;
- vision, leadership and structure for the process, with at least one party to drive the process;
- involving all relevant stakeholder groups and engaging with stakeholder representatives who actually have decision-making power, where all interested parties need an opportunity to participate to maximize acceptance of the outcome, noting that identifying and engaging the ‘reluctant’ participants can be critical to success;
- adequate definition of the issue, including issue boundaries and spatial and time scales;
- adequate information upon which to base the dialogue, and strong, accepted science;
- accept local knowledge, including validated anecdotal knowledge, not just science: cultural insights, based on decades and even centuries of observation and experience can be extraordinarily valuable;
- workable solutions expressed clearly and succinctly to communicate the process of reaching these solutions — e.g. how the catchment models work; and communicating the outcome itself in simple terms is vital, as is use of simple common sense tools and approaches to achieve critical communication and education including holding annual general meetings, forming community reference groups and a catchment website; and
- committed leaders willing to facilitate shared solutions: leadership is vital, especially from those who are respected in the community. They will provide the catalyst that makes the difference between success and failure.

The Collaborative Learning Team at Landcare Research (one of the partners in the Motueka ICM programme) also endorses collaborative approaches to ICM where each interest group brings different information, values, capacities, perspectives, methods of learning, and stores of historical experience to any situation (for more information, refer to http://www.landcareresearch.co.nz/research/research_details.asp?Research_Content_ID=38).

In essence collaborative learning is integration of these diverse knowledge bases in ways that advance the collective decision-making capability of all. Natural resource managers are increasingly faced with highly complex problems, multiple social perspectives, high levels of uncertainty, and

low levels of agreement on causes, solutions and desired outcomes. Often there are no final solutions that 'fix' a problem. The emphasis on learning, or adaptive management and policy-making, helps stakeholder groups appreciate different perspectives, as well as addressing the dynamism of social and environmental systems.

There are clear learnings from the above examples of community collaboration and participation. Allen et al. (2002) analysed the factors that contribute to successful partnerships between environmental management agencies and community groups in New Zealand.

Allen et al. (2002) distinguished between:

- agency-led partnerships;
- community-led partnerships; and
- joint partnerships.

Their research suggested that joint partnerships have the greatest capacity for long-term sustainability, finding that partnerships that share resources and decision-making power lead to the most effective long-term commitment to changing environmental management outcomes.

Craig and Courtney (2004) pose a partnering continuum from co-existence through networking, co-operation and collaboration to partnership. This has also been explored by the International Association for Public Participation (Figure 4-44) and Taylor (2004).

In line with the findings of Allen et al. (2002), Taylor's model (as adapted in Figure 4-55) is preferred for ICM in New Zealand as a more detailed and aspirational model.

Figure4-4 A public participation spectrum

Source: International Association for Public Participation

IAP2 Public Participation Spectrum

Developed by the International Association for Public Participation

INCREASING LEVEL OF PUBLIC IMPACT

IN

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assist t
underst
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alternat
solution

**Promis
the Pu**

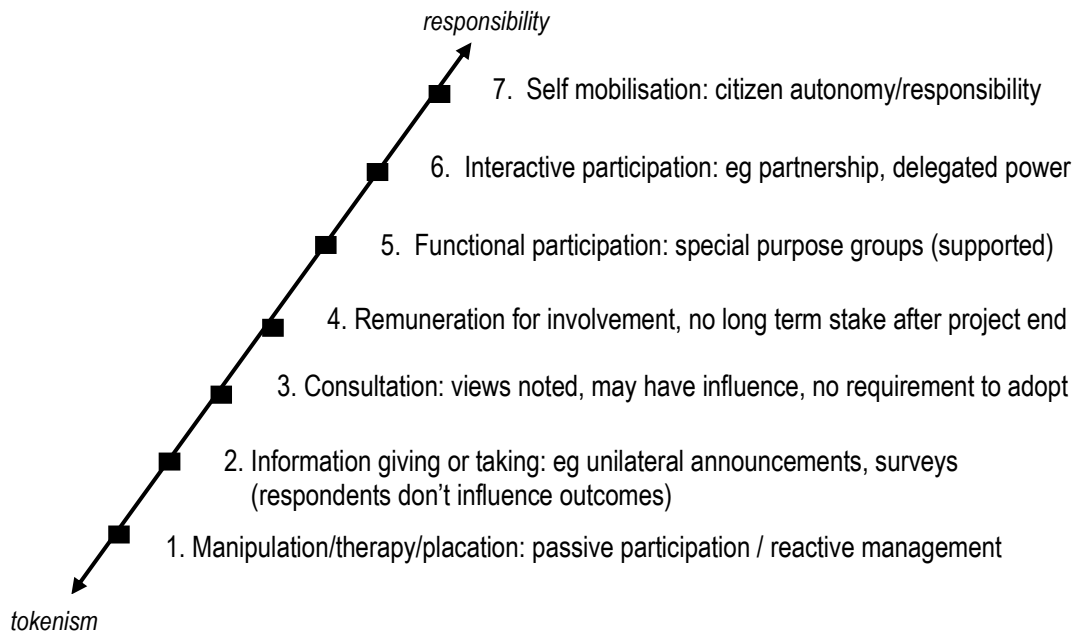
We will
informe

Examp

- Fact
- Web
- Open

Figure 4–5 Rungs on a citizen participation ladder

Source: Adapted from Taylor, 2004 (Arnstein, Blamey et al)



4.4 The challenges for integrating catchment and coastal management

The preceding historical narrative may be summarised in terms of the following persistent and recurring themes:

- Māori aspirations for the environment;
- development vs environment;
- engineers vs scientists and planners;
- territorial vs regional agencies;
- continuity vs change; and
- proliferation, duplication and the struggle for integration.

There remain significant challenges for integrating coastal and catchment management. The most serious are:

- the split between the control of land use by territorial councils and the control of its adverse effects by regional councils; and
- the split between land, freshwater and sea.

4.4.1 The split between land and freshwater

According to Ericksen 1990, of “fundamental importance to problems of implementing water planning and management in New Zealand is the role played by territorial ... authorities” which have responsibility for many water-related functions and have had a “significant’ influence politically on the way in which land and water planning and management have evolved”.

As early as the 1920s, planning legislation (see section 3.2.4) required local authorities to prepare plans to control development in such a way as to promote and safeguard the economic, cultural, social, and general welfare of the people and the preservation of the amenities of the area, including (from the 1970s) matters relating to natural resources and the environment. “The problems of implementation of planning and management of land and water resources through the statutory processes of territorial government were region, and included difficulties in generating planning schemes [under the 1953 Town and Country Planning Act] and cross-linkages between the territorial authorities and the catchment cum water boards”.

TAs had to agree to form a regional planning authority and most vigorously resisted this until the 1974 Local Government Act made them mandatory, setting up strong regional councils with powers to collect rates, appoint staff and have elected members. However a change of government saw them weakened to United Councils without elected representation and which were dependent on the local authorities for funding and staff.

By the late 1980s there were specific links between planning and water and soil legislation and while there was “opportunity for working hand in glove on common problems like flooding, operationally this failed for a variety of reasons. To overcome this, legislation relevant to TAs on water matters was progressively strengthened. However a major issue was the belief among TAs that land use management even for avoiding a problem as serious as flood hazard would limit development and therefore rateable income for use in stimulating further growth.

The poor performance of TAs in this respect was exacerbated by the behaviour of the catchment and water boards: they held the expertise and it was “an indictment on their performance that they did not produce flood hazard information maps” to help with land use planning by local authorities in their regions.

This lack of liaison between regional and territorial councils is echoed in the key findings of an independent review of the 2004 New Zealand Coastal Policy Statement (Rosier, 2004). The review found that while overall, it has had a positive effect on coastal management in New Zealand and has generated debates about our national priorities for coastal management and is effectively implemented through Regional Policy Statements and Regional Coastal Plans, it is only partially effective in influencing district plans and only generally referred to in resource consent applications.

It seems that catchment managers need to consider not only requiring TAs to manage their land uses for sustainable outcomes, but also providing them with supporting information, methods and resources to do so.

4.4.2 The split between land, freshwater and the sea

Administration of the RMA lies with the Ministry for the Environment but the major responsibility for coastal management still lies with the Minister of Conservation and the Department of Conservation. Together they have policy, approval and advocacy mandates in respect of things “coastal”. This act transferred most planning responsibilities to regional and local councils and

established a hierarchy of resource management documents. Each level provides guidance to the level below.

The RMA requires the preparation of a national coastal policy statement (NZNCPS) by the Minister of Conservation to guide local authorities in their day-to-day management of the coast. It also requires monitoring of the implementation of the policy statement. Although the policy relates to the coastal environment the emphasis is largely on the area below MHWS (the "coastal marine area"). There are chapters on natural character and subdivision, use and development and the provision of adequate servicing of these activities. Policy 3.2.7 notes that "policy statements and plans should identify practicable ways whereby the quality of water in the coastal environment can be improved by altered land management practices, and should encourage adoption of those practices". The RMA has retained an approval role for the Minister of Conservation for regional coastal plans and for restricted coastal activities (specific activities which the Minister has identified as requiring central government approval). The Department of Conservation has a general mandate to advocate conservation.

Regional councils with jurisdiction to the 12 nautical mile extent of the territorial sea are charged with the "integrated management of the natural and physical resources of the region". This is to be achieved through regional policy statements which give effect to national policy statements and national environmental standards through objectives, policies and methods to guide the regional plans (including a regional coastal plan) and district plans which are to give effect to the RPS through objectives, policies and rules. Other legislation in the 1990s included maritime transport (1994) and fisheries (1996).

In line with the lack of central government ability to support the devolved mandate under the new Resource Management Act (see Ericksen et al, 2003), Britton (2005) notes that the Act required that Regional Coastal Plans (RCPs) be proposed by 1 July 1994. The first New Zealand Coastal Policy Statement, which was to influence the preparation of RCPs, was to be notified by 1 October 1992, but subsequently became operative on 5 May 1994. Therefore, many of the RCPs had to be prepared without the guidance of this national policy, with the rest only able to give it cursory attention, in order to meet the statutory deadline. Many of these documents are still in effect or just undergoing review.

The RMA test at the time was for the RCPs to be "not inconsistent" with the NZCPS. The Resource Management Amendment Act 2003 strengthened this to ensure that Councils "give effect to" national policy statements.

Plans for coastal areas were new for all regional councils. Some regions had previously developed harbour or maritime plans under the Harbours Act 1950, but these provided little guidance in the preparation of RMA plans and policy statements. The challenge was to provide a planning framework for all coastal areas within the region from mean high water springs (MHWS) to the 12 nautical miles limit. Notwithstanding the extensive areas, most RCPs opted to provide generic policy focused on "effects" of activities (as governed by s12, Schedule II and Part II of the RMA). Depending on the available information, some areas were zoned and activities more specifically provided for. Whatever approach was taken, it was clear that there was a lack of specific information to enable adequate standards to be written into rules, to provide any clear guidance or certainty to applicants or decision-makers.

Britton (2003) states that while the RMA emphasises integrated management, MHWS was set as the RMA jurisdictional boundary between regional and territorial authorities, dividing coastal areas off from land management, and as a result, integration of the management between land and sea has not been achieved particularly well.

Most RCPs and District Plans were drafted simultaneously and there were a number of barriers to achieving integrated plans at that early stage. Not surprisingly, most of the coastal pressures arise on land and the effects of land use activities then impact on the CMA (e.g. subdivision, water quality, structures). Likewise, most activities in the CMA occur within a short distance of MHWS. In the future, Britton considers that regional councils and territorial authorities will need to be "smarter" about the way they integrate their plans to ensure the land based activities are controlled in a way that does not impact on the CMA, particularly in relation to natural character, erosion (a natural process for significant parts of New Zealand's coast) and water quality (elderly inadequate septic tanks and community services which do not adequately address the swings in population from winter to summer demands). Britton considers that regional councils also need to be more cognisant of the associated land based effects resulting from CMA 5 planning and decision-making and anticipates that in the future, a far greater emphasis will be placed on coastal environment plans, to enable better linkages between the land and water issues. Britton notes that some regional councils had already taken this approach, to varying degrees, in their "first generation" plans.

Britton concludes by saying that "it is expected that the next generation of plans will be more focused on activities, on applying zoning to water space and on better addressing the land-water interface and that there will probably be a more focused policy framework and the scope of the plans is likely to be different, as they seek to ensure better integration across the line of MHWS, which could lead to better integration with other regional and/or district plans."

One of the other big problems for coastal management has always been determining how much development is appropriate (Peart, 2007a). Views have changed over the years through changing public appreciation of the coastal environment and developing scientific knowledge and understanding of natural processes affecting the coast. The question now is whether the pattern or form of development is sustainable, whether it has had adequate regard to natural processes and ecosystems across both land and sea and whether it is achieving integrated or holistic management of the resources affecting the coast.

Based on case studies of the Kaipara Harbour and Hauraki Gulf, Peart (2007a) concludes (like Britton 2005 and Brookes no date) that New Zealand's current coastal management system is fragmented and suffers from inconsistent objectives and management approaches. Her specific criticisms are that:

- the legislative framework has developed in an ad hoc manner and without a clear vision of how integrated coastal management might be delivered at a regional level;
- there is a wide disparity in the extent to which key elements of a successful integrated coastal management system are being implemented in the various management spheres;
- levels of information and resourcing to support effective coastal management are insufficient;
- the "jurisdictional apartheid" resulting from the basic tensions in the RMA between TAs seeking to "protect" land and assets [that are predominantly in private ownership] for development, and Regional Councils [and DoC seeking to protect natural resources that are of public benefit by] upholding the NZCPS, and where relevant, regional policy statements and regional plans there is no legislative framework to support integrative initiatives when they do occur;
- although spatial planning at a regional level is well established under RMA, it is less well used in other coastal management regimes: some significant resource management activities are outside the jurisdiction of the RMA, or have overlapping management regimes. These include

the harvesting of fish, shellfish and seaweed stocks which are managed under the Fisheries Act 1996, the logging of indigenous forests on private land which are also managed under the Forests Act 1949 and marine pollution from ships and offshore structures which is also managed under the Maritime Transport Act 1994. The RMA does not, therefore, provide a fully integrated resource management regime; and

- the separation of land and sea planning because of the lack of an holistic approach appears to have resulted in New Zealanders “giving up” on preservation of natural character along a lot of our coastline (e.g. Northland, Auckland, Bay of Plenty, Coromandel) and therefore the imperative to manage it as an integrated living biophysical system has almost vanished.

Peart (2007a) concludes with a list of recommendations that aim to:

- improve agency alignment of coastal management outcomes, objectives and approaches, especially for integrated ecosystem-based management among territorial, regional and ministerial organisations (e.g. Ministry of Fisheries), with more decentralised decision-making by central government agencies and a clearer statutory relationship between MFish and regional councils;
- a clearer statutory basis for the role of tangata whenua in coastal management
- build a climate of trust that will allow more experimental approaches as a result of better stakeholder engagement, public participation, conflict resolution and participatory decision-making;
- promote the development of a best practice guideline and provision of funding to build capacity for such engagement;
- better use of spatial planning at compatible scales to enable better interagency co-ordination and public participation, and to achieve better interfaces amongst the various pans and better integration across MHWS;
- better use of strategic planning based on improved information;
- a comprehensive monitoring framework that promotes better consistency and integration between existing programmes and helps to progressively fill knowledge gaps; and
- better resourcing to enable all the above.

Essentially it seems that coastal management has focused on development on beaches and extractive or occupational uses of saline waters (e.g. fishing, shellfishing, moorings, ports, dredging and so on). There has been a growing realisation that land uses throughout the nation from the central ridgelines to the coast affect inshore and wider coastal ecosystems, with some statutory documents acknowledging this, such as the Auckland Regional Policy Statement and Coastal Plan, as discussed above. However, the specific management of land uses for the purposes of maintaining the health of the freshwater and saline ecosystems in which their effects are expressed has yet to become mainstream.

4.4.3 Summary: from Māori to Mauri

New Zealand’s short history of human occupation has come full circle, from Māori to Mauri. Māori peoples had, since their arrival, learned to adapt to the country’s ecological limits and developed an environmental tikanga to manage resource use. European colonists also had to adapt as they realised the “new” land had resource limits.

However, the tensions that developed during this process of adaptation are still evident today: development vs the environment; engineers vs planners and scientists; territorial vs regional agencies; town vs country and centralised vs decentralised controls.

The more recent and growing focus on life-supporting capacity of ecosystems enshrined in the RMA and the four wellbeing of the LGA reflect a better understanding of the importance of maintaining and enhancing the biophysical environment for the benefit of people and the economy.

This broadening awareness is reflected in the progressive realisation that good land management is essential for healthy freshwaters, and that healthy freshwaters are essential for healthy coastal waters.

Although significant challenges remain, like Tangaroa, catchment managers are beginning to appreciate and incorporate coastal and estuarine management issues within broader ICM approaches, to maintain and enhance the mauri of waters and lands and their resources.

How this awareness has emerged specifically in the Auckland region is discussed in the next chapter.

5 The evolution of catchment and coastal management in the Auckland region

The key findings from the survey of the evolution of catchment and coastal management in the Auckland region are that there have been successive advances and retreats in vision and implementation. In the present situation, the planning framework and iwi and community aspirations favour integration of catchment with coastal management, and the implementation is once again moving closer to realising these visions.

5.1 The evolution of coastal management in the Auckland region

Coastal planning has a long history in the Auckland region, commencing with the 1911 Manukau Harbour Control Act, which interestingly focused on acquiring land above mean high water springs (MHWS) in order to protect recreational, ecological and landscape values and coastal areas (including estuaries and harbours) through designations/purchases and advocacy through regional/district plans. The measures were motivated by concerns about coastal subdivision and development and protection of significant natural areas and recreation – themes that remain today.

Table B-3 of Appendix B summarises the main legislation passed since then, noting how Auckland agencies gave effect to these national requirements, the issues and objectives identified and the approach to achieving the intended outcomes. These are grouped under the following broad themes:

- up to the 1950s and 60s: public reaction to coastal changes and the “planning” response – a focus on the coastal edge;
- 1970s: a shift to environmental policies and controls, with a focus on the coastal edge and identified maritime planning areas and a recognition of the need to manage land uses for the benefits of harbours;
- 1980s: a shift towards integrated management of the coastal area, including the coastal edge and defined maritime planning areas;
- 1990s: integrating management of the coastal zone, with an expanded focus to include water catchments;
- 2000s: consolidating and fully integrating regional resource management and sustainable development, with a focus on water catchments, the coastal marine area and the exclusive economic zone (EEZ).

A review of the contents to place these in the context of the themes identified in section 3.5 indicates:

- explicit recognition of Māori aspirations for the environment in the 1974 Manukau Harbour Plan and other plans thereafter, though this does not progress towards formal involvement in coastal management, apart from the election to the ARWB of Nganeko Minhinnick in the early 1980s and the establishment in the 1990s of an iwi liaison team at the ARC;

- ongoing attempts to manage the tensions between development and the environment since the 1911 Act, focused on coastal development and uses of the marine area. Not noted in the legislative summary is the importance in this area of community interest groups who have (sometimes vigorously) engaged with councils and other agencies for better management and protection of coastal areas and conducted a great deal of work on their own. As well as beach and coast care groups throughout the region, these groups include the Manukau Harbour Protection Society, Tamaki Estuary Protection Society, Orakei Basin Protection Society, Waterview Environmental Society, Friends of the Whau, Friends of the Mahurangi, Friends of the Manukau Harbour and Friends of the Lucas Creek;
- the ongoing struggle between territorial and regional agencies about how to and how much to control land use for the purposes of managing coastal waters;
- how changes in representation affected the direction of policy in the region with the voting in of the “New Deal” in the late 1980s, a group of representatives elected on a mandate to reduce regional spending and powers;
- the development in the 1990s of a range of new planning documents in the region under the new RMA, a recognition in 1996 by the ARC and the TAs of the need to work together to manage growth, with the formation of the Auckland Regional Growth Strategy and Regional Growth Forum;
- the struggle for integration of the 2000s, with the development of the multi-stakeholder Auckland Sustainability Framework and One Plan; and
- the journey towards integrating catchments with coasts in the 1990s and 2000s, with coastal plans expanding their focus to include water catchments and aiming to consolidate and fully integrate regional resource management and sustainable development above and below MHWS. It is notable, however, that the 1974 Manukau Harbour Plan had a clear focus on integrating land use with coastal water quality and ecology that was not to be bettered by other plans until nearly 20 years later, with the production of the Auckland Regional Policy Statement in 1999. This theme will be explored in more detail in section 3.8.

Of particular note is the Hauraki Gulf Marine Park Act 2000, which set up the Hauraki Gulf Forum, a Marine Park and objectives for managing the Gulf. The objectives aim to achieve integrated management of natural, historic and physical resources of the Hauraki Gulf, its islands and catchments and to establish objectives that recognise the historic, traditional, cultural, and spiritual relationship of tangata whenua with the Gulf and its islands. The Act recognises the relationship between the Gulf, its islands and [land-based] catchment as a matter of national significance, and covers Hauraki Gulf waters, adjacent DoC land and, with the TA’s agreement, other adjacent public lands. Among its intended outcomes are integrated management “from catchment to the sea” and of 21 statutes and production of state of the environment reports.

The Forum includes representatives appointed by the Ministers for Conservation, Fisheries and Māori Affairs, representatives of the twelve TAs adjoining the Gulf and its islands, six tangata whenua representatives appointed by the Minister of Conservation and two further representatives appointed by the ARC. It meets every three months and is supported by a technical officers committee that meets monthly. As summarised by Peart (2007a), it seems to have achieved better communication and exchange of expertise, joint interagency projects, a forum in which agencies can present ideas and exert “moral pressure” on each other. It also provides a forum where iwi are resourced to articulate their perspectives. On the downside, it is perceived to lack clear vision or purpose, possibly because of weak relationships amongst politicians (which may be attributed to its low public profile) and lack of priority accorded it by

participating organisations, an uneasy relationship with iwi because of the lack of direct accountability and accountability, occasional parochialism and lack of success in directly affecting what management agencies are doing on the ground. That said, the opportunity for dialogue seems to have been valued by participants and with the publication of its first state of the environment report, the Forum may find a focus for joint action.

At a more local scale, the ARC and TAs have been working together to produce Coastal Compartment Management Plans for the Pahurehure Inlet, Algies Bay and Waiuku Inlet. These are non-statutory plans that articulate a shared vision for an area and identify the measures required to achieve that vision. They are comprehensive management plans that integrate the protection, use and development of a section of coastline. They may be incorporated into statutory plans through plan changes or may be implemented through works programmes or other activities depending on the nature of the area concerned. Their content includes activities in the coastal marine area and on adjacent land and their purpose is to achieve improved integrated management of the use and development of prioritised sections of coast through the preparation of management plans in partnership with local councils and communities.

The effects of the 1980s reforms in terms of loss of guidance for the preparation of key policy documents seems to have been less serious for coastal planning in the Auckland region, with better interaction between engineers and planners. However, they emerge more clearly in the next section, which examines the development of integrated catchment management in the Auckland region.

5.2 The evolution of integrated catchment management in the Auckland region

Despite (or perhaps because of) never having had a catchment board, the Auckland region has been held up as “one of the most progressive in the country” (Ericksen, 1990). While it was not without its share of soil erosion, localised flooding and some serious water pollution issues, the councils in the region did not vote to set up a catchment commission for the region, despite the presence of the adjacent Northland Catchment Commission and the Waikato Valley Authority (set up under its own Act). The catchment commission functions of the 1941 SCRCA and the regional water board functions of the 1967 WSCA were carried out by the district office of the MOWD.

It was not until 1973 that the Auckland Regional Authority (ARA) was constituted a Regional Water Board – the Auckland Regional Water Board, or ARWB – with responsibilities under the 1941 and 1967 Acts (the ARA at that time was a metropolitan utility agency that owned and operated the water supply and sewerage systems and well as the metropolitan roads, refuse services, buses and airport). The members of the Board comprised representatives elected to the ARA, together with five technical appointees, including a representative of the MOWD (the District Commissioner of Works) and the Harbour Board, which at that time had the responsibilities for managing the Waitemata and Manukau Harbours under the 1950 Harbours Act and for carrying out maritime planning under the 1977 TCPA.

From its inception, the ARWB took a catchment approach to manage urban flooding and stormwater issues, while its rural soil conservation and pollution control programmes, though active, were not necessarily carried out in the context of whole of catchment management.

Relevant initiatives in the region since 1973 are summarised under the following headings:

1. hydrological data collection and water allocation plans;
2. the Upper Waitemata Harbour Catchment Study;

3. the Manukau Harbour Action Plan;
4. TP10 and the network consents;
5. the three-waters vision of the utilities;
6. the Auckland Regional Policy Statement (RPS);
7. the “Boston” report and the formation of the SWAT team;
8. the Air, Land and Water Plan;
9. the Auckland Sustainability Framework;
10. collaborative and community-based initiatives; and
11. iwi engagement.

5.2.1 Hydrological data collection and water allocation plans

Apart from some limited hydrological data collected by the MOWD, the new Auckland Regional Water Board (ARWB) took on its new responsibilities with (Poole, 1983) “virtually no historical water and soil information or experience” and “some perplexing problems ... particularly in the conflict between the needs of urban and rural areas.” The generally small streams and aquifers were under intense pressure: the ARWB had inherited some 300 unprocessed water right applications from the MOWD and got a new application per day (Poole, 1983). The Board commissioned Tonkin and Taylor to conduct water resources surveys and began preparing the surface and ground water allocation plans that have been the mainstay of sustainable water resource management in the region ever since.

By the late 1980s the water allocation plans had become comprehensive documents that typically described climate, soils, geology, present and potential land and water use and the quality and size of the water resource (ARA, 1990). However, their primary purposes was to formulate a management strategy and policies for the catchment or aquifer, based on the total quantity of water available for allocation to water users and the volume to be retained as stream residual flow or groundwater through flow or recharge.

Poole singles out a number of places for discussion, notably the Upper Waitemata (urbanisation and “scraped earth” development), Lake Pupuke (conflicting uses of a small and valuable water body), the Mahurangi Harbour (a “scenic gem” and home of a promising oyster-farming industry), Omaha (coastal development and erosion), Parakai and Waiwera (geothermal resources), and Pukekohe and Bombay (high class soils). Under the issue of pollution, Poole discusses the trade waste, sewage treatment and combined sewer overflows affecting the Waitemata and Manukau Harbours, while under the heading “Problems of urban development” he notes intensification of farming and the resulting soil erosion, water pollution and water demand, local flooding by poorly planned urban development and “bare earth land development” resulting in “gross silt pollution of drainage systems, streams, beaches and harbour waters”.

Such problems were widespread in 1970s New Zealand, with Ericksen (1990) citing “cut-and-fill development leading to subsidence and land slippage, suicide developments in flood-prone areas, river and harbour pollution and little regard for aesthetic values”. Urban flood hazard is noted as a particular problem because although the 1941 SCRC Act provided a range of flood control tools, central government subsidies were not directly available to local authorities (which had statutory power to deal with flooding), so land use management (also the responsibility of local authorities)

was weakly used to reduce urban flood hazard. Similar concerns are expressed in a Water Board publication at the time (ARWB 1983a) and are further discussed in section 3.5.4 of this report.

5.2.2 The Upper Waitemata Harbour Catchment Study

In 1975 the Waitemata Harbour Plan expressed great concern about the fate of the Upper Waitemata and suggested setting up a study. NWASCO (no date) note that “the area is particularly prone to pollution because it is shallow with a narrow entrance which receives drainage from an area of 200 km² – half the catchment for the total harbour. It is at the expanding fringe of the Auckland urban area and therefore subject to intensification of land use, and demonstrating the beginnings of water pollution and sediment build-up”. The Upper Waitemata Harbour Catchment Study (UWHCS) began in 1979 with three years of funding from the ARWB and NWASCO. It involved the MOWD, local county and city councils, the Universities, the Ministry of Agriculture and Fisheries, Forest Service, Auckland Harbour Board and a number of consultants. The study was motivated by the area’s vulnerability to uncoordinated development, and it was hoped that by understanding the natural processes in the environment it would be possible to work out land and water management practices that would be least harmful.

Many guidelines, reviews and specialist technical reports were produced in 1983 to guide the conservation and wise use of land and water resources in the area during its future development, as well as that in other parts of the country where similar environments were threatened. Reviews were prepared on stream and harbour ecology, ecosystem energy patterns, freshwater and land resources, land and water use, stormwater control, harbour sediments, tidal flushing and legal aspects of land and water management. Together, the reviews aimed to inform the development of a land and water plan (LAWMAP).

To help people implement the LAWMAP, eight guidelines were produced on:

- comprehensive catchment planning;
- land use suitability assessment;
- urban stormflow and floodplain management;
- urban stream quality management;
- earthworks erosion management;
- rural catchment management;
- riparian zone management; and
- estuarine resource management.

The comprehensive catchment planning guideline (ARC, 1983b) notes that “the management of water resources cannot be divorced from the management of the land from which they drain and in which they are stored ... catchment management should involve responsibility not only for land and water, but for the long term viability of the ecosystems they support”. It used the term “comprehensive catchment planning” and was aimed at elected and technical members of catchment authorities as well as all those interested in improving the management of land and water resources.

The guideline notes that a LAWMAP has no legal status, but provides a policy framework to inform day-to-day decisions. It referred to the World Conservation Strategy and the approach recommended by the New Zealand Nature Conservation Council (this had been commended by the OECD), the integration of conservation and development and balancing total environmental planning with the freedom of the individual and public rights to information about land and water

management. It also itemised regional needs, including the use of environmental impact reports to assess impacts of developments on land and water resources in order to achieve sustained resource use at minimum cost; sound decision-making in the context of an integrated framework of policies for long term use, including cumulative impacts, with information available to catchment authorities and developers; decision-making within the context of individual catchments subject to detailed comprehensive planning when more intensive development is proposed, and links with controls on land-based activities through regional and district planning schemes.

It proposed principles and objectives, including the need to integrate with the wider management of economic and social factors and the incorporation of land and water policies into regional planning schemes. It set out the following steps in preparation of a LAWMAP:

- plan land and water use together;
- use naturally defined units for planning;
- maintain options for the future;
- maintain or improve water and soil quality;
- match resource use to resource capability;
- minimise impacts and counter them at source;
- involve the public in policy formulation, by producing a draft and giving the public ample opportunity to participate in the formulation of objectives and policies;
- ensure LAWMAP is comprehensible to the general public, informative and easy to read;
- write the LAWMAP with implementation in mind, in a form that can be readily assimilated into regional, district and maritime planning schemes;
- formally adopt the LAWMAP as modified by public submissions;
- vigorously promote the inclusion of LAWMAP policies in the regional planning scheme; and
- use the LAWMAP to guide day-to-day decision-making.

While acknowledging the need for tailoring to the needs of the region or district, it suggested the following content of a LAWMAP:

- a summary by subcatchment of resources and their use;
- a review of land resources;
- a review of freshwater resources;
- a review of harbour resources;
- an appraisal of needs for future research and monitoring;
- a procedure to ensure implementation of the policies, including public awareness and pressure, integration into government department activities, coordinated direction of ARWB activities, planning and administration of regional and local government.

The guideline also stated that cooperation between the catchment authority and the regional planning authority is essential for the public interest to be fully met – this finding remains relevant today even though today the region's planners and catchment managers are housed within the same organisations.

The guideline noted the role of the catchment authority in giving technical advice on natural hazards such as flood-proneness and land slips, with the local authority being responsible for identifying hazardous areas and controlling or prohibiting development, by preparing stormflow and flood management plans. It noted that comprehensive catchment planning is essential to implement the principles of the local government and town planning legislation so that coordinated land and water management can take place within a district and between adjacent territorial local

authorities in the same catchment, with developments planned on a whole catchment rather than a piecemeal basis

A cartoon guide to public participation was also produced (ARA, 1983d), and together with the topics listed above, the extensive research and engagement indicates an advanced stage of genuinely integrated and participatory catchment thinking.

The guideline noted that “catchment authorities have the opportunity to take a much more active role in positively promoting improved natural environmental management in New Zealand than is currently their practice.”

Apparently this opportunity was missed as it has been difficult to find evidence that the ARWB ever produced a LAWMAP; the reason for this should be explored and an appropriate recommendation is made in section 5 for this to be considered further. Part of the reason may be the complexity of the many pieces of legislation and statutory agencies in operation at the time.

However, it seems that the guideline’s final recommendation for comprehensive water rights was adopted; that firstly, a catchment should be the subject of comprehensive land and water use planning, and secondly, the local territorial authority should apply for a comprehensive water right in respect of the catchment to enable it to gain specific control through its powers of planning and subdivision, on the basis of a detailed catchment plan, consistent with the Water Board’s objectives and policies, such as set out in a LAWMAP.

It was hoped that this would ensure that the councils dealt directly with developers and the developers were aware of natural hazards and knew what conditions they had to meet ahead of concept planning, while giving the local authority closer control and the water board assurance that its policies were being met – all contributing to a saving of public time and money and sustainable land management.

Certainly this seems to have triggered the development of catchment plans by the ARWB throughout the 1980s, though they were not as comprehensive as the UWHCS had envisioned, and focused on dealing with the increased quantities of water running off land after development. For example, as well as two flood management studies under way in the Manukau catchment in the late 1980s, there were five comprehensive stormwater rights in the catchment for areas ranging from 5-380 ha (ARA, 1990). While it was known at the time that the quality of this runoff was a cause for concern, the water was treated “as if it were clean” because not enough was known about cost-effective ways of dealing with the problems (Tim Rix-Trott, former ARWB engineer, pers. comm.).

The UWHCS guideline on urban stream quality management (ARA, 1983d) had clearly identified the contaminants of concern and their sources, and the solutions identified (riparian buffers, vegetated strips, natural urban streams, location of urban development and so on) would have required changes in urban design and stream protection that today seem common sense. However, at a time when there were over 30 TAs in the region, it may have been too difficult for the ARWB to fully implement, as it would have had to encourage or require the TAs to include the appropriate land use planning controls in their district schemes.

Stormwater quality was nevertheless the next task for the ARWB to tackle, and the context for this was the Manukau Harbour Action Plan.

5.2.3 The Manukau Harbour Action Plan

The Manukau Harbour Action Plan (MHAP) was to a large degree the result of the Manukau claim to the Waitangi Tribunal by Nganeko Minhinnick and Te Puaha ki Manuka. The Tribunal ruled in its findings in 1985 (section 2.2) that there was a need for co-ordinated research aimed at developing management policy and an “affirmative action plan”.

The ARWB took the finding seriously and by 1987 had obtained funding to start a three year action plan that aimed to “set up a comprehensive water quality management framework for the Manukau Harbour and catchment to ensure the quality of the Harbour and its tributaries are suitable for a wide variety of uses for present and future generations”. Its objectives were to:

- identify and quantify the relationships between all major land uses and the Manukau Harbour environment;
- identify and as far as possible abate and control all significant point pollution sources within the Harbour catchment;
- identify the necessary planning and legal frameworks to ensure the implementation of the Management Plan. Where shortfalls in existing planning/legal provisions are identified, means should be found to remedy these;
- identify and quantify the distribution and extent of the major biological resources of the Harbour;
- identify the various uses of the Harbour;
- identify the aspirations for the Harbour and obtain substantive consensus on the desired Harbour environment;
- characterise the bulk water quality of the Harbour;
- identify areas of the Harbour resource that are of concern from a public health point of view;
- review authorised uses to ensure they comply with Management Plan policies;
- consult with and give due weight to the concerns and objectives of tangata whenua as kaitiaki of the Manukau; and
- review currently used management tools to ensure their appropriateness and where shortfalls are identified develop new tools to achieve the MHAP’s overall objectives.

In addition to the core management staff at the ARWB, a project manager and five staff were appointed for the duration of the three-year project. Four visited all rural and industrial properties in the catchment to record the land use and how any environmentally hazardous material are held on site and assess and advise on environmentally safe options for storage, handling and disposal. A fifth was a soil conservator whose role was to reduce sediment loads from farms and earthworks. All five were also involved in identifying what land use, water quality or other controls needed to be reviewed and what other controls were needed. These inspections accounted for 65% of the total budget, the remainder focusing firstly on reviewing existing information and undertaking research in areas where more information was needed about the Harbour, and secondly on public education for more proactive, cost-effective environmental management.

As well as visiting thousands of sites and ensuring the cleanup many hundreds of pollution sources, the Action Plan team produced the Manukau Harbour Water Quality Management Plan (ARA, 1990), which came up with findings and policies relating to:

- interagency involvement and coordination;

- tangata whenua liaison, perspectives and research;
- pollution abatement and control, including:
 - rural wastes and runoff;
 - urban stormwater runoff quality;
 - industrial pollution abatement;
 - sediment runoff from rural and urban areas;
- long term aquatic resource monitoring (saline, freshwater, groundwater, biological);
- shellfish and finfish resources and their state, and other biological inventories;
- bathing beach surveys;
- harbour sediment accumulation and chemistry;
- public health considerations;
- solid and liquid waste handling, including household hazardous waste and waste minimisation;
- sewage reticulation and treatment, including pump station overflows, other sewage treatment plants and on-site systems (apart from the Manukau Sewage Treatment Plant, which was undergoing a separate review at the time);
- stream channel works for flood mitigation;
- harbour developments and uses;
- public education and aspirations; and
- further work and procedures for ensuring ongoing implementation and review.

Although it was set up as a water quality action plan, it is clear from the above that the MHAP had a wider scope, effectively that of an ICMP. It brought research and management of water quality and ecosystem health in the region up to the standard of the work already done on flooding, rural soil conservation and water resources allocation. It went further again, in terms of public engagement, interagency liaison and tangata whenua involvement.

Of particular interest are the levels of organisation set up to coordinate and guide the Action plan, which proved to be a productive working model, especially given the much greater organisational and legislative complexity of the times:

- the political advisory group (PAG): chaired by the ARWB Chairman, the PAG included political representation from the TAs and ARA electorates adjoining the Harbour, Tangata Whenua and the Auckland Harbour Board. Its purpose was to keep these key agencies up to date with progress, provide a forum for discussion on relevant matters and “facilitate necessary actions that may have been identified at officer level but that were being delayed for one reason or another”;
- the officers liaison group (OLG): membership comprised senior officers of the ARA, TAs, Auckland Harbour Board, Health Department, Department of Conservation, Ministry for the Environment, Ministry of Agriculture and Fisheries, Tangata Whenua, the Manukau Harbour Protection Society and other relevant environmental groups. Like the PAG, the purpose of the OLG was to regularly update senior officers of agencies with responsibilities for the Harbour with progress and provide a forum for discussion on relevant matters;

- a scientific advisory group (SAG): established in 1988, its functions were to provide a peer review of research proposals submitted for funding as part of the Action Plan, identify gaps in the work being undertaken by the Action Plan and seek new proposals to fill these gaps. The seven members of this group were “invited to join the SAG solely on the basis of the expertise and perspective they had to contribute, not as representatives of their particular organisation, the objective being to obtain the best advice available”;
- working groups: working groups were set up as indicated by the results of research and clean up activities to deal with specific issues, with the aim of bringing together the relevant organisations that could coordinate work and make policy decisions. The groups formed and met on an as-required basis, with one group needing only one meeting to resolve the issue of mangroves and pacific oysters; and
- Tangata Whenua liaison and input: Tangata Whenua were contracted to prepare various reports, starting with one on their perspectives on the shellfish resources which became TP75 (ARWB, 1998). Other reports on the conservation and management of the Harbour covered topics including fin fish and plant resources, waters, runoff of sediment and other waste matter, freshwater ecosystems and works, developments and structures in and around the Harbour. This work was presented as Chapter 3 of the 1990 Action Plan.

The programmes set up in 1988 included stormwater quality, rural and industrial pollution abatement, erosion and sediment control and public education. These programmes have remained core components of the environmental management work in the region since then, and have resulted in the setting up of similar programmes throughout the rest of the country. The ability of the ARWB to continue this work was an endorsement of the MHAP’s success, as the Committee was able to be confident enough of the value to be gained that it provided funding to allow the contract staff to be taken onto the permanent staff. These programmes survived the restructuring of the ARWB into the Auckland Regional Council resulting from the local government reforms of 1990 and the passage of the Resource Management Act in 1991. It is likely that the consultative, multi-stakeholder partnership approach was largely the reason for this.

However, when the various MHAP programmes were carried over into ongoing core functions, the overall catchment-based focus needed to co-ordinate these into an integrated catchment-based framework seemed to get lost. Rural, industrial, sediment and stormwater work continued, but as region-wide single issues rather than catchment-specific groups of issues.

This sets the scene for the predominantly stormwater-focused discussion that follows, reflecting the more intensive focus on catchment management of the stormwater team.

5.2.4 TP10 and the network consents

The 1998 ARWB stormwater quality programme carried on during and after the MHAP programme, with key stages involving a literature review and attendance at an international stormwater quality conference and obtaining onsite advice from overseas experts on a recommended strategy for implementing region-wide stormwater controls (1988-90) and detailed evaluation of implications and potential implementation options (1990-1993). This resulted in the production in October 1992 (by the still very new Auckland Regional Council) of the original version of Technical Publication Number 10 (TP10) the Stormwater Treatment Devices Design Guideline Manual. Numerous other publications followed, showing the growing learning and competence being developed, including TPs 51-53, 90 and 92, and TP 108 (Stormwater runoff guidelines for the Auckland region, 1999); TP124 (The Low Impact Design Manual for the Auckland region. April 2000), the Fish Passage Guidelines (TP 131, June 2000) and TP 148, The Riparian Strategy,

guideline and planting guide (June 2001). Other projects also followed, including the long term investigations of the Mahurangi Harbour.

The stormwater quality programme had identified the crucial need for TA involvement, and from 1993-1996 focused on encouraging the use of treatment devices on new development where appropriate, the use by TAs of contributions from developers to allow “comprehensive catchment treatment” of stormwater and the formation of a TA-ARC stormwater liaison group (Firth, 1996).

In 1987, the ARA had initiated the Auckland Area Sewerage Study that paralleled the MHAP, in response to Waitangi Tribunal recommendations and public aspirations for improved harbour water quality. The Wastewater 200 programme was the vehicle for six years of public consultation on the Mangere Sewage Treatment plant that culminated in the plant’s upgrade, the decommissioning of the oxidation ponds and the restoration and rehabilitation of the foreshore (Robinson, 2008). Earlier work done as part of Wastewater 2000 had identified the need to address stormwater contamination on a regional and comprehensive basis, and together with the ARC Stormwater Quality programme, this provided the impetus for the formation of the TA-ARC Stormwater Liaison Group in September 2000 (Firth, 1996). The Group was supported by an independent facilitator and its objective was to develop an agreed strategy to mitigate the adverse effects of stormwater in the region, acknowledging that the ARC’s Stormwater Quality Programme had “evolved to a point where wider involvement and commitment by agencies outside the ARC [was] required, to enable effective management of stormwater to protect the Auckland environment from the adverse effects of stormwater”. The group comprised the Auckland Regional Council, TAs, environmental groups and Ministry for the Environment, and adopted a “comprehensive catchment planning” approach to urban stormwater pollution control and management. It identified the risk to estuarine headwaters of contaminant build-up and aimed to agree on a prioritised list of catchments in which to deal with stormwater-related issues in a more integrated way within each catchment. It endorsed the use of a package of solutions (many being land use and subdivision planning not engineering solutions) to manage flood risk as well as stormwater contamination. It also acknowledged the key role of the TAs and the need to survey catchment land uses, stormwater quality, history of spills and abuse of the stormwater system, availability of undeveloped land and the potential for planning or retrofitting stormwater treatment devices and flood management measures. The importance of community consultation was also identified.

This work was given impetus in October 2001 by the expiry of the existing authorisations provided for by way of the RMA’s transitional provisions for discharges from stormwater and wastewater networks. The Act enabled the authorisation of the ongoing operation of such networks until new consents were issued, provided consent applications had been lodged six months beforehand. The ARC had historically worked in partnership with the region’s TAs and utilities in an effort to manage stormwater problems, and set up the Regional Discharges Project (RDP) to co-ordinate the resource consent process for the region’s stormwater network discharges.

The complexity of the networks and their environmental effects brought together for the first time within a legal context the need for TAs to consider flooding and water quality together.

5.2.5 The three-waters vision of the utilities

The formation, in 1995, of the National Asset Management Steering (NAMS) Group, and the passage of the Local Government Act 2002 which required, among other things, the preparation of asset management plans and the challenges of the network consents, led to an explosive growth of asset management knowledge, tools and capacity in the water sector.

Integration became the name of the game for asset managers, too, with Waitakere City Council adopting a “three waters” approach to managing water supply, wastewater, and stormwater, based on the environment and natural water cycle. The City has set up a green network which, among other things, promotes riparian margins along streams to reconnect the waters of the Waitemata Harbour with their source in the native forest of the Waitakere Ranges.

In 2004 the Auckland utilities and the Auckland Regional Council published “From the sky to the sea”, a new, region-wide approach to managing Auckland’s reticulated water resources. In 2004 and 2008, they produced draft strategic plans (Watercare Services et al, 2004, 2008) aimed at protecting the natural environment from the operation of the three waters networks. The contributing organisations have committed to a shared vision for the future (“a region where water services fully met our needs and expectations and contribute to a safe and healthy environment where people enjoying living, working and playing”) and to working collaboratively with each other. They note that performance targets are likely to be achieved by a combination of measures, including “regional land use policy, including the promotion of sustainable urban design and low impact design methods” (2008).

How far the region’s utilities have come may be shown by the findings of a 1955 Noxious Fumes Inquiry, which identified that pollution of the Manukau and its impacts on the harbour mud flats was the source of “dangerous fumes” in the Mangere Inlet that were severe enough to blacken the paint work of neighbouring houses (Watercare Services, no date), while today the organisation’s website highlights the restoration of 13km of shoreline and the provision of nesting facilities for seabirds following the progressive removal from 2002 of 500 hectares of oxidation ponds that reunited the original foreshore with the sea, together with the construction of a 7km coastal walkway along the Mangere-Ihumatao foreshore.

5.2.6 The Auckland Regional Policy Statement (RPS)

The RPS became operative in 1999, and in section 1.10 (General approach to the management of natural and physical resources), discusses the precautionary approach, catchment management plans, structure plans, surveys and research, modelling, pollution abatement/enforcement, formal submissions (statutory processes), non-statutory submissions, advocacy or education and co-operation. It states that “Catchment management plans are non-statutory plans, which can be prepared for catchments where issues arise which affect the use, development or protection of a range of natural and physical resources. The part they play in resource management processes, and their relationship to strategic planning and structure planning processes, is outlined in Appendix A to the RPS. The provisions of catchment management plans may be given effect through resource consent processes, or their findings may be incorporated in regional, district and/or annual plans.”

Appendix A to the RPS identifies the general scope and outputs of a catchment plan in the following terms:

“Identifies and describes the important characteristics of a catchment in which resource management problems already exist or may occur as a result of expected changes. The expected changes may include urban development or redevelopment, or other major changes in activity patterns.

“Catchment management planning will:

- identify the natural resource values which should be conserved or preserved

- identify actual and potential resource management problems (such as demands for natural water resources which exceed sustainable supply, flooding, land stability, effects of sediment laden stormwater on estuarine areas, or pollution from urban stormwater)
- describe alternative futures (scenarios) and analysis of their consequences
- identify and evaluate the cost/effectiveness of alternative means of avoiding or mitigating adverse effects on the environment, and of protecting and enhancing conservation values and amenity values
- propose preferred means for addressing issues.”

“Catchment planning produces guidelines and programmes to address resource management issues in ways which give effect to the purposes and principles of the RM Act, and are cost-effective. Outputs will normally be non-statutory plans to guide decisions about resource allocation or use. The non-statutory plans may provide:

- the basis for promulgation of regional plans under the RM Act
- guidance for the ARC in exercising consent responsibilities
- recommendations to be effected through district plans
- recommendations to be effected through ARC and TA annual plan.”

This gives a very wide scope for ICMPs – and clearly notes the need to consider effects of land use on saline receiving environments below MHWS.

Proposed Change 6 to the RPS was notified on 31 March 2005 as a requirement of the Local Government (Auckland) Amendment Act 2004. The Act directs all Councils in the Auckland region to integrate their land transport and land use provisions and ensure these are consistent with the Auckland Regional Growth Strategy, give effect to its Growth Concept and contribute to the land transport and land use matters specified in Schedule 5 (s39 & s40 of the Act). The revisions note that “Much of the presently urbanised area requires significant expenditure to upgrade stormwater and wastewater networks to remedy or mitigate adverse environmental effects. The entire catchment issues need to be considered and the most appropriate solutions found to ensure future population growth can be accommodated whilst mitigating ongoing adverse environmental effects. The regions Councils are working together to develop a more co-ordinated and integrated approach to stormwater treatment that considers cumulative effects on a catchment wide basis. A number of future growth areas, particularly rural and coastal settlements, also require significant infrastructure upgrades to meet the growth capacity and to satisfy new environmental standards particularly for discharges.” The adverse effects of transport on water quality are also noted, and together with other matters relating to urban form and regional strategic direction, Proposed Change 6 reinforces the need for ICMPs to integrate the effects of many land use activities and their supporting transport and drainage infrastructure with the needs of the natural environment.

5.2.7 The Boston report and the formation of the SWAT team

A review of stormwater management in the Auckland region commissioned by Infrastructure Auckland found (Boston Consulting Group, 2004) that while good progress had been made, there were a number of shortcomings in the approach to stormwater management, including:

- a regional focus on regulation;
- lack of understanding and buy-in;
- too much variability in the approach to the ICMP process;

- incomplete information;
- focus on a narrow range of solutions;
- fragmented and insufficient educational efforts;
- insufficient organisational capabilities and human resources; and
- insufficient funding.

The report recommended five workstreams based on creating effective and agreed framework, deploying the best available solutions, building public and policy-maker commitment, ensuring capable and sufficiently resourced organisations and securing sufficient funding. By September that year, the ARC had published a Stormwater Action Plan (ARC, 2004) that proposed setting up the Stormwater Action Team (SWAT) with five interrelated workstreams:

- integrated catchment management
- regional solutions (includes source control, best practice techniques and environmental understanding)
- education and communication
- regional capacity building
- alternative funding sources.

In March 2005, the SWAT team produced the ICMP Funding Eligibility Guideline (ARC, 2006) that formally proposed that “integrated” CMPs address aquifers, freshwater and saline receiving environments, contaminants as well as flooding, consultation, institutional capacity and monitoring.

The Team has since focused on commissioning research and providing other support for the TAs to produce plans that will help them gain their network discharge consents and also plan for the management of the effects of growth. As well as locally targeted environmental and technical investigations, including flood and contaminant modelling, of particular relevance to planning for integrated catchment and coastal management are:

- helping adjoining TAs to prepare ICMPs for catchments discharging into shared receiving environments such as the Tamaki Estuary and Papakura Stream;
- development of tools for setting objectives for ICMPs that are SMARTER³ (specific, measurable, affordable, realistic, time-based, endorsed and relevant);
- introduction of multiple bottom lines appropriate to the LGA’s four wellbeings for use in the SMARTER objectives and multi-criteria analysis of ICM methods;
- introduction of the orders of outcomes framework (UNEP/GPA, 2006) for monitoring plan implementation and outcomes, based on work developed specifically for complex coastal ecosystems; and
- adoption of the eight PUCM criteria for a good plan (Ericksen et al, 2003) to promote good internal plan logic that promotes ease of monitoring plan quality, plan implementation and outcomes.

Other research commissioned (e.g. Menzies and Hooper, 2008) has examined the desirability of taking a more widely integrated approach to catchment-based planning and management, for example by enabling the collection or consideration of other related data in ICMPs such as wastewater overflows; stormwater and stream diversions and piping; erosion and sediment

³ The earliest use of the ‘SMART’ acronym for objectives seems to have first been outlined by Peter Ducker in his 1954 book ‘Management by objectives’. The final ‘ER’ were adopted for the purposes of that project, in order to ensure the objectives were within the capacity of the TA to implement and relevant to its legal mandate. The latter is one of the eight criteria for a good plan identified by Ericksen et al (2003).

controls on bulk earthworks, small sites and utilities, terrestrial and aquatic ecosystems (including plant and animal pest management); surface and underground water availability; exposure of archaeological sites during site works or effects on natural heritage; landscape values; hazards such as contaminated soils, land instability or inundation; transport planning.

There has been steady building of working relationships with the region's TAs, and growing awareness of the need to work across the administrative units that are part of any organisation.

One example is the Mahurangi Action Plan (MAP), a five year community project initiated by the ARC and the Rodney District Council and launched in 2004. It was set up in response to long-term environmental monitoring that indicated that the health of Mahurangi Harbour was in decline, largely because of high levels of erosion and sedimentation, adversely affecting the social, economic and environment future of the community. The monitoring found increased sedimentation was smothering marine life and causing a decline in diversity, common shellfish such as cockles were no longer found in some areas and boating had become more difficult because of reduced water depths. The Action Plan aims to halt, slow or reverse the adverse effects of sedimentation on the Mahurangi Harbour by a range of measures, including:

- managing projects in the area, particularly with landowners;
- significant fencing and riparian planting;
- compliance monitoring of earthworks and forestry;
- research and investigation including a sediment source assessment project; and
- extensive environmental education throughout the local community and schools.

Related to this are Rodney District Council's Mahurangi East ICMP and the 2006 Integrated Catchment Management Plan and Network Management Plan to support the application for a comprehensive discharge consent for stormwater from the Mahurangi East Catchment. It contains a set of guidelines for managing stormwater in the Mahurangi East catchment. Although the plan targets areas above MHWS, it aims to protect and enhance the identified sensitive receiving environments and maintain the integrity of the air, land and water to ensure that waterways and coastal receiving environments are free from pollution and contamination – a good example of integration of catchment and coastal planning.

5.2.8 The Proposed Auckland Regional Plan: Air, Land and Water

The Proposed Auckland Regional Plan: Air, Land and Water (PARP:ALW) integrates the various functions of the ARC under the RMA. It seeks integration with the RPC, as the coastal marine area is a receiving environment of the effects of land use activities when discharges of contaminants to land or to freshwater bodies are not adequately managed. The plan notes that liaison between all agencies involved in the management of the region's air, land and freshwater resources are an important component of integrated management. It also notes that the most effective options for improving the performance of stormwater and wastewater systems should be identified on a "whole of catchment" basis or on a "whole of network basis". The key management tools proposed to integrate receiving environment values and the risks of discharges are a requirement for TAs to prepare ICMPs and a requirement for resource consents for:

- discharges and diversions from stormwater and wastewater networks;
- some discharges and diversions from non-networks; and
- discharges of environmentally hazardous substances from industrial or trade activities.

Other tools could include land-use planning controls and education. The plan notes that ICMPs are non-statutory documents that assist TAs in managing catchments to achieve specified outcomes. These outcomes will, in many cases, be determined through statutory processes under the RMA and/or the Local Government Act. ICMPs may also define statutory and non-statutory methods that will be used to contribute to the achievement of the outcomes sought. To that extent, ICMPs provide useful guidance to all parties on the statutory requirements to be met and additional guidance on other methods the TA will use in seeking to achieve the stated outcomes. The methods will consider many management aspects including environmental sensitivity, catchment values, quality and quantity of discharges, affordability and management methods.

ICMPs and applications for network discharge consents may be prepared as combined documents or separate documents as appropriate to the organisational structures of the TA and its stormwater and/or wastewater network utility operators. Schedule 9 sets out contents of an ICMP and differentiates between an ICMP and a network management plan (NMP) required for consent under rules 5.5.10-5.5.13.

Schedule 12 defines an ICMP as “A plan for management of the stormwater and wastewater discharges, diversions and associated activities within the catchment or District which is prepared in accordance with this Plan and identifies:

- i) the stormwater or wastewater issues facing the catchment and the range of effects from those discharges, diversions and associated activities
- ii) strategic objectives for the management of stormwater and wastewater discharges, diversions and associated activities within the catchment or District
- iii) a range of management options and the preferred management approach for avoiding, remedying or mitigating environmental effects and risks
- iv) roles and responsibilities for implementation of the management approach
- v) tools to support implementation of the management approach
- vi) a process for review.

The definition of an ICMP in the PARP:ALW is narrower than the definition of catchment planning in the RPS. This issue is addressed in more detail in section 0, which outlines the current situation with respect to integrating catchment and coastal planning in the region.

5.2.9 The Auckland Sustainability Framework and One Plan

The recognition that the many players, plans and processes in the region must come together to get cost-effective implementation led the Auckland Regional Growth Forum to develop the Auckland Sustainability Framework in 2007. The Framework is built around eight interrelated and long term goals, all of which are relevant to integrated catchment and coastal planning and management:

- 1. A fair and connected society
- 2. Pride in who we are
- 3. A unique and outstanding environment
- 4. Prosperity through innovation
- 5. Te Puawaitanga o Te Tangata: Self-sustaining Māori communities
- 6. A quality, compact urban form
- 7. Resilient infrastructure

8. Effective, collaborative leadership.

Achieving these long term goals will enable Auckland to take a sustainable development approach to responding to the following forces of change: climate change, unsustainable natural resource use, global economic change, population pressures and demographic change and social disadvantage. This does, however, require changing our current ways of doing things. The Framework's contributors have identified the following major 'shifts' that must occur in our social values and expectations, and systems and processes:

- Put people at the centre of thinking and action
- Think in generations, not years
- Value Te Ao Māori
- Activate citizenship
- Create prosperity based on sustainable practices
- Reduce our ecological footprint
- Build a carbon neutral future
- Integrate thinking, planning, investment and action.

The concept of sustainability at the heart of the Framework is expressed through a number of concepts, including Learning from the past and building strong communities and robust ecological systems. Although all goals are relevant to integrated catchment and coastal management, the detail for Goal 3, the most directly relevant, is spelled out in Table 5-1.

Further evidence of the desire for more cost-effective integration is the One Plan, which aims to provide a single, strategic framework and plan of action for the Auckland region (available at <http://www.arc.govt.nz/albany/index.cfm?3F5D31E2-145E-173C-980E-081BFF423631>).

The One Plan emerged from community pressure to turn the region's strategies into action and to bring an improved regional focus to decision-making. It is being developed by the Regional Sustainable Development Forum, which comprises all eight Auckland councils, representatives from the adjoining regional councils (Environment Waikato and Northland Regional Council), the Mana Whenua Forum and the Department of Internal Affairs, Ministry of Economic Development, Ministry of Social Development and Ministry for the Environment. It is intended to pull the policies and action plans of a range of strategies and implementation agencies together to focus on a few regionally important issues. It will provide a detailed infrastructure plan to progress social, economic, environmental and cultural well being, and to strengthen the links between national and regional strategy, planning and action. It aims to set a clear direction for how the region plans to achieve its aspirations for sustainable development in order to better integrate regional planning, investment and action. Although the outcome of the ultimate One Plan will be the integrated long-term sustainable development of Auckland region, the focus of the first One Plan is on implementation and action. Among other things it will produce an action plan to give effect to the vision and strategic direction provided by the Auckland Sustainability Framework.

An approach to coastal and catchment planning that integrates the relevant documents, strategies, people and processes within the ARC and with the TAs, Tangata Whenua and other interested government and non-government agencies would be an ideal candidate for one of the early action plans proposed by the Auckland Sustainability Framework.

Table 5-1: Goal 3 of the Auckland Sustainability Framework

Goal 3 : A unique and outstanding environment Auckland's unique natural heritage and outstanding landscapes create a strong sense of place. Urban and rural communities sit within a mosaic of green spaces and blue waters, enhancing ecological integrity while connecting people to the natural world. Productive soils and land support a thriving rural economy. We have clean air to breathe and our streams, harbours and forests are rich with life and opportunity for enjoyment. Aucklanders live sustainably, protecting the environment and natural resources for generations to come.	
Shift required to meet goal	Indicative strategic responses which will contribute to meeting the goal
Integrate thinking, planning, investment and action	Develop a regional natural network throughout city, neighbourhood and rural areas, providing ecological, recreational and transport benefits Take an integrated, inter-organisational approach to managing Auckland's natural environment Take a catchment management approach to planning
Reduce our ecological footprint	Change production, design and consumption patterns to reduce resource usage and waste Develop compact urban settlement patterns to prevent the loss of natural areas and productive soils Utilise low-impact urban design
Build a carbon neutral future	Undertake reforestation Reduce energy consumption and substitute renewable energy sources for fossil fuels Reduce vehicle and domestic fire emissions to improve air quality
Think in generations, not years	Identify and protect from development areas of cultural and environmental significance Identify key tipping points for ecological systems and their consequences to social and economic wellbeing Take a precautionary approach to decision-making when environmental consequences are uncertain Ensure that product and service pricing reflects the associated social and environmental costs Ensure that investment decisions are driven by both long- and short-term benefits Provide adequate funding for environmental restoration efforts Improve ecosystems through restoration, reforestation and effective pest management
Put people at the centre of thinking and action	Increase resourcing for school-based educational programmes that promote a sense of connection with, and stewardship for, the environment Ensure everyone is aware of the opportunities for, and has easy access to, recreation in the natural environment
Value Te Ao Māori	Care and protect the mauri of water and other natural Taonga Future proof wāhi tapu and whenua from climate change and other adverse effects

5.2.10 Collaborative and community-based initiatives

As noted in section 3.6, a great deal of catchment restoration, education and other work is being done by community interest groups, who also engage with councils and other agencies for better management and protection of streams in urban and rural areas. These groups include local groups such as the Kaipatiki Ecological Restoration Project, Friends of Oakley Creek, St Lukes-Sandringham Environmental Protection Society, Waterview Environmental Society and the Waitakere Ranges Protection Society.

As well as various beach care groups, other region-wide groups include the predominantly school-based Trees for Survival and Waicare Groups, who focus on replanting native vegetation (including along rural streams) and monitoring and managing urban streams. Landcare groups also care for eroding soils and stream banks in rural areas.

WSL also supports Adopt a Stream, a student-centred, science education programme that provides resources for hands-on field study of local waterways and lab analysis work, as well as on the water cycle and the fundamental relationship between water and all living things.

The community-based groups often work hard to ensure councils maintain and enhance urban and rural waterways, while the learning provided for students can show them how water quality and ecology directly affects their lives by getting them involved in learning about their local environment, thus building citizen capacity for the future.

The ICMP Funding Guideline (ARC, 2006) refers to consultation, but it is not always done, though there is evidence of growing community interest in ICMPs and asset management plans in the Auckland region (Kathryn Scott, Landcare Research, pers. comm., 2007).

For example, the Landcare Trust has Ministry for the Environment Sustainable Management funding (http://www.landcare.org.nz/integrated_catchment_management/projects.asp) for a project aimed at sharing community level best practice in Integrated Catchment Management (ICM) nationally. The purpose of the project is to establish a network of Integrated Catchment Management practitioners and participants involved at the community level, and to provide opportunities for these people to share experiences, tools and approaches throughout New Zealand. Five groups have currently been established in Northland, Bay of Plenty, Lower North Island, Upper South Island and the West Coast. The Working Group's role is to:

- bring their ICM expertise and networks to the project
- identify other ICM stakeholders and expertise in their region
- identify pressing regional issues being addressed through ICM
- identify specific ICM projects, tools and approaches
- disseminate ICM information regionally
- provide input into regional and national ICM field days and workshops.

This work has a rural focus, but is equally applicable to ICM in urban or urbanising contexts.

The Kaipatiki Ecological Restoration Project (KERP) is a community-based organisation located in Glenfield, Auckland, which is responsible for restoring the Kaipatiki Stream, forest margins and reserve by ridding it of pests and encouraging natural regeneration (http://www.landcare.org.nz/integrated_catchment_management/nzprojects.asp). The Kaipatiki Stream, like other North Shore streams, is home to endangered native fish, eels and other

freshwater organisms. KERP aims to improve the quality of the aquatic environment through restoration of the Witheford Reserve. The riparian vegetation is primarily quick growing pioneer plants, which provide shade and stability to the stream environment. The bush on the Northwest side of the stream is well established, and is home to many birds, lizards and insects. The stream soon becomes tidal, and the shore habitat is distinctly estuarine, with the reeds, sedges and mangroves providing the habitat for native and introduced birds and aquatic organisms. This urban group was established in November 1997. The project is now well established and offers a broad range of courses and activities for the community and local schools. Volunteers carry out the bulk of the restoration work, which includes the revegetation of a 2.5 kilometre section of stream bank. The members and volunteers come from all over the North Shore. Some volunteers work casually, some regularly, some work in groups and others adopt their own plots to manage independently within the overall plan. Volunteers also take part in water quality monitoring, flora and fauna surveys, plant propagation and planting, and educational activities. KERP receives support from a number of government agencies, companies and private organisations including the North Shore City Council and the Auckland Regional Council. It and similar groups have a key role to play in urban ICM.

Another example of community engagement in ICM in an urban context is Waitakere City's Project Twin Streams (<http://www.waitakere.govt.nz/abtci/ne/twinstreams.asp#whatis>), which aims to restore 56kms of Waitakere stream banks through an integrated community development approach. By engaging local communities and residents via community organisations, the streambanks are weeded, replanted with natives and maintained. The project is designed to work with nature rather than against it, and is about many things: community engagement, stream health, natural environment and the health and recreation of people and their community. It fits in with other stormwater initiatives in Waitakere, including the City's Three-Waters strategy and its ICMPs and network discharge consents. One of the key objectives of Project Twin Streams is to build strong relationships with and within the communities through which the streams run. Local community organisations, including iwi groups, are contracted by the Council to work with residents and groups in their area - they organise community plantings events and work with groups, businesses and schools who adopt specific areas. This means that local organisations with local knowledge are the driving force of the project.

Two reports on partnering and its potential were later prepared (Courtney, 2005; Craig and Courtney, 2004). Craig and Courtney note that partnerships are part of a wider debate about what should be done at what level: a debate about decentralisation and accountability and who should be responsible for what, e.g. should responsibility be at national, regional or local level?

Partnerships therefore need to be seen in the bigger context of:

- Treaty partnerships;
- joining up government and service delivery at regional and local levels;
- joining up accountability, especially shared across government at the local level;
- local government's mandate for promoting wellbeing and community outcomes through their long term planning processes;
- government's relationship with the community and voluntary sector; and
- decentralisation and devolution.

Benefits include:

- multi-sector/agency approaches to complex, interlinked problems facing communities;
- more locally responsive services;
- more long term community buy in and involvement in local social development projects, services and outcomes; and
- greater sharing of resources, both monetary and non-monetary.

Issues include profound fragmentation of service delivery and accountability, raising the real need to find ways to keep local action accountable and coordinated. There is also a risk that unrealistic expectations and unreasonable responsibilities can be heaped (or dumped) into partnerships, along with a lack of support.

Much valuable consideration is given to issues including Māori perspectives, mandates and representation, the need for strategic brokers (people that glue others together), getting from contracts to 'relationship agreements', understanding the dynamics and tactics of joining up and partnership, potential gains and risks from decentralisation, and the resources and other support that need to be in place. Conflict resolution and mutual capacity-building are also identified as key needs for all parties, and this echoes the findings of Brown (2004, 2005) that councils need to build electoral and staff capacity for meaningful engagement in order to achieve more sustainable urban water management.

5.2.11 Iwi engagement: an overview

The involvement of iwi in resource management was envisioned as long ago as 1974. They played a major role in the Manukau Harbour Action Plan (see 3 above) and Nganeko Minhinnick was elected to the ARWB in the early 1980s to progress her iwi's vision for the Harbour. Investment is also made to ensure iwi engagement in key initiatives such as the preparation of the PARP:ALW and review of the RPS, and the ARC has set up an iwi liaison team.

Individual councils in the region also work closely with iwi, for example Auckland City and Metrowater asked Ngati Whatua to prepare a report on the cultural values of streams on the Auckland isthmus as part of preparing their network management plan, and other councils have sought similar input.

As with all sectors, however, it is likely that opportunity exists for further and more active engagement with tangata whenua in both rural and urban ICM as a specific activity given the observations of Matunga (2000) that: "ecological restoration in the city should not be separated from the social and cultural restoration of the human communities that inhabit the city", and that the possibilities for reinclusion of tangata whenua in urban biodiversity and ecology "are endless".

Harmsworth (2001) has also developed a collaborative research model for working with iwi based on a case study on Māori community goals for enhancing ecosystem health. A key strand of the work focuses on determining the best mix of communication strategies to facilitate dialogue and participation with the Waipua community, and between the community and those stakeholders with an interest in sustainable catchment management.

An iwi-led example of ICCM for the Kaipara is outlined in section 5.7.4 of this report.

5.3 Integrating catchment and coastal management in the Auckland region: the current situation

This section reviews Auckland practice in light of New Zealand's catchment and coastal management history under the following headings:

- planning: the enabling or requiring framework provided by national and regional instruments;
- players: the agencies, groups and people involved;
- integration – integrating what?; and
- implementation: what is currently being done by the ARC, the TAs and other parties.

5.3.1 The planning framework

5.3.1.1 The national legislative framework

The RMA is focused on sustainable management and the assessment of effects of proposed human activity on natural resources and processes and on other activities. There is in the RMA a legislative split between the coastal marine area and the land components (above and below sea level). This is in effect a split between a public resource (the coastal marine area, or CMA) and a largely private resource (land).

As well as being a resource managed in its own right, the CMA is the receiving environment for the effects of land use activities that are controlled through other mechanisms. This is recognised through the control of contaminant discharges into the CMA being controlled by a Coastal Plan, rather than by an Air, Land and Water Plan. This jurisdictional split leads to tensions in planning for and managing activities in these areas.

Integrated management should ensure that the line of MHWS is of little or no consequence in decision-making (Brookes, no date). For coastal planning and coastal management to be truly integrated, integration needs to occur at a number of levels and in a number of ways:

- across the land-sea interface by regional and district councils through the New Zealand Coastal Policy Statement (NZCPS) and the Auckland Regional Policy Statement, Regional Plan: Coastal;
- across TA boundaries where a catchment area lies in more than one district, through the provision of the Air Land and Water Plan and the district plans; and
- across regional council boundaries (across coastal receiving water boundaries) RPSs, RPCs, RPs

Policy 6 of the Proposed New Zealand Coastal Policy Statement (DoC, 2008), Integration, states that "Policy statements and plans shall provide for the integrated management of natural and physical resources in the coastal environment, and activities that affect the coastal environment. This includes coordinated management or control of activities within the coastal environment, and which could cross administrative boundaries, particularly:"

- (a) where use or development in the coastal marine area will require, or is likely to result in, associated use or development above mean high water springs
- (b) where use or development above mean high water springs will require, or is likely to result in, associated use or development in the coastal marine area;
- (c) where public use and enjoyment of public space is affected, or is likely to be affected;

- (d) where land management practices affect, or are likely to affect water quality in the coastal environment; and
- (e) where significant adverse cumulative effects are occurring, or can be anticipated.”

Thus, it is clear that at a national legislative level (in the proposed New Zealand Coastal Policy Statement and in the RMA) and the Auckland Regional policy level, the concept of integrated and sustainable coastal management is already built in. Such concepts have already been incorporated into the RPS, which is the overarching regional policy document.

There are some unresolved tensions between the RMA and LGA; both Acts promote the social, economic, environmental, and cultural well-being of communities, the former taking a sustainable management approach which is generally interpreted as being narrower than the sustainable development approach under the latter (Taylor and Yates, 2006). While the two Acts use the same words to define the four areas of wellbeing, they do not necessarily have the same/similar purpose or attempt to achieve similar outcomes. Neither are their outcomes ‘required’: both refer to ‘promotion’ of outcomes – a more process-oriented focus. These subtleties lead to misunderstanding and frustration by the public and councils, making it more complex and difficult to achieve sustainability.

Key points noted by Taylor and Yates (2006) are:

- the LGA creates many opportunities for public participation in discussions about sustainable development, without defining how weak or strong the level of sustainability should be, thereby leaving potential for communities to move towards stronger sustainability than noted by the RMA;
- education and knowledge of local communities and players is essential to bring environmental sustainability more directly into LGA processes;
- having stronger sustainability outcomes in for example an LTCCP or stormwater asset management plan does not directly influence RMA processes such as regional or district plans or resource consents. Councils and communities must therefore repeat the process of interpreting and giving effect to their sustainability outcomes under RMA tools – this despite some opinions that the broader concept of sustainable development could lend RMA plans much-needed strategic direction;
- community outcomes and reporting on progress towards them are not mandatory under LGA;
- legal changes needed to move from environmental and conservation law to sustainable development law include changes to existing laws, transformation of non-environmental areas of law to reflect all four wellbeings; amendment of laws that encourage unsustainable development; legislation for the attainment of positive objectives; and convergence of domestic and international law.

The most directly ICM-related provisions of the LGA take effect at the TA level, and are discussed further below.

5.3.1.2 The Auckland Region’s statutory instruments

The RPS, RPC, PARP:ALW and Regional Plan: Sediment Control recognise that the coastal marine area is an important receiving environment and emphasise the need for integrated management. These documents are analysed in Appendix B, which draws out those sections relevant to catchment and coastal planning and their integration.

The RPS Strategic Direction (Ch 2) requires that:

“The use, development and protection of the region’s natural and physical resources are to be managed in an integrated manner, so that adverse effects, including significant cumulative adverse effects that range across resources or cross jurisdictional boundaries are avoided, remedied or mitigated.”

All of the region’s statutory documents include provision for a number of largely non-statutory processes and documents which aim to achieve integrated coastal and catchment management. These are summarised in Table 5-2 and include ICMPs and structure plans. However, it can be seen that while all these documents address integrated catchment and coastal planning, they do not do so in a consistent way.

The definition of catchment management planning in the RPS is broader than the definition of integrated catchment management plans in the PARP:ALW, which states that an ICMP is done in order to identify the BPO for discharges from wastewater and stormwater networks. However, given that these documents and processes form a hierarchy, there would be nothing to prevent a TA preparing an ICMP that was as broad as the provisions of the RPS – or, indeed broader, if it so wished.

Nevertheless (apart from structure plans, which should ideally be developed alongside ICMPs), all the documents are framed around the coastal marine area being the ultimate receiving environment.

The conclusion is thus that all the statutory regional documents provide for, and in fact require, integrated coastal and catchment management if their objectives are to be achieved.

Their weakness is that, as shown in Table 5-2, the higher order document that covers both coast and catchments – the Regional Policy Statement – comprises objectives, policies and methods which can only be implemented through the rules of the lower order regional and district plans, because it cannot make any rules of its own. Therefore if those plans do not include appropriate provisions, the opportunity for integration is jeopardised and can be challenged in informal and formal forums, up to and beyond the Environment Court.

Table 5-2: Statutory provisions for integrating coastal and catchment management

Auckland Regional Policy Statement	
<p>Catchment management planning will:</p> <ul style="list-style-type: none"> ▪ identify the natural resource values which should be conserved or preserved; ▪ identify actual and potential resource management problems (such as demands for natural water resources which exceed sustainable supply, flooding, land stability, effects of sediment laden stormwater on estuarine areas, or pollution from urban stormwater); ▪ describe alternative futures (scenarios) and analysis of their consequences; ▪ identify and evaluate the cost/effectiveness of alternative means of avoiding or mitigating adverse effects on the environment, and of protecting and enhancing conservation values and amenity values; ▪ proposed preferred means for addressing issues. ▪ Catchment planning produces guidelines and programmes to address resource management issues in ways which give effect to the purposes 	<p>This is a process to inform other statutory and non-statutory documents (but not RPS).</p>

<p>and principles of the RM Act, and are cost-effective. Outputs will normally be non-statutory plans to guide decisions about resource allocation or use. The non-statutory plans may provide:</p> <ul style="list-style-type: none"> ▪ the basis for promulgation of regional plans under the RM Act; ▪ guidance for the ARC in exercising consent responsibilities; ▪ recommendations to be effected through district plans; and ▪ recommendations to be effected through ARC and TA annual plans. 	
<p>Structure planning will consider:</p> <ul style="list-style-type: none"> ▪ the natural character of the land (steepness, flood proneness, propensity to erosion, vulnerability of ecosystems, and existing vegetation patterns); ▪ the existence of features or values which warrant protection or preservation (such as sites of significance to Māori, indigenous vegetation, sensitive areas such as stream valleys and estuaries); ▪ the location and scale of infrastructure, such as water and sewerage systems, and the adequate treatment of stormwater. ▪ The process will produce a plan which guides development so that the form and intensity of development is appropriate to the character of the land. The Structure Plan will identify the future pattern of significant land uses, including: <ul style="list-style-type: none"> ▪ arterial roads ▪ commercial centres ▪ schools, parks ▪ land required for active or passive recreation ▪ land to be reserved for environmental protection purposes <p>Structure planning should be undertaken within the frame of regional strategic policy as provided by the RPS, any relevant regional plans and management plans, and strategic policy for the district.</p>	<p>This is a process to inform district planning strategies for future land use change – principally urban development.</p>
<p>Auckland Regional Plan: Coastal</p>	
<p>A Comprehensive Coastal Management Plan is a plan prepared for one or more adjacent coastal compartments which:</p> <p>(a) characterises the predominant natural coastal processes operating within the compartment(s); and</p> <p>(b) identifies the potential natural coastal hazards in the compartment(s); and</p> <p>(c) details the proposed management plan for that area; and</p> <p>(d) may include guidelines on how use and development should avoid, remedy or mitigate the identified natural coastal hazards, taking into account the need to consider processes operating across the land - sea interface, as well as within the entire coastal compartment(s). A Comprehensive Coastal Management Plan should be developed in consultation with the affected community.</p>	<p>This is a process to enable ARC and TAs to work together with local communities to develop guidelines on issues across the line of MHWS.</p>
<p>Integrated Management means management of natural and physical resources:</p> <p>(a) where decision-making about the use, development or protection of natural and physical resources occurs in a holistic way;</p> <p>(b) which takes into account the full range of effects which may stem from any such decision over the short- and long-term; and</p> <p>(c) which considers effects by referring to section 3 of the RM Act, and may include effects on natural and physical resources and effects on the environment.</p>	<p>This is a process to achieve integrated management.</p>
<p>Proposed Auckland Regional Plan: Air, Land and Water</p>	

<p>An Integrated Catchment Management Plan (ICMP) is a plan for management of the stormwater and wastewater discharges, diversions and associated activities within the catchment or District which is prepared in accordance with this Plan and identifies :</p> <ul style="list-style-type: none"> (i) the stormwater or wastewater issues facing the catchment and the range of effects from those discharges, diversions and associated activities; (ii) strategic objectives for the management of stormwater and wastewater discharges, diversions and associated activities within the catchment or District; (iii) a range of management options and the preferred management approach for avoiding, remedying or mitigating environmental effects and risks; (iv) roles and responsibilities for implementation of the management approach; (v) tools to support implementation of the management approach; and (vi) a process for review. <p>Schedule 9 sets out minimum information requirements for an ICMP.</p>	<p>This is a process to inform a development proposal and identify the Best Practicable Option in respect of TA network planning.</p>
<p>Auckland Regional Plan: Sediment Control</p>	
<p>A Sediment Control Management Plan must clearly show the control measures intended to prevent erosion and the movement of sediment off sites. The level of design should be appropriate to the scale and potential impact of the proposed activity.</p>	<p>This is a process to inform a resource consent.</p>

Table 5-3: The powers of RMA instruments above and below MHWS

Resource Management Act (RMA) instruments										
Above Mean High Water Springs (MHWS)						Below Mean High Water Springs (MHWS)				
Auckland Regional Council jurisdiction										
RMA instrument	Principles	Objectives	Policies	Rules	Other methods	Principles	Objectives	Policies	Rules	Other methods
NZCPS Operative 1994	✓		✓			✓		✓		
NZCPS Proposed 2007		✓	✓				✓	✓		
Relates to coastal environment										
RPS Operative 1999 *		✓	✓		✓		✓	✓		✓
RPC Operative 2004		✓	✓		✓		✓	✓	✓	✓
Relates to coastal environment										
Other regional plans **		✓	✓	✓	✓					
Territorial local authority jurisdiction										
District plans (7 in the Region)		✓	✓	✓	✓					

Notes:

* Includes proposed changes

** Other current Regional Plans are the Proposed Regional Plan - Air, Land and Water, the Regional Plan - Sediment Control 2001 and the Regional Plan - Farm Dairy Discharges 1999

NZCPS = New Zealand Coastal Policy Statement (compulsory for e central government to prepare)

RPS = regional policy statement (compulsory for each regional council to prepare)

RPC = regional coastal plan (compulsory for each regional council to prepare)

5.3.2 Plans and players

5.3.2.1 Planning as a political activity

Planning is therefore in effect a political activity in which integration of statutory and non-statutory plans and processes means:

- vertical integration of statutory documents (from the NZCPS through the RPS and regional plans to the district plan), which then achieves –
- horizontal integration of controls above and below MHWS, both of which need –
- vertical and horizontal political integration, to get a holistic approach to the issues.

The primary vehicle for achieving the difficult task of this integration is the regional policy statement.

District councils also have the difficult task of translating the required outcomes into methods that can be achieved by way of the relevant district plan provisions, and the associated changes to related instruments such as asset management and other plans in their district. Much of the historical tension between territorial and regional agencies has probably arisen from the difficulty of this task. The Auckland Regional Growth Forum (see above) was a process set up to achieve vertical and horizontal integration between the ARC and the TAs and among the TAs on the issue of regional growth. The Auckland Sustainability Framework (ASF) is a similar process but with a wider mandate – to develop the "political" integration that is necessary to achieve sustainable development (although they are interrelated). The Framework website states that it is "a collaborative effort led by all of the region's councils working with central government, Mana Whenua and the academic, business and community sectors".

Given that the ASF is seeking a catchment approach to planning, it would seem that there is a region-wide consensus on the need for integration in all forms.

It is significant in another way that the Framework has taken a 100-year planning horizon: this opens up opportunities for linking ICMPs and urban intensification on brownfield sites with LGA asset management plans. While electoral and funding cycles are much shorter, 100 years roughly aligns with the working life of built water management assets, so planning the long term replacement of assets on a regional basis could align with visions and opportunities to increase built asset capacity or, where desirable, progressively supplement and replace it with decentralised built and natural services to reintegrate water and plants into the urban water management system. Such visions and opportunities would need to be constantly put before the community at the appropriate times during the shorter funding and electoral cycles to ensure that sustainability – which also operates on ecological cycles – remained a commitment by both the community and its public servants.

A key finding of three case studies investigating different dimensions of the water cycle in Australia and the UK (Brown, 2005) revealed significant and common socio-political impediments to improved practice where a "technocratic culture is inadvertently underpinned by the need to demonstrate implementation success within short-term political cycles that conflict with both urban renewal and ecological cycles". A 100-year vision could help overcome this impediment.

A robust regional and community-endorsed consensus within the context of a 100-year vision is thus an indispensable tool for working to achieve outcomes with timeframes in ecological cycles rather than the cycles of electoral change and legislative and institutional reform.

5.3.2.2 Players

The analyses in preceding sections and the experience of the UWHCS, MHAP, MAP and Hauraki Gulf Forum reveal a multitude of statutory and non-statutory agencies with a role or interest in or influence on land use and its effects on fresh and saline waters. They include central government Ministries and Departments and state-owned organisations such as Transit; adjoining regional councils, iwi, national and regional stakeholder groups including rural, urban and marine land and water users and environmental groups, as well as territorial local authorities and the many local community groups and individual people with an interest in their local environment.

Accommodating the many and sometimes competing or conflicting desires of so many players is a complex affair, and it is perhaps surprising that so much has been achieved. Bringing them together requires integration of many different factors.

5.3.3 The existing planning framework and its implementation

It is clear that the current suite of relevant national and regional planning instruments in the Auckland Region in different ways unequivocally promote, enable and require integration of catchment and coastal planning.

This subsection examines what is currently being done by the ARC, the TAs and other parties with respect to catchment management to protect the coastal receiving environment. Chapter 5 examines whether ICM is being used and interpreted in the most effective way and where ICMPs should really sit in the hierarchy of available planning instruments.

The production of the current generation of ICMPs and NMPs shows that the planning instruments are indeed working to some extent, although the requirement to obtain network discharge consents has inevitably been the main focus for some.

This means that fewer ICMPs encompass the wider scope envisaged in the RPS, focused as they are on meeting the consent-related requirements of the PARP:ALW. However, given the focus of these plans on the ultimate saline receiving environments, it may be said that the objectives and policies in the RPC relating to activities above MHWS are also being observed – in practice if not by explicit intent. There is therefore an integration of planning across MHWS by each TA within its own district – as is appropriate given the extent of their jurisdictional mandate.

In terms of the land component of the coastal environment, the RPC also provides guidance and encouragement for TAs in developing their district plans. It states that in recognition of the dynamic nature of the coastal environment, which contains physical and biological processes and values that cross the coastal marine area boundary of Mean High Water Springs, district plans should contain appropriate provisions to ensure the adverse effects on the coastal marine area of any activity undertaken on land are avoided, remedied, or mitigated.

However, the current territorial boundaries mean that the effects of land uses in many TAs are merged in common receiving environments, so that the possibly very different land use influences on water quality and quantity and associated terrestrial and aquatic values need to be considered at a higher level. To date this has been addressed by describing areas such as the Papakura Stream (bordered by the Papakura District and Manukau City Councils) and the Tamaki Estuary (Manukau and Auckland City Councils) as “supercatchments”. Although the term is used for joint project planning, rather than reflecting any regulatory provisions, it does encourage councils to make a strategic assessment of shared receiving environments, and this informs the separate

land-based catchment planning of the respective organisations with respect to receiving environment issues and outcomes.

However, agricultural run-off (mainly sediment, fertilisers and nutrients) is a major pollutant of some rivers, and to a lesser extent of estuaries and coastal waters (Hutchings and Walrond, no date). The Ministry for the Environment's 1997 State of the Environment report identified pollution from point sources such as factory and sewage treatment plants as the key pressure on water quality. The 2007 report (Ministry for the Environment, 2007) observed that while these remained an issue in some areas, including the Auckland region, this source of pollution has been largely addressed by better management of sewage, meatworks and farm effluents. Today, the "main pressure on the quality of our freshwater is intensive agricultural and urban land use. Increasing pollution from paved surfaces in urban areas, such as diffuse run-off from pasture and from paved surfaces in urban areas, poses the greatest challenge for water management in New Zealand".

A truly integrated ICMP would address both rural and urban land uses. The reason for TAs lack of focus so far on integrated catchment planning for rural areas could be the respective powers of TAs and regional councils in that farm discharges, whether point or non-point source, have traditionally been a regional responsibility. Improved treatment of point source discharges shows the effectiveness of the consent, compliance and enforcement processes in place across many regions around the country. However, land use management matters such as soil erosion from pasture (sediment runoff from farm tracks and races has been largely put aside) and nutrient budgeting have also been a regional responsibility since the 1941 Act, although many district schemes protect promote riparian areas (for example policies 12.4.7 and 8 of the Manukau City District Plan) and promote riparian planting (e.g. policies 7.8.2.2.5 and 10 of the Proposed Rodney District Plan).

Auckland's ICMPs do assess runoff volumes from rural catchments where downstream flooding is an issue, but their focus has been on urban issues. Given the impact of rural land uses on water quality, which in Auckland are mostly expressed in estuaries, the inclusion of rural areas in ICMPs would seem desirable. Also given the respective and complementary roles of the ARC and the TAs in rural land areas, a partnership model would seem beneficial should the ICMP process be extended in Auckland to include rural areas.

This is envisaged in Ch 12 (Soil conservation) of the RPS, including 12.4.4, which promotes integration of soil conservation with other resource management issues in the region.

Table 5-4 summarises the provisions of some recent coastal and catchment planning documents. It shows that the jurisdiction of the non-statutory coastal compartment management plans (Table 5-4) is restricted to the coastal fringe immediately above and below MHWS, and are not aimed at a long term catchment management to improve land use issues that are expressed at the coast, such as water quality or sedimentation.

The Mahurangi East ICMP and NMP, while not covering the entire Harbour catchment, are able to take a whole of catchment approach to land use management for the purposes of managing outcomes in coastal waters, because the whole Mahurangi Harbour falls within Rodney District. However, integration would also be needed with the Mahurangi Action Plan being promulgated by the ARC in partnership with Rodney and other players.

The Stanmore Bay ICMP and NMP take a similar approach to one part of a larger catchment.

However, a wider issue remains, which is the question of describing "management areas defined on the basis of holistic and meaningful geographic and ecosystem boundaries", as outlined in the previous subsection. On this basis, the effects of land uses in the Northland and Auckland regions

and their constituent TAs on the Kaipara Harbour should be jointly managed. Auckland Regional Council may consider how the North Shore City, Rodney District, Waitakere City and Auckland City Councils can collectively manage their land uses to achieve desired outcomes in the Waitemata Harbour, and how the Waitakere, Auckland and Manukau City Councils together with the Papakura and Franklin District Councils can do the same for the Manukau.

A potential model for this is discussed in Chapter 6.

Table 5-4: Selected examples of coastal and catchment planning provisions of non-statutory documents for the Auckland region in 2008

Coastal Compartment Management Plans	
Awhitu, Pahurehure, Algies Bay	
Purpose	To obtain better information about coastal management problems to inform coastal planning To achieve better integration and less conflict with TAs over coastal protection works/structures etc.
Scope	Primarily restricted to the coastal fringe (the area of concern for TAs, the coastal edge and public land behind it). Water quality and sedimentation highlighted as being dealt with through other ARC processes. Prepared by ARC/TAs in consultation with local communities.
Issues	Lack of information and resources Getting buy-in from TAs Raised community expectations Non-statutory plans do not necessarily influence resource consent decisions or LTCCP).
Summary	Promotes integration between regional and districts to solve immediate land-sea interface problems. Reliant on other process to achieve coastal/catchment integration. Short term solutions to help local communities (not aimed at long term catchment improvement).
Integrated catchment management plans (ICMPs)	
Mahurangi East ICMP and NMP	
Purpose	To develop a set of guidelines with respect to management of stormwater in the Mahurangi East Catchment. To bring together earlier work on discrete sections of the catchment under a common management perspective.
Scope	Issues identified and objectives developed for whole catchment (including objectives on marine environment protection), each sub catchment studied and highly sensitive parts of the marine receiving environment identified, future land use options identified and assessed (currently zoned for some urban and some lifestyle development), stormwater management options assessed, QBL assessment undertaken. Development controls identified as particularly important in minimising effects of land use change on the receiving environment Prepared by RDC in consultation with ARC, Iwi and the community
Issues	Focus is on stormwater management but looks at a range of issues to assess the effects of this.
Summary	Whole of catchment approach to land use management. Whole catchment under one TA. TA can implement through its statutory and non-statutory processes.
Stanmore Bay ICMP and NMP	
	Same approach as above but relates to one part of a larger catchment.

6 Towards integrated catchment and coastal planning: learnings and applications

Kia urupu tatou: kaula e taukumekume

Let us be united, not pulling one against another.

The key learning from this section is perhaps that, like other parts of the world trying to define and apply sustainability principles to complex real world management issues, the Auckland region has made a significant investment in catchment and coastal planning, while outcomes are as yet elusive. The vision has been defined in terms of outcomes across all four wellbeings and it is no small matter to implement plans that are able to bring them into effect.

It is timely indeed that learnings from local and international experience are brought to bear upon catchment and coastal planning as players in the region now work together on plan implementation. This section summarises how these learnings can be considered for application in Auckland.

While ICM concepts have been used internationally for over a hundred years, examples of successful long term ICM programmes remain infrequent. This is an intriguing finding, because ICM is widely supported as the ‘best practice’ approach to achieving holistic natural resource management that is sympathetic to socio-economic considerations. The international literature review reveals a remarkable parity of experience between jurisdictions in terms of successes and shortcomings in the development and implementation of ICMs. A number of key themes emerge as over-arching themes to be considered in developing a successful “best practice” ICM process, including:

- political leadership;
- collaboration between and within the public and private sectors;
- genuine community participation through bottom-up collaboration;
- local ICM champions, together with good resourcing and succession planning;
- capacity building;
- adequate resourcing and investment over the long term;
- strong governance and clear institutional roles and responsibilities;
- specific, measurable and time bound targets to focus ICM programmes; and
- adaptive management that is driven by monitoring and evaluation outcomes.

The discussion below enlarges on these matters under the relevant headings.

Table 6-1 is a summary comparison and evaluation of Auckland and international best practice for integrated catchment and coastal management. It is based on the main headings of the assessment criteria outlined in the international literature review in section 3.

The discussion summarises the international best practice and the New Zealand/Auckland practice with respect to integrating catchment with coastal planning and management and compares them with each other with a view to identifying potential gaps where the Auckland region can learn from overseas practice under the following headings drawn from Table 6-1:

- scale;
- legislative and organisational frameworks and the incorporation of regional planning issues into catchment planning;
- financial structures and resourcing;
- integration of biophysical, economic, social and cultural issues;
- planning and implementation;
- monitoring, evaluation and adaptive management;
- collaborative models;
- capacity building; and
- learning and review.

The project brief also referred to the following specific matters:

- incorporation of regional planning issues into catchment planning (see section 6.2.);
- applicability to both rural and urban land uses (see section 6.4.1);
- applicability to both greenfield and brownfield developments (see section 6.4.2);
- progressive phasing in of related issues (see section 6.4.3);
- issues that may require different scale (see section 6.1); and
- issues that may require different institutional/collaborative models (see section 6.7).

Findings under these headings are also summarised under the relevant headings below.

6.1 Scale

Section 5.3 examined whether integrated catchment and coastal management (ICCM) is being used and interpreted in the most effective way in principle. This section applies the principle to Auckland's local geography.

While the landward component of genuinely integrated catchment plans will integrate many multiple bottom line considerations (e.g. transport, biodiversity and more), the discussion below focuses on water-related aspects, because for the purposes of this report they are the most dominant considerations for integrating catchment with coastal management.

TAs' ICMPs and structure plans inform the district plans that control land use. However, TAs can only plan land uses in their own districts, but the effects of those land uses are expressed in shared freshwater and saline receiving environments to which many TAs drain.

Figure 6–1 shows that the region's main receiving environments are its estuaries – and there are four TAs round the Waitemata and five round the Manukau, with two around the Tamaki. Therefore it may be beneficial for the ARC to take a leadership role in providing guidance at the holistic scale, doing the catchment planning envisaged in the RPS at the harbour catchment scale, within which the TAs prepare ICMPs for the series of catchments which drain into them. This may then provide the vertical and horizontal integration that is needed for co-ordination between the ARC and TAs and amongst the TAs. This does not mean making ICMPs into bigger statutory instruments, but taking a strategic ecosystem approach to common receiving environments. This

then provides a context within which the relevant statutory documents give effect to desired outcomes.

It also helps set out actions for the ARC and the TAs to give effect to Goal 3 of the ASF – taking an integrated, inter-organisational approach to managing Auckland’s natural environment and a catchment management approach to planning.

The practical implications of this for integrating coastal and catchment management are set out next, under “A spatial framework within which to apply existing planning instruments”.

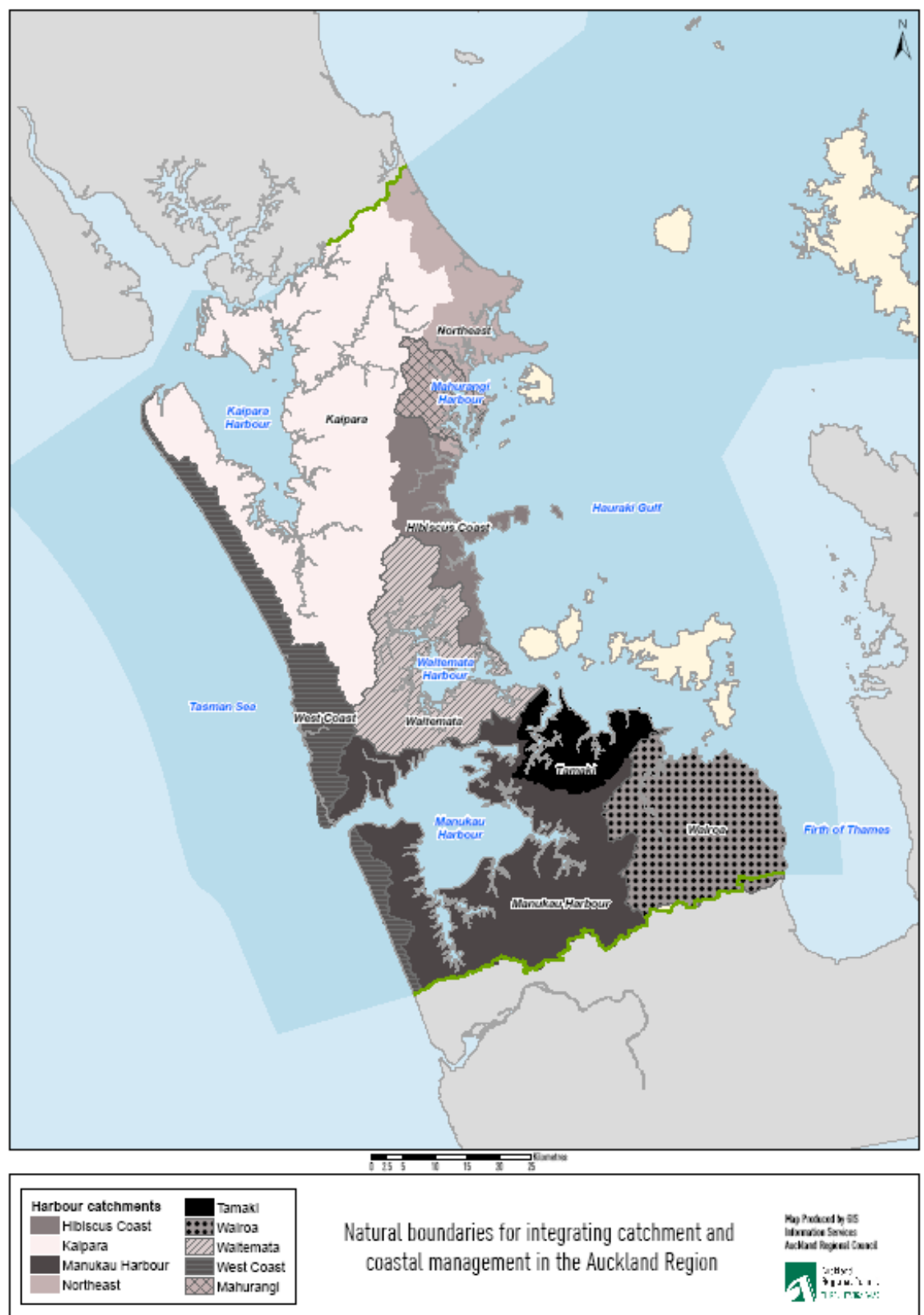
Scale is a major consideration for environmental data collection, management and monitoring, especially for integrating catchment with coastal management. In particular, the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based activities, co-ordinated by UNEP (UNEP/GPA, 2006), recognises changes in ecosystems that have transboundary consequences and need management programmes that address the complex linkages between marine systems, coastal regions and river basins, especially estuaries.

Estuaries are the defining feature of the Auckland region. Figure 6–1 shows that from an ecosystem point of view, they are the natural management unit for integrating the management of catchments with that of their ultimate coastal receiving environments. The scales listed below, together with some example rationales for them, are recommended for use during the ICM process. It is important to note that the words catchment, sub catchment and the like are currently used in different ways in the region, with the term “super-catchment” already in use in connection with estuaries adjoined by two districts, including the Whau and Tamaki Rivers. Further, while these spatial scales are often used internationally (refer to section 3.3.1), it is noted that additional analysis is required to ascertain the most appropriate scale for each ICM process within the Auckland region.

Objectives and priorities would then be set at a range of appropriate scales.

It is suggested that a macro-style approach to ICM may be considered for the Auckland region, due to the presence of a comparatively small number of large estuarine receiving environments surrounded by many (mostly small) river catchments and aquifers with varied land uses and dependent environmental, social and economic variables, all needing integrated management and planning. As a result of the large number of public and private sector stakeholders in the Auckland region, macro scale catchment-based approaches also align strongly with existing management and collaborative approaches such as the Auckland Sustainability Framework (ASF). Moreover a macro approach is inclusive of meso- and micro- scale planning and implementation, thereby best incorporating the principle of vertical integration into the catchment and coastal planning frameworks.

Figure 6-1 Natural boundaries for integrating catchment and coastal management in the Auckland region



However, within a truly integrated policy, planning, regulatory and community-supported framework, nested levels of effort will emerge, so that effective action can be taken at all scales.

Despite this need to further consider the most appropriate spatial scale for different aspects of ICM planning and implementation, it is suggested the nested terminology below can be used as a basis for further discussion on terminology:

1. **Macro catchment (e.g. harbour):** defined on the basis of shared saline receiving environments, the main harbour catchments would comprise the Mahurangi, Kaipara, Manukau, Tamaki and Waitemata Harbours, the combined Wairoa/ Mangemangeroa/ Turanga/ Waikopua coastal area, as well as the residual areas of the West Coast and the East Coast Bays with similar biophysical and human settlement characteristics. Into these, many river basins discharge contaminants of concerns including microbes, endocrine disruptors, sediment, hydrocarbons and metals. A key driver for this definition would be ecosystem health in the saline receiving environments. There may not necessarily need to be a detailed ICMP for the catchment as a whole, though enough detail would be needed to prioritise the issues affecting lands, freshwater and the saline receiving environment. These priorities would then guide the TAs in setting research and management priorities in their catchment plans. A harbour catchment management plan could also set out processes for joint management of catchments with waterways shared between TAs, such as the Whau or Tamaki Creeks or the Papakura Stream. Such an approach is in keeping with the definition of catchment planning in the RPS. An iwi-led initiative aims to integrate the management of the Kaipara Harbour with that of its catchment across the boundaries of the Northland and Auckland Regional Councils (see section 6.7.4).
2. **Meso catchment:** defined on the basis of watersheds within the harbour catchments and the “other” residual areas draining to various parts of the East and West coasts, these would form the basis of, for example, flood management and water allocation planning, as well as the ecological health (instream and riparian) of the streams entering the harbour catchment receiving environments. This is in keeping with the definition of integrated catchment planning in the PARP:ALW.
3. **Micro catchment:** within each catchment it may from time to time be desirable to focus on certain sub-catchments for particular management reasons such as land use intensification or control of non-point sources such as zinc from industrial roofing or illegal discharges into stormwater systems, in order to protect freshwater and marine receiving environments, as well as to address other issues such as local flooding. This level of catchment planning would accompany the detailed structure planning process.
4. **Site:** some areas in one or more sub-catchments may need to be targeted for particular reasons such as large subdivisions. These could be dealt with at the plan change/structure planning and/or resource consent level to facilitate appropriate development within the context of the wider catchment plan.
5. **Groundwater catchments:** many aquifers cross surface water divides, and in cases such as the Kaawa formation, the recharge area is quite small and needs protection. Shallow aquifers also need protection from contamination resulting from overlying land uses. Again, such issues could be dealt with at the plan change/structure planning and/or resource consent level to facilitate appropriate development within the context of the wider catchment plan.
6. **Hauraki Gulf Islands:** the objectives and processes of the Hauraki Gulf Marine Park Act 2000 and the NZCPS would provide the overarching coastal/catchment management framework for the Islands and the areas along the East Coast Bays and harbour catchments.

7. *Other considerations:* some matters vary across the region such as ecological districts, while others traverse it, such as transport, water supply and wastewater networks. While having their own management requirements, their environmental needs and effects are also expressed within catchments at all scales and these will need consideration and management from that point of view.

Implementing the framework of spatial scales listed above may enable all stakeholders – elected representatives at national, regional and territorial levels; local communities and region-wide communities of interest; planners, engineers and other environmental and asset management professionals in the public, private and not-for-profit sectors to play active roles that are co-ordinated in line with the vision of the Auckland Sustainability Framework.

6.2 Legislative and organisational frameworks and the incorporation of regional planning issues into catchment planning

The international literature made it clear that having workable institutional and governance arrangements before starting ICM process is one of the most critical elements of success. In the Auckland context, although the institutional and legislative arrangements are now present, they both changed at a critical time – just after the completion of the Manukau Harbour Action Plan in 1990, local government was reformed and the RMA was passed. This seems to have interrupted a nascent ICM process that, despite the supporting and enabling provisions of the RPS and RCP, has largely resumed only since the appearance of the more prescriptive requirements of the PARP:ALW.

In most overseas jurisdictions, ICM programmes commit to integration as a "smart thing to do", but due to the complexities driven by multiple issues, conflicting stakeholder and policy frameworks and uncertainties regarding implementation versus planning, it quickly comes under a narrower legislative umbrella, either requiring or enabling. From the literature it seems that ICM is predominantly an enabling process which brings together the community, specific stakeholders (industry, NGOs etc) and governments at all levels and jurisdictions (including across borders where applicable). Regulatory instruments should reflect this approach. It is important to differentiate that in some cases ICM (or the ICM delegated authority) is enabled by legislation, while in other jurisdictions the ICMP may also be required by legislation and, as it develops through the ICM process, it becomes local policy for managing the ICM issues appropriate to the geography.

In some cases, such as the Australian NRM Frameworks, the ICM process has progressed to becoming a national policy, that through political commitment (via Ministerial agreements), require ICMPs to consider certain things and set actual, specific and time bound targets to achieve through the ICM process. This target setting process by nature is adaptive and cannot sit within a legislative framework as generally these are not responsive to rapid adaptation if environmental (or human) condition changes.

The Australian NRM Frameworks appear to have engendered political leadership and financial commitment to ICM. In particular, the adoption of a national ICM policy can facilitate the setting of both short-term (five to seven year) and long-term (20-50 years or more) ICM outcomes or targets. The 50+ year targets recognise that change in natural environments can take a long time to become measurable, but it also allows ICM groups to be aspirational in setting targets of how they want their geography to be in that timeframe.

The agreements reached in the Regional Growth Forum and ASF mean that ICMPs have become an indispensable tool for planning land use and asset development in order to accommodate growth – and the ASF has endorsed a 100-year planning horizon. This would also inform the setting of visions, goals and interim targets to measure progress.

Section 4.8 also shows that the relevant national and regional planning documents address ICM, many with specific reference to ICMPs, and all in ways that require or enable ICMPs to integrate the effects of land use on coastal waters by managing urban stormwater quality and stream erosion. However, as noted in section 5, there is further potential for catchment planning to better incorporate regional planning policy into catchment planning for coastal outcomes.

Land use planning to control the uses of land that affect fresh and saline receiving waters is embedded in some overseas jurisdictions, for example Germany, but does not appear to be discussed in detail in the international papers reviewed. On this basis, the strong links between ICMPs and district and structure plans in the Auckland region puts it at least on a par with or not potentially ahead of some jurisdictions – again, in principle – but potentially also in practice.

Some shared river basin management agreements (see section 6.3.2.1) are already being used in some cases in Auckland, such as the Papakura District and Manukau City Council's agreement for the Papakura Stream, to ensure agreed and compatible policy for managing catchments that cross TA boundaries (the national legislation and regional planning framework are in common). While the ARC in these cases may effectively broker an agreement by all participants to work within the existing legislative framework in order to develop and subsequently implement the ICMP outcomes, this is happening organically already, and its role may be more valuable at the macro or harbour scale (see section 6.1).

While the legislative frameworks are present, it seems that the best value from them will be delivered as the ARC and TAs progressively work more closely together from their complementary strengths and mandates to ensure the full spectrum of catchment issues is covered – above and below mean high water.

The primary vehicles for achieving the desired level of integration of coastal and catchment planning are the RPS and RPC. The RPS is under review and the RPC will soon be due for review.

It is recommended that the existing provisions integrating coastal and catchment planning be examined in light of the findings of this report, especially the suggestions as to management scales suggested in section 6, so as to retain and make better use of existing provisions, or improve them to progress the desired outcomes.

Reasons could usefully be explored for not implementing 7.4.26 of the RPS, which states that the ARC will prepare a regional plan incorporating a regional coastal plan in order to promote consistent and sustainable management of the coastal environment and which will, over time, progressively include objectives, policies and rules as they relate to the functions of the ARC under section 30 of the RMA.

An approach to coastal and catchment planning which integrates the relevant documents, strategies, people and processes within the ARC and with the TAs, Tangata Whenua and other interested government and non-government agencies may present an ideal opportunity for one of the early action plans proposed by the Auckland Sustainability Framework.

6.3 Financial structures and resourcing

The recent impetus given to ICM in the Auckland region by the need to apply for network discharge consents has received significant support from funding by Auckland Regional Holdings. This legacy fund was dedicated to the improvement of regional infrastructure, and has contributed to the preparation of the first generation of ICMPs. Research and some pilot projects have also been funded. Funding for the works proposed in the plans propose is raised by the individual TAs via the LTCCP processes under the LGA.

The long term availability of such funding cannot be guaranteed, yet much work remains to be done and the industry is under-resourced. Many plans await completion while the subsequent cycles of implementation, monitoring and review have yet to be undertaken.

Future funding for ICM therefore needs to be considered. Internationally, cost-sharing is a strongly supported approach to achieving sustainable, on-going implementation of ICM, with funding by both government and stakeholders (private and public) as it improves ownership and commitment. In a cost-sharing approach, financing is on-going, guaranteed, adequate, and linked to national, state and regional ICM priorities.

The Global Water Partnership (2008) recommends that all market sectors be considered as funding contributors – including forestry, housing and land planning or agriculture, so as to reduce direct pressures on funding streams that are applied directly to the ICM process.

Growing interest in ICM in New Zealand from sectors as diverse as farming and business (see section 4.3.5) show that such support may be available. More widespread public endorsement of ICM may also help councils that have identified lack of capacity to do justice to their land use; catchment and asset management obtain the political and financial support they need.

6.4 Progressive integration of wider biophysical, economic, social and cultural issues into ICCM

A common thread of the international papers is the lack of full “integration” of ICM issues in the planning and implementation process. Many of the terms used to describe the ICM process are themselves indicative of a lack of integration (e.g. Integrated River Basin Management Planning; Water Sharing Plans; Integrated Water Resources Management; Integrated River Basin Management). These variations on a water management plan suggest that aspects critical to integration, such as coastal and marine waters, groundwater, catchment land use planning and the full breadth of socio-economic considerations are not always incorporated into the ICM process. Deeper analysis of the literature shows that, generally, most of these issues are at least considered in the early planning/ scoping phases, but often not carried forward into on-ground implementation. Yet again the question of “why does this occur?” must be asked.

While these various forms of ICM no doubt set out to integrate various aspects of coastal and catchment management planning, there seems to be a disconnect between intent and outcome. The international literature does of course show that many ICM variables are integrated into planning and implementation but the results also indicate that nowhere have all of the variables to attain a truly holistic, integrated ICMP been successfully executed. In summary, it is clear that in conceptual terms, the integration of catchment with coastal planning in the Auckland region is on most fronts on a par with – and in some cases, somewhat ahead of – international best practice.

The Global Water Partnership (2000) noted (see section 3.3.7) that while ICM processes have historically focused on water quality and quantity, they should also incorporate integrated land use

management and planning in ICMP development, because of the strong linkages between land use change and water resource management: land use change is seen as a key area for potential conflict if land use planners and communities are not involved in ICMP from the beginning.

In the Auckland region, there are strong links between ICM and RMA land use planning tools such as district and structure plans, as well as asset management plans and other tools under the LGA. Both RMA and LGA require consideration of resource management and sustainable development in integrated terms – that is, across multiple bottom lines, and this is reinforced by the requirements of the PARP:ALW to address the social, ecological, economic, amenity and cultural objectives of ICMPs. This would help to promote the ecologically sustainable development (ESD) endorsed in section 3.3.7 by several overseas authors and jurisdictions.

Of particular interest to the ARC as noted in the project brief are:

- applicability to both rural and urban land uses;
- applicability to both greenfield and brownfield developments; and
- progressive phasing in of related issues.

These are briefly reviewed below.

6.4.1 Applicability to both rural and urban land uses

Section 4.8.4.1 notes that rural issues are at present mostly not covered in ICMPs, which unlike those in most of the rest of the country, have a predominantly rural focus. However, using the “harbour catchment” approach recommended in section 4.8.4 (as was done in the MHAP) would promote their inclusion. This would mean the ARC and TAs would need to work much more closely with a wider range of players, as was done in the MHAP and UWHCS and is being done in the Hauraki Gulf Forum.

That said, little of the international literature specifically discusses both rural and urban issues, and if anything is more focused at the rural end of the scale. This raises an issue for further investigation: given that many rural activities of interest to ICM fall under the control of the ARC, while the TAs prepare the ICMPs for urban and urbanising areas, what would be the mechanism for including both urban and rural issues within an integrated plan?

6.4.2 Applicability to both greenfield and brownfield developments

Greenfield/brownfield issues were not identified as such in any of the international papers reviewed, indicating that Auckland may be ahead of the play in this respect, at least conceptually if not yet in practice. However given the findings discussed in section 3 above, this conclusion must be tempered by the fact that much of the international literature refers to rural ICMPs where the concept of brownfield development is perhaps not as well recognised.

Low impact/ water neutral designs are not uncommon overseas, for example the Bedzed development in London (see www.peabody.org.uk/bedzed). However they are usually on a site rather than a catchment basis, with the possible exception of Portland, Oregon, which has rules requiring hydrologic neutrality for new buildings (see <http://www.portlandonline.com/BES/index.cfm?c=34598>). This is achieved by using stormwater management systems that mimic nature by integrating stormwater into building and site development, in order to reduce the damaging effects of urbanisation on rivers and streams by disconnecting the flow from storm sewers and directing runoff to natural systems such as landscaped planters, swales, gardens or green roofs.

The structure planning process promoted by the RPS links enables ICMPs to deal with greenfield developments, and there is no reason why it could not also accommodate large lot brownfield redevelopments as well as the progressive greening of infrastructure by asset management upgrades in existing urban areas noted in section 3.8.1. As pointed out by Govert Geldof in his keynote address to the 2007 South Pacific stormwater Conference, if 1% of the built stormwater and related assets are renewed every year, it only takes 100 years to substantially improve its sustainability characteristics.

The 100-year timeframe and catchment-based focus of the ASF also provide an opportunity for urban infrastructure renewal to accommodate the sustainability concepts identified in the government's infrastructure stocktake (see section 5.3). This offers a much wider sustainability perspective for ICM, linking it to the future resource-efficient and decarbonised – and therefore more innovative and learning – economy.

6.4.3 Progressive phasing in of related issues

The evolutionary analyses in this report show that “integrated” management is fundamentally a point of view.

A shift in language over time from “control” to “collaboration” reveals a growing understanding of the benefits of stakeholder and community engagement in resource management. This has paralleled a shift towards a multiple bottom line approach that better reflects real world tradeoffs in environmental management as well as stakeholders' different uses of and aspirations for land and water. A progressively widening focus from flooding to ecosystem health is another significant shift, along with a growing appreciation of urban ecology and its potential for native biodiversity and cultural renaissance.

Even the view that a catchment focus is the only constant has shifted as catchment managers realise they are managing land uses for the purposes of ecosystem health in the ultimate saline receiving environments, and that estuarine ecosystems adjoining urban areas are affected by every river and underground catchment around them. The concept of what a fundamental geographic unit should be is also broadening with time.

In New Zealand in particular, there has been a view that ICM is a predominantly rural process, despite its comparatively long urban history in Auckland. This polarisation too is shifting, with a growing realisation that the integrated management process has much to offer both rural and urban catchments, as well as those with mixed uses.

Accompanied with a deepening knowledge of the effects of all land uses on water quality and quantity and the associated terrestrial and aquatic ecosystems – and their social, cultural and spiritual values, this has also seen a shift towards integration into catchment and coastal planning of matters as apparently disparate as transport and biodiversity.

All of this requires progressively more sensitive and sophisticated processes, and both the international and local experience reveal their emergence.

The international literature reveals that ICM has evolved over its history to include a greater coverage of natural resource, environmental, social and economic variables for consideration under an ICMP. This reflects the change from a largely rural, water quantity or water quality driven ICM process, to one that is more truly integrated and which addresses emerging issues such as ecologically sustainable development, socio-economic impacts, the need to manage for whole-of-

environment outcomes and, more recently, to consider the looming potential of climate change impacts.

This widening circle of issues is being driven not simply through a realisation that a holistic approach is beneficial in delivering positive on-ground outcomes, but by the inclusiveness of contemporary ICM following the wider adoption of a bottom-up approach and the input of community and stakeholder issues for ICM.

The New Zealand history shows a progressive move towards inclusion of more issues into catchment and coastal planning, usually reflecting the interests of a widening circle of stakeholders as much as it does the broadening and deepening awareness of researchers and managers. The inclusion of Māori views and biodiversity are perhaps the best examples in New Zealand, along with the increasing interest in other infrastructure such as transport (as evidenced by the Local Government (Auckland) Amendment Act 2004 (the LGAAA), which directs all Councils in the Auckland region to integrate their land transport and land use provisions and ensure these are consistent with the Auckland Regional Growth Strategy, give effect to its Growth Concept and contribute to the land transport and land use matters specified in Schedule 5 (s39 and s40 LGAAA).

The adoption by the Auckland region's TAs of best practice plan preparation (Ericksen et al, 2003) and multi-criteria analysis of management options together provide timely support for TAs and the ARC as they set up frameworks that to define issues, objectives, methods and outcomes in integrated terms. Naturally, of the focus is on wastewater and stormwater networks and their effects on receiving environments, but the requirement to meet the multiple bottom line objectives of the RMA and LGA will over time encourage catchment managers to widen the focus of ICMPs as an invaluable information repository and planning support tool.

This gradual inclusion of more and more items to be addressed in an integrated manner appears to work best in this way, as an organic "bottom up" move rather than being imposed by way of a top-down statutory requirement – as noted in Brown (2004, 2005), such edicts almost inevitably result in technical compliance with the new requirement in ways that do not lend themselves to feasible implementation:

"You cannot simply require integration any more so than you can sustainable management. It is a frame of mind that needs to be nurtured, developed, accepted, not only by technical experts and professionals, but also by the wider coastal community. It is clearly time to take advantage of the lessons of the past, the scope which RMA gives us to achieve integrated management, and the time we have now to make a difference to the way in which we manage much of our coast." (Brookes, no date).

Some key aspects that could be included in discussions about future planning for the region in the short to medium may therefore include:

- including rural areas in Auckland's ICMPs: given the respective and complementary roles of the ARC and the TAs in rural land areas, a partnership model may be beneficial should the ICMP process be extended in Auckland to include rural areas;
- aligning asset management plans with ICMPs in a more proactive way for greening brownfields developments: so planning the long term replacement of assets on a regional basis could align with opportunities to increase built asset capacity or, where desirable, progressively supplement and replace it with decentralised built and natural services to reintegrate water and plants into the urban water management system;

- progressively aligning ICMPs more closely with other strategies, starting perhaps with biodiversity, pest and open space strategies, possibly piloted in a particular problem shed with iwi to seamlessly include Māori outcomes in these areas;
- noting where councils and communities are progressively phasing in additional matters of interest to them; and
- aligning such actions so as to demonstrate and document how integrated coastal and catchment planning may contribute to the achievement of all the goals of the ASF.

6.5 Planning and implementation

The international findings showed that there is often a gap between an ICM vision and its implementation, either because not enough time had elapsed for much to be done, or because the studies were conceptual rather than place-based.

The PUCM team has analysed the stormwater and other aspects of six district plans and found that (Day et al, 2005):

- there is a gap between the intentions of plans as illustrated in policies and the actions taken in resource consents;
- commitment and capacity of councils were important contributors to the quality of plan implementation; and
- factors that will promote good implementation include increasing staff time, resources and guidance in preparing and implementing plans that have clear policies to give good direction for rules and other management processes; internal consistency in plans between policies, methods and rules and integration between policy and consenting staff.

Other work (e.g. Brown 2004, Brown et al 2005) also shows that both intra-and inter-institutional capacity as well as community capacity are crucial for effective implementation of plans.

Of course, how well a plan has been implemented remains unknown until the results of monitoring and review are available.

6.6 Monitoring, evaluation and adaptive management

The international literature highlights that adaptive management is a key to the success of ICM programmes. In particular, institutional arrangements (such as the roles and responsibilities of various governments; their agencies; private sector investors and participants including industry, non-government organisations; and the broader community) must be able to adapt to changing conditions e.g. economic, environmental, social and political. Management plans and their implementation need to incorporate sufficient flexibility to adapt to new information, new scientific findings, changing legal and political landscapes and evolving resource and funding arrangements.

A pivotal element of successful planning and adaptive management is cost-effective and meaningful monitoring, to enable documentation of both plan implementation and plan outcomes. Key questions that monitoring needs to answer are:

- did we do what we said we would? In other words, how well are we implementing our plans (outputs)?
- did it make a difference – are the outcomes as anticipated?

- what else is going on – what other trends are present or emerging?
- does it make sense? – how accurate were our assumptions about cause and effect in selecting our methods in our plan? How well do we understand the environmental, social, cultural and economic systems and processes that we are attempting to influence?

As indicated in section 3.7, the UNEP/GPA (2006) orders of outcomes framework helps catchment and coastal managers put in place monitoring programmes that will help them undertake meaningful monitoring. However, regional players in the wider sense also need to have input to an integrated monitoring programme that will:

- enable the integrated assessment of the four wellbeings across both the RMA and LGA Acts, acknowledging that the narrower focus of the RMA;
- meet the environmental and programme monitoring requirements of the RMA;
- enable cost-effective community outcome monitoring under the LGA that is integrated with RMA monitoring;
- inform the development and monitoring of resource consent conditions, to ensure they are aligned with policies and outcomes in the relevant laws, plans and strategies;
- link and co-ordinate the information collected under both the Resource Management and Local Government Acts by both the ARC and the territorial council/s; and
- pull information collected by iwi and community groups into a joint monitoring framework.

Comparison with the findings of the international literature shows that Auckland is at least on par with most international experience in the development of its planning frameworks for integrated and coastal catchment management. However, like most other jurisdictions, implementation remains the challenge, with significant successes in the past (such as the MHAP) and the current generation just embarking on an implementation phase.

The fact that consideration of stormwater, wastewater, water quantity and the freshwater –marine continuum are being considered as part of a holistic management approach through ICM is placing the Auckland region at the forefront of development. In many other jurisdictions it is clear that ICM is somewhat artificially separated in many cases between a rural and urban focus which obviates the need to consider these factors collectively – this is no doubt a reflection of the land use mix which exists in a relatively small geographic area within the Auckland region.

Table 6-1 suggests the current situation in the Auckland region in comparison to international practice. Further exploration and discussion of Auckland's achievements are suggested; and this can be accomplished through a collaborative partnership with Auckland region stakeholders and practitioners to assess current practice and its advantages.

This also enables assessment of policy and plan effectiveness – and the opportunity for reflection and learning by programme managers and the wider community. The PCE (2004) identified that complexity and long time frames make it vital that better use to be made of science when policy is being formulated. This problem has also been identified for specifically for catchment management (Stokes, 2008).

Section 3.3.8 demonstrated the need for robust, targeted and well-resourced monitoring and reporting for ICM to identify plan outcomes and inform adaptive management response.

Given that the scope of ICMPs will progressively grow over time as understanding of sustainability grows, it will be increasingly important for catchment managers and their interdisciplinary teams to:

- keep up with the wider sustainability dialogue; and
- further the practical application of natural principles to the design, development, maintenance and replacement of urban infrastructure in order to reduce the effects of cities on essential elements of the life-supporting capacity of their natural environment.

6.7 Collaborative models

Urban water planning and management processes have tended to be “dominated by technocratic expertise and resulted in plans with a series of technologies with little consideration to the socio-political development strategies needed to enable political relevance and need within the community and the broader local administrative system.” (Brown, 2005). It was evident from an Australian urban stormwater case study (Brown, 2005) that the urban water management programme “involved a centralized authority directing local government to prepare plans in consultation with the community, which was unsuccessful, yet all of the plans achieved regulatory compliance. The legislative direction was based on a false technocratic assumption of how to enable change. It involved one set of centralized technical experts directing another set of local technical experts to develop engineering plans. As it turned out this was indeed a naive approach for enabling change towards a more sustainable urban water future, with the idea that the identification of technologies will ‘somehow’ translate to the necessary political and social capital needed to advance institutional change and implementation.”

The “top-down” model clearly does not deliver sustainability outcomes. The consideration of water, soil, coastal and marine issues, together with the human dimension of land users in the catchment integrates a wider range of issues than the traditional soil conservation, flood management, water allocation or water quality management plans, and many more players are needed.

Engagement is thus a key theme for catchment managers in New Zealand: “the skills we require into the future will be more associated with human resource and project management – the power of engagement” (Stokes, 2008). This is in line with the international findings (section 3.3.4).

Similarly, the international literature showed that in countries with well developed economies, the preferred collaborative model for achieving successful ICM is a decentralised bottom-up approach. However there is also strong evidence that a “mixed” approach is beneficial. The mixed approach to ICM involves shared vision planning and full community participation in the ICM development, but with a strong emphasis that, for implementation, many actions (due to scale, complexity and cost) need to be implemented by government. Irrespective of the collaborative model adopted, stakeholders must have clearly defined roles and responsibilities and these must be understood by the participants at the commencement of the ICM process. It is important that the ICM process is managed effectively and appropriately, and all decisions must be responsive. The best outcomes occur where stakeholders are involved at all steps of the ICM process.

The general view is that the role of the public sector (governments) in best practice ICM is to support and provide commitment to the ICM approach and the delegated ICM organisation but should not control it, i.e. community and stakeholder collaboration and participation are critical to achieving a shared vision for ICM. The literature suggests that shared vision planning will result in better on-ground outcomes because communities will have ‘ownership’ of the ICM programme. Put simply, government must strike a balance between supportiveness and intrusiveness. In many cases, governments should “enable” the ICM process, rather than run the process.

Successful examples of ICM also demonstrate a need for good managers to resolve conflicts and manage cross-sectoral participation. Good managers ensure that all participants are fully engaged in collaborative development and implementation of ICM. Stakeholders must have links with government; government and agencies must ensure capacity building with stakeholders (including succession planning of both government and community participants).

A critical component throughout all the international literature is that ICCM – the integration of land and water (fresh and saline) management and planning – requires the synchronisation of management actions that achieve holistic outcomes across all sectors of the community. Integration between land and water is seen both a key for success, but also an indicator of potential failure; i.e. cases where land and water planning and management are not synchronised may lead to poor on-ground outcomes and (at worst) mixed messages to the community which lead to disillusionment and a loss of empowerment in achieving local ICM solutions.

It is therefore critical to achieve integration:

1. between disciplines e.g. natural sciences, social sciences and engineering;
2. among government departments;
3. among different stakeholders;
4. between government and non-government stakeholders;
5. across mean high water springs; and
6. at the different levels of government that may affect ICCM outcomes.

Examples from the Auckland region discussed below include:

- the Auckland Sustainability Framework (ASF);
- the Mahurangi Action Plan (MAP);
- six urban ICM projects in Auckland; and
- the iwi-led Integrated Kaipara Harbour Management Group (IKHMG).

The examples conclude with an analysis of the factors of success for the six urban ICM projects that are potentially relevant for improved ICCM.

6.7.1 Auckland Sustainability Framework

The process of developing the Auckland Sustainability Framework (ASF), a joint project by all the local authorities of the Auckland region and central government agencies co-ordinated by the Government Urban and Economic Development Office, also involved active engagement of stakeholders. It envisions engagement with the private and public sectors to undertake an on-going role in delivering its outcomes – including those for ICM – and this will engender community ownership of the ICM process – a more “bottom-up” approach.

Mahurangi Action Plan

One example of a more “bottom-up” approach is the Mahurangi Action Plan (MAP), a five year community project initiated by the ARC and the Rodney District Council and launched in 2004. It covers part of the Mahurangi Harbour and was set up in response to long-term environmental monitoring that indicated that its health was in decline, largely because of high levels of erosion and sedimentation, and that this was adversely affecting the social, economic and environmental future of the community. The monitoring found increased sedimentation was smothering marine

life and causing a decline in diversity, common shellfish such as cockles were no longer found in some areas and boating had become more difficult because of reduced water depths. The Action Plan aims to halt, slow or reverse the adverse effects of sedimentation on the Mahurangi Harbour by a range of measures, including:

- managing projects in the area, particularly with landowners;
- significant fencing and riparian planting;
- compliance monitoring of earthworks and forestry;
- research and investigation including a sediment source assessment project; and
- extensive environmental education throughout the local community and schools.

6.7.2 Urban ICM projects

An analysis of six urban ICM projects in Auckland (Tiffany Bush, Friends of the Oakley and Whau Creeks, KERP, Tamaki Estuary Protection Society and Project Twin Streams – Scott, 2007) found that factors that enhanced community engagement in group activities and building group capacity and partnerships with local government and industry are closely linked. Factors identified as critical to successful capacity-building include (political or organisational) leadership; targeted planning and communication; a willingness to identify and engage existing community organisations; and adequate resourcing, knowledge and skills of the sponsor organisation and its personnel. Flexibility and creativity is needed to engage the community's different motivations for participation, as are local projects that give regular opportunities for people to connect with and become involved with caring for their local area.

The analysis (Scott, 2007) showed that groups had built varying levels of working relationships with councils, from participation in consultation processes to active partnerships on catchment management. The analysis also highlighted that the availability of resources was critical for building effective partnerships with local government.

6.7.3 The Integrated Kaipara Harbour Management Group

The Kaipara is the largest enclosed harbour in the Southern Hemisphere and the “food basket” of Ngati Whatua. A wide range of authorities have statutory responsibilities in relation to the harbour and their challenge is to deal with competing and sometimes conflicting uses, including dairy farming, exotic forestry, subdivisions, sand mining, fishing, aquaculture, and energy generation activities. The information below is drawn from the website of the Integrated Kaipara Harbour Management Group (IKHMG), referenced in section 6.

The IKHMG is an initiative developed by Te Uri o Hau and its stakeholders to help manage the Harbour. The Kaipara is a sacred taonga and Kaitiaki are responsible for protecting it for the benefit of all people. The Kaitiaki vision is focused on ‘the realisation of rights as Te Uri o Hau’ and Nga Kaitiaki Tai Ao o Kaipara and ‘a natural environment that is rich in diversity and life-supporting capacity’. Nga Kaitiaki Tai Ao o Kaipara see their role as providing the leadership to coordinate the various resource management agencies and stakeholders in a united vision for the management of the Kaipara Harbour catchments and of the harbour itself. This would assist them in meeting their responsibilities under the Te Uri o Hau Settlement Act and is consistent with a number of Memoranda of Understanding and Protocols established between Te Uri o Hau Settlement Trust and key stakeholders.

The vehicle for achieving the vision is a Sustainable Kaipara Catchment Plan. An Interim Kaipara Management Group was formed to undertake a 6 month programme, appoint a Project Co-ordinator and oversee research and co-ordination with the aim of scoping an agreed approach to achieve a Sustainable Kaipara Catchment Plan. The first report back to the wider group was in March 2006. The group is a broadly based movement of common interests and is not aimed at supplanting any agencies which have statutory responsibilities but rather aims to explore the means by which all interests, public and private, cultural and social, commercial and recreational, can focus on a common vision and achieve a responsible outcome. Additionally, the ARC and NRC have initiated a Kaipara Harbour Scoping Study. The Kaitiaki see it as essential to develop a unified approach to research and planning for the Kaipara with the interregional authorities.

The Environs Holdings Trust of Te Uri o Hau Settlement Trust was successful in a seeding grant application to the Foundation for Research, Science and Technology/Health Research Council (2004/05) to identify research priorities for the Kaipara and Mangawhai Harbour catchments. An initial meeting with Manaaki Whenua – Landcare Research began a process to identify research priorities took place in Whangarei on March 17 2005. The outcome of that meeting was a plan of action based around a successful process used for Integrated Catchment Management of the Motueka River. That process led to the formation of the IKHMG.

The IKHMG identifies the following issues facing the Kaipara:

- biodiversity
- climate change
- fish stocks
- integrated management and coordination of action
- kaitiakitanga
- resource use and development
- sedimentation and water quality
- socio-economic opportunities.

In terms of integrated management and coordination of action, the Kaipara is governed by two different Regional Councils, Auckland and Northland; two different District Councils, Kaipara and Rodney, two different Department of Conservation (DoC) conservancies and the Ministry of Fisheries (MFish). There is a plethora of plans, conflicting management philosophies and a highly fragmented legislative framework that includes:

- Regional Coastal Plans, focused on the coastal marine area, but not fisheries or the Marine Protected Areas under the RMA;
- Fisheries Plans under the Fisheries Act 1996, focusing on single fish stocks in fisheries management areas;
- Protected Species Action Plans under the Marine Mammal Protection Act 1978, focused on national-level plans for species such as marine mammals and seabirds;
- Regional Coastal Environment Plans under RMA with only policies for land areas (see section 5.3.1.2 of this report)
- Coastal Compartment Plans under the RMA for small areas of coastal edge;
- Iwi Planning Documents under the RMA for individual iwi rohe;

- Long Term Council Community Plans under the LGA that focus on broad environmental, economic, cultural and social outcomes as well as budgetary provisions for each of the individual councils;
- Marine Protection Planning to provide for marine protected areas within a region developed under the non-statutory Marine Protected Areas Policy Statement and Implementation Plan of DoC and the Ministry of Fisheries in 2005 and the Marine Reserves Act 1971;
- District Plans under the RMA that help the two territorial authorities address functions such as managing effects of land use, noise, and impacts of land use on indigenous biodiversity. They set out rules that implement policies and must give effect to Iwi authority planning documents and regional and national policy statements;
- Annual Plans under the LGA to promote sustainable development.

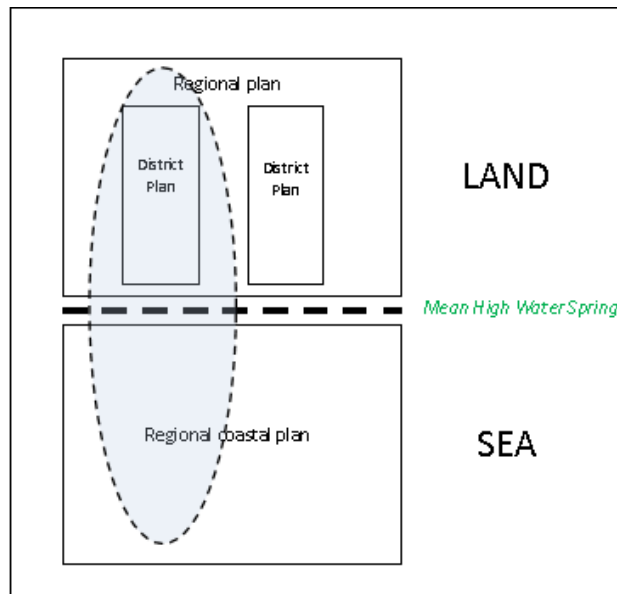
The IKHMG notes that there are different rules on the land versus the coast/marine environment and then again in the north versus the south of the Harbour, including the “lack of planning integration across Mean High Water Spring (MHWS) which is a widely recognised problem across the country”.

The IKHMG notes also a lack of planning capacity and varying resources across agencies, with smaller councils struggling to develop and retain sufficient planning expertise to undertake their strategic planning functions and a lack of robust information that together reduce the ability to make informed decisions about development and resource use.

Figure 3-3 and Table 4-3 of this report show the fragmentation of jurisdiction and tools either side of MHWS. Figure 5-2 depicts a possible pathway of integration for the Kaipara where planning occurs from the land to the sea.

Figure 6-2 A possible pathway of integrated planning for the Kaipara Harbour

Source: <http://www.kaiparaharbour.net.nz/>



Nga Kaitiaki Tai Ao o Kaipara see themselves as coordinating the management of the harbour, but currently lack capacity to fulfil this vision and need the support of management agencies. Te Uri O Hau see themselves as the only management body with a fully integrated perspective, and together with other hapu of Ngati Whatua are driving the IKHMG project to create a healthy and productive Kaipara using an integrated management plan.

Such a plan would provide better integrated management of the Kaipara Harbour and catchment through such approaches as:

- developing a clear and common philosophy of how Kaipara ecosystems will be managed by tangata whenua and agencies;
- ensuring adequate provision for public participation across all sectors, for example, fisheries, marine protection, resource consents;
- ensuring accessible and timely conflict resolution processes across all sectors;
- improving communication between agencies so actions by one management agency do not have unintended consequences in another agency;
- integrated planning at compatible scales; and
- building trust to achieve effective integrated management.

6.7.4 Factors of success

There are clear learnings from the above examples of community collaboration and participation. Allen et al. (2002) analysed the factors that contribute to successful partnerships between environmental management agencies and community groups in New Zealand. Key findings were:

- the need to foster shared understanding of individual viewpoints and group participation: each individual or group experiences the world slightly differently, they may react differently to what may to be the same situation. This highlights the importance of getting people together to establish a shared understanding of any problem situation and the potential pathways for action. When people feel that they have had the opportunity to participate in planning future change, they are likely to buy into the changes that may be required of them;

- complementary approaches are required to promote action, based on educational initiatives: this recognition has led researchers and policy makers to rethink environmental policies and the role of regulation. Regulation is not a linear process where policy makers enforce a particular policy with a distinctive and well-defined effect. Policy success depends on many factors and particularly on the cooperation of different groups of society. International environmental policy trends are recognising the need to creatively utilise the multiple mechanisms available (regulatory, incentive, voluntary, and property right) in designing approaches to promote action on environmental issues. Each has specific strengths and weaknesses. However, the effectiveness of all depends on a supporting framework of education, awareness raising, understanding and ownership;
- while stakeholder participation is a key operational principle of contemporary sustainable-development policies, programmes, and projects, involving different groups in participatory initiatives is a complex and ongoing process with no universal single approach or method. It takes time, resources, understanding and perseverance, but the end result should be a development process that involves people from different groups – and their ideas, skills and knowledge. Participation in this way can contribute heavily to sustainability, make environmental activities more effective, and simultaneously contribute to building the capacity of those groups involved to continue and grow the initiative. However, promoting participation implies a different way of working, the use of different approaches and methods, and different expectations;
- participation needs to be effective at all levels of involvement: it can be practised simultaneously at different levels of decision making. It is most useful to think of three levels of participation: national, institutional and programme, and projects on the ground. Because environmental programmes are designed to be responsive to changing community needs, one of the most pressing challenges is to develop participatory and systems-based monitoring and evaluative processes that allow for ongoing learning, correction, and adjustment by all parties concerned;
- it is important to give attention to both task and process: effective collaborative initiatives are those that pay attention to both task and process, and so meet the needs of the different participants in both these areas. In this regard the task can be defined as what those involved have to do (e.g. reduce waste) whereas the process is concerned with how people and groups/teams work together, maintain relationships, and achieve agreed outcomes. Because task and process are linked in this way, it is important to measure and evaluate the progress of both.
- the process is one of transformational change, and it requires group cultural change that spreads to others: in the end, participatory initiatives on the ground involve people working in groups and teams. Accordingly, an understanding of how to initiate and foster these social units is essential for delivering participation. However, to foster a more collective approach to environmental management that is capable of transformational change, we have to do more than just work together on specific projects. Transformational change requires individuals and groups to develop the capacity to move beyond the completion of task-bounded activities. They must catalyse change within their immediate membership first, and spread that culture to others in their communities over the longer term. Supporting groups in this way requires an understanding of group processes and stages of development, attention to factors such as group abilities and skills, and the use of appropriate participatory monitoring and evaluation processes.

As part of the above analysis, Allen et al. (2002) distinguished between:

- agency-led partnerships;
- community-led partnerships; and
- joint partnerships.

Their research suggested that joint partnerships have the greatest capacity for long-term sustainability, finding that partnerships that share resources and decision-making power lead to the most effective long-term commitment to changing environmental management outcomes.

This is highly congruent with the multiple bottom line approach to ICM, where social and cultural outcomes are valued – and in fact become a key part of the vehicle for delivering the desired environmental outcomes.

The different scales proposed in section 3.3.1 lend themselves ideally to identification of stakeholders who may be appropriately engaged at each scale by way of the appropriate collaborative models – formal, informal and so on.

The range of issues that could be addressed would in all likelihood expand to accommodate the issues raised at each of these different scales, depending on the issues and visions of the stakeholders who self-engage at each scale. It seems that the principle of collaboration or partnership can most probably be applied to the full suite of issues encompassed by ICCM regardless of the degree of associated regulation.

Many examples of collaboration discuss community-based stream bank planting and similar initiatives. However, while sectors like farming and business are often heavily regulated, regulation can also be accompanied by dialogue and partnership. The collaborative models would vary depending both on scale and also on the needs and capacity of the different stakeholders, ranging from formal memoranda of understanding to very informal liaison (Courtney, 2005; Craig and Courtney 2004).

The New Zealand and Auckland histories show that much potential for ICM and ICCM has been lost because of ongoing “demarcation” issues between regional and territorial agencies over issues such as land use and flood control. The process of ICCM initiated by the network consent process and the requirements of the PARP:ALW have polarised opinions on some issues in the Auckland region, but the positive spinoff is that work has effectively begun on clarifying areas that were not previously clear. Much ground has been made up in the Auckland region in recent years, so the relationship between regional and territorial councils could be a good contender for a partnership agreement. The necessary discussions would help clarify the vision, mandate and strengths of the respective parties as they work through the elements of good ICCM, including research needs, support for sector and community initiatives and the like. Much work along these lines is now being done by way of informal initiatives, but more formal partnership discussions could be of great benefit in clarifying these complex issues. On the basis of the emerging clarity, wider sector and community engagement would be possible on goals, roles and responsibilities for ICCM.

However, for true collaboration and partnership, the capacity of all parties to genuinely engage will need to be built.

6.8 Capacity building

Globally and locally, the engineering profession is under-resourced, and ARC has identified this as an issue for ICM since the inception of the stormwater programme (ARC, 2005).

Similarly, the need for and benefits of improved capacity building through more informed and educated decision-makers and members of the public was documented in all the reports prepared for the Infrastructure Stocktake (refer section 4.3.3).

Capacity building for the community and professionals is also identified by the Global Water Partnership (2000) as a critical area that requires further effort. In the Auckland region, the ARC has long recognised the need to build the capacity of the ICM sector generally to prepare, implement and monitor ICMPs.

In “Beyond aging pipes and murky waters”, the PCE (2001) noted the following as one of four major areas of challenge with specific recommendations made for each: “The lack of stakeholder awareness and understanding of urban water systems and involvement in their management. One of the biggest challenges will be reaching consensus between the various stakeholders on the environmental, social and economic goals of urban water systems. There is a need for a more detailed understanding of community and business expectations and provision of information to promote awareness and understanding of the issues”.

In New Zealand the engagement of Māori cultural beliefs through the development of the Cultural Heritage Index (CHI) is an excellent example of capacity building in a bottom-up framework, where the CHI informs the resource management process to deliver better outcomes and build capacity for non-indigenous stakeholders (Ministry for the Environment, 2006). Within the Auckland area, there are significant opportunities to engage the public and in particular Māori to undertake monitoring and evaluation during the implementation and adaptive management phases.

The SWAT team has recently invested in work to help build the capacity of the TAs in setting objectives and evaluating progress.

The Motueka ICM researchers have concluded that such iwi-led and iwi-issue-driven collaborative projects are an important incubator for building capacity for iwi and hapu researchers, scientists and stakeholders, and contribute to building strong long-term iwi–science partnerships and increase iwi engagement and interaction in ICM science objectives. They also facilitate a move towards transdisciplinary research where knowledge is created, discussed, and understood from various world-views.

ICCM is not only multi- and trans-disciplinary, it is multi-stakeholder, too. The Australian experience (Brown, 2005, cited above) shows that the community engagement capacity of engineers and other urban water managers also needs to be built if cities are to achieve widespread and self-sustaining implementation of sustainable urban water management.

For better ICCM in the Auckland region, therefore, possible solutions include:

- fostering partnerships with councils, iwi, communities and sector interests;
- growing future capacity by fostering the entry of more students into the relevant professions, e.g. by working with schools, tertiary institutions and professional associations to attract more people into the sector and the wider sustainability industry;
- growing current capacity by widening the pool of people actively involved in the preparation, implementation and monitoring of ICCM plans, for example beyond engineering and planning to the biological and social sciences;
- growing current capacity of those engaged in the core disciplines to engage with related professions, elected representatives and sector and community groups; and
- growing the capacity of iwi, sector and community groups to play a more substantial and sustained role in ICCM.

6.9 Learning and review

A key impediment to the preparation, implementation and monitoring of good plans is lack of time and resources (Ericksen et al 2003; Day et al 2005). While growing the capacity of councils, iwi and sector and community groups will eventually help with this, it is also important for good ICCM for all players (nationally, regionally and locally) to schedule regular periods of reflection, in order that people may become conscious of their needs, successes and learnings. Forums that could promote this already exist, such as the Stormwater Liaison Group, regular seminars and annual conferences, but reflection time needs to be provided to enable this reflection to go deeper and wider into the professional, political and partnership participants and processes.

6.10 Summary and conclusions

A recurring theme in the international literature is that truly successful integrated coastal and catchment management and planning remains elusive. Many of the authors, notably Davis (2007), discuss that ICM has a long history of endeavour, without a correspondingly long list of successful examples of implementation. Perhaps related to this finding is that the “planning” phase of ICM is often well resourced and completed to a high standard; however on-ground implementation is often less developed and financially supported.

The question of “why does this occur” must be asked. Is there a fundamental failure in the process and if so, where is the weak link? Clearly, investment is necessary to ensure on-ground outcomes are achieved and that ICM is not just an exercise in recording aspirational goals and targets but one that achieves substantive improvements in the natural and human environments.

In keeping with the international findings, areas where the Auckland region’s performance can be improved relate to practice rather than vision: much of the literature notes that examples of implementation are rare, and where found, often only apply to a subset of the best practice criteria assessed in this paper.

One of the key recurring themes of the New Zealand and Auckland histories has been that of successive waves of proliferating bodies and tools followed by reform and amalgamation. Practitioners have little control over this process, but must nevertheless make the best of the institutional, legislative and other arrangements available to them.

“Structures are important, but it is people who count” (Ericksen 1990)

The Auckland region is about to undergo an institutional reform based on the findings of the Royal Commission on Auckland’s Governance. It is anticipated that the legislative framework and tools currently specified in various Acts may not change in the short to medium term – that is, the Ministry for the Environment, Department of Conservation and Department of Internal Affairs will retain their national roles and tools, including national coastal (and possibly other) policy statements; regional and territorial councils will retain theirs, including regional policy statements and coastal and other plans, district plans, resource consents, LTCCPs, asset management plans and so on.

People and their ongoing communication and collaboration are therefore the focus for change, if the findings of this report are to retain relevance and get some traction in the short to medium term.

Hence two related aspirational goals are presented in which the full spectrum of coastal and catchment stakeholders are able to transcend silos and work within and between organisations, plans and processes.

6.10.1 Building industry capacity and collegiality

"The lack of lessons learned seems to haunt us everywhere, and personally it has been starkly shown for flood hazard in the revival of policy options by MfE that I had provided to MWD over two decades ago." (Neil Ericksen, pers. comm. 26 June 2008).

Managing the ebb and flow of practical knowledge and experience is essential for running any organisation. Experience with the capacity-building initiatives in the erosion and sediment control sector in the Auckland region shows that flows of people between regulatory, consulting and contracting organisations can in many ways be beneficial: differing perspectives are brought to the work and the sector as a whole becomes a repository of knowledge. This has had the positive benefit of building collegiality across the professional and organisational divides, with of corporate memory effectively being institutionalised sector-wide.

If the ICMP/ coastal management sector is considered as one group at national, regional and local levels – elected representatives; council/ utility/ developer planners and engineers; iwi; community groups and the like, then the rapidly developing capacity of that sector for intra-and inter-organisational communication and partnership bodes well for knowledge retention and transfer. For good outcomes, all these stakeholders need to know that they need to work together, regardless of where the particular lines on organisational charts are drawn.

Among the services that could support this (supplementing the existing active liaison, research and seminar programmes) would be the building up of a specialist library that can act as an information clearing house for all parties.

6.10.2 Building community capacity

Another way to hold the vision for the 100 years envisaged by the ASF is to build the capacity of the community as the holder of the collective vision for catchment and coastal management. Local people are another repository of memory and vision to partner both public servants and private sector – and, where necessary, hold them accountable.

This report has collated much information of value to stimulate reflection, debate and learning. Much useful knowledge and comparison with international best practice may be gained from engaging with stakeholders and practitioners on the basis of the findings.

Table 6-1: Comparison and evaluation of Auckland and international best practice for integrated catchment and coastal management

ICM element	Best practice approach	Alternative accepted practice	Areas where Auckland could learn from overseas best practice	Areas where Auckland is at the leading edge
Scale	Macro	Meso	Nested scales enabling prioritising of planning and management needs and resourcing/capacity across the whole region	Provisions of national and regional documents.
Legislation	1. ICM planning 2. Management Authority enabling	Supporting natural resource management	Adopting ICM specific legislation	The Resource Management Act enables ICM processes. The proposed NZCPS requires coastal/catchment integration.
Institutional framework	Identified ICM authority	Cross sector/ jurisdictional agreements		Auckland Regional Council fills the role of the lead ICM authority.
Governance framework	1. International policy framework 2. National policy framework	Clear public and private sector roles	Adopting a national ICM framework	Regional documents enable coastal/catchment integration.
Financial/ Investment structure	1. Combined public and private sector investment sources 2. Performance driven investment strategies	User pays/ market based instruments	Exploring market based incentives to achieve self-supporting ICM programmes	ARH funding supports TAs in this work which requires a large investment in planning and implementation.
Collaborative approach and learning approach	Bottom-up	Mixed model	Shared Vision Planning and other participatory methods should be investigated to engage all stakeholders (both public and private sector) in a collaborative learning process.	Care groups – Waicare, Beachcare and Landcare, among others.
Capacity building	Capacity Building Framework	Knowledge building, training and communication strategies	Community and interagency capacity could be nurtured. Succession planning for all participants is critical to achieving the ICM continuum.	Targeted capacity building initiatives including education, communication and research.

Biophysical variables	Dependent on scale and local variables but should include consideration of: <ul style="list-style-type: none"> • river flow (hydrology) • water quality • soil condition/ health/ erosion • surface & groundwater connectivity • freshwater and saline connectivity • rainfall and runoff • vegetation, especially endemic vegetation • land use including greenfield and brownfield • threatened species and communities • dependent ecosystems • climate change 		Rural and brownfield issues as well as native biodiversity could be better accommodated in ICMPs. Better integration of climate change considerations is likely to be an emerging issue for future ICM programmes.	Increasing focus on freshwater ecosystems and those in coastal receiving environments.
Socio - economic variables	Dependent on scale and local variables but should include consideration of: <ul style="list-style-type: none"> • behavioural change • recreational values • property rights • market failures • intergenerational equity • third party impacts • price (market) incentives • private sector implementation cost • cultural and heritage values 			Advocacy and uptake of multi-criteria analysis and measurable objectives that assess outcomes across the four wellbeings of the LGA as well as the outcomes set out in S5 of the RMA. Such a triple or quadruple bottom line assessment could be done in a way that integrated the monitoring of outcomes under both Acts while acknowledging the narrower or more specialised biophysical focus of the RMA..
Indigenous values	Cultural Framework Index	1. Targeted engagement 2. Indigenous specific goals and objectives		The incorporation of Māori interests puts New Zealand in the vanguard of international best practice. The existing CFI is an outstanding tool to assist in the incorporation of Māori interests in ICM programmes.
Sustainability	Inclusion of Ecologically Sustainable Development (ESD) principles		Links could be progressively forged between integrated catchment and coastal management and wider ESD principles, particularly with respect to sustainability of water-related infrastructure, building/construction and transport.	

Implementation	1. An ICM champion 2. An ICM business plan using S.M.A.R.T.E.R. principles		See building community capacity, above.	Adoption of Specific, Measurable, Affordable, Realistic, Time bound, Endorsed and Relevant goals, objectives and targets.
Adaptive management	Monitoring, evaluation and reporting framework	Identified review periods	Could be expanded for ICMPs not directly related to network consents. Integrating ICM and coastal monitoring under both the LGA and RMA by both the ARC and TAs would be desirable.	Monitoring of NMPs and some ICMPs will be done as part of the network discharge consents. Use of the orders of outcomes framework, measurable objectives and multiple bottom line considerations is conceptually at the leading edge of practice.

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Mō tātou, ā, mō kā uri āmuri ake nei.

For us and our children after us.

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7 Appendix A: International Literature Review – matrix of best practice ICM

Matrix of findings – international literature review

Title	Author	Year	Region	Type	Purpose
Ecosystem-based management: markers for assessing progress	United Nations Environment Programme (UNEP), Global Programme of Action for the Marine Environment from Land-based Activities (GPA)	2006	Global	Spatial and conceptual	Paper discusses a practical tool (order of outcomes framework) for assessing the progress in integrated coastal and river basin management (ecosystem); highlights the needs and benefits of integrated management, and provides guidance in establishing management links
Integrated river basin governance and key performance indicators	Dr Bruce P Hooper	2006	USA	Conceptual	Discusses aspects of Integrated Water Management and Integrated River Basin Management governance and role of key performance indicators in integrated river basin management
The EU Water Framework Directive - a key to catchment-based governance	Dr. Fritz Holzwarth	2002	Europe	Conceptual	Framework for catchment based river management governance
Water Financing and Governance	Global Water Partnership	2008	Global	Spatial and conceptual	To bring together integrated catchment management, good water governance and financing so that a more coordinated, coherent approach to water financing is adopted. Focuses on the need to fund the water resources functions that are essential for security and sustainability and to examine the relationship between the different governance and organisational structures in the sector and their ability to secure funding for essential goods and services
Effective Water Governance	Global Water Partnership	2003	Global	Spatial	This document is a status report prepared for presentation at the 3rd World Water Forum in Kyoto, Japan, March 16-23, 2003. This document brings together the experience gained after conducting the Dialogue on Effective Water Governance over the previous year. The Dialogue on Effective Water Governance was designed to be as broad based as possible and constructed through country and regional workshops and roundtables that brought together parliamentarians, government agencies, key water practitioners, community groups, NGOs, UN agencies, donors, the private sector and others.
Integrated Water Resources Management	Global Water Partnership Technical Advisory Committee	2000	Global	Conceptual	Integrated Water Resources Management
Integrated River Basin Management Through Decentralisation	Karin E Kemper, William Blomquist, Ariel Dinar	2007	Global	Spatial and Conceptual	Investigation on whether river basin management at the lowest appropriate level works (decentralisation) and what the outcomes are when it is applied; development of an analytical framework to capture the factors likely to related to the river basin management success and generation of hypotheses to be tested in actual case studies
Integrated water resource management, institutional arrangements, and land use planning	Bruce Mitchell	2005	USA	Neither spatial or conceptual	Literature review - lessons learned: examines the implications of different interpretations of a systems, ecosystem, or holistic approach related to Integrated Water Resources Management (IWRM), and to consider how institutional arrangements can be designed to facilitate IWRM; how IWRM can benefit from a closer connection to land use planning
Integrated Catchment Management:	Bellamy, J., Ross, H., Ewing, S., Meppem, T.	2002	Australia	Spatial	Identify flexible, best practice approaches for Integrated Catchment Management in the Murray Darling Basin, Australia

Learning from the Australian Experience for the Murray-Darling Basin					
Planning and Implementing Integrated Catchment Management	Bellamy, JA., McDonald, GT., Syme, GJ. And Walker, GH.	1999	Australia	Conceptual	Identifies guiding principles for the role of community-based Integrated Catchment Management including factors likely to influence success; makes recommendations on planning and implementation.
Sustainability Criteria for Water Resource Systems	American Society of Civil Engineers (ASCE) Task Committee, Working Group of UNESCO, Water Resources Planning (COR) Task Committee on Sustainability Criteria	1998	USA, UN	Conceptual	Use of sustainability indicators as evaluation criteria for water resource systems
Coastal Planning and Management	Robert Kay, Jacqueline Alder	2005	USA and Global	Spatial and conceptual	Introduces importance and uniqueness of the world's coastal areas and outlines coastal issues and planning and management tools
Disciplined Planning, Structured Participation and Collaborative Modelling: Applying Shared Vision Planning	Richard N Palmer, Hal E Cardwell, Mark A Lorie, William J Werick	2007	USA	Spatial and conceptual	Looks at technique of shared vision planning as an approach to collaborative decision-making and the support of computer models in water resources systems
National Framework for Natural Resource Management - Standards and Targets; Monitoring and Evaluation; Capacity Building	Natural Resource Management Ministerial Council	2003	Australia	Conceptual	The (3) National Frameworks establish the principles and requirements for natural resource management (NRM) to guide investment through national NRM programs, particularly investment
Alternative policy approaches to natural resource management - background report to the Natural Resource Management Taskforce	ABARE	2001	Australia	Conceptual	The consideration of economic costs to different NRM policy approaches and how economic considerations can assist decision makers to choose the right policy mix to achieve their stated objectives.
Integration of stormwater and associated activities in catchment management plans - DHI	Murray Menzies, Bruce Hooper	2008	New Zealand, Global case studies	Spatial and conceptual	Investigation into the incorporation of associated activities into integrated catchment management plans
Integrated Water Resources Management and Water Sharing	Matthew D Davis	2007	Global, with USA and Europe case studies	Spatial and conceptual	Summarises Integrated Water Resource Management concepts and issues and illustrates successes and challenges with case studies from two different geographic areas with differing legal and institutional arrangements

Author (abbrev.)	Scale					Legislative framework			
	Macro	Meso	Micro	Strategic	Other	Role of law	Vertical integration of policy & regulatory tools	Horizontal integration of policy & regulatory tools	Other
UNEP	✓	✗	✗	✗	✓	✓	✗	✗	✓
Hooper	✓	✗	✗	✓	✗	✓	✗	✗	✗
Holzwarth	✓	✗	✗	✓	✗	✓	✗	✗	✗
Global Water Partnership 2008	✓	✓	✓	✓	✗	✓	✓	✗	✗
Global Water Partnership 2003	✗	✗	✗	✓	✗	✓	✗	✗	✗
Global Water Partnership 2000	✓	✓	✗	✓	✗	✓	✓	✓	✗
Kemper et al	✓	✗	✗	✗	✗	✓	✗	✗	✗
Mitchell	✗	✗	✗	✗	✗	✗	✗	✗	✓
Bellamy et al 2002	✓	✗	✗	✓	✗	✓	✓	✓	✗
Bellamy et al 1999	✗	✗	✓	✗	✗	✓	✗	✓	✗
ASCE	✓	✓	✗	✗	✓	✗	✗	✗	✗
Kay and Alder	✗	✗	✗	✓	✗	✓	✗	✗	✓
Palmer et al	✓	✗	✗	✗	✗	✗	✗	✗	✓
NRM Ministerial Council	✓	✓	✓	✓	✗	✓	✓	✓	✗
ABARE	✗	✗	✗	✗	✓	✓	✗	✗	✓
Menzies and Hooper	✓	✗	✗	✗	✗	✗	✗	✓	✗
Davis	✓	✗	✗	✗	✗	✓	✓	✓	✗

Author (abbrev.)	Institutional, Planning and management framework					Collaborative framework			
	Organisational design	Goals, goal shift, goal completion	Financial sustainability	Information & research	Accountability & monitoring	Bottom up	Top down	Other	Private/ public sector roles
UNEP	✓	✓	✓	✗	✓	✓	✗	✓	✗
Hooper	✓	✓	✓	✗	✓	✗	✗	✓	✓
Holzwarth	✗	✗	✗	✗	✗	✗	✗	✓	✓
Global Water Partnership 2008	✓	✗	✓	✓	✓	✓	✓	✓	✓
Global Water Partnership 2003	✓	✗	✓	✓	✓	✗	✗	✗	✗
Global Water Partnership 2000	✓	✗	✓	✓	✓	✓	✓	✗	✓
Kemper et al	✓	✗	✓	✗	✓	✓	✗	✓	✗
Mitchell	✓	✓	✓	✗	✓	✗	✗	✗	✗
Bellamy et al 2002	✓	✓	✓	✓	✓	✓	✗	✗	✗
Bellamy et al 1999	✓	✗	✓	✓	✓	✓	✗	✗	✓
ASCE	✓	✓	✓	✓	✓	✓	✗	✗	✓
Kay and Alder	✓	✓	✗	✓	✓	✓	✓	✓	✓
Palmer et al	✓	✓	✗	✓	✓	✗	✗	✗	✓
NRM Ministerial Council	✓	✓	✓	✓	✓	✗	✗	✓	✓
ABARE	✗	✗	✗	✗	✗	✗	✗	✗	✓
Menzies and Hooper	✓	✗	✗	✗	✗	✗	✗	✗	✗
Davis	✓	✓	✗	✗	✗	✗	✗	✓	✓

Author (abbrev.)	Collaborative framework			Learning & capacity framework				Biophysical, social and economic variables					
	Top down	Other	Private/ public sector roles	Responsive decision- making	Training	Capacity building	Provision for learning & reflection	Rural/urban land uses	Greenfield/ Brownfield growth	Water quality	Water quantity	Bio- diversity	Heritage/ cultural
UNEP	✗	✓	✗	✓	✓	✓	✓	✗	✗	✓	✓	✗	✗
Hooper	✗	✓	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
Holzwarth	✗	✓	✓	✓	✓	✗	✓	✗	✗	✓	✓	✓	✗
Global Water Partnership 2008	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Global Water Partnership 2003	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Global Water Partnership 2000	✓	✗	✓	✓	✗	✓	✗	✓	✗	✓	✓	✗	✗
Kemper et al	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Mitchell	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Bellamy et al 2002	✗	✗	✗	✓	✗	✓	✗	✗	✗	✓	✓	✗	✓
Bellamy et al 1999	✗	✗	✓	✓	✗	✓	✗	✓	✗	✗	✗	✗	✗
ASCE	✗	✗	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✗
Kay and Alder	✓	✓	✓	✓	✗	✗	✓	✗	✗	✓	✗	✓	✗
Palmer et al	✗	✗	✓	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗
NRM Ministerial Council	✗	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓
ABARE	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
Menzies and Hooper	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Davis	✗	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓	✗	✗

Author (abbrev.)	Biophysical, social and economic variables														
	Recreation	Cross boundary issues	Ecologically sustainable developmt	Flooding	Pests	Transport planning	Structure planning	Water use/ allocation/ damming	Land-scape values	Streams	Aquifer	Storm-water	Waste -water	Sed-iment	Ero-sion
UNEP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Hooper	x	x	✓	x	x	x	x	✓	x	x	x	x	x	x	x
Holzwarth	✓	x	x	x	x	x	✓	x	x	x	✓	x	x	x	x
Global Water Partnership 2008	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x
Global Water Partnership 2003	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Global Water Partnership 2000	x	✓	✓	✓	x	x	x	✓	x	x	✓	x	✓	x	x
Kemper et al	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mitchell	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x
Bellamy et al 2002	x	✓	x	x	x	x	x	✓	x	x	x	x	x	x	x
Bellamy et al 1999	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ASCE	x	x	x	✓	x	x	x	✓	x	x	✓	x	x	x	x
Kay and Alder	✓	x	x	x	x	✓	x	x	x	x	x	x	x	x	x
Palmer et al	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NRM Ministerial Council	x	✓	x	x	✓	x	x	✓	✓	✓	✓	x	x	✓	✓
ABARE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Menzies and Hooper	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Davis	x	x	✓	x	x	x	x	✓	x	x	✓	x	x	x	x

Author (abbrev.)	Biophysical, social and economic variables							Implementation		Applicability to the Auckland region		Adaptive management
	Marine, coastal, estuary-line	Property rights	Climate change	Inter-generation al equity	Socio-economic	Economics/ financial	Other	How would it be implemented/ monitored? (theoretical)	Has it been implemented/ monitored? (actual)	Alignment with relevant goals, shifts & strategic responses of ASF	Ability to accommodate Treaty/ iwi interests/ other stakeholders	
UNEP	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✓
Hooper	✗	✓	✗	✗	✗	✗	✓	✓	✗	✓	✓	✓
Holzwarth	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗
Global Water Partnership 2008	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Global Water Partnership 2003	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Global Water Partnership 2000	✓	✓	✓	✓	✓	✓	✗	✗	✓	✗	✓	✓
Kemper et al	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓
Mitchell	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
Bellamy et al 2002	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✓
Bellamy et al 1999	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✓
ASCE	✗	✗	✓	✓	✗	✓	✓	✗	✗	✗	✗	✓
Kay and Alder	✓	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗
Palmer et al	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓
NRM Ministerial Council	✓	✗	✗	✓	✓	✗	✗	✗	✓	✗	✓	✓
ABARE	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
Menzies and Hooper	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Davis	✗	✓	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗

- 8 Appendix B: Coastal/Catchment Planning –
relevant provisions of the statutory documents
for the Auckland region in 2008

Table B-1: Effects of land use on water quality: research and management recommendations

Source: NWASCO, 1981

Research recommendations	Management recommendations
<p>Hydrology, including:</p> <ul style="list-style-type: none"> ▪ pollutant entrainment and transport ▪ sensitive land areas needing application of hydrological land concepts ▪ runoff source area techniques ▪ effects of riparian zones and wetland preservation on water quality, hydrology and biota 	<p>Hydrology:</p> <ul style="list-style-type: none"> ▪ understand hydrological processes, including streamflow source areas during storms and between seasons ▪ map areas contributing to streamflow ▪ base buffer some management on hydrological understanding ▪ understand the land-water interface zone
<p>Native vegetation, including:</p> <ul style="list-style-type: none"> ▪ nutrient loads from different vegetation ▪ effects of pastoral burning ▪ effects of peatlands as nutrient sinks ▪ update water quality in indigenous forests 	<p>Natural vegetation and water quality recommendations for:</p> <ul style="list-style-type: none"> ▪ native grassland, tussock, scrubland ▪ swamps and peatlands ▪ indigenous forests
<p>Land clearing:</p> <ul style="list-style-type: none"> ▪ identification of problem areas where land use may have a major effect on the water system ▪ water quality in uncleared catchments ▪ impact of clearance on water quality and different clearance methods ▪ effects of succeeding land uses on water quality and downstream users ▪ desirable characteristics of riparian zones and their impact on key parameters 	<p>Land clearance practices:</p> <ul style="list-style-type: none"> ▪ importance of manuals and techniques to minimise exposure of bare earth ▪ apply principles such as land use capability; avoiding burning on steep land or by streams; burning only at low temperatures to preserve soil organic material; no clearing of key infiltration areas or riparian zones, and re-establishment of vegetation cover as soon as possible, with fertiliser if needed
<p>Agriculture: several needs for each of:</p> <ul style="list-style-type: none"> ▪ arable farming and horticulture ▪ pastoral farming ▪ fertiliser practice ▪ irrigation ▪ drainage ▪ exotic forestry 	<p>Agriculture and water quality management:</p> <ul style="list-style-type: none"> ▪ cropland and grassland ▪ reducing loss of fertiliser ▪ reducing effects of grazing animals on water quality ▪ irrigation ▪ drainage
<p>Chemical residues</p> <ul style="list-style-type: none"> ▪ fate, persistence and mobility of biocides ▪ ability of ecosystems and aquatic food changes to recover from biocides in runoff ▪ effects of different methods of spraying ▪ toxicity and ability of biocides to enter streams ▪ effectiveness of riparian buffers for reducing stream contamination during spraying ▪ methods of safe disposal of agricultural and forest chemicals 	<p>Pollution by toxic chemicals from agriculture and forestry:</p> <ul style="list-style-type: none"> ▪ apart from spills or illegal disposal, surface runoff or probably the major source of agrichems to waterways but there have been few studies ▪ existing controls need to be supplemented by overseas guidelines ▪ direct entry to waterways is the big risk from forestry chemicals ▪ several guidelines exist
<p>Urban land:</p> <ul style="list-style-type: none"> ▪ effects on water quality of cut and fill 	<p>Managing urban land use and water quality:</p>

<p>land development and different forms of urban and suburban land use and lifestyles</p> <ul style="list-style-type: none"> ▪ techniques for reducing the impact on water bodies of urban development and urban land use ▪ effects of different methods of sewage and stormwater disposal on water quality 	<ul style="list-style-type: none"> ▪ flood frequency and magnitude ▪ sediment problems ▪ pollution from localised sources ▪ pollution from spills & stored chemicals ▪ stormwater: regular road sweeping by trained operators, 1st flush treatment at sewage works, land use planning, self-purification of streams, natural streams, fish passage, control of biocide use
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Table B-2 Coastal/catchment planning: relevant provisions of the statutory documents for the Auckland region in 2008

Note: excerpts of significance to this report have been highlighted in bold.

REGIONAL POLICY STATEMENT	
Regional Policy Statement Chapter 2 Regional overview and strategic direction	
2.5.1 Strategic Objectives	<p>3: To protect the soil resources, amenity values, rural character, landscape values, and mineral resources of rural areas, from the regionally significant effects of inappropriate subdivision, use or development.</p> <p>4. To preserve the natural character of the coastal environment, whilst ensuring that the use of the coastal environment by those industries and activities which serve the needs of the region and which depend on a coastal location is appropriate and efficient.</p> <p>5. To protect the intrinsic values of the region's natural resource base, and to make appropriate provision for the avoidance, remediation or mitigation of adverse effects on the region's environment, including the identification of significant natural features and landscapes, and areas of significant indigenous vegetation and habitat, and protection of these from inappropriate subdivision use and development.</p> <p>6. To promote transport efficiency, and to encourage the efficient use of natural and physical resources, including urban land, infrastructure, and energy resources.</p> <p>8. To manage the region's natural and physical resources in an integrated manner.</p> <p>9. To involve the Tangata Whenua as kaitiaki of the region's natural resources.</p>
2.5.2 Strategic Policies	<p>1. The use, development and protection of natural and physical resources in the region is to be managed so that the region's growth is accommodated in a manner and in locations which are consistent with the Strategic Objectives and which promote the sustainable management of those resources.</p> <p>2. Where significant degradation of water, air, ecosystems and land has occurred it is to be remedied or its adverse effects mitigated.</p> <p>3. Urban development is to be contained, within the metropolitan urban limits shown on Map Series 1 and the limits of rural and coastal settlements as defined so that:</p> <p>(i) expansion of urban activities outside the metropolitan urban limits as defined and shown in the RPS from time to time is not permitted;</p> <p>(ii) environmental values protected by the metropolitan urban limits and/or the limits of rural or coastal settlements are not adversely affected, and that the integrity of those limits is maintained;</p> <p>(iii) urban intensification at selected locations is provided for and encouraged. Selection of these places will take into account, amongst other things, any significant adverse effects which arise from the interaction with any regionally significant infrastructure and other significant physical resources;</p> <p>(iv) expansion of rural and coastal settlements outside the limits of existing urban zones and settlements (at the time of notification of the RPS or as shown or provided for in the RPS) is not permitted;</p> <p>(v) the identification and provision of areas for future urban growth are managed through an integrated process on a regional basis and are consistent with the Strategic Direction.</p>

	<p>4. Countryside living is to be subject to constraints as to location, scale and extent so as to avoid remedy or mitigate adverse effects.</p> <p>5. The subdivision, use and development of rural land is to be managed so that:</p> <ul style="list-style-type: none"> (i) the life supporting capacity of rural soils is safeguarded so far as is practical; (ii) the ability of rural resources to meet the needs of future generations is maintained; (iii) future options to accommodate urban development are not prematurely foreclosed or compromised; (iv) significant adverse effects on the environment, including effects on the rural character of rural areas and on regionally significant environmental values, are avoided; and where avoidance is not practicable, adverse effects are remedied or mitigated; (v) the creation of conflicts between quarrying (and similar activities dependent on locationally specific natural resources) and other incompatible activities are avoided. <p>6. Provision is to be made to enable the safe and efficient operation of existing regional infrastructure which is necessary for the social, and economic wellbeing of the region's people, and for the development of regional infrastructure (including transport and energy facilities and services) in a manner which is consistent with this strategic direction and which avoids, remedies or mitigates any adverse effects of those activities on the environment.</p> <p>7. The use, development and protection of the region's natural and physical resources is to be managed in an integrated manner, so that adverse effects, including significant cumulative adverse effects, that range across resources or cross jurisdictional boundaries are avoided, remedied or mitigated.</p> <p>8. Resource management processes in the region are to be carried out in ways which ensure that affected parties are consulted at an early stage, and in particular Tangata Whenua involvement as kaitiaki of the region's natural resources is to be facilitated.</p>
2.6.1 Urban Growth Management Policies	<p>1. The growth of metropolitan Auckland is to be managed with reference to a 30 year time horizon, in a manner which gives effect to the Purpose and Principles of the RM Act, is consistent with the Strategic Direction, and has regard to:</p> <ul style="list-style-type: none"> (i) the rate of urban development occurring in, and forecast for, the whole region and sectors of the region; (ii) the capacity realistically available for further urban development, including <ul style="list-style-type: none"> (a) provision for metropolitan urban expansion (b) the potential for intensification within the urban area (c) the growth capacity, and contribution that may be made by rural and coastal settlements (iii) the need to recognise and provide for areas of significant natural and physical resources requiring protection from urban development in existing and future urban areas and rural areas; (iv) areas where provision should be made for future urban development, and priorities for, and sequencing of development; (v) an explicit evaluation (as required by Section 32 of the RM Act) of the costs and benefits of alternative forms of development to accommodate Auckland's growth; (vi) the use of financial contributions as provided for in section 108 of the RM Act. <p>2. Urban development shall be contained within the defined limits (including the metropolitan urban limits and the limits of rural and coastal settlements – referred to in Strategic Policy 2.5.2-</p> <p>3) shown in the RPS from time to time, and its form shall be planned and undertaken through an integrated process on a regional basis and in ways that are consistent with the Strategic Direction and:</p> <ul style="list-style-type: none"> (i) provide for urban intensification around selected nodes and along selected transport corridors; (ii) provide for higher intensities of urban activities at selected locations within areas of new development;

	<p>(iii) bring about patterns of activities that will mitigate the effects of increased travel and improve the energy efficiency and convenience of urban areas (refer to Chapter 4 – Policy 4.4.1-2, and Chapter 5 – Policy 5.4.1-3);</p> <p>(iv) enable the operation of existing regional infrastructure and the provision of necessary new or upgraded regional infrastructure which is operated and developed in a manner which ensures that any adverse effects of those activities on the environment are avoided, remedied or mitigated;</p> <p>(v) facilitate efficient provision of services (including utility services, transportation facilities or services, and community facilities and services, such as schools, libraries, public open spaces) through the utilisation or upgrading of existing facilities, or the provision of new ones;</p> <p>(vi) maintain and enhance amenity values within the existing urban area, and achieve high standards of amenity in areas of new development;</p> <p>(vii) do not give rise to conflicts between incompatible land uses;</p> <p>(viii) avoids, remedies, or mitigates adverse effects on the environment.</p> <p>3. Countryside living (see Appendix D) may be provided for in rural areas to the extent that provision will take into account and make appropriate provision for the following matters: (includes)</p> <p>(ii) the avoidance of significant adverse effects (including cumulative adverse effects) on:</p> <p>(a) the environmental values protected by defined limits to metropolitan Auckland and defined limits of rural or coastal settlements</p> <p>(b) the safe and efficient operation of existing regional infrastructure</p> <p>(c) the necessary upgrading of existing regional infrastructure</p> <p>(d) the provision of new regional infrastructure</p> <p>(e) the rural character of the region</p>
2.6.2 Methods	<p>3. To promote the implementation of Policy 2.6.1-1, the ARC will, in consultation with the TAs, prepare a non-statutory strategic report or a regional plan which identifies the following features:</p> <p>(i) major regional infrastructure features and other important physical resources;</p> <p>(ii) major regional transport corridors;</p> <p>(iii) areas with regionally significant environmental constraints to urban (re)development;</p> <p>(iv) areas considered suitable for residential and employment intensification.</p> <p>4. The Policies in 2.6.1, shall be given effect to the extent necessary and appropriate, through the provisions of any relevant regional plan, changes to the RPS, district plans, and the RLTS, and should be reflected in the annual plan process and any strategic planning process undertaken by a TA.</p> <p>5. Policy 2.6.1-3 will be implemented through the following processes:</p> <p>(i) Each TA shall set out within its District Plan issues, objectives, policies and methods for enabling countryside living. This shall:</p> <p>(a) be an integrated consideration of the relevant issues ;</p> <p>(b) be integrated with the urban and rural components of the District Plan ;</p> <p>(c) not be inconsistent with the RPS and will need to take into account:</p> <p>_ potential effects (adverse or beneficial) on the environment</p> <p>_ cumulative effects that may accrue when considered together with the effects of other activities elsewhere in the district or in</p>

	<p>adjoining districts</p> <p>_ the possible provision of mechanisms aimed at achieving amalgamation of titles (e.g. transferable development rights) in surrounding rural areas.</p>
2.6.4 Policy - Rural Area	<p>1. The use, development and protection of natural and physical resources and the subdivision of land in the rural parts of the region (except as provided by Policy 2.6.1-3) is to be managed in an integrated manner, that:</p> <p>_ gives effect to Part II of the RM Act;</p> <p>_ is consistent with the Strategic Direction and with the relevant provisions of Chapters 3 to 18 inclusive of this RPS ;</p>
Regional Policy Statement Chapter 7 Coastal Environment	
7.3 Objectives	10. To achieve integrated management of land and water areas in the coastal environment both within the Auckland region and between adjacent regions.
7.4.1 Policy	<p>In determining the extent of the coastal environment of the Auckland region, the following areas and features shall be taken into consideration:</p> <p>(i) any vegetation or habitat adjacent to, or connected with, the CMA which derives its intrinsic character from a coastal location or which contributes to the natural character of the coastal environment;</p> <p>(ii) any landform adjacent to the CMA which is presently being formed or modified by processes of coastal erosion or deposition;</p> <p>(iii) any feature or collection of features, either natural or physical, that derives its intrinsic character from a coastal location and which substantially contributes to the visual quality or amenity value of the coast;</p> <p>(iv) any site, building, place or area of cultural heritage value adjacent to, or connected with, the CMA which derives its heritage value from a coastal location;</p> <p>(v) areas of Significant Natural Heritage listed in Appendix B and Outstanding and Regionally Significant Landscape Areas shown on Map series 2 which are adjacent to the CMA;</p> <p>(vi) any land adjacent to the coast from which surface drainage may flow directly to the CMA;</p> <p>(vii) any land adjacent to the coast which is affected by, or could be affected by, coastal flooding and other identified coastal hazards;</p> <p>(viii) any land adjacent to the coast where activities may take place which have a direct physical connection with or impact on the CMA;</p> <p>(ix) the CMA.</p>
7.4.2 Methods	<p>1. Local authorities will include provisions in their plans which recognise the coastal environment of their areas in a manner consistent with the factors in Policy 7.4.1.</p> <p>2. In formulating plan provisions relating to the coastal environment, local authorities will consult with the adjacent TAs, the relevant regional council, DoC and Tangata Whenua.</p>
7.4.4 Policy – Natural Character	<p>1. The natural character of the coastal environment shall be preserved, and protected from inappropriate subdivision, use and development by:</p> <p>(i) In areas of high natural character, avoiding adverse effects on:</p> <p>(a) the natural functioning and natural processes of sediment transport, substrate composition and movement of biota;</p> <p>(b) areas of indigenous vegetation and habitats of indigenous fauna and associated processes;</p> <p>(c) the physical integrity of coastal landforms and geological features and associated natural processes;</p> <p>(d) features, elements and patterns which contribute to landscape value and scenic and visual value;</p>

	<p>(e) natural features, sites and natural areas of historic, aesthetic, cultural or spiritual value;</p> <p>(f) water or air quality;</p> <p>(g) habitat important for preserving the range, abundance and diversity of indigenous and migratory coastal species;</p> <p>(h) habitat important for breeding and feeding of coastal species;</p> <p>(i) the healthy functioning of estuaries, coastal wetlands, mangroves, dunes, sand spits and their margins.</p> <p>(ii) In all other areas, avoiding any adverse effects which result in the significant reduction in habitat important for preserving the range and diversity of indigenous and migratory coastal species within the Auckland region.</p> <p>(iii) In areas which are not of high natural character, avoiding where practicable or remedying, or mitigating the adverse effects of subdivision, use and development on the elements of natural character outlined in Policy 7.4.4-1 (i) (a) – (i) except those adverse effects which are to be avoided in 7.4.4-1 (ii) above.</p>
7.4.5 Methods	<p>1. District plans, the Regional Plan: Coastal and other regional plans will include appropriate provisions to give effect to Policies 7.4.4-1 (i), (ii) and (iii), and 7.4.4-2, and in conjunction with other relevant land management documents shall include appropriate measures to restore and enhance the natural character of the coastal environment, including those established under Chapter 18. Where restoration planting is carried out, preference shall be given to the use of indigenous species, with a further preference for the use of local genetic stock.</p> <p>(Refer also to Chapter 3 – Matters of Significance to Iwi and Chapter 6 – Heritage.)</p>
7.4.10 Policy : Subdivision, use and development	<p>1. The diverse range of values of the coastal environment shall be recognised and the need to enable people and communities to provide for their social, economic and cultural wellbeing shall be provided for in appropriate areas of the coastal environment.</p> <p>3. A precautionary approach shall be taken by local authorities when providing for and assessing subdivision, use and development in the coastal environment where potentially significant adverse effects may arise.</p>
7.4.11 Methods	<p>1. Regional and district plans shall contain appropriate provisions to give effect to Policies 7.4.10-1 through 10.</p> <p>2. Regional plans and district plans should include provisions which enable financial contributions (including contributions of money, land, works or services) for the purposes of remedying, or mitigating adverse effects of subdivision, use and development, to be secured by way of conditions on resource consents as provided by section 108 of the RM Act.</p> <p>3. In order to give effect to Policies 7.4.10-1 through 10, regional and district plans shall incorporate the limits to urban coastal development within their areas as required by Method 4.4.2 of this RPS.</p>
7.4.25 Policies Integrated Management	<p>1. Regional policy statements and regional plans of adjoining regional councils should be consistent with each other to the extent that they will achieve integrated management across the regional boundaries.</p> <p>2. In the preparation of regional and district plans, local authorities will have regard to the provisions of regional and district plans of adjoining local authorities to ensure integrated management of the coastal environment.</p> <p>3. Local authorities, Tangata Whenua and statutory agencies with resource management responsibilities in the coastal environment shall consider joint initiatives when:</p> <p>(i) there is potential for significant cross boundary adverse effects on the natural and physical values of the coastal environment; or</p> <p>(ii) the natural and physical values are of regional significance or greater; or</p>

	<ul style="list-style-type: none"> (iii) the activities are of regional significance or greater; or (iv) the activities may contribute to significant cumulative adverse effects; or (v) this will result in consistent and efficient management of the coastal environment.
7.4.26 Methods	<p>1. Regional plans and district plans will include appropriate provisions to give effect to Policies 7.4.25-1 and 7.4.25-2.</p> <p>2. In order to promote consistent and sustainable management of the coastal environment, the ARC will prepare a regional plan incorporating a regional coastal plan. This plan will, over time, progressively include objectives, policies and rules as they relate to the functions of the ARC under section 30 of the RM Act.</p> <p>3. Local authorities will give effect to Policy 7.4.25-3 through appropriate initiatives including, but not limited to,:</p> <ul style="list-style-type: none"> (i) preparation of joint plans; (ii) non-statutory studies; (iii) use of joint hearings; (iv) transfer of powers; (v) public education; (vi) consultation with adjacent local authorities; (vii) sharing information and knowledge gained by them about the coastal environment, particularly where it relates to coastal processes and/or to activities with previously unknown or little known effects.
Regional Policy Statement Chapter 8 Water quality	
8.3 Objective	<p>1. To maintain water quality in water bodies and coastal waters which have good water quality, and to enhance water quality which is degraded particularly for the following purposes:</p> <ul style="list-style-type: none"> (i) Estuaries and harbours: protection of aquatic ecosystems, recreation, fishing and shellfish gathering, cultural and aesthetic purposes. (ii) Open coastal waters, including parts of the Hauraki Gulf: its natural state. (iii) Groundwater: water supply. (iv) Lakes, rivers and streams: protection of aquatic ecosystems, recreation, food gathering, water supply, cultural and aesthetic purposes. (v) Wetlands: protection of aquatic ecosystems.
8.4.4 Policies – Development & Redevelopment	<p>1. Land use intensification in urban areas shall only occur where adequate provision is made for:</p> <ul style="list-style-type: none"> (i) control of sediment discharges; (ii) control of stormwater discharges; (iii) collection, transport, treatment, purification and disposal of sewage; (iv) protection of the quality of groundwater recharge especially into aquifers used for water supply purposes; (v) protection of water quality and riparian margins; <p>2. Land use intensification in rural areas to countryside living or urban developments (whether reticulated or not) shall only occur where adequate provision is made for:</p> <ul style="list-style-type: none"> (i) the matters listed in 8.4.4-1; (ii) retention of vegetation (excluding plant pests) wherever practicable adjacent to water bodies and coastal waters; (iii) maintenance of normal access for biota throughout stream channels;

	(iv) protection of the intrinsic ecological values of aquatic systems.
8.4.5 Methods	<p>1. When proposals for land use intensification are initiated, sufficient investigations will be undertaken by the persons initiating such proposals to establish the feasibility of making adequate provision to deal with the matters listed in Policy 8.4.4-1 and 8.4.4-2. Those investigations must be documented as part of the proposed change, variation or application.</p> <p>2. Where land use intensification is proposed, the need to prepare a catchment management plan or structure plan (see Appendix A) will be determined by consultation and agreement between the ARC, relevant TA and persons initiating the proposal. The need for a plan will be determined by assessing the proposal in terms of the following criteria:</p> <ul style="list-style-type: none"> (i) the scale of the proposal; (ii) the sensitivity of the receiving environment; (iii) the potential for adverse effects, particularly cumulative adverse effects to water quality. The catchment management plan or structure plan will include the measures which are necessary to address the matters set out in Policy 8.4.4-1 and 8.4.4-2 and the implementation of those measures will be secured by means of resource consents and related conditions, and/or measures in district plans and/or regional plans. <p>3. Where land use intensification occurs in accordance with Policies 8.4.4-1 and -2, district plans and district structure plans shall provide for the establishment and retention of riparian protection yards, wherever practicable, between land use activities and water bodies and coastal waters.</p> <p>4. District plans shall not provide for land use intensification in sewerage catchments that are at a maximum capacity for sewage disposal and/or have inadequate drainage (which is resulting in hydraulic overloading of the sewers) unless services are upgraded to an adequate capacity, or a commitment made to upgrading, sufficient to handle the demand that will result from the intensification.</p> <p>5. Where district plans are changed, varied or reviewed in ways which enable land use intensification, TAs will investigate and report on the overall adequacy of the existing and planned capacity of the wastewater reticulation and treatment system and stormwater utility systems, relative to the demands on those services which will arise from the planned intensification of land use. Documentation of those investigations will form part of the information supporting the proposed changes, variations or reviews.</p>
8.4.7 Policies: Stormwater and sediment discharges	<p>1. All new developments discharging stormwater, whether allowed as a permitted activity or by a resource consent, shall adopt appropriate methods to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments.</p> <p>2. The ARC will promote stormwater quality control on a catchment wide basis to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments.</p> <p>3. All land disturbance activities which may result in elevated levels of sediment discharge shall be carried out so that the adverse effects of such discharges are avoided, remedied, or mitigated.</p>
8.4.8 Methods	<p>1. A strategy to prioritise catchments for retro-fitting within existing development will be developed and agreed jointly at a date to be agreed upon by the ARC and relevant TAs.</p> <p>2. The ARC will implement a Stormwater Quality Control Programme including public education, source controls and retro-fitting and</p>

	could include rules in a regional plan to control stormwater.
8.4.21 Policies: Areas susceptible to water quality degradation/areas already degraded/areas that have significant values	<p>1. In identifying new areas for urban development outside the Metropolitan Urban Limits and, in the case of rural and coastal settlements, the extent of existing urban zones, catchments which drain to areas susceptible to degradation (as detailed in Tables 8.1 and 8.2 and Map Series 5 Sheets 1 – 4) shall be avoided unless the best overall option determined by the process outlined in Policies 2.6.1(1) and (2) indicates otherwise and the adverse effects of new urban development (and, where appropriate, existing urban development) on water quality in that catchment will be remedied or mitigated.</p> <p>2. In determining where it is appropriate for existing urban development to remedy or mitigate its adverse effects under Policy 8.4.21(1), consideration will be given to the significance of the adverse effect on water quality and the sensitivity of the receiving environment.</p> <p>3. Priority shall be given to maintaining, and where possible improving, water quality in areas which are susceptible to degradation and/or have significant values (as listed in Tables 8.1 and 8.2 and shown in Map Series 5 – Sheets 1-4).</p>
Methods	<p>1. District plans, regional plans, and annual plans where appropriate, will give effect to Policies 8.4.21-1, 2, 3 and 4.</p> <p>2. Methods for the ARC and TAs to achieve Policy 8.4.21-3 include:</p> <ul style="list-style-type: none"> (i) pollution abatement and control work, including focus on controlling contaminants at source; (ii) stormwater quality control including retrofitting in existing urban areas; (iii) drainage remediation programmes for illegal connections and combined sewer discharges, particularly for degraded urban streams and aquifers; (iv) techniques to reduce nitrate contamination; (v) riparian management techniques to protect water quality; (vi) water quality education programmes. <p>3. The ARC will promote the use of riparian management techniques.</p> <p>4. Methods for implementing Policy 8.4.21-2 will include the development of a Regional Stormwater Management Strategy which considers stormwater management issues in both new and existing urban areas. This strategy will be developed jointly by the ARC and the region's TAs.</p>
Regional Policy Statement Chapter 9 Water Conservation and Allocation	
9.3 Objectives	<p>1. To maintain water levels and flows sufficient to protect the:</p> <ul style="list-style-type: none"> (i) natural character, (ii) cultural, amenity and intrinsic values, and (iii) aquatic habitats and ecosystems, of streams, rivers, lakes and wetlands. <p>2. To maintain water levels and flows of aquifers in the long term so as to retain adequate spring flow, prevent seawater intrusion at the coast, and to maintain temperatures in geothermal aquifers.</p> <p>3. To manage the use of water so as to enable people and communities to provide for their present and future social, economic and cultural wellbeing, and for their health and safety, while being consistent with Objectives 9.3-1 and 9.3-2.</p>
9.4.1 Policies: Land use and water resources	<p>1. Land use activities that affect the quantity of water contributed to streams, rivers, lakes, wetlands or aquifers shall be managed so as to:</p> <ul style="list-style-type: none"> (i) protect the quantity of water in water bodies which have high amenity, cultural or ecological values;

	<ul style="list-style-type: none"> (ii) avoid or mitigate flooding and erosion; (iii) enhance water quality; (iv) protect highly used water bodies. <p>2. Planning for changes or intensification of land use shall have particular regard to current water availability and priorities for allocation of available water resources.</p>
9.4.2 Methods	<p>1. The ARC will give effect to Policy 9.4.1-1 and -2 by seeking the inclusion of appropriate provisions in district plans or, where desirable, through the provisions of regional plans.</p> <p>2. The ARC will record and make available to the public ,appropriate information on current water availability for significant or priority surface water catchments and aquifers.</p> <p>3. TAs should give effect to Policies 9.4.1-1 and -2 by the inclusion of appropriate provisions in district plans.</p>
9.4.4 Policy – Water Availability	<p>The availability of water in water bodies and coastal water for taking, use, damming or diversion shall be determined on the following basis:</p> <ul style="list-style-type: none"> (i) A precautionary approach shall be taken. (ii) The following matters shall be recognised and provided for: <ul style="list-style-type: none"> (a) the ability of the water body to sustain the abstraction; (b) the relationship of Tangata Whenua and their culture and traditions with their ancestral water, waahi tapu and other Taonga; (c) preservation of the natural character of the coastal environment, streams, rivers, lakes and wetlands and their margins; (d) protection of indigenous vegetation and habitats of indigenous fauna in streams, rivers, lakes, wetlands and the coastal environment; (e) maintenance of the natural flow variability in streams, rivers, lakes and wetlands. (iii) Particular regard shall be had to the following matters: <ul style="list-style-type: none"> (a) kaitiakitanga; (b) maintenance and enhancement of the recreational, scenic, amenity and intrinsic values of streams, rivers, lakes and wetlands; (c) maintenance of water quality including sufficient capacity for streams, rivers, lakes and wetlands to assimilate contaminants; (d) the security of a specific quantity of water being available in streams, rivers, lakes and wetlands during periods of low flow; (e) estimates of aquifer recharge; (f) maintenance of aquifer water levels adequate to ensure continued recharge between aquifers; (g) maintenance of outflow from aquifers at the coast to prevent salt-water intrusion; (h) retention of adequate spring flow from shallow aquifers which provide base flow for streams; (i) avoidance of land subsidence and structural damage to aquifers; (j) maintenance of geothermal aquifer water levels to prevent cold groundwater or seawater intrusion and reduction in aquifer temperatures; (k) avoidance of long term decline of aquifer water levels; (l) the extent of the overlap, if any, of catchments and aquifers with regional council boundaries. (iv) The principles of the Treaty of Waitangi (Te Tiriti o Waitangi) shall be taken into account.
	<p>1. The ARC will record and make available to the public, appropriate hydrological and other information such as the following:</p> <ul style="list-style-type: none"> (i) For selected surface water bodies: flow regimes, water levels, water quality, aquatic habitat, indigenous vegetation, indigenous fauna and other uses.

	<p>(ii) For selected aquifers: extent, thickness, water levels, transmissivity and storage coefficient parameters, chemical character and temperature.</p> <p>2. The ARC may impose conditions on consents which require consent holders to record and forward to the ARC, as appropriate, information on water use and the effects of that use on the adjacent environment. Consent holders may also be required to record water level, temperature, quality information, and other information as required by the ARC.</p> <p>3. The ARC will identify in the ARC Annual Plan, those catchments and aquifers for priority investigation and ongoing monitoring within that year.</p> <p>4. The process for determining the availability of water for abstraction from a water body which is identified as having priority for investigation will be as follows:</p> <p>(i) A non-statutory Water Resource Assessment Report (WRAR), which is part of the catchment planning process, will be prepared (see Appendix A). In the process of preparing the WRAR the ARC will:</p> <p>(a) consult with the Tangata Whenua, and persons interested or affected (see Appendix D – for consultation);</p> <p>(b) refer any issues which are not resolved by consultation to a Hearings Commission, which will receive and hear submissions and evidence from any person interested, deliberate thereon, and recommend any changes which it considers should be made to the WRAR.</p> <p>(ii) If any issue then remains unresolved at the completion of the hearings process, either appropriate provisions will be included in a regional plan to give effect to the findings of the study or, any consent applications relevant to the study will be notified. The plan, provisions, or consents will proceed in accordance with the statutory processes set out in the RM Act. Water Resource Assessment Reports will be regarded in the resource consent process.</p> <p>Where the process proceeds to (b) the WRAR will be superseded by the provisions of any relevant regional plan.</p> <p>5. Non-statutory ARC Water Resource Assessment Reports will, as appropriate:</p> <p>(i) describe the area and water resource to which the assessment report applies;</p> <p>(ii) identify issues that affect the use, development or protection of the natural and physical resources;</p> <p>(iii) provide information on quantities of water available for abstraction including the setting of any minimum water levels or flow regimes;</p> <p>(iv) evaluate alternative strategies for addressing the issues including priorities of allocation, economic instruments, and assessment of efficient use;</p> <p>(v) propose ongoing monitoring or investigation of the water resource;</p> <p>(vi) have a review or expiry date on the assessment report.</p>
Regional Policy Statement Chapter 11 Natural hazards	
11.3 Objective	To avoid, remedy, or mitigate the adverse effects of natural hazards on human life, property and the environment, while minimising the adverse effects of measures implemented to reduce the risks of natural hazards.
11.4.1 Policies	<p>1. The responsibilities of the ARC and the TAs shall be as per the Methods in 11.4.2.</p> <p>2. Natural hazard management shall be integrated and co-ordinated between the ARC and TAs within the Auckland region, and with adjoining regional councils.</p> <p>3. Before provision is made enabling significant development or redevelopment of land which will result in intensification of land use, any</p>

	<p>flood hazards and measures to avoid or mitigate their adverse effects shall be identified.</p> <p>4. Development shall be discouraged in flood hazard zones unless it can be demonstrated that all habitable floor levels are protected from the 1% AEP flood level, and that structures in the 1% AEP flood level do not divert overland flows onto neighbouring properties.</p> <p>5. Development shall not be permitted if it is likely to accelerate, worsen or result in inundation of other property, unless it can be demonstrated that the adverse effects can be avoided or mitigated.</p> <p>6. Where changes in the use of land allows for the construction of habitable buildings, such buildings shall not be permitted to be constructed in the 1% AEP flood hazard zone, unless the hazard can be avoided and access maintained.</p> <p>7. Construction of mitigation works shall be encouraged only where people, property and the environment are subject to unacceptable risk from flood hazards.</p> <p>8. When carrying out flood mitigation works, existing vegetation shall be retained, where appropriate, to aid stability and maintain environmental quality. However, the planting of vegetation, which may, because of growth habit etc., restrict water flow and exacerbate the flooding hazard, shall be avoided.</p> <p>9. Development shall not be permitted in areas subject to erosion/land instability unless it can be demonstrated that the adverse effects can be avoided or mitigated.</p> <p>10. In the coastal environment, new subdivision, use or development should be located and designed, so that the need for hazard protection measures is avoided.</p> <p>11. Where existing subdivision, use or development is adversely affected by a coastal hazard, coastal protection works should be permitted only where they are the best practicable option for the future. The abandonment or relocation of existing structures and the use of non-structural solutions should be considered among the options. Where coastal protection works are the best practicable option, they should be located and designed in a manner consistent with Chapter 7 – Coastal Environment.</p> <p>12. A precautionary approach shall be used in avoiding, remedying, or mitigating the adverse effects on development, of earthquake, volcanic activity, sea level rise and global climatic change.</p>
11.4.2 Methods	<p>1. The ARC will co-ordinate the management of natural hazards throughout the region by setting standards and ensuring consistency among TAs, by co-ordination of action in respect of natural hazards which extend across local boundaries, and by co-ordination of action with the appropriate regional council in respect of natural hazards which extend across regional boundaries.</p> <p>2. The ARC will regulate diversions and discharges of stormwater in order to avoid or mitigate adverse effects of flooding and erosion, through the resource consent process.</p> <p>3. The ARC and TAs will jointly advocate methods to avoid, remedy, or mitigate the adverse effects of natural hazards on the environment.</p> <p>4. The ARC will promote a comprehensive catchment-wide approach to flood management.</p> <p>5. The ARC will, where appropriate, transfer day to day flood management functions, powers and duties to TAs.</p> <p>6. TAs will give effect to these policies by including objectives, policies and methods of implementation within district plans to control the use of land for the avoidance or mitigation of natural hazards.</p> <p>7. TAs will ensure that flood management plans are prepared before any new areas are rezoned in ways which enable intensification of use, or where development is likely to cause adverse effects. This may be done as part of a wider planning process or structure planning process (as described in Appendix A).</p>

	<p>8. TAs will ensure that any required hazard mitigation works are undertaken, and that they are adequately maintained.</p> <p>9. Within the 1% AEP flood hazard zone TAs will control infilling and storage of materials likely to be moved by flood events, and ensure that development within the zone is located in such a manner as to limit the restriction of flood flows.</p> <p>10. The ARC will implement objectives, policies and rules with respect to coastal hazards in the coastal environment, through the provisions in the Regional Plan – Coastal, which will encourage subdivision, use and development in the coastal environment to locate in appropriate areas.</p> <p>11. In consultation with the TAs, the ARC will develop and maintain a regional coastal hazards database, and provide information on appropriate methods of avoiding, remedying, or mitigating the adverse effects of coastal hazards, including sea level rise.</p> <p>12. TAs will implement objectives, policies and rules with respect to coastal hazards through provisions in district plans, including the use of esplanade reserves and strips.</p> <p>13. TAs will ensure that current information about known hazards is available to all persons.</p> <p>14. The ARC will develop and carry out educational strategies aimed at providing the general public with a greater understanding of risk associated with natural hazards, and how these risks are being addressed throughout the region.</p> <p>15. The ARC will undertake research on the risks and impacts of natural hazards, particularly those that are regionally significant, and make this information available to TAs and the general public.</p> <p>16. The ARC, in consultation with relevant parties, will establish monitoring programmes for natural hazards of regional significance, and make this information available to TAs and the general public.</p> <p>17. The ARC will undertake research on methods to avoid or mitigate natural hazards and make this information available to TAs and the general public.</p> <p>18. The ARC will provide support for Civil Defence in planning and implementing measures to guard against, prevent, reduce or overcome the effects of natural hazards.</p>
Regional Policy Statement Chapter 12 Soil conservation	
12.3 Objective	<p>1. To protect the versatility and productive potential of the region's soil resource.</p> <p>2. To protect the natural long-term health, stability and potential productivity of soils in the region.</p> <p>3. To avoid, remedy, or mitigate adverse effects of activities that result in soil degradation. To minimise the effects of soil degradation on the water quality of receiving environments.</p>
12.4 Policies for Objective 1	1. The use and development of the soil resources of the region shall be managed so as to protect and maintain their versatility and productivity so far as practicable.
12.4.2 Methods	<p>1. Regional and district plans will give effect to the above policies.</p> <p>2. The ARC will take a lead role in coordinating the development and updating of a regional database which will identify the versatility and productive potential of the region's soil resources.</p>
12.4.4 Policies for Objectives 2, 3	<p>1. The clearance of protective vegetation from land identified as having a moderate to severe erosion potential shall be controlled to avoid soil erosion.</p> <p>2. The excavation and transfer of topsoil shall be controlled to minimise soil degradation.</p> <p>3. The adverse effects of soil degradation will be avoided where practicable. Where complete avoidance of the adverse effects of activities that result in soil degradation is not practicable, those effects shall be remedied, or mitigated.</p>

	<p>4. Sustainable land use practices shall be encouraged and promoted in order to avoid, remedy or mitigate soil degradation in the region and to minimize adverse effects on the water quality of the receiving environment.</p> <p>5. When addressing issues of soil conservation, management of those issues shall be co-ordinated between adjoining regional councils.</p>
Methods	<p>1. Regional and district plans will give effect to Policies 12.4.4-1.</p> <p>2. The ARC will take a leading role in coordinating the development of a regional database to identify those areas susceptible to soil degradation using the New Zealand Land Resource Inventory as base information and other information as it becomes available.</p> <p>3. The ARC will promote and assist land care and other self-help programmes in the region to better achieve wise land management techniques.</p> <p>4. The ARC will provide a soil conservation advisory service to landowners and other relevant parties to promote soil conservation and associated sustainable land use practices.</p> <p>5. The ARC will undertake an education programme to inform relevant parties of the land use practices that cause soil degradation, the effect of that degradation on the environment, and the alternative options available to remedy and mitigate these problems.</p> <p>6. Incentives will be used, where appropriate, to promote and implement soil conservation remedial, or mitigation activities.</p> <p>7. The ARC will:</p> <ul style="list-style-type: none"> (i) carry out assessments of the soil conservation issues within a catchment or subcatchment, and produce management plans as required; (ii) develop a prioritising system, such that high risk catchments can be identified and addressed first; (iii) promote integration of soil conservation with other resource management issues within the region. <p>8. Where the results of the monitoring programme proposed in 12.6(i) indicate that the methods outlined above are not adequately achieving the objectives of this RPS, the ARC will incorporate provisions in a regional plan to ensure soil degradation and associated adverse effects on water quality are avoided, remedied, or mitigated.</p>
Regional Policy Statement Appendix A Planning process	
Strategic regional planning	<p>ARC</p> <p>Strategic planning at the regional level includes preparation of forecasts of land requirements for housing, jobs and related facilities, and the articulation and evaluation of a range of development options. Evaluation of options will lead to the formulation of objectives and policies designed to guide development in the region towards directions and a form which give effect in appropriate ways to the purposes and principles of the RM Act. Evaluation will include consideration of the following:</p> <ul style="list-style-type: none"> _ effects on land, water and air resources; _ economic effects, including capital works and operating costs; _ effects on heritage values; _ social effects. <p>The process leads to the determination of a strategic direction for the region, which is expressed in the Regional Policy Statement, and will be reflected in regional plans prepared under the RM Act. It will also be important to ensure that the annual work programmes and budgetary commitments of local authorities detailed in the annual plan process under the Local Government Act are consistent with the strategic directions for the region.</p>
Strategic district planning	TAs

	<p>The approach to strategic planning by TAs will vary from district to district, depending on the nature of the development pressures and change which is expected to occur in the future. TAs not only provide regulatory services, but may also deliver to the community a wide range of infrastructural and community services (i.e., the provision and operation of social and cultural facilities and services). The general aim of strategic district planning is to bring into effect corporate objectives and policies which will ensure that the whole range of regulatory responsibilities and service delivery functions at district level are provided consistently, cost-effectively, and in a manner which meets community expectations and fulfils statutory obligations. Where significant development pressures are anticipated, strategic district planning will include preparation of forecasts of land requirements for housing, jobs and related facilities, and the articulation and evaluation of development options for the district. Where development patterns are established and limited development is expected in the foreseeable future, strategic district planning may be focused mainly on determining the level of resourcing necessary to achieve appropriate levels of service. In both situations, the evaluation will include a similar range of matters as occurs at the regional level. Within a region, it will be important to ensure that the developmental aspects of strategic planning at the district level are consistent with the strategic objectives and policies for the region. To a large extent this may be achieved through the processes established by the RM Act, and through the annual plan process under the Local Government Act through which local authorities establish yearly work programmes and related budget commitments. Consistency with regional objectives and policies will also be facilitated by a high level of consultation between local authorities within the region.</p>
Catchment management planning	<p>ARC, TAs or major developers.</p> <p>Catchment management planning will:</p> <ul style="list-style-type: none"> _ identify the natural resource values which should be conserved or preserved; _ identify actual and potential resource management problems (such as demands for natural water resources which exceed sustainable supply, flooding, land stability, effects of sediment laden stormwater on estuarine areas, or pollution from urban stormwater); _ describe alternative futures (scenarios) and analysis of their consequences; _ identify and evaluate the cost/effectiveness of alternative means or avoiding or mitigating adverse effects on the environment, and of protecting and enhancing conservation values and amenity values; _ proposed preferred means for addressing issues. <p>Catchment planning produces guidelines and programmes to address resource management issues in ways which give effect to the purposes and principles of the RM Act, and are cost-effective. Outputs will normally be non-statutory plans to guide decisions about resource allocation or use. The non-statutory plans may provide:</p> <ul style="list-style-type: none"> _ the basis for promulgation of regional plans under the RM Act; _ guidance for the ARC in exercising consent responsibilities; _ recommendations to be effected through district plans; _ recommendations to be effected through ARC and TA annual plans.
Structure planning	<p>TAs</p> <p>Structure planning will consider:</p> <ul style="list-style-type: none"> _ the natural character of the land (steepness, flood proneness, propensity to erosion, vulnerability of ecosystems, and existing vegetation patterns); _ the existence of features or values which warrant protection or preservation (such as sites of significance to Māori, indigenous vegetation, sensitive areas such as stream valleys and estuaries);

	<p>_ the location and scale of infrastructure, such as water and sewerage systems, and the adequate treatment of stormwater.</p> <p>The process will produce a plan which guides development so that the form and intensity of development is appropriate to the character of the land. The Structure Plan will identify the future pattern of significant land uses, including:</p> <ul style="list-style-type: none"> _ arterial roads _ commercial centres _ schools, parks _ land required for active or passive recreation _ land to be reserved for environmental protection purposes <p>Structure planning should be undertaken within the frame of regional strategic policy as provided by the RPS, any relevant regional plans and management plans, and strategic policy for the district.</p>
Regional Policy Statement: Definitions	
	<p>In determining the extent of the coastal environment of the Auckland region, the following areas and features shall be taken into consideration:</p> <ul style="list-style-type: none"> (i) any vegetation or habitat adjacent to, or connected with, the CMA which derives its intrinsic character from a coastal location or which contributes to the natural character of the coastal environment; (ii) any landform adjacent to the CMA which is presently being formed or modified by processes of coastal erosion or deposition; (iii) any feature or collection of features, either natural or physical, that derives its intrinsic character from a coastal location and which substantially contributes to the visual quality or amenity value of the coast; (iv) any site, building, place or area of cultural heritage value adjacent to, or connected with, the CMA which derives its heritage value from a coastal location; (v) areas of Significant Natural Heritage listed in Appendix B and Outstanding and Regionally Significant Landscape Areas shown on Map series 2 which are adjacent to the CMA; (vi) any land adjacent to the coast from which surface drainage may flow directly to the CMA; (vii) any land adjacent to the coast which is affected by, or could be affected by, coastal flooding and other identified coastal hazards; (viii) any land adjacent to the coast where activities may take place which have a direct physical connection with or impact on the CMA; (ix) the CMA. <p>Integrated Management means management of natural and physical resources:</p> <ul style="list-style-type: none"> (a) where decision-making about the use, development or protection of natural and physical resources occurs in a holistic way; (b) which takes into account the full range of effects which may stem from any such decision over the short- and long-term; and (c) which considers effects by referring to section 3 of the RM Act, and may include effects on natural and physical resources and effects on the environment.
Regional Policy Statement: Summary	
<p>The RPS sets up a planning framework which encourages/enables both the ARC and TAs to prepare integrated planning or resource management documents. It includes reference to catchment management planning to be undertaken generally at the initiative of ARC, but by TAs and developers under the supervision of ARC in</p>	

certain circumstances. Structure planning is also a non-statutory process. Both are strategic planning tools to identify and deal with issues relating to areas which are currently developed or are proposed for future development or land use change. RPS requires that where land use intensification is proposed, the need to prepare a catchment management plan or structure plan will be determined by consultation and agreement between the ARC, relevant TA and persons initiating the proposal.

Strategic Policies require that the use, development and protection of the region's natural and physical resources is to be managed in an integrated manner, so that adverse effects, including significant cumulative adverse effects, that range across resources or cross jurisdictional boundaries are avoided, remedied or mitigated.

The Methods include that in order to promote consistent and sustainable management of the coastal environment, the ARC will prepare a Regional plan incorporating a Regional coastal plan. This plan will, over time, progressively include objectives, policies and rules as they relate to the functions of the ARC under section 30 of the RM Act. If this plan is prepared and implemented it will provide a strong impetus to achieve a fully integrated approach to catchment/coastal management. This is similar to the approach recently taken by Manawatu-Wanganui (Horizons) with preparation of The Proposed One Plan although this Horizons document goes even further and incorporates the RPS.

REGIONAL PLAN: COASTAL

Regional Plan: Coastal: Chapter 3 Natural Character

Objectives	<p>3.3.1 To preserve the natural character of the coastal environment by protecting the coastal marine area from inappropriate subdivision, use and development.</p> <p>3.3.2 To preserve the natural character of the coastal environment by encouraging appropriate subdivision, use and development above Mean High Water Springs to locate in appropriate areas of the coastal environment.</p>
Methods	<p>3.6.1 District plans and other relevant land management documents such as reserve management plans, coastal management strategies and conservation management strategies should include appropriate provisions to protect from inappropriate subdivision, use and development, those qualities, elements and features located above Mean High Water Springs, where they contribute to the natural character of the coastal environment, particularly in:</p> <p>a Areas adjoining the Coastal Protection Areas and Outstanding or Regionally Significant Landscape Areas identified in this Plan; and</p> <p>b Areas having elements of natural character which provide an important contribution to the identity and character of the Auckland region's coastal environment.</p>

Regional Plan: Coastal: Chapter 5 Natural features and ecosystems

Objectives	<p>5.3.1 To protect the dynamic functioning of physical coastal processes.</p> <p>5.3.2 To protect the integrity, functioning and resilience of ecosystems within the coastal environment.</p> <p>5.3.3 To protect from inappropriate subdivision, use and development and where appropriate, preserve the ecological and physical values and processes of Coastal Protection Areas, in recognition of their intrinsic values, their regional, national and international significance, and their high vulnerability to adverse environmental effects.</p>
Methods	<p>5.6.1 District plans should contain appropriate provisions to ensure the protection of the values of Coastal Protection Areas by:</p> <p>a protecting the indigenous vegetation, habitat, fauna, natural features and natural processes that may form part of an area of land associated with a Coastal Protection Area, which is located above Mean High Water Springs;</p>

	<p>b ensuring that any subdivision, use and development in the coastal environment avoids as far as practicable, remedies or mitigates adverse effects on the values of, or the functioning of, natural and physical processes in adjacent Coastal Protection Areas, and on other coastal and marine ecosystems.</p> <p>5.6.2 This Plan shall facilitate the protection of the significant indigenous vegetation and the significant habitats of indigenous fauna by the identification for information purposes of those areas above Mean High Water Springs which have important functional links to Coastal Protection Areas in the coastal marine area.</p>
Regional Plan: Coastal: Chapter 6 Tangata whenua	
Objectives	6.3.2 To sustain the mauri of natural and physical resources of the coastal environment, and to enable provision for the social, economic and cultural wellbeing of Māori.[all other provisions refer to CMA]
Regional Plan: Coastal: Chapter 9 General	
Other Methods	<p>9.6.1 Where appropriate, the ARC will work in conjunction with territorial authorities, Tangata Whenua, landowners, the Crown, occupiers, and users of the coastal marine area and other interest groups to protect appropriate subdivision, use and development of the coastal marine area from adverse effects of other activities on land adjoining the area.</p> <p>9.6.2 Where subdivision, use and development extends across the boundary of the coastal marine area onto adjoining land, the ARC will work in conjunction with territorial authorities and other relevant agencies to provide integrated planning, development and management processes for the activity.</p>
Regional Plan: Coastal: Chapter 20 Discharges to the coastal marine area (CMA)	
Objectives	<p>20.3.1 To maintain appropriate water and sediment quality in the coastal marine area and to enhance water and sediment quality where practicable in the parts of the coastal marine area where water and sediment quality is degraded.</p> <p>20.3.2 To adopt the best practicable option for avoiding, remedying or mitigating the adverse effects from stormwater and wastewater discharges on the coastal environment.</p>
Policies	<p>20.6.3 The ARC will encourage the seeking of comprehensive discharge consents, rather than dealing with a series of individual consent applications. The ARC will encourage developers of infrastructure improvement programmes, to adopt adaptive environmental management techniques (including catchment management programmes, monitoring programmes, contingency plans, community liaison groups and review procedures) to address information gaps and uncertainties about effects on the marine environment, and to take into account existing demands made on the coastal marine area by communities of people.</p> <p>20.6.4 The ARC will incorporate into a Regional Plan a degraded and sensitive water management strategy which will specify:</p> <ul style="list-style-type: none"> a a generally higher level of land use control in the catchment; and b target environmental standards; and c monitoring for compliance and achievement.
Other Methods	<p>20.6.8 Appropriate land use management practices, including the management of stormwater and the maintenance and enhancement of riparian vegetation should be recognised and promoted by territorial authorities as important ways in which sustainable management of the coastal marine area, and the overall character of the coastal environment can be promoted and achieved.</p> <p>20.6.9 The ARC will, in conjunction with other interested parties provide for and undertake education programmes to inform the public</p>

	and businesses of the environmental damage caused by deliberate and accidental discharge of contaminants to the coastal marine area. 20.6.11 The ERC monitoring information will be used by the ARC in resource consent application and environmental education processes to provide a regionally consistent benchmark of the environmental quality of the coastal marine receiving environment, thereby assisting with determining priorities for catchment based investigations and for setting appropriate outcomes for catchment management. [NB Variation 1 - subject to Appeal]
Regional Plan: Coastal: Chapter 22 Aquaculture	
Objective	22.3.5 To take a precautionary approach in determining an appropriate scale and quantity of aquaculture activities, and in determining species to be farmed, within the Aquaculture Management Areas in the Auckland region to ensure that the adverse effects (including cumulative effects) on the coastal environment are avoided, remedied or mitigated.
Policy	22.4.3 New subdivision, use and development on land in the coastal environment adjoining Aquaculture Management Areas, shall have regard to the need to maintain water quality in the coastal marine area for aquaculture activities within Aquaculture Management Areas, and any land-based infrastructure which is integral to carrying out aquaculture activities.
Other Methods	<p>22.6.32 The ARC will liaise with Northland Regional Council, Environment Waikato and territorial authorities to facilitate integrated management of aquaculture activities, particularly in terms of access, waste disposal and land-based facilities.</p> <p>22.6.3 The ARC will submit on District Plan reviews and plan change applications to ensure the ability to carry out aquaculture activities is not compromised by any proposed subdivision, use and development.</p> <p>22.6.4 The ARC will consult with the Hauraki Gulf Forum and Environment Waikato to develop a consistent and integrated approach to the management of aquaculture in the Hauraki Gulf Marine Park.</p> <p>22.6.5 To enable Tangata Whenua to act as kaitiaki and take an active role in the management of aquaculture throughout the Auckland region, the ARC will:</p> <ul style="list-style-type: none"> a carry out a preliminary investigation of options for Tangata Whenua to have greater participation in aquaculture management, including the option of a transfer of specific powers to iwi authorities pursuant to section 33 of the RMA; b consult with relevant iwi regarding the location of new Aquaculture Management Areas. <p>22.6.6 The ARC will protect the interests of tangata whenua by promoting the utilisation of aquaculture to facilitate the social, economic and cultural wellbeing of current and future generations of iwi, hapu and whanau by:</p> <ul style="list-style-type: none"> a recognising that Tangata Whenua can obtain positive, social, economic and cultural benefits from opportunities to develop aquaculture activities within Aquaculture Management Areas; and b having regard to the cultural association of iwi, hapu and whanau through the allocation of space within Aquaculture Management Areas. <p>22.6.4 The ARC will, as needed, conduct recreational boat surveys to establish the intensity and timing of recreational boat use in the Hauraki Gulf, and will monitor the effects of aquaculture on recreational use and navigation, particularly at Great Barrier Island where a number of new marine farms are being established. The ARC may, as necessary, undertake surveys in conjunction with DOC and territorial authorities.</p> <p>22.6.57 The ARC will liaise with the Ministry of Fisheries, the Aquaculture Industry, research institutions, and other regional councils on studies being undertaken, and will undertake research on the effects of aquaculture on the coastal marine area.</p> <p>22.6.8 The ARC will undertake research which can be used as the basis for appropriate provisions to be included in both regional and</p>

	district plans to avoid, remedy, or mitigate the adverse effects of land use on water quality. This is particularly relevant in areas where aquaculture is an established activity, such as in the Mahurangi Harbour. The ARC will liaise with territorial authorities on the outcomes of any research and the effects of land-based activities on water quality.
Regional Plan: Coastal: Chapter 43 Cross boundary issues	
Process Statements	<p>To promote integrated management of the natural and physical resources across those administrative and jurisdictional boundaries, which occur within the coastal environment. This includes the line of Mean High Water Springs and regional and district boundaries. To achieve this the following processes will be used:</p> <p>43.3.1 When considering coastal consent applications, regard shall be had to the effects of the activity on any values, or physical and biological processes, of the coastal environment and to the provisions of any relevant district plan, regional plan, or council adopted non-statutory planning document. A copy of any coastal permit application which may have more than minor adverse effects across a regional boundary, shall be referred to that regional council.</p> <p>43.3.2 The ARC will liaise with adjacent regional councils and territorial authorities to promote integrated coastal management and ensure as far as practicable that a consistency in approach is maintained between coastal resource management issues in adjacent coastal marine areas and across the coastal marine area boundary of Mean High Water Springs.</p> <p>43.3.3 Liaison shall occur with other statutory bodies on legislative issues that affect the management of the coastal environment.</p> <p>43.3.4 In recognition of the dynamic nature of the coastal environment, which contains physical and biological processes and values that cross the coastal marine area boundary of Mean High Water Springs, district plans should contain appropriate provisions to ensure the adverse effects on the coastal marine area of any activity undertaken on land are avoided, remedied, or mitigated.</p>
Regional Plan: Coastal: Definitions	
	<p>Coastal compartment A discrete part of the coast, within which material on the foreshore and seabed actively moves with changing wave conditions. Coastal compartments are often bounded by rocky headlands.</p> <p>Comprehensive Coastal Management Plan A plan prepared for one or more adjacent coastal compartments which:</p> <ul style="list-style-type: none"> a characterises the predominant natural coastal processes operating within the compartment(s); and b identifies the potential natural coastal hazards in the compartment(s); and c details the proposed management plan for that area; and d may include guide lines on how use and development should avoid, remedy or mitigate the identified natural coastal hazards, taking into account the need to consider processes operating across the land - sea interface, as well as within the entire coastal compartment(s). A Comprehensive Coastal Management Plan should be developed in consultation with the affected community.
Regional Plan: Coastal: Summary	
<p>RPC sets up a planning framework which promotes the integrated management of coastal and land resources, both across the MHWS boundary, and between regional and local authorities. This plan deals with activities in the CMA (below MHWS) including discharges to the CMA.</p> <p>In terms of the land component of the coastal environment RPC provides guidance and encouragement for TAs in developing their district plans. It states that in</p>	

recognition of the dynamic nature of the coastal environment, which contains physical and biological processes and values that cross the coastal marine area boundary of Mean High Water Springs, district plans should contain appropriate provisions to ensure the adverse effects on the coastal marine area of any activity undertaken on land are avoided, remedied, or mitigated.

Policies include that the ARC will encourage developers of infrastructure improvement programmes, to adopt adaptive environmental management techniques (including catchment management programmes, monitoring programmes, contingency plans, community liaison groups and review procedures) to address information gaps and uncertainties about effects on the marine environment, and to take into account existing demands made on the coastal marine area by communities of people.

RPC provides for the preparation of Comprehensive Coastal Management Plans (Coastal Compartment Plans) which are to integrate management across the land-sea interface between ARC and TAs to identify natural coastal hazards and identify appropriate management actions.

PROPOSED REGIONAL PLAN: AIR, LAND AND WATER

Proposed regional plan: air, land and water: Chapter 1 Introduction

Purpose	<p>HOW THE PLAN PROMOTES SUSTAINABLE MANAGEMENT</p> <p>A key component to promoting sustainable management is integrating the management of natural and physical resources, hence the reason for dealing with most of the ARC's functions in relation to air, land and water resources in one plan. Consistency is also required with the provisions of the Regional Plan: Coastal. This is important, as the coastal marine area is a receiving environment of the effects of land use activities, when discharges of contaminants to land or to freshwater bodies are not adequately managed and end up entering the marine environment.</p>
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Proposed regional plan: air, land and water: Part 3 – Water Quality - Chapter 5

<p>5.1.3 MANAGEMENT APPROACH</p> <p>5.1.3.1 STORMWATER AND WASTEWATER NETWORKS</p>	<p>Stormwater and wastewater networks operated by stormwater and wastewater network utility operators are key components of the infrastructure necessary for any large city or intensively urbanised area. They have been constructed to provide for the health and safety of the community and are designed to reduce the risk of flooding and risks to public health by transporting stormwater and wastewater away from Urban Areas. There is also a range of regionally significant infrastructure, such as the State highway network, the commercial seaport and airport facilities, that has stormwater infrastructure to service its activities. However, the discharges from these networks and other discharge points can cause adverse effects.</p> <p>This plan promotes an integrated approach to the management of stormwater discharges and wastewater overflows. An integrated approach involves consideration, where possible, of environmental performance at the catchment level having regard to the interconnections between the stormwater and wastewater networks, recognising that discharges from different networks impact the same receiving environment. Whilst this Plan considers the effects of discharges onto land and into freshwater, the interlinked nature of this system with the coastal marine area must be acknowledged.</p> <p>The most effective options for improving the performance of stormwater and wastewater systems should be identified on a "whole of catchment" basis or on a "whole of network basis". Therefore, before investing in expensive upgrades of wastewater or stormwater infrastructure, it is essential to consider the relative contribution of each to environmental degradation, how to avoid, remedy or mitigate</p>
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	<p>the effects, and the values of the receiving environment itself. The implementation of performance improvements will be prioritised within catchments and across the network based on public health, environmental and property risk and receiving environment effects, and acknowledging the costs involved in improving existing networks.</p> <p>The key management tools proposed in this Plan to integrate receiving environment values and the risks of discharges, are the preparation of an Integrated Catchment Management Plan (ICMP) by the territorial authority, and resource consents for:</p> <ul style="list-style-type: none"> • Discharges and diversions from stormwater and wastewater networks; • Some discharges and diversions from non-networks; • Discharges of environmentally hazardous substances from Industrial or Trade Activities. <p>Other tools could include land-use planning controls and education. It is noted that ICMPs are non-statutory documents prepared to assist the TA in managing catchments to achieve specified outcomes. These outcomes will in many cases, be determined through statutory processes in accordance with the RMA and/or the Local Government Act. The ICMPs may also define statutory and non-statutory methods that will be used to contribute to the achievement of the outcomes sought. To the above extent ICMPs will provide useful guidance to all parties on statutory requirements to be met and additional guidance on other methods the TA will use in seeking to achieve the stated outcomes. The tools will consider the many management aspects including; environmental sensitivity, catchment values, quality and quantity of discharges, affordability and management methods. Overall, they will determine the Best Practicable Option.</p>
Rule 5.4.1 ICMP	<p>Integrated Catchment Management Plans and applications for consent under Rules 5.5.10 to 5.5.13 may be prepared as combined documents or separate documents as appropriate to the organisational structures of Territorial Authorities and stormwater or wastewater network utility operators. ICMPs and applications for consent under Rules 5.5.10 to 5.5.13 (in combination) shall meet the minimum information requirements set out in Schedule [9]. The minimum information requirements for a consent under Rules 5.5.10 to 5.5.13 without an accompanying ICMP are listed as a standard and term to those rules.</p>
Schedule 9	<p>Sets out contents of an ICMP and differentiates between an ICMP and an ICMP required for consent under rules 5.5.10-5.5.13.</p>
Definitions	<p>Integrated Catchment Management Plan (ICMP) A plan for management of the stormwater and wastewater discharges, diversions and associated activities within the catchment or District which is prepared in accordance with this Plan and identifies :</p> <ul style="list-style-type: none"> (i) the stormwater or wastewater issues facing the catchment and the range of effects from those discharges, diversions and associated activities; (ii) strategic objectives for the management of stormwater and wastewater discharges, diversions and associated activities within the catchment or District; (iii) a range of management options and the preferred management approach for avoiding, remedying or mitigating environmental effects and risks; (iv) roles and responsibilities for implementation of the management approach; (v) tools to support implementation of the management approach; and (vi) a process for review. <p>Schedule 9 sets out minimum information requirements for an ICMP.</p>

Proposed regional plan: air, land and water: Part 3 – Water Quality - Chapter 9	
Integrated Management	<p>The RMA includes various provisions to address cross boundary issues and encourage the integrated management of the natural and physical resources of the Auckland region. The Auckland Regional Policy Statement states policies for the management of the region's air, land and water resources. District or regional plans are required to be not inconsistent with this document. There is provision within the RMA for the integration of administrative functions through joint and combined hearings with territorial authorities or adjacent regional councils when consent applications or the possible effects cross administrative boundaries. Various other agencies, including the Ministry for the Environment, Ministry of Agriculture and Forestry, Department of Conservation and the New Zealand Historic Places Trust also have statutory responsibilities under other legislation for the management of natural and physical resources in the Auckland region. Liaison between all agencies involved in the management of the region's air, land and freshwater resources is an important component of integrated management.</p>
Proposed regional plan: air, land and water: Summary	
<p>PRPALW integrates the ARC functions under RMA and seeks integration with the RPC noting that it is important, as the coastal marine area is a receiving environment of the effects of land use activities, when discharges of contaminants to land or to freshwater bodies are not adequately managed and end up entering the marine environment.</p> <p>This plan notes that the most effective options for improving the performance of stormwater and wastewater systems should be identified on a "whole of catchment" basis or on a "whole of network basis". The key management tools proposed to integrate receiving environment values and the risks of discharges, are a requirement for the preparation of an Integrated Catchment Management Plan (ICMP) by the territorial authority, and a requirement for resource consents for:</p> <ul style="list-style-type: none"> • Discharges and diversions from stormwater and wastewater networks; • Some discharges and diversions from non-networks; • Discharges of environmentally hazardous substances from Industrial or Trade Activities. <p>The definition of an ICMP in this plan is not the same as the definition of catchment planning in RPS which addresses the additional issues of demands for natural water and land stability.</p> <p>The plan notes that liaison between all agencies involved in the management of the region's air, land and freshwater resources is an important component of integrated management.</p>	
REGIONAL PLAN SEDIMENT CONTROL	
Regional Plan Sediment Control: Chapter 5.0 Regulation	
Objectives	<p>To maintain or enhance the quality of water in waterbodies and coastal water.</p> <p>To sustain the mauri of water in waterbodies and coastal waters, ancestral lands, sites, Waahi tapu and other Taonga.</p> <p>To reduce the exposure of land to the risk of surface erosion leading to sediment generation.</p> <p>To minimise sediment discharge to the receiving environment.</p>
Policy 5.2.2	Land disturbance activities resulting in elevated levels of sediment into coastal waters considered inappropriate where they have a significant adverse effect on (features, landscapes, indigenous vegetation etc identified in RPS or RPC).

Method 5.3.2	Sediment Control Protection Areas – includes 100m either side of a foredune or 100m landward of CMA)
Rules	Rules cover vegetation removal, sediment control protection areas, roading/tracking/trenching and quarries.
Regional Plan Sediment Control: Chapter 6.0 Information Requirements	
6.1	<p>(1) A Sediment Control Management Plan which clearly shows the control measures intended to prevent erosion and the movement of sediment off sites. The level of design should be appropriate to the scale and potential impact of the proposed activity.</p> <p>Reference to a locality map and detailed drawings showing site type and location of sediment control measures, on-site catchment boundaries and off site sources of runoff.</p>
Regional Plan Sediment Control: Chapter 7.0 Minimum Earthworks Strategies	
Objective 7.1.2	To minimise sediment discharge to the receiving environment.
Methods 7.3	<p>7.3.1 The ARC will continue to develop and review, on an ongoing basis, minimum earthworks strategies and initiatives which will include practices and techniques to minimise sediment generation associated with earthworks.</p> <p>7.3.2 These minimum earthworks strategies and initiatives will be developed by the ARC in consultation with all interested parties.</p> <p>7.3.3 The ARC will encourage Territorial Authorities to consider and provide for minimum earthworks strategies and initiatives to minimise sediment generation associated with earthworks in the development and implementation of District Plans.</p>
Regional Plan Sediment Control: Chapter 12.0 Processes to deal with other local government bodies.	
Processes to deal with other local government bodies.	<p>Processes to be used to deal with the Issues where it crosses Local Authority boundaries will be as follows:</p> <ol style="list-style-type: none"> 1. Ongoing consultation and liaison will be undertaken with the Region's Local Authorities at both staff and Council levels. 2. The ARC will make its statutory and non-statutory documents available to other Local Authorities for comment in order to share up-to-date information. 3. The ARC will make comments and/or submissions on statutory and non-statutory documents produced by other local authorities. 4. The ARC will monitor the state of the environment of the region and the effectiveness of this Plan. This information will be publicly available. Pollution abatement and enforcement will also be carried out. 5. The ARC will use education programmes, non-statutory guidelines, industry codes of practice, give advice to applicants and generally advocate for the benefit of the environment in respect of this Issue. 6. Surveys, research and modelling are carried out for the purpose of the Auckland Regional Policy Statement, the Auckland Regional Coastal Plan and any other Regional Plan on a regional basis and any information concerning this Issue will be made available to the relevant Local Authorities. 7. The ARC will make use of the powers given under Section 108 of the RM Act for joint resource consent Hearings. If found to be appropriate, the transfer of powers under Section 33 or the creation of joint bodies and plans under Section 80 may also be used. 8. The ARC will liaise with other Local Authorities on legislative matters that could affect this issue. <p>These Processes together with ongoing consultation and liaison will be used to deal with issues between Territorial Authorities and between regions.</p>
Regional Plan Sediment Control: Summary	

<p>RP Sediment Control recognises the interrelationship between catchment planning and coastal waters but limits concern significant adverse effects on significant areas identified in RPS or RPC. It is focussed on sediment control and requires the preparation of a Sediment Control Management Plan as part of an AEE.</p> <p>This plan includes a range of non-statutory methods to seek integration across jurisdictional boundaries.</p>	
REGIONAL PLAN FARM DAIRY DISCHARGES	
Objectives	<p>To maintain water quality in water bodies and coastal waters which have good water quality, and to enhance water quality which is degraded.</p> <p>To provide clarity, consistency and certainty to resource users.</p>
<p>Regional Plan Farm Dairy Discharges: Summary</p> <p>Although coastal water is included in the objectives there is no general discussion of existing or potential effects on coastal water (in s3.1) other than tangata whenua concerns which are discussed in s3.2. Focus is on surface water and lake catchments.</p> <p>A stand alone plan to address a particular issue of concern.</p>	

Table B-3: The evolution of coastal planning in the Auckland region

Up to the 1950s and 60s [Public reaction to coastal changes and the “planning” response] Focus on the coastal edge					
Legislation	Auckland actions	Objectives	Issues addressed	Coverage/approach	Intended outcomes
<p>Manukau Harbour Control Act 1911</p> <p>Soil Conservation & Rivers Control Act 1941</p> <p>Harbours Act 1950</p>	<p>Coastal Reserves Surveys (Lands & Survey Dept)</p> <p>Beach reserves identification and purchases (Regional Parks)</p>	<p>To identify/acquire coastal areas for protection (including estuaries and harbours) and protect public access.</p> <p>To protect coastal land from subdivision and protect public access to the coast.</p>	<p>Coastal subdivision and development, protection of significant natural areas, recreation.</p> <p>Coastal subdivision and development, public access</p>	<p>Areas above MHWS. Single issue areas of national significance</p> <p>Areas above MHWS</p> <p>Single issue – Coastal areas of regional significance.</p> <p>Areas above MHWS.</p>	<p>Protection of recreational, ecological and landscape values through designations/purchases and advocacy through regional/district plans</p> <p>Protection of coastal land, natural values and public access</p>
Town & Country Planning Act 1953	Regional Master Plan, Auckland Regional Authority (ARA) 1967	<p>Conservation & economic development.</p> <p>Classification of lands for purposes for which they are</p>	ARA takes over catchment board and regional water board roles	<p>Infrastructure and engineering influence</p> <p>Water and soil conservation input.</p>	<p>A guide to matters of regional significance</p> <p>Conservation and economic development.</p>

Auckland Regional Authority Act 1963		best suited. Co-ordination of all public improvements, utilities, services and amenities.			Conserve natural assets and ensure proper use of land/
Water & Soil Conservation Act 1967	Development in the Auckland region (ARA) 1968 (follows on from Regional Master Plan)	Integrated regional development	Develop criteria to assess quantity quality and nature of development	Areas above MHWS Infrastructure and engineering influence	Integrated regional development
Hauraki Gulf Maritime Park Act 1967			Conserve natural assets and ensure proper land use		
Reserves Act 1953			Provide more suitable accommodation, environments, recreation and community facilities and a modern road and transport network		
Wildlife Act 1953			Promote urban consolidation		
New Zealand Ports Authority Act 1968					

1970s [shift to environmental policies and controls] Focus on coastal edge and identified maritime planning areas					
Legislation	Action	Objectives	Issues addressed	Coverage	Intended outcomes
Town & Country Planning Act 1977	Auckland Regional Planning Scheme 1974 (mandatory but not binding on TLAs)	Protection of the natural character of the coast. Objectives, policies and proposals for TLA guidance	Coastal subdivision and development.	Areas above MHWS.	Protection of the natural character of the coast. Protection of environmental values.
Local Government Act 1974	Manukau Harbour Plan (1974) (ARA/Auckland Harbour Board) (non statutory)	Guidance for bodies having control over development which affects the harbour. Zones and policies for harbours to provide better for a wide variety of uses, from navigation to swimming, and from reclamation to the preservation of wildlife life habitats.	Goals, Attributes (birds, fish, harbour waters, heritage, intertidal habitats, ownership, runoff, sub littoral ecology, visual); Activities (marine farming, navigation, recreation, water related transport, water transport); Works (general, airport, bridges, erosion control, minerals, Port of Onehunga, public utilities, railways, reclamations, roads & bridges, rubbish, sewage).	<i>Areas above & below MHWS.</i> Beginning of integrated ecosystems approach but only looked at harbour to skyline. Recognition of Māori values. A guide for other documents/agencies.	Co-ordinated land use and resource planning control and management of change through two principles: - Conservative Management - The harbour is open space
Marine Pollution Act 1974					
Marine Reserves Act 1971					
Marine Farming Act 1971					
Marine Pollution Act 1974	Waitemata Harbour Plan 1976 (sponsored by ARA & AHB) (non statutory)	To secure the wise use of the Waitemata Harbour and its shoreline as a resource for the benefit of present and future generations.	Planning responsibilities and processes Use and Development (includes landscape) Activities affecting the harbour.	Harbour and shoreline. A joint working party. To develop a process to integrate the range of agencies involved in administering the harbour. Public consultation involved. A policy plan for evaluating development and use proposals	A process to recognise existing responsibilities and statutory processes and achieve integrated planning and management of land and water areas. [Recognises need for public support to implement policies].
Marine Mammals Protection Act 1978					
Territorial Sea and Exclusive Economic Zone Act 1977					
	District Planning Schemes (29)	Protection of the natural character of the coast	Landscape, public access, subdivision, use and	Documents with objectives, policies and	

Historic Places Act 1980			development.	rules for land use activities.	
	Waitakere Coastal Area 1976 (ARC/ Waitakere City Council)			Area above MHWS	Protection of the natural character of the coast through coastal zones, reserve identification, rules
1980s [Shift towards integrated management of the coastal area] coastal edge and defined maritime planning areas					
Legislation	Actions	Objectives	Issues addressed	Coverage	Intended outcomes
Environment Act 1986 Conservation Act 1987 Local Government Reform 1989	Regional Planning Policies for Marine Areas, Lakes and Rivers 1988 (ARA) (non-statutory) Guidelines for the planning and development of marinas (ARA) 1986 (non-statutory).	Guidelines for wise use and management of these important regional resources so that their value to present and future generations of the regional community will be upheld and maintained.	Sections on environmental, ecological, Māori traditional and cultural values, historical, economic, open space, amenity, recreation and tourism, transport, waste disposal, defence, areas of special regional value. Regional planning objectives.	Areas above and below MHWS – 12m limit. Included guidelines for marina development. Areas of special regional value – Waitemata, Manukau and Mahurangi Harbours, Hauraki Gulf. Policies on maintaining high coastal and inland water quality.	A policy framework for the region's marine areas, lakes and rivers. Protection of the natural character and ecological values of the region's water bodies.
Fisheries Act 1983	Proposed Regional Planning Scheme (1982) and Regional Planning Scheme 1988	Protection of the quality of the natural environment. Objectives and policies for a wide range of issues (including social, economic, recreation/leisure, Māori culture, coastal, ports, natural environment, open space, coastlines, gulf islands). Final version in 1988 is significantly different - New Deal and change of ARA composition (no longer TA reps but elected members) and Environment Court rulings on plan scope.		Areas above and below MHWS.	Policy framework for regional development through making best use of the region's resources – capital, infrastructure, land, natural environment and people.
Transit New Zealand Act 1989	District Planning Schemes	To control land use		Areas above MHWS.	Protection of the natural character of the coast through coastal zones, reserve identification.
Public Works Act 1981	Urban Earthworks Guideline, Urban Earthworks Notice, Forestry Operations	To control runoff and discharges of contaminants into or onto water. To sustain and protect fish habitat and ecosystems and maintain and enhance the quality of water bodies and coastal water.		Areas above MHWS.	

Local Government Reform (1989)	Notice.				
	Proposed Manukau Harbour Maritime Planning Scheme 1989 (AHB).			Harbour and coastal edge of catchment. Focused on harbour uses	
	Waitemata Harbour Maritime Planning Scheme 1987 (AHB).		Aquaculture	Harbour and coastal edge of catchment. Focused on harbour uses.	
	Manukau Harbour Action Plan (Auckland Regional Water Board).	Develop specific, enforceable, scientifically defensible and enforceable management policies. Set minimum water quality standards for the harbour.	Use and enjoyment reduced by pollution Need data to assess impacts of past developments.	Harbour and catchment.	Reduced pollution from land use practices in the catchment Control of present activities Clean up and monitor actions.
	District Plans	Protection of the natural character of the coast	Landscape, subdivision, use and development, esplanade reserves.	Area above MHWS	
	TA Coastal Reserves Management Plans		Natural character, natural values, public access (including structures)	Reserves above MHWS	
1990s [Integrating management of the coastal zone] Focus expanded to include water catchments					
Legislation	Actions	Objectives	Issues addressed	Area covered	Intended outcomes
Resource Management Act 1991 Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 Biosecurity Act 1993	Regional Development Strategy (ARA) 1990. Auckland Regional Policy Statement (ARC) 1999.	Strategic direction for the region and objectives & policies for regional plans and district plans (containment of urban development, high density communities around town centres and transport routes, focus on redevelopment and intensification in specific areas, growth in identified greenfield areas, constraints on countryside living, urban	Strategic direction; Matters of significance to iwi; Transport, Energy, Heritage, Coastal Environment, Water quality, Water conservation and allocation, air quality, Natural hazards, soil conservation, Minerals, Pests, Waste, Hazardous substances, Contaminated sites, Preservation of the natural character of the coastal environment,	Area above and below MHWS to 12 mile limit	Accommodating growth while safeguarding resources. Integrated, consistent and co-ordinated management of the natural and physical resources of the region. Awareness of the constraints and opportunities in the Auckland region. Preserving the natural character of the coastal environment and protecting intrinsic values of resources.

Maritime Transport Act 1994		development avoided in highly valued and sensitive areas, promotion of transport efficiency, maintenance of urban amenity and rural character, identification of significant environmental values and the management of effects of activities).	Esplanade reserves and strips		
Hazardous Substances and New Organisms (HASNO) Act 1996					
Fisheries Act 1996					
New Zealand Coastal Policy Statement 1994 (NZCPS)	Auckland Regional Plan: Coastal (ARC) 2004 (Minister of Conservation approval required for area below MHWS)	Guided by NZCPS Comprehensive use management Ecosystem integrity	<ul style="list-style-type: none"> - Values (natural character, landscape, natural features & ecosystems, tangata whenua, public access, cultural heritage, subdivision, use & development, - Management Areas (ports, marinas, moorings, coastal protection etc) - Use & Development, - Consent Processing, - - Monitoring and Review for the CMA. - Objectives, policies and other methods which relate to the coastal environment landward of MHWS as guidance to TAs in drafting district plans, other plans or strategies and assessing applications. 	<p>Area above and below MHWS to 12 mile limit</p> <ul style="list-style-type: none"> - Coastal marine area (CMA below MHWS) – objectives, policies and rules - Coastal environment (includes active coastal zone and landward component above MHWS) - objectives and policies. <p>Promotes integrated planning, catchment planning, structure planning. Includes ICMP (defined) to support some consent applications.</p>	Implement NZCPS and provide a framework for Integrated and sustainable management of the region's coastal environment. Integrated management functions of ARC and local councils throughout the region.
	Regional Plan – Sediment Control (ARC) 1995 (final 2001).	Environmental protection and water quality. Control the use of land for the maintenance and enhancement of the quality of water in water bodies,	Site by site pollution abatement – sediment discharge.	Area above MHWS	<p>The maintenance and enhancement of water quality in water bodies and coastal waters, at a level which:</p> <ul style="list-style-type: none"> • ensures the life supporting capacity of water and

		coastal water, Control of discharge from bare earth surfaces.			ecosystems; and • ensures the use and enjoyment by people and communities.
	Regional Plan – Farm dairy discharges (ARC) 1999.	To maintain water quality in water bodies and coastal waters which have good water quality, and to enhance water quality which is degraded. To provide clarity, consistency and certainty to resource users.	Regulates discharges of farm dairy contaminants onto land and into water, except where contaminants are discharged into the coastal marine area. [Discharges of contaminants into the coastal marine area are regulated by the Regional Plan: Coastal]	Area above MHWS	The maintenance and enhancement of water quality in water bodies and coastal waters, at a level which: • ensures the life supporting capacity of water and ecosystems; and • ensures the use and enjoyment by people and communities.
	Proposed Auckland Air, Land 7 Water Plan (2001)	Management of air, land and water resources in the region, including air, soil, rivers and streams, lakes, geothermal water	1 Values (natural values, use and development, tangata whenua, Management Areas). 2 Air quality 3 Water quality (Discharges and land management, Water allocation, Beds of lakes & rivers diversion of surface water. 4 Information and processes	The whole region above & below MHWS but focus is on above MHWS because of the coastal plan.	Build on and provide guidance on implementing the strategic direction of the ARPS.
	District Plans (7)	To control and manage development in districts in a way which provides for the wellbeing of people while maintaining environmental bottom lines.	Preservation of the natural character of the coastal environment The efficient use of natural and physical resources Intrinsic values of ecosystems Maintenance and enhancement of the quality of the environment	Area above MHWS. All include provisions for esplanade reserves, soil disturbance, coastal landscapes. Some incorporate structure planning for areas of new development.	Provision for appropriate subdivision, use and development in the coastal environment.

			Finite characteristics of natural and physical resources		
	Auckland Regional Growth Strategy and Regional Growth Forum 1996 (LG Act) (representatives of ARC and TLAs).	To ensure that growth in the region is well planned and well managed.	Identifies metropolitan urban limits and details the form, amount and staging of development within MUL and greenfield areas for development, implications for infrastructure, areas where urban development should not occur (including rural and coastal areas).	Areas above MHWS.	50 year vision for managing growth which is to sustain: <ul style="list-style-type: none"> - strong supportive communities - high quality living environment - a region that is easy to get around - protection of the coast and surrounding natural environment.
	ARC Technical Publications (TPs)				
	Manukau Harbour Water Quality Management Plan (Auckland Regional Water Board) 1990				
	Iwi planning documents	Integrated management of natural resources			
	Auckland Regional Services Trust (ARST) set up (a transitional body)	Manage the ARC's investment portfolio (including ports, Watercare)			
	Infrastructure Auckland established	Replaced ARST			

2000s – [Consolidating and fully integrating regional resource management and sustainable development] Focus on water catchments, coastal marine area and EEZ					
Time period	Actions	Objectives	Issues addressed	Area covered	intended outcomes
Hauraki Gulf Marine Park Act 2000	Hauraki Gulf Forum	Overall objectives are: - Integrated management of natural, historic and physical resources of the Hauraki Gulf, its islands and catchments. - Establish objectives that recognise the historic, traditional, cultural, spiritual relationship of tangata whenua with the Gulf and its islands.	Recognises the relationship between the Gulf, its islands and catchment as a matter of national significance.	Hauraki Gulf waters, adjacent DoC land and other adjacent public lands with TA agreement	Integrated management of across land and sea and integrated management of 21 statutes. State of the Environment Reporting.
Local Government Act 2002					
Local Government Amendment (Auckland) Act 2004	Auckland Sustainability Framework (comes from The Growth Forum) and Regional Sustainable Development Forum (reps of Auckland councils, central government, adjacent regional councils, Māori)	An overarching sustainability framework for the region. Goals include: 3 – A unique and outstanding environment. 7 – Resilient infrastructure. 8 – Effective, collaborative leadership	A shared 100 year vision, 8 goals, 8 shifts in thinking, immediate actions and long term responses, indicators to measure progress. Shifts in thinking include: 2 - Think in generations, not years. 3 - Value Te Ao Māori 5 – Create prosperity based on sustainable practices. 6 – Reduce our ecological footprint. 7 - Build a carbon neutral footprint. 8 - Integrate thinking, planning, investment and action.	The whole region - above and below MHWS. Advocates a catchment approach to planning to achieve integration.	Direction so that the region's LAs and central government agencies work together to develop a truly sustainable future socially, culturally, economically and environmentally. Goal 3 includes - Taking a catchment management approach to planning
Foreshore & Seabed Act 2004					
Marine Protected Areas Policy and Implementation Plan 2005					
Oceans Policy Initiative 2000					
Auckland Regional Holdings established (replaced)					
	Auckland One Plan	To turn the region's strategies into action and	Over time the objectives, goals and targets already	The whole region – above and below MHWS.	Better integration of regional planning, investment and

Infrastructure Auckland)		bring an improved regional focus to decision making. To pull the policies and actions of a range of strategies and implementation agencies together to focus on a few regionally important issues.	expressed through a number of strategic documents drawn together under a series of focussed action plans. First One Plan focussed on: - Vision and strategic direction of ASF. - A set of strategic visions currently provided by other regional strategies - a prioritised set of regionally significant programmes (1-5 years) - a process for further developing One Plan and a longer term programme of action (5-20 years).		action. A single, strategic framework and plan of action for the region. A detailed infrastructure plan to progress social, economic, environmental and cultural wellbeing. Strengthened links between national and regional strategy, planning and action.
	TA Coastal reserves management plans.	To manage existing reserves and in some cases identify future reserves.	Natural values, coastal processes, water quality, landscape, public access, coastal rehabilitation.	Area above MHWS.	Integrated, co-ordinated management of TA reserves along the coast. Identification of areas for esplanade reserve or strip provision.
	Mahurangi Action Plan 2004 (ARC/RDC)	To address the effects of sedimentation, pollutants and contaminants on the harbour and surrounding water ways.	Fencing, stock removal from vulnerable erosion prone areas, native revegetation. Whole catchment approach but two main priority areas, Ducks Creek and Dyers Creek.	Areas above MHWS.	Halt, slow or reverse the adverse effects of sedimentation on the Mahurangi Harbour. Public involvement in actions.
	ARC Stormwater Action Plan 2005	Generally aims to promote the use of ICMPs to assess and prevent or minimise environmental effects arising from stormwater network	Sets up 5 work streams to promote these outcomes.	Areas above and below MHWS	

		discharges, and promote better understanding of stormwater issues and impacts by policy makers and the general community.			
	Coastal Compartment Management Plans 2006 [Pahurehure Inlet, Algies Bay, Waiuku (ARC and TLAs)]	To articulate a shared visions (ARC/local council) and develop goals and actions for integrated protection, use and development of a section of coastline.	Measures required to achieve the shared vision for the area. Goals and actions to integrate the coastal management functions of both councils.	Areas above and below MHWS	Integrated management of the use and development of prioritised sections of coast. Integration into statutory plans through plan changes and/or implementation through works programmes or other actions (e.g. LTCCPs).
	Mahurangi East ICMP (RDC) 2006.	Integrated Catchment Management Plan (ICMP) and Network Management Plan (NMP) to support the application for a comprehensive discharge consent for stormwater for the Mahurangi East Catchment.	A set of guidelines with respect to the management of stormwater in the Mahurangi East catchment.	Area above MHWS – 2 subcatchments for priority action.	Protect and enhance the identified sensitive receiving environments. Maintain the integrity of the air, land and water to ensure that waterways and coastal receiving environments are free from pollution and contamination.
	Draft Aquaculture Policy 2008	To distinguish broad areas where future marine farming is both appropriate and inappropriate.	Precautionary approach to allocating space for aquaculture because of uncertainties/gaps in knowledge of environmental effects	Area below MHWS	Framework for changes to RP Coastal to identify Aquaculture Management Areas identification Excluded Areas. Use of IPPC (private plan change process for new areas)
	Auckland Waterfront 2040				