CONSERVING BIODIVERSITY THROUGH COLLABORATIVE MANAGEMENT

AN INVESTIGATION OF INTERACTIONS BETWEEN ECOSYSTEMS AND SOCIETAL SYSTEMS AND THE WHANGAMARINO WETLAND

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in Resource and Environmental Planning

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Abstract

The notion of collaborative management is analysed as a method to achieve biological diversity conservation. This is explored primarily in the context of New Zealand's social, cultural and economic values and norms, and the influences of these human constructs on sensitive ecological systems, using the Whangamarino Wetland and its sub-catchment as a case study.

Collaborative management can be defined as a situation in which some or all of the relevant stakeholders in a protected area are involved in a substantial way in governance, management and monitoring activities. In the New Zealand context, collaborative management would need to involve an equal partnership between the Crown and tangata whenua at a governance level. At a management and monitoring level, all the relevant stakeholders (primarily including the local community, recreational and resource users, and mana whenua) would be involved in a process which specifies and guarantees their respective functions, rights and responsibilities with regard to the relevant ecosystem.

From the Naturalistic Inquiry research process employed, six propositional statements were developed from the data:

1. Multidisciplinary, integrated and interagency partnerships will enhance biodiversity conservation management decisions as well as promote more efficient, effective and relevant monitoring programmes.
2. Tangata whenua have a legitimate and equal status role to the Crown in the governance, management and monitoring of the Whangamarino Wetland.
3. Local communities and resource users are ready and willing to participate in a collaborative management approach to resource management issues within the Whangamarino sub-catchment.
4. Crown agencies understand what collaborative management entails but there are political, personal, institutional and capital barriers to implementation.
5. Skilled leadership, policy flexibility and a common vision amongst all parties involved will improve the quality of biodiversity conservation outcomes.
6. Incorporating local and indigenous knowledge, ideas and experience will produce better biodiversity conservation outcomes and monitoring processes, and build public trust and support for natural resource institutions.

Acknowledgements

I would like to thank the people of the land, my loyal friends at DoC and the councils, and those wise and 'grey eminence's' (truly meant in the most flattering way). You all took a great deal of precious time and effort to talk to me so passionately, truthfully and openly. Thank you, thank you, thank you.

To my supervisor, Peter Horsley, your guidance, encouragement, perseverance and friendship through to the end meant the pupil had the benefit of learning from a continually inspiring teacher.

Someone told me once that I was mad or stupid or both by tackling a 4 paper thesis while working, building a house and raising a son. Well it didn't take long for me to realise I was definitely stupid, and now that I have got to this stage I can assert that madness is not far from the surface. That same person told me that his thesis was a "labour of hatred". To be sure at times I have hated this expedition. But for me it has been a labour of love, not so much for the thesis itself, but because those closest to me gave me so much support and tolerance over what seems like such a long time, that it only could have come from love. Thanks so much to my partners in crime, Peter N. and Roger T. (what is it about crazy Irishmen who always seem to attach themselves to my life?). Thank you Mum and Dad for reminding me of my roots with the land. Thank you to my chief editors, Colin and Eleanor P., and of course any remaining errors are entirely my responsibility. Thank you Taio, my son, for giving me the confidence and optimism to carry on. Thank you Helen, my wife, for giving me all that I ever needed to finish.

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Chapter 1: Introduction

1.1 The Inquirer

This thesis concerns the management of a threatened ecosystem and emphasises the importance of local involvement in the preservation of its unique biodiversity. It examines present practices in the governance, management and monitoring of the study area – the Whangamarino Wetland, and assesses reasons for their current failure to reduce biodiversity loss. It proposes a greater involvement of tangata whenua and the local community in collaborative management strategies and looks toward the future sustainability and enhancement of this internationally recognised wetland.

The principal research methodology employed in this thesis is one of Naturalistic Inquiry, as first propagated by Lincoln and Guba in 1985. It is a qualitative, post-positivist approach, fully described in Chapter Three. A significant contribution of this current research is the recording of face-to-face interviews with over twenty people, representing tangata whenua, Crown administrators, adjacent landowners, major stakeholders and interest groups involved in various ways (some historical) with the Whangamarino Wetland.

One of the important axioms of naturalistic inquiry is that, unlike positivist approaches where the 'inquirer' and the 'object' of inquiry are discrete and separate from one another, both inquirer and object in reality interact to influence each other, and knower and known are inseparable. The first task of an inquirer then is to state their background in order to expose the 'baggage' they may carry in terms of their social, cultural and ethical values. Ultimately, these values will influence the interactions between the inquirer and the object of inquiry and hence influence the outcomes of the research.

As this is a personal exposition of the inquirer, it is appropriate that this is described in the personal tense. I am a Dutch immigrant, whose parents dairy farmed in the Waikato after arriving in the country. I obtained a Science degree in zoology and ecology from Massey University in 1987, and after some experience in adventure tourism, gained employment with the Department of Conservation (DoC) at the Mount Bruce Wildlife Reserve in 1989. Later it became apparent, after my first few months as a Department of Conservation officer (Protected Species – Hamilton Field Centre, Waikato Conservancy), that all was

not well with the way DoC managed many of the natural remnants vested with the Crown. An almost unbelievable lack of resources thwarted DoC's management attempts in trying to slow down, let alone maintain the line against biodiversity loss. This continual inability to do anything effective was extremely soul destroying. Added to this was the complete feeling of hostility toward DoC by landowners, District Council staff, hunters and almost anyone else directly involved in the natural environment. At times it felt as if we, the staff, were engaged in a holy war. And we knew we would win because DoC was right. This was no more apparent than when I was involved in the resource consent process to build a weir on the Whangamarino River in order to raise the water levels in the wetland itself. This is when I first realised that DoC may not have been so right, and the farmers may not have been so bad, or even so wrong. Shortly after I left DoC and began a career as a consultant environmental planner and ecologist, where I acted as an ecologist on both sides of the conservation fence. I found an independence, a variety of work and a realisation that there is very little 'black and white' in resource management. My experience was that the 'bad farmers' I had dealt with were in the main, reasonable people, who were genuinely concerned about the natural environment and wanted to be involved in helping to conserve it. Through Resource Management Act consultations I also met local Maori who I found to be extremely concerned about their natural resources and with a much wider and deeper understanding of local ecosystems than many academics. From these contacts, consolidated through my work in recent years with the Queen Elizabeth the Second National Trust, I realised that biodiversity conservation is not a task to be solved by science, technology, or the financing of big 'politically correct' projects alone. True biodiversity conservation must embrace the widest possible community of interest in preservation and enhancement projects. It is a challenge which must link people with ecology, people with people, and it must cross legal, cultural and socio-economic boundaries if we, as a country, are to slow biodiversity loss and begin to rebuild degraded ecosystems.

1.2 Thesis Aim and Objectives

1.2.1 Thesis Aim

The aim of this thesis is to explore collaborative management of protected natural areas as a method to achieve biological diversity conservation. This is explored primarily in the context of New Zealand's social, cultural and economic values and norms using the

Whangamarino Wetland and its sub-catchment as a case study. The process this research follows is represented as the flow chart in Figure 1.1.

1.2.2 Thesis Objectives

The objectives of this thesis are:

(1) To define and analyse the concepts of both biological diversity and collaborative management and establish the links between them.

(2) To analyse the present methods of conserving biodiversity and how collaborative management could be used to conserve biodiversity, particularly in a New Zealand wetland context.

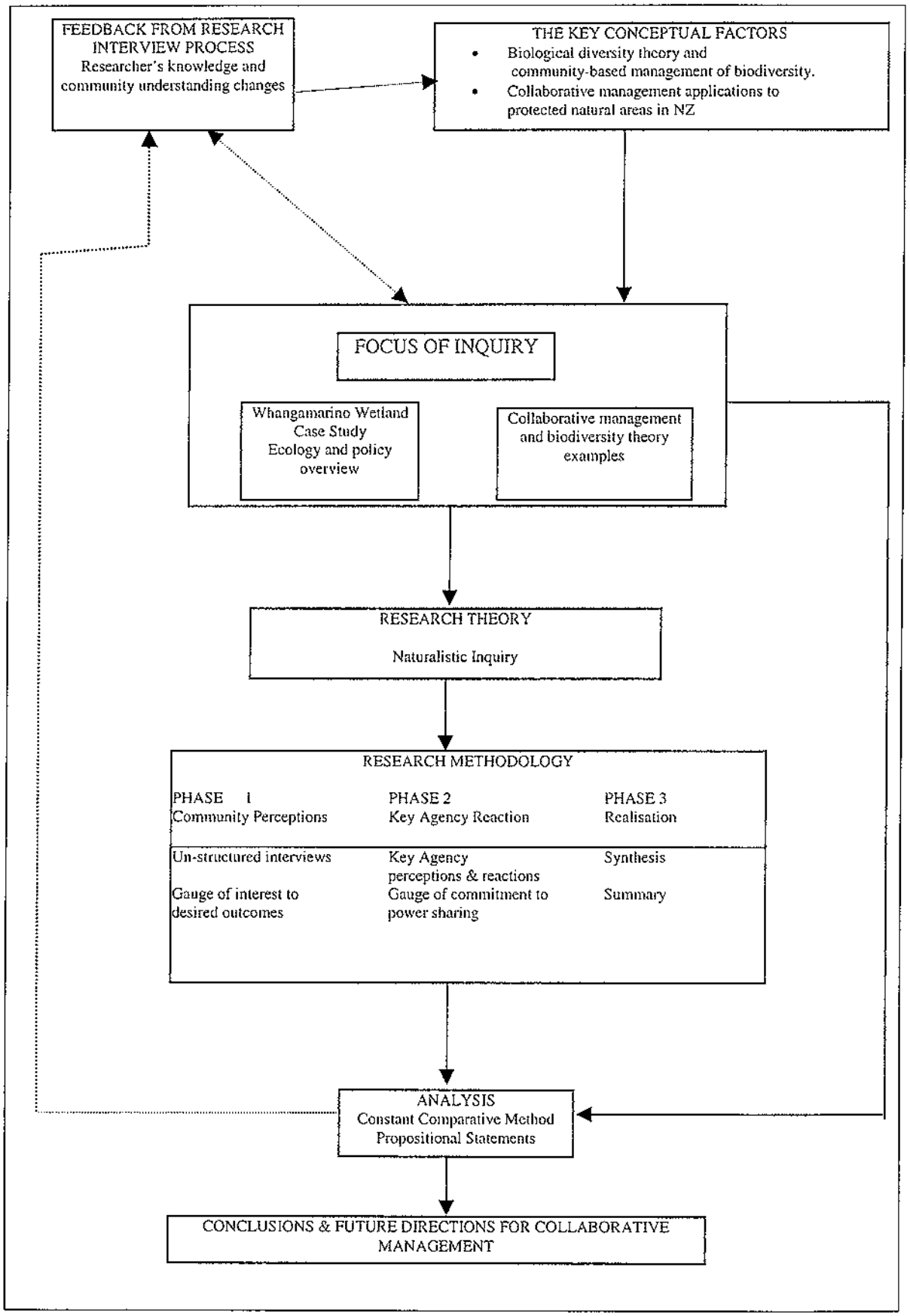
(3) To investigate the human interactions which have helped to shape the present ecological and social landscapes of the Whangamarino Wetland.

(4) To gauge the underlying historical, political, social, recreational, economic, spiritual and cultural values of the local community within the Whangamarino Wetland sub-catchment that may represent bridges or barriers to implementing a co-management approach to biodiversity conservation.

(5) To use appropriate qualitative research methods to identify existing processes of community involvement and co-ordination that are used by Waikato Regional Council, Franklin District Council, Waikato District Council, Fish and Game Council and the Department of Conservation within the Whangamarino Wetland sub-catchment to address the management issues facing the wetland.

(6) To suggest processes and pathways, which could be followed by managers and key stakeholders to improve existing biodiversity conservation management practices for the Whangamarino Wetland.

Figure 1.1 Summary of Thesis Design and Methodology



1.3 The Case Study Area

1.3.1 Location of the Whangamarino Wetland

The Whangamarino Wetland is situated in the lower Waikato River Basin of the North Island, New Zealand, 62 kilometres (km) south of Auckland (Figure 1.1). It is located at $37^0$18' South, $175^0$07' East. The wetland occupies approximately 103 km^2, making it the second largest freshwater wetland in the North Island.

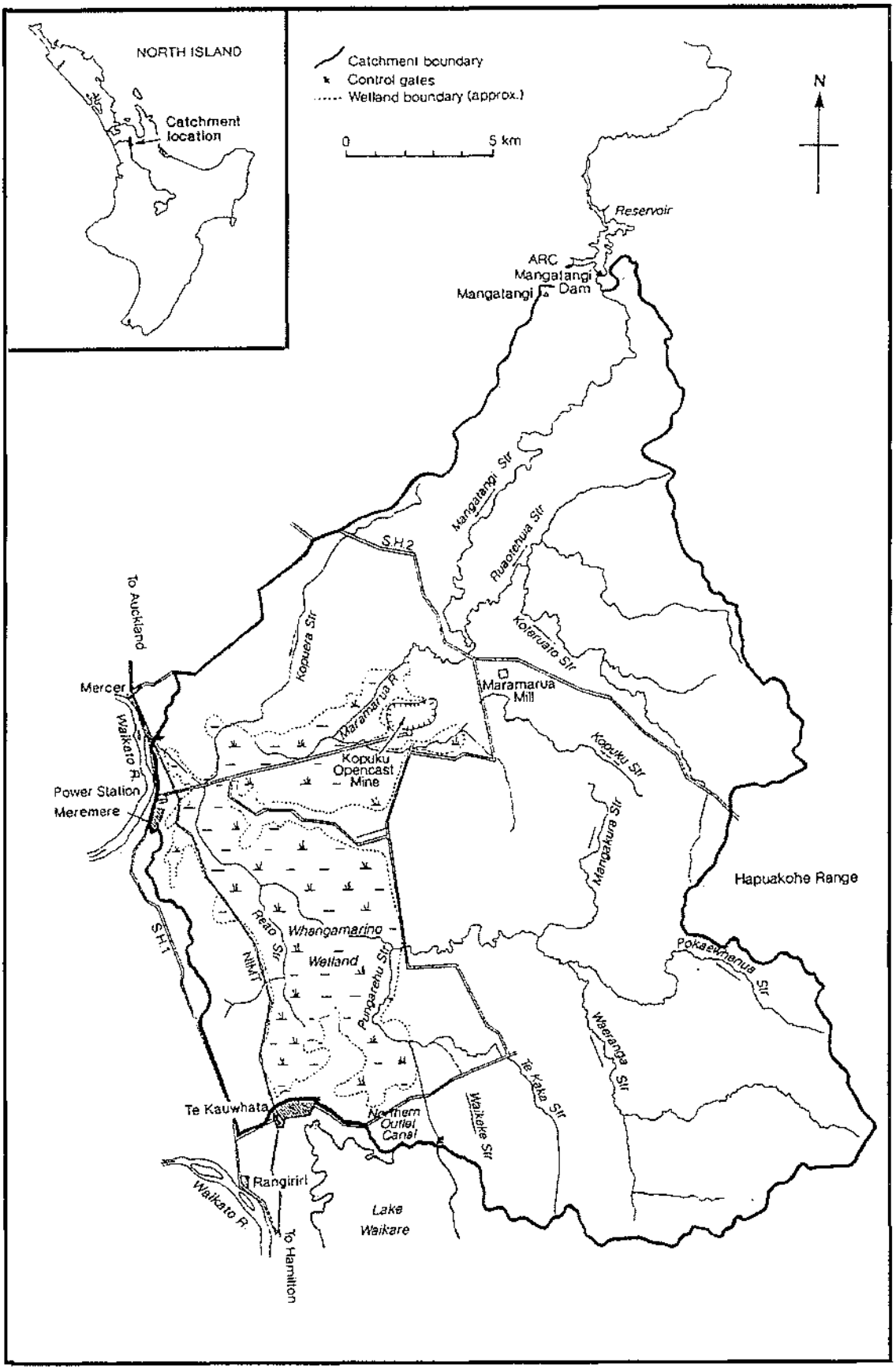
1.3.2 Topography & Geology

The Whangamarino Wetland is only 7.15 metres (m) above sea level at its highest point. It contains four river and streams, all being tributaries of the Waikato River. The major drainage course is the Whangamarino River. These tributaries flood over the swamp land during flood periods and prolonged high rainfall events, resulting in a wetted area that is much more extensive than that found during summer (Story, 1991).

Whangamarino is contained within three large shallow basins. They are bounded to the east by the Maugaroa Fault and to the west by a range of low hills from Te Kauwhata to Meremere. Outcrops of sediments form the base of low hills and rises within the wetlands. The three, relatively flat basins are drained by the Maramarua, Whangamarino and Reao Streams. The expanse is divided by the Island Block rise, which rises to some 20m above the wetland (DoC, 1989).

A prominent topographical feature of the northern part of the wetland is a causeway, some 30m wide, which was constructed across the wetland between 1950 and 1958 in order to transport coal to the Meremere Power Station. Pylons span this 11km causeway, and stand out from the surrounding low peat bog vegetation.

Figure 1.2 Location of the Whangamarino Wetland and Associated Catchment



1.3.3 The Creation of the Whangamarino

The Waikato River, on emerging from the Karapiro Gorge, built a huge fan across the floor of the Lower Waikato basin out toward the Waikato Estuary over thousands of years during the Quaternary Era. The river adopted many different courses down the fan during this period. The subsequent building of sand and gravel levees changed the existing drainage of the basin, and gave rise to a wide range of wetlands. The most recent Taupo eruption of 186 A.D. brought huge floods of pumice slurry down the river and many lakes were formed by pumice levees blocking off local drainage patterns downstream. Additionally, the expansive Waikato Estuary was totally filled in by the volcanic debris to form a huge freshwater wetland (Stephenson, 1986).

The Whangamarino Wetland and Lake Waikere was formed in the aftermath of these cataclysmic volcanic events in the centre of the North Island as the gradual meanderings of the Waikato River found a path to the sea. Subsequent events, e.g. peat formation, began to expand and alter the Wetland – filling in hollows in the latter part of the last glacial period until the present form was developed (Storey, 1991). The Whangamarino Wetland is now a complex mosaic of swamp and peat bog, while the Waikato River still has a large bearing on its hydrology (Stephenson, 1986).

1.3.4 Flora

The vegetation of the Whangamarino Wetland can be divided into two major communities – peat bog and mineralised swamp. In general the peat bog vegetation is found in the central portions of the wetland, while the swamp vegetation is found on the margins near the major streams and rivers (DoC, 1989).

The reason is that water depths and fluctuations do not solely determine the distribution of plant communities within a wetland, the availability of nutrients being another important factor. A combination of available nutrients and water depth determines what plant species grow within a specific region (Mitsch & Gosselink, 1993). Different plant communities will develop in nutrient rich areas (eutrophic) compared to nutrient poor areas (oligotrophic) (Blackett, 1996). Wetlands are assigned trophic status based on the plant species present (Moore *et al*, 1989; Tiner, 1993). In some cases, the water source itself will determine trophic status (Johnson and Brooke, 1989).

Peat bogs are fed by rainwater only and are, therefore, termed ombrogenous. They are typically acidic, having a pH value less than five. They have a very low nutrient status as the anaerobic nature of the bog means little or no plant decomposition takes place, resulting in little or no nutrient release. As such they are also defined as oligotrophic. These bogs typically occur as a peat dome or 'blanket' bog and because water enters only through precipitation, seasonal water levels fluctuate very little. The dome is created because plant decomposition is less or nil in the centre of the bog compared to plant decomposition occurs on the edges, which decomposes more quickly.

The infertile wetlands of the Whangamarino Wetland are raised peat bogs. Characteristic plant species in these bogs include *Empodisma minus* (wire rush), *Gleichenia dicarpa, Sporodanthus traversii, Sphagnum crista, Leptospermum scoparium* (manuka) and various *Drosera* species, which utilise insects as an additional source of nutrients (Johnson & Brooke, 1989). These species all have relatively slow growth rates, a common feature of plants inhabiting oligotrophic wetlands (Moore *et al,* 1989).

Swamps on the other hand are supplied by ground and surface water and thus termed soligenous. They tend to have a pH value in excess of 5.5 and are very fertile. The areas they form in are usually concave, having formed in poorly drained hollows in river flood plains or around lakes and are periodically or permanently flooded from through-flowing streams. As a result swamps have wide seasonal fluctuations in water levels. These eutrophic or fertile wetlands, generally have a high influx of nutrients, high standing crops, and less biodiversity than their oligotrophic counterparts (Moore *et al*, 1989). Plant species which are typically found in the Whangamarino's eutrophic wetlands, include raupo (*Typha orientalis)*, flax (*Phormium tenax*), *Glyceria maxima, Eleocharis sphacelata, Azolla rubra* and willow (*Salix* species) (Blackett, 1996).

1.3.5 Fauna

Fifty-six species of bird have been recorded in the Whangamarino Wetland (Ogle and Cheyne, 1981). Waterfowl are the most abundant with an estimated 30-50,000 waterfowl using the wetland seasonally from late autumn to spring when water levels are highest. Mallard duck (*Anas platyrhynchos*), an introduced species, is the most abundant, while the indigenous grey duck (*Anas superciliosa*) is now confined to dense willow cover. The

endemic New Zealand shoveler duck (*Anas rhynchotis variegata*) is also a user as is the introduced black swan (*Cygnus atratus*). The endemic brown teal (*Anas aucklandica*) is still officially recorded as being present but has most likely been locally extinct for at least 10 years (*pers obs.*). Australasian bittern (*Botaurus stellaris poiciloptilus*) is widespread in the willow and open herbfield areas in and around the Whangamarino. Of a New Zealand population of about 1000, 200 –250 may dwell in the wetland. The most commonly heard bird within the peat bog and manuka margins is the endemic and widespread North Island fernbird (*Bowdleria punctata*), while the shyer and less common spotless crake (*Porzana tabuensis*), along with its even more reclusive cousin - marsh crake (*Porzana pusilla*), can very occasionally be heard along the swamp/peat bog margins (DoC, 1989).

In terms of mammals, possum are widespread. Ferret, stoat, weasel and cat are also present. Norway rat is common. Red deer have been found within the wetland from time to time and may now be established. Domestic livestock, especially cattle, graze portions of the mineralised swamp and edges of the peat bogs in the summer, depending on water levels and how hard they are pushed (DoC, 1989).

Aquatic fauna comprises of a number of invertebrates species (of which little is known), frogs and fish. Eighteen species of fish have been recorded in the wetland. Both the long-finned eel (*Anguilla dieffenbachii*) and short-finned eel (*Anguilla australis*) and are among the most common of the indigenous fish found within the river systems. The endemic black mudfish (*Neochanna diversus*) is found throughout the wetland in both the swamp and bog areas, in permanent and temporary waters. Koi carp (*Cyprinus carpio*), mosquito fish (*Gambusia affinis*), rudd (*Scardinius erythrophthalmus*) and bullhead catfish (*Ictalurus nebulosus*) appear to be the most widespread and common of the introduced fish, and are found predominantly in the rivers, streams or temporary flooded open water swampland (DoC, 1989).

1.3.6 Existing Management Regime and Use

About 8000 hectares (ha) of what can be termed 'wetland' exists today (DoC, 1996). Of this, 4960 ha is managed by DoC on behalf of the Crown – 360 ha of this are above the wetland margin and leased as pastoral land; 730 ha are owned by the Fish and Game Council and the rest is privately owned (DoC, 1989). The Crown owned wetland is managed as a Government Purpose Reserve - Wetland Management, under the Reserves

Act 1977. The Waikato Area Office of the Department of Conservation, under the Conservation Act 1987, administers it. The remaining remnants on the periphery of the protected wetlands are either managed for recreational gamebird hunting by the Fish and Game Council or are held in private ownership, usually unprotected and associated with pastoral farming activities.

Waterfowl hunting dominates public use of the Whangamarino Wetland. It has been estimated that some 700 hunters spend around 11,000 person days in the wetland each year preparing maimais, ponds and hunting. Several privately owned wetland areas are specifically managed for hunting of waterfowl, with overseas clients purchasing rights to hunt on these wetlands, although this pursuit is technically still illegal (Lawrie, *pers comm.*). Indigenous and exotic duck species and black swan are the main gamebirds hunted (DoC, 1989). At present fewer than 100 people per annum visit the area to specifically observe and study wetland fauna and flora (Roxburgh, *pers comm.*). Some recreational 'coarse' fishing occurs at the Whangamarino-Maramarua River confluence and, in particular, bow hunting of koi carp on the 'Rice Bowl' (located at the confluence of the Whangamarino River and the outlet of the Lake Waikere spillway cannel) appears to be an increasingly popular sport (*pers obs.*).

Two fulltime eel fishers and one part time koi carp/catfish fisher utilise fish stocks within the Whangamarino. More up to date data on quantities of fish removed were unable to be obtained due to commercial sensitivity and a lack of specific information for the Whangamarino (Pullan, *pers comm.*). However, in 1979 some 78 tonnes of eels were taken from the Whangamarino and Maramarua Rivers (DoC, 1989).

As a result of works undertaken as part of the Lower Waikato and Waipa Flood Control Scheme, natural flows from the Waikato River were confined and directed from Lake Waikere in the Whangamarino Wetland via a 4m wide canal and control gate structure. Thus a major role of the wetland is to act as a gigantic storage pond for floodwaters from the Waikato River. An additional control structure was built at the confluence of the Whangamarino River and the Waikato River to prevent reverse flow into the wetland during periods of high flow (Strachan, 1981).

1.3.7 Surrounding Landuse

Drainage and land clearance directly adjacent to the wetland have resulted in the majority of the land being converted to farmland, with dairy farming and cash cropping being the predominant agricultural activities. Associated hill country landuse within the catchment combines a mixture of indigenous vegetation (a large portion of which is the Hunua Water Supply Reserve), farmland (mainly dairy and sheep and beef) and plantation *Pinus radiata* forest (mostly within the Maramarua Forest). Coal mining is undertaken at two active open cast mines in the Kopuku Stream sub-catchment.

1.3.8 Conservation Significance

The Whangamarino is listed as a Wetland of International Significance under the Ramsar Declaration (IUCN, 1996). Only four other wetlands in New Zealand share this listing. Cromarty & Scott (1996) summarise the reasons why the Whangamarino is of such international ecological significance:

> "Whangamarino Wetland is an outstanding example of a wetland characteristic of its region; it is the second largest bog and swamp complex in the North Island of New Zealand.
>
> 1. Whangamarino Wetland supports appreciable numbers of threatened plants and animals, including eight [threatened] plants; *Corybas carseii* [the only known location of this plant on the planet, (Roxburgh, *pers comm.*)], *Lycopodium serpentinum*, *Utricularia laterifolia*, *U. australis*, *U. novae-zelandiae*, *Cyclosorus interruptus*, *Myriophyllum robustum* and *Prosophyllum aff. patens*, two birds, Australasian bittern and brown teal [most likely to be now locally extinct], and at least one fish – black mudfish.
> 2. Whangamarino Wetland is more diverse botanically than any other large lowland peatland in the North Island, and its oligotrophic portions have a combination of very specialised plants which no longer occur in the Waikato Region or beyond. This diversity gives it an ability to support a wide range of regional rare communities.
> 3. Whangamarino Wetland supports a large number of species of plants and animals that are endemic to New Zealand. The wetland is one of the remaining strongholds for two endemic plants to New Zealand, *Corybas carseii* and *Myriophyllum robustum*, and for the black mudfish.
> 4. Whangamarino Wetland regularly supports over 20,000 waterfowl.
> 5. Whangamarino Wetland regularly supports approximately 20% of the New Zealand population of bittern (including 20% of the breeding pairs), 7% of the New Zealand population of black swan, and 5% of the New Zealand population of grey teal (*Anas gracilis*). These are 1988 figures. Numbers are likely to be somewhat reduced, as a lowering of water levels in the subsequent period has resulted in reduced habitat for wildlife. However, reinstatement of water levels was planned for 1993."

1.3.9 Key Management Issues

The Department of Conservation and the Fish and Game Council consider that the major management issues faced by the Whangamarino Wetland faces can be summarised as:

- maintaining and enhancing the biodiversity and ecological integrity of the unique and fragile wetland communities;
- protection of rare, endangered or vulnerable species of plants and animals;
- maintaining and restoring natural water level fluctuations;
- checking the spread of exotic plant and animal pests;
- maintaining or enhancing the water quality of the catchment which feeds the wetland;
- controlling the effects of browsing ungulates on sensitive wetland plan communities;
- management of a large gamebird population , including enhancement of its habitat;
- control of recreational hunters activities within the wetland, such as maimai construction, policing of bag limits and firearm safety;
- providing facilities for a range of recreational activities, such as fishing, boating, bird watching , walking and educational studies; and
- controlling the commercial use of the resources within the wetland, such as eeling and commercial koi carp fishing (DoC, 1989; DoC, 1996; Teal, *pers comm.*).

1.4 Thesis Organisation

Chapter One has introduced the Whangamarino Case Study and outlines the aim and objectives of the thesis. Chapter Two explores the link between biological diversity conservation and collaborative management, culminating in a brief overview of how New Zealand's conservation and resource management legislation relate to wetland biodiversity conservation. Chapter Three describes the theoretical basis for Naturalistic Inquiry as the principal research method. It then details the research approach and interview methods and focus. Chapter Four is an expansion of the key management issues stated in Section 1.3.7, using the information gained from the interview process. Chapter Five postulates six 'propositional statements' or bridges and barriers to the implementation of collaborative management as a means to conserve biodiversity within the Whangamarino Wetland. Chapter Six summarises the main findings of the research and reflects on some of the issues discussed in Chapter Five. It then offers paths toward future governance, management and monitoring regimes within the wetland.

Figure 1.3 The 'Causeway' as Viewed from Island Block Road – The main Northern entrance to the Whangamarino Wetland

Figure 1.4 Typical Vegetation of Whangamarino Peat Bog - Umbrella fern (*Gleichenia dicarpa*) and the 'restiad' wire rush (*Empodisma minus*)

Chapter 2: Establishing The Link Between Biological Diversity Conservation and Collaborative Management

> "We have duties to the ecosystems with which we share the world and that sustain us in it. They are more than just commodities for us. They contain life forces we have to learn to live with, to respect, to revere in fact." (Aldo Leopold, 1949)

2.1 Chapter Objectives

The purpose of this chapter is to investigate how collaborative management, largely a planning practice and social science constructs, can be used to achieve biodiversity conservation. This chapter also investigates how the existing institutional structures in New Zealand may assist or hinder the concept of collaborative management being used as a tool to achieve biodiversity conservation of protected natural areas.

The objectives of this chapter are to:

- define biological diversity (biodiversity);
- investigate the historical developments, from a global perspective, which have lead to the concept of biodiversity conservation;
- outline the traditional approaches to biodiversity conservation of protected natural areas;
- define and explore the notion of collaborative management (co-management) in the context of biodiversity conservation of protected natural areas;
- investigate the potential catalysts and limitations in the institutional structures of New Zealand that would affect the implementation of co-management; and
- discuss these factors within a New Zealand wetland management context.

2.2 The Science of Ecology

2.2.1 The Evolution of Ecological Contexts

Ecology is a relatively young science. Like all sciences it is dynamic and evolving in terms of theory as well as practice. The noun "*Ecology*" is derived from the Greek *oikos,* meaning "household", and *logos,* meaning "study" (Odum, 1983). Ecology is the study of the environmental house, which includes all the organisms in it and all of the functional processes that make the house habitable. Although ecology has close links with "pure"

biology, it has emerged in the last three decades as an essentially holistic discipline. Ecology unites biological and physical processes and links the natural sciences with the social sciences (Odum, 1983). This study of these links of ecological situations with societal factors has further increased since 1983 (International Union for Conservation of Nature and Natural Resources - IUCN, 1987).

The term *ecosystem* describes communities of organisms and their interactions with their environment. It covers the linkages between the physical and natural environment. *Habitats* are places where certain organisms are found, while *biomes* are the major types of ecological community, such as wetlands, coral reefs or humid forests. A *biome* might contain a number of different habitats (Odum, 1983). An *ecosystem* may cover the linkages between the biomes, their abiotic components such as soils and water, and the organisms found within it. The characteristic of these linkages is one of inter-dependency, such that changes in one component will have an effect upon the quantity and quality of others. These effects may often be described as synergistic. Such linkages would also include the relationships of humans with their environment (Odum, 1983).

Initial views of ecosystem succession were based on models showing highly ordered sequences of species assemblages moving toward a sustainable steady state climax. This view has been substantially challenged by more recent empirical research. For example, Gunderson *et al* (1995) state that the traditional view of ecosystem succession has been seen as being controlled by two functions: *exploitation*, in which rapid colonisation of recently disturbed areas is emphasised; and *conservation*, in which slow accumulation and storage of energy and material are emphasised.

Revisions in understanding, refined by C.F. Holling in 1986, showed that two additional functions were needed. One is that of *release*, or creative destruction, in which the tightly bound accumulation of biomass and nutrients become increasingly fragile (overconnected in systems terms), until suddenly released by agents such as forest fires, insect pests, or intense pulses of grazing. The second is one of *reorganisation*, in which soil processes of mobilisation and immobilisation minimise nutrient loss and reorganise nutrients to become available for the next phase of exploitation. Capital becomes tightly bound, preventing other competitors from utilising the accumulated capital until the system becomes so over-connected that rapid change is triggered (Gunderson *et al.*, 1995). This process is shown in Figure 2.1. Holling describes this view of system functions as "... *the dynamic*

sequential interaction between four system functions – exploitation, conservation, release and reorganisation." (Gunderson *et al.*, 1995: p36)

In order to examine this opposing view of ecosystem process, two other terms that will be used frequently should be defined. The first is that the basic processes of biological productivity, hydrology and sedimentation, as well as the ability of ecosystems to support life, is termed *ecosystem functioning.* The second is *ecological resilience*, which can be defined as the capacity of an ecosystem to recover from, and thus absorb, external shock and stresses, whether natural (e.g. drought, fire or earthquake) or human caused (e.g. pollution or biomass removal) (Gunderson *et al.*, 1995).

Gunderson *et al.* (1995) considers that a critical feature of such hierarchies is an "asymmetric", and sometimes unpredictable, interaction between levels. In particular, the larger, slower levels maintain constraints within which the faster levels operate. This means that the slower levels control the faster ones. There is a bottom-up trigger point however, where these seemingly fixed static (or "stable") systems are vulnerable to small disturbances at certain critical times in the cycle. For example, once a system becomes over-connected and brittle as it reaches maturity there is a resulting loss of resilience (Gunderson *et al.*, 1995). For example, Old Growth ('over mature') Australian indigenous forests are a good illustration. As the amount of vegetation on a forest floor accumulates, when a fire does eventually start the considerable amount of "fuel" will generate sufficient heat to burn the canopy. Whereas little leaf litter on a 'young' forest floor (in the 'exploitation' phase) would have not caused such upper canopy destruction. Holling (1986) provides examples that at this stage the system can often jump unexpectedly to different and more productive systems and hence the cycle continues (Fig. 2.1).

2.2.2 Ecology and the Economy

The ecological processes which support life on this planet are also the cornerstone of the global economy. Odum eloquently described this relationship as:

> "The word 'economics' is derived from the Greek root *oikos*. Since *nomics* means 'management', economics translates as the 'management of the household', and accordingly, ecology and economics should be companion disciplines. Unfortunately, many people view ecologists and economists as adversaries with antithetical visions." (Odum, 1977: p86)

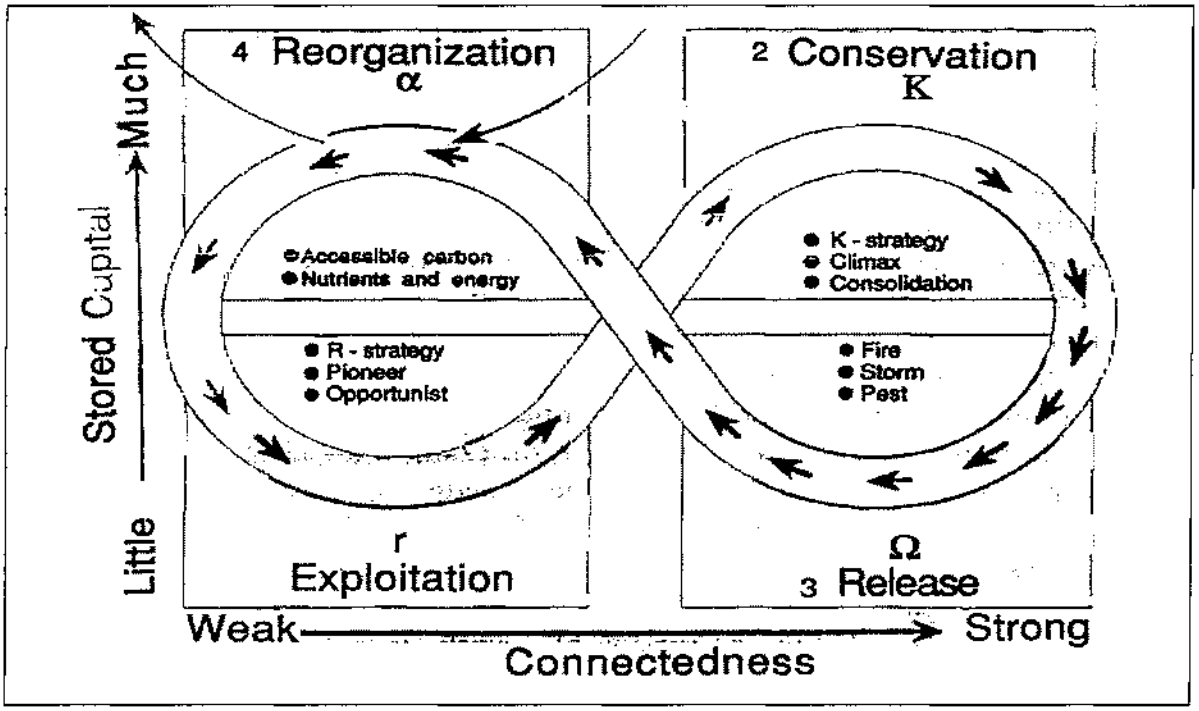


Figure 2.1 Ecosystem Succession Dynamics (from Gunderson *et al.*, 1995)

Economic benefits or values provided by ecosystems may be in the form of direct or indirect contributions. Ecological functions such as flood control and ground water recharge have direct benefits. Less readily identifiable functions, such as mangrove habitats which support fisheries, have less quantifiable benefits, but nonetheless are equally important for economic activities (Barbier *et al.*, 1994). Ultimately these functions affect human welfare. Barbier *et al.* defines human welfare as "*the economic value that individuals may derive from the ecological resources and services or ecosystems in terms of human consumption, production and overall wellbeing*" (Barbier *et al.*, 1994: p13). Thus the United Nations Environmental Programme (UNEP) clarifies the economic role of biodiversity:

> "The primary service of biological diversity is to make available, on a sustainable basis, a wide array of biological resources (including genetic resources) and ecological functions through contributing to the productivity of the "services" of natural ecosystems." (UNEP, 1993: p16)

What the UNEP is recognising is that natural ecosystems are providing a "service" to the economy and hence human welfare. These links between the economic systems and ecosystems can be shown systematically as in Figure 2.2.

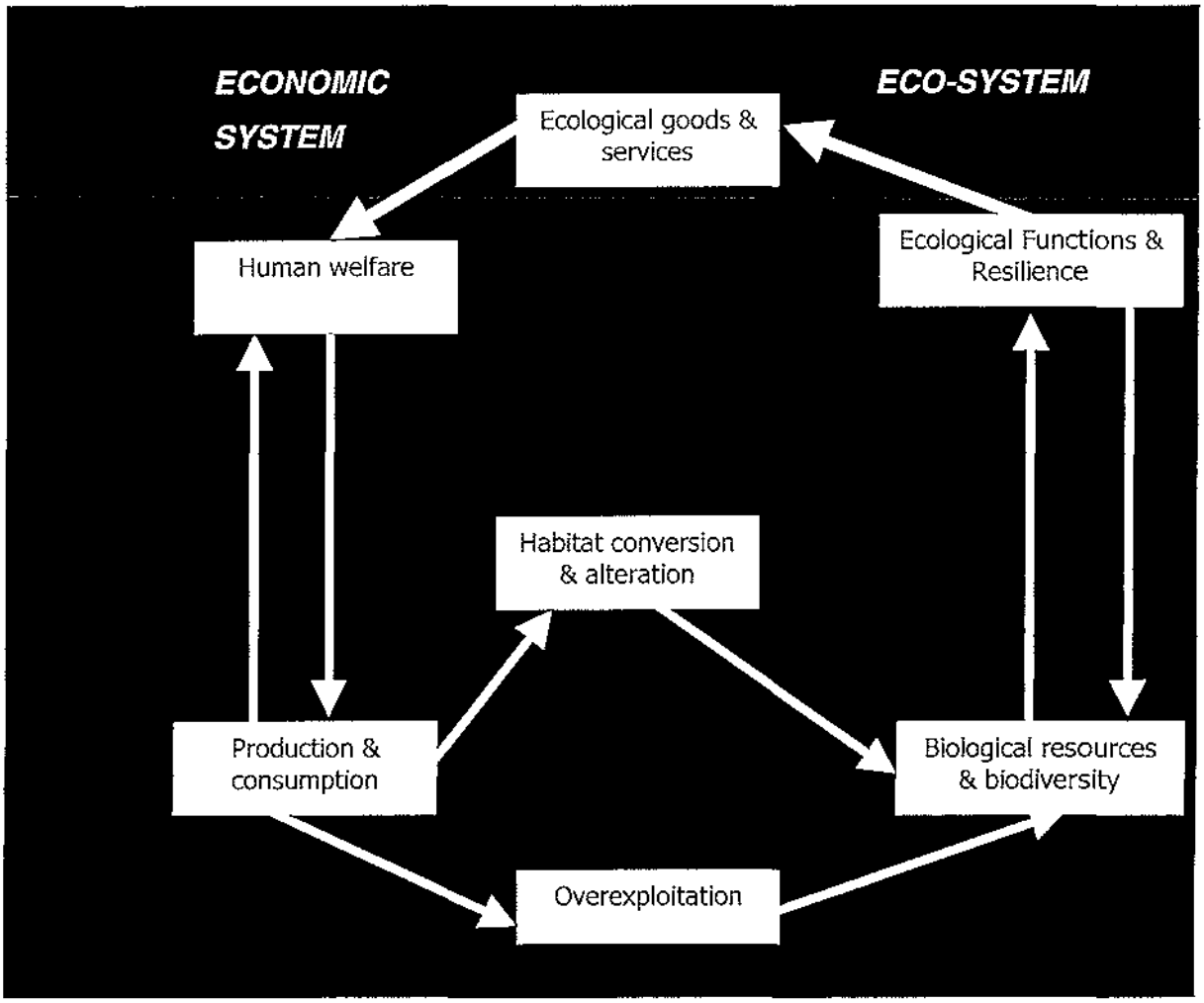


Figure 2.2 Links Between Economic and Environmental Systems

2.2.3 The Economic Value of New Zealand Wetland Ecosystems

Figure 2.2 indicates why biodiversity has become the environmental "issue" for humankind in the late twentieth century in a society dominated by monetary-led economic philosophies. In New Zealand alone, the annual value of terrestrial indigenous biodiversity in 1994 was estimated at $46 billion. Marine ecosystem services were valued at $183 billion per year. This equates to a benefit to the economy more than twice the 1997 gross national product of New Zealand (Patterson & Cole, 1997). Natural wetlands are no exception and perform many important economic services - prevention of storm damage, flood and water control, support of fisheries, nutrient and waste absorption. Wetlands are used for recreation and water transport and can be directly exploited for fishing, agriculture, wildlife products, wood products and water supply. When properly measured, the total economic benefits to human welfare of a wetland's ecological functions, its

services and its resources may exceed the economic gains of converting the area to an alternative use (Storey, 1991). Wetlands are also extremely diverse, energy rich and complex ecosystems. Further, their surface and subsurface hydrological linkages with their surrounding catchment have effects, and are affected by, bio-physical parameters far outside of their obvious natural boundaries (Sainty and Jacobs, 1981).

2.3 Biological Diversity

2.3.1 Defining Biological Diversity

Ecologists have been concerned for many years about the increasing rate of biological diversity (biodiversity) depletion on a global scale for many years. They have also noted the cost of this loss in terms of the intrinsic values of the ecosystems as much as for the disbenefits of this loss to humans (e.g. Leopold 1949; Odum; 1977). However, it was not until the late 1980s that wider attention was drawn to the issue. In 1987 the World Commission on the Environment and Development (WCED), known as the Brundtland Commission, presented its report called "*Our Common Future*" to the United Nations General Assembly. In this report nine issues were identified as being of major concern in maintaining the quality of Earth's environment (WCED, 1987). The Assembly determined to convene a global conference on development and environment, in which these nine points would form the focal point (Blay & Piotrowicz, 1993). One of these nine issues was conservation of biological diversity. It was noted that depletion of the planet's biodiversity is happening at a very fast, and ever accelerating rate (e.g., McNeely *et al.*, 1990; May, 1989). Preston (1995) estimates that at the beginning of human kind, the extinction rate of wildlife was about one species for every thousand years. The extinction rates have increased exponentially in the last two decades so that as at June 1992, when the Earth summit was held, the United Nations estimated that 50,000 species became extinct each year. That is equivalent to almost one species every ten minutes.

But biodiversity depletion is more than just an economic or species numbers issue. One of the indicators of overall ecosystem integrity is the biodiversity it can sustain. As an ecosystem loses its integrity, so the numbers of species of plants and animals generally decrease; they either move away (if they are able) or die out. If the biodiversity in the area changes, resulting in altered character, this often means a loss of productivity and possibly loss of the functions of that ecosystem. These ecosystem changes are additional to the loss

of genetic material that is no longer available for future agricultural, medical or cultural purposes (IUCN, 1997).

The United Nations Conference on Environment and Development (UNCED), otherwise known as the Earth Summit, convened in Rio de Janeiro in June 1992, deliberated biodiversity conservation. One outcome was a definition of biodiversity in Article 2 of the 1992 Convention on Biodiversity, to which New Zealand (as well as 178 other countries) is a signatory, *viz.*:

> "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". (UNCED, 1992)

In other words, biodiversity is a concept which encompasses the complicated mosaic of plants, animals and micro-organisms and the ecosystems to which they belong, at all hierarchical levels (McNeely, 1990). In 1989 Greenpeace defined biodiversity as:

> "the wealth of life on earth, the millions of plants, animals and micro-organisms, the genes they contain, and the intricate ecosystems they help build into the living environment. Biological diversity is simply the end result of four billion years of evolution" (McNeely, 1990: p23).

Lister (1998) proposes three general categories for biodiversity. The most common focus is on ecological structure; followed by a focus on function (ecological processes); and an implicitly value-oriented focus on wealth or richness (resources). The ecological hierarchy stipulates three general levels or scales: genes, species, and ecosystem or landscapes (Gunderson *et al.*, 1994). In short, the traditional and structural perspective is that biodiversity is "*the totality of genes, species and ecosystems in a region*" (World Resources Institute - WRI, *et al.*, 1992). These definitions tend to focus on the genetic diversity as such with little, if any, reference to the human factor (Blay & Piotrowicz, 1993). Such definitions tend to treat human activities and impacts as interventions into biophysical systems as opposed to being long-standing interactive elements or processes in ecosystems and as much an influence on biodiversity as "natural" evolutionary characteristics. Lister therefore proposes the following heuristic definition of biodiversity in an attempt to expand the narrower views of biodiversity:

> "Biodiversity is the variety, distinctiveness and complexity of all life on Earth, including its structures, functions, *cultures* [emphasis added], and information at all scales (from genetic to global) and in all its contexts (from DNA to self-organization)." (Lister, 1998: p16)

Lister (1997) argues that biodiversity must now be considered from both a literal scientific perspective and a figurative political perspective. Only with this transition, she states, can biodiversity become an issue of ethics and ensuing values which it is of necessity. This progression of biodiversity beyond its traditional ecological roots is the logical extension of biodiversity as a normative concept, guided by specific social, rather than scientific values (Blay & Piotrowicz, 1993). Traditionally biodiversity has been focussed on, and limited to, ecological structure and function in the context of ecosystem stability. Emergence of a post-normal, systems-based science, the hallmarks of which are uncertainty and complexity, reveals ecological realities that force consideration of broader perspectives and multiple contexts for biodiversity (Lister, 1998). Moreover, the role of alternative knowledge, in particular from indigenous societies, is given little mention in the "purist" definitions (Blay & Piotrowicz, 1993; Lister, 1997). This role can be expressed as "*the unique character or way of life of a* [Human] *community*" (Lister, 1998: p4). Including a cultural perspective recognises a vital linkage between humans and nature, where culture and nature are mutually intertwined, each influencing the other. The depletion of natural biodiversity is generally accompanied by, and is a partial result of, the loss of cultural diversity (Shiva, 1993; WRI *et al.*, 1992).

2.3.2 Measuring Biodiversity

If biodiversity conservation is to succeed, the scientific rationale is there has to be some quantifiable measurement of biodiversity and biodiversity depletion. The United Nations (UN) Secretariat General Report addressing biodiversity in 1991 admitted that:

- "the precise relationship between landscape transformation and biodiversity loss is unknown;
- it is also not known what are the exact negative consequences of biodiversity loss; and
- there is much scientific uncertainty regarding the number of species which inhabit the earth, and knowledge about the genetic diversity of wild species, including relatives of economically important plants, is even poorer."(UN, 1991)

The UN report concedes that before ways to preserve biodiversity can be developed: "*we must first learn how much biodiversity is present, what is its role in the function of species, populations, and ecosystems, and what its potential economic value is.*"(UN, 1991)

According to Magurran (1998) one of the reasons why biological diversity has become a central focus of ecological science is that considerable debate continues to surround the measurement and definition of biological diversity. This is despite the extensive range of indices and models that have been developed for measuring diversity (for example, New Zealand's State of the Environment Report, 1997).

In reality there is no single convenient method of measuring biodiversity. As Nowicki notes:

> "The condition of being different or having differences does not provide a good yardstick with which to measure diversity. It is more convenient to define diversity as a complexity of systems. Diversity does not imply that all components of the system are complex; it only implies that the system itself is complex." (Nowicki, 1993: p66)

The method of measure or analysis of biodiversity is also dependent on the observer of the system. Specifically, spatial and temporal issues such as boundary determination, and the measurement and scope of the data to include in research or policy, are all significant means by which biodiversity is rendered subjective on the observer (Lister, 1998).

To overcome these limitations, the notion of biodiversity becoming "*heuristic and therefore useful in guiding conservation planning and management*" as proposed by Lister, appears to be justified. This pluralistic perspective of biodiversity is advocated in this thesis to include both information and culture elements. It is not a case of measuring 'apples with pears' but rather the potential for biodiversity conservation planning is determined by virtue of its permeation through the whole living system. Finding a single selected scale or number of scales which measure isolated biophysical components will not allow for a holistic view. Management and monitoring need to address the critical issues which are associated with biodiversity loss – how complex systems function and the links between ecosystems and societal systems (Lister, 1998).

2.3.3 Justification for Biodiversity Conservation

As indicated in Figure 2.2, human economic activities are based on using resources created and sustained by natural ecosystems. The main driving forces behind biodiversity loss arise from the relationship between these human activities and natural ecosystems, (i.e. the interactions within and between the models shown as Figure 2.1 and Figure 2.2).

Norgaard (1987) attributes the human-induced loss of biodiversity to three 'macrophenomena':

- increasing human populations;
- technological change; and
- social organisation based on a Newtonian, positivist paradigm.

The clearest direct cause of biodiversity loss (at a landscape level) is habitat destruction as a result of population growth and technological change (Ehrlich and Wilson, 1991). More specifically this loss can be distinguished in terms of two primary proximate and underlying causes:

- Proximate causes refer to the direct overexploitation of species and the indirect impact of ecosystem degradation that leads to species loss. For example, through habitat alteration and conversion (Barbier *et al.,* 1994).

- Underlying causes refer to the economic, social and cultural factors that lie behind the economic activities that lead to the direct depletion of species, and the destruction and degradation of their habitat. These underlying causes include the scale and growth of human population, culture and ethics, economic incentives and institutions (Barbier *et al.,* 1994).

Only a handful of domesticated animal species provide nearly all the terrestrial protein sources for the majority of the developed world population (WRI, 1992). Resource and environmental management practices that attempt to maintain highly managed domesticated ecosystems run the risk of developing systems that are less resilient. Although domesticated ecosystems are heavily supported by a variety of exogenous inputs such as irrigation, industrial energy, fertilisers, pesticides etc, they may still be susceptible to unexpected shocks and stresses (Barbier *et al.*, 1994; Holling, 1986). Domesticated ecosystems are also characterised by their lack of diversity. As a result, the impact of an unexpected shock on a managed system can be the collapse of the system, and consequently the loss of production on a large scale (Barbier *et al.,* 1994).

The effects of habitat degradation on biodiversity loss are well understood and documented. Habitat change by humans is caused directly through land-use changes, urbanisation, infrastructure development and agricultural expansion. Habitat change

occurs indirectly through environmental effects caused by the use and extraction of resources, and the introduction of new species to an area. Biodiversity is also affected by discharges to air, soil and water and by global climatic changes due to fossil fuel burning and emission of greenhouse gases (Barbier *et al.*, 1994).

An important point to note is that 75 percent of all recorded animal species loss has occurred on islands (Ehrich, 1988). One reason for this is that ecosystem types are constrained by their size. Typically, island birds, animals and plants have a small range that contains a relatively small number of potential habitats (Odum, 1983). Therefore, when an island habitat is degraded or destroyed there are few, if any, alternative habitats for the species to find refuge in. In comparison, continental species often have much greater access to alternative habitats. Subsequently, fragmentation and a decline in the quality of remaining habitats have particularly important implications for biodiversity (Ehrich, 1988). Loss and fragmentation of habitat leads directly to species extinction. The gradual and cumulative effects of a decline and fragmentation of habitats is difficult to measure in terms of its effects on local biodiversity, and even more difficult on a global scale (Blay & Piotrowicz (1993); Gunderson *et al.*, 1994). The consequence is that it is extremely difficult to assess how close we are to prolific and 'sudden' habitat loss and hence widespread ecosystem collapse (Lister, 1998).

Some species are used as a focus or indicator of biodiversity loss since they are considered to be indicators of the health of the ecosystem. Migratory birds, for example, depend upon a number of different ecosystems ranging over whole continents. If one of these ecosystems is damaged, e.g. the loss of a particular estuarine wetland where migrating birds spend part of the year feeding, their numbers will decrease. This focus on migratory birds, and on migratory species in general, has lead to the identification of critical global habitats and areas requiring urgent protection (Saunier & Meganck, 1995). The survival of endemic species which are only found in one location are also indicators of the health and satisfactory functioning of their particular ecosystem. Sometimes this results in a highly restricted range for that species, making it essential to conserve those habitats. Saunier & Meganck state that:

> "The idea of basing conservation of a particular species on the maintenance of our existing network of protected areas will become even less tenable as the number of threatened species increases and their refuges disappear. Natural areas will have to be designed in conjunction with the goals of regional development and justified on

the basis of ecological processes operating within the entire developed region and not just within existing protected natural areas." (Saunier & Meganck, 1995: p234)

The uncertainty surrounding the present state of knowledge and understanding of biodiversity and the implications of biodiversity loss has provoked two general types of responses. Blay and Piotrowicz (1993) term these as the "*bio-dogma*" and "*anti-dogma*" responses. The bio-dogma response advocates the adoption of immediate measures to deal with the issues of biodiversity loss, notwithstanding the limits of present knowledge. The anti-dogma response takes the view that the growing concern about biodiversity is alarmist and exaggerated (Reid & Miller, 1989). The basis for this argument is that there is little empirical or scientific rationale for the claims regarding mass extinction of species and collapse of ecological life-support systems (May, 1989). Blay and Piotrowicz (1993) consider that the principal weakness of the anti-dogma response is that in the face of lack of complete knowledge it may be wise and prudent to adopt measures aimed at biodiversity conservation. This is consistent with the 'precautionary principle'. The 'precautionary principle' can be defined as:

> "Activities which have an assumed negative environmental effect should be avoided even when scientific evidence can not yet prove them to be the cause. An adaptive management philosophy is also part of the precautionary principle. That is, management actions need to be taken within certain limits, the effects monitored and actions modified according to the changes recorded in the affected ecosystem." (IUCN, 1997: p15).

But it is the pattern of normative constructs that prevail in society, which can either encourage or discourage behaviour leading to conservation of biodiversity. Lister (1998) lists the key driving forces in society as being:

- laws and institutions;
- economic incentives and disincentives ;
- culture; and
- individual ethics.

2.4 Why Biodiversity Conservation of New Zealand Wetlands is Failing

2.4.1 Definition of Wetlands

The use of the term wetlands covers a wide variety of inland, coastal and marine habitats. The enormous range of wetland types can be sub-divided into 30 categories of natural wetlands and nine human-made ones (Dugan, 1990). Essentially any habitat that is significantly 'wet" for

sufficiently long periods of time can be classified as a 'wetland". The international treaty on wetland conservation, the Ramsar Convention, officially defines wetlands as:

> "areas of marsh, fen, peatland or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six metres."(IUCN, 1972)

In 1982 The Environment Council of New Zealand proposed the following definition of a wetland:

> "Wetlands is a collective term for the permanently or temporarily wet areas, shallow –water and land-water interfaces. The water may be fresh, brackish or saline, and wetlands are characterised, in their natural sate, by plants and animals which are adapted to living in wet conditions." (Stephenson *et al.*, 1982: p5)

The legal definition of a wetland in New Zealand is described in the Resource Management Act 1991 as:

> "...including permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions." (RMA, 1991: section 2)

This is similar to international definitions that also describe wetlands by the presence of water and specialised plant and animal communities (Hammer, 1992). A wetland has been defined as an ecotone between terrestrial and aquatic ecosystems, sharing ecological properties of both but also possessing unique properties of their own (Howard-Williams, 1991). Ecological definitions tend to be broader than the legal definitions, describing wetlands as transition zones between terrestrial and freshwater ecosystems, where water is present either at the surface or within the root zone and the soils are saturated and have unique characteristics that are distinctly different from terrestrial soils. Wetland vegetation is also characterised by the absence of flood intolerant species (Mitsch & Gosselink, 1993).

Both the legal and ecological definitions of wetlands rely on the hydrological features of these systems (Blackett, 1996). This is because the hydrological characteristics are the single most important defining factor for any wetland ecosystem (Mitsch & Gosselink, 1993). Water flow and depth vary through most wetlands depending mainly on local topography (Johnson & Brooke, 1989). Water depths can vary within a year from nil to 3-5 metres (Kadlec & Hammer, 1988). Such a range and fluctuation of water levels allows for the development of a diverse range of plant and animal communities. For example, deeper water zones, with low flow rates, are ideal fish habitats and allow sedimentation of

suspended particles (Thompson, 1987). Shallower regions allow for the establishment of a variety of aquatic macrophytes, and have a large amount of soil and water contact. This in turn maximises nutrient transformations (Mitsch & Gosselink, 1993).

2.4.2 Loss of Wetlands in New Zealand

Wetlands are among the most diverse ecosystems in New Zealand. Yet we have a very poor history in managing them. For example, it has been estimated that in New Zealand over 90 percent of our natural wetlands have been destroyed since European settlement. As Table 2.1 indicates, New Zealand has the worst track record of any developed country in this respect (Dugan, 1990). Wetland loss within the Waikato region is slightly less drastic with 75 percent of an estimated 110,000 ha of pre-European wetland area being drained and converted to pasture by 1995 (Leathwick *et al.*, 1995)

Country	Estimated percentage wetland lost
USA	53%
UK	60%
Netherlands	60%
France	15%
New Zealand	90%

Table 2.1 Comparison of Wetlands Destroyed by Humans in Developed Countries (after Barbier *et al.* 1994)

2.4.3 Effectiveness of the Existing Legislation to Protect Wetlands

Table 2.1 suggests that over one hundred years of reserves, national park and planning legislation has not been successful in preventing the destruction and modification of New Zealand's wetland ecosystems. However, in recent years the Crown has made several key attempts to slow down the rate of wetland modification. On the international front, two main international treaties relating to the protection of wetlands have been ratified by New Zealand. These are:

- The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971, known as 'Ramsar'); and
- The Protocol to amend the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Paris, 1982).

The Ramsar Treaty imposes the following obligations on the signing parties:

- to designate at least one national wetland for inclusion in the List of Wetlands of International Importance. New Zealand have so far designated the Whangamarino Wetland, Farewell Spit, Kopuatai Peat Dome, Waituna Lagoon and the Firth of Thames, which were signed in at Ramsar, Iran in 1991 (EW, 1998);
- to consider their international responsibilities for conservation, management and wise use of migratory stocks of wildfowl; and
- to establish wetland reserves, co-operate in the exchange of information, and to train personnel for wetland management.

No legislation specifically implements these treaties, but New Zealand's obligations are fulfilled through existing legislation, principally through the Conservation Act 1987 and Resource Management Act 1991 (Milne, 1992). These obligations have been met by the reservation of Crown owned freshwater wetlands through the Conservation Act 1987, Wildlife Act 1953 or Reserves Act 1977. As no wetland meets the key minimum size criteria of 20,000 ha, the protection of wetlands under the National Parks Act 1980 has never occurred. Privately owned wetland can be formally protected through a covenant on the title, which is usually through the relevant territorial authority under the Reserves Act or the Queen Elizabeth the Second National Trust Act 1977. However, it has been the former Acclimatisation Societies, and their successor the Fish ands Game Council, which have protected and restored the greatest area of wetland on privately owned land (Teal, *pers comm.*). The Fish and Game Council through the Conservation Reform Act 1990, has legal powers and functions to protect and conserve gamebird and sports fishery habitats. Furthermore, the preservation of wetlands is a matter of national importance under the RMA (S6 (a)). This means that all persons exercising functions and powers under the Act must 'recognise and provide for' wetland preservation, regardless of the tenure of the land.

However, the indistinct ecological boundaries caused by seasonal water fluctuations are the reason why wetlands are so difficult to manage effectively as protected natural areas within their legal boundaries. The other reason why wetlands face so much threat from development is, because of their very nature, they are often the most productive and hence highly desirable areas for agricultural or horticultural use. Wetlands are also subject to many other external influences, such as their use as flood control areas for the benefit of surrounding agricultural land. Moreover, inputs of nutrient rich water from the agricultural

use within the catchments have caused significant changes in the water quality and ultimately the plant community compositions of wetlands. Other effects such as the extremely rapid colonisation of exotic plants (e.g. grey and crack willow) or animals (e.g. stoats) are the result of the waterways or road corridors that link the wetlands with other more modified systems. Consequently, the culmination of all of these indirect effects over the last hundred years or so mean that even remaining 'natural' wetlands are nothing like the original, pre-European wetlands in terms of the representation of indigenous fauna and flora within them. They are now, more often than not, totally dominated by introduced plants and animals (Stephenson *et al.*, 1983). Consequently, in order to mange the biodiversity of wetlands effectively, one must address the effects of resource use and landuse activities outside of the wetland boundary to a much greater extent than for an indigenous forest remnant.

An understanding the energy flows of wetlands is also critical when assessing why current management regimes have been so unsuccessful. As the energy flows within wetlands are complex and vast, a change in flow of energy (or stored capital) can cause rapid changes in system functions from conservation to release (or catastrophe). In other words, the ecosystem succession dynamics, shown graphically in Figure 2.1, mean that in the case of wetlands, the system dynamics are more often than not 'over-connected' and brittle. Consequently, they will have a low ecological resilience to absorbing external shocks and stresses.

C.F. Holling (*in* Gunderson *et al.*, 1995), using the management of the Florida Everglades as an example, concludes that the inability of resource management institutions to successfully conserve biodiversity in wetlands, is because the problems are essentially systems problems. Where aspects of human behaviour are complex and unpredictable and where causes, although at times simple, are always multiple in effects, the resultant problems have a fundamentally non-linear cause. As both the social and ecological realms exist in multiple states and are discontinuous in behaviour, in both time and space, reaction to ecological crisis rather than predication, becomes the norm. Therefore policies that rely exclusively on rigid social or economic reactions to ever-changing and irreversible ecological conditions lead to reduced options for future management, limited restoration potential and perpetual 'surprise' (be it unexpected ecological change or a societal reaction) when the human reaction is found to fail.

2.5 Alternative Paths to Conserve Biodiverity

2.5.1 Command and Control Management [1]

In order to clarify why wetland management in New Zealand is failing, an understanding of the concepts behind the present legislative regimes is useful. The western conservation ethic of valuing and protecting wild nature evolved out of the period of Romanticism in the second half of the 18th century. The original impetus came from the aristocratic and wealthy land-owning classes in England and Europe, influenced by concepts such as Edmund Burke's philosophies of the 'picturesque' and the 'sublime'. These ideas rapidly became popular and extended across the globe with the 19th-century expansion of Europeans into new colonial territories.

This preservation ethic was further refined through the American experience with nature, and the philosophies that developed in response to the 'taming of the West'. A fundamental principle here came from the establishment of Yosemite and Yellowstone Parks. This was the concept that nature can be set aside, separate and inviolate, free from human interference. Boundaries were drawn around 'special places' so they could be 'set aside' from the 'ravages' of ordinary use for human inspiration and enjoyment (Hales, 1989).

This idea also has a particular logic when you look at it in its historical context, enshrining what was perceived to be nobility and innocence. For example, President Lincoln's official grant of Yosemite in 1864, shows a curiously defiant idealism against the violence, destruction and escalating death tolls of the Civil War. Dismissing the original inhabitants of these park landscapes was a necessary aspect of conceptualising the scenery as pristine and unspoiled. Thus the Crow and Shoshone peoples, who had lived and hunted in the Yellowstone area for generations, were moved off by the Army when the Park was established (Phillips, 1995).

From this original American concept, many protected natural areas were established around the globe, and each country developed legal mechanisms which include various types of reserves dependant on the primary purpose they were to be used/protected for.

[1] I am indebted to Cooper, R. 1998: *Quantum Physics and Maori Customary Access to Natural Taonga,* for discussions in this section.

The utilitarian value of nature as a resource to be exploited for human advantage goes back through the millennia to Palaeolithic cave drawings of hunting scenes, bison, bulls and elk whose representation may have been part of rituals to ensure a successful kill and continuing abundance of game. The utilitarian ethic was endorsed in the Biblical guarantee given by God to Noah after the Flood, that all creation is given into human authority. For many centuries the relationship of humans with nature was one of superiority, above the beasts and closer to the angels, with the responsibilities that go with that sophisticated status — the duty to practice wise stewardship, to improve on wild nature and turn it to profitable use. The Romantic idea of valuing nature by setting it aside and preserving it, the cornerstone of modernist conservation management, is only a very recent paradigm, a concept of the last two hundred years (Cooper, 1998).

In the philosophies and belief systems that have influenced the development of the contemporary environmental ethic, the dominance of humans is a consistent theme. Both the protection and utilitarian world-views derive from a fundamental assumption that the human role is interventionist. This is, to control, to be in charge, to make decisions and judgements for nature (whether using it or choosing to protect it), to decide on boundaries and limits, to impose rules and constraints, to determine the value and worth of things, and above all, to solve problems for nature with science and technology. The decision to set some areas of nature apart, and strictly control what people might do there, is no less deliberate an intervention (Cooper, 1998).

When close examination of the objectives of protected natural area legislation is undertake, it could be argued that most of these protected areas were originally established with little or no regard for local people. In fact, park management has emphasised a regulatory role aimed at the exclusion of local people (Wells *et al*, 1992). Machilis and Tichnell (1985) have argued that this "*preservationist approach requires an essentially militaristic defence strategy and will almost always heighten conflict* [between the managers and the local people]." Additionally, conventional, top-down, formal management regimes ('command and control') have generally not been successful for managing protected natural areas because they have not dealt adequately with ecological *or* societal complexity or surprise (Gunderson *et al.*, 1994; Lister, 1997).

Boyle (1998) describes the western reliance on paternalistic authority, hierarchy, and status as reflecting the following entrenched principles of social organisation:

- the dependence on patron-client relationships for ensuring loyalty and advancement;
- the desire to avoid conflict and maintain face in personal relations as the key cultural characteristics that tend to isolate decision-makers from the concerns of people and affected communities; and
- this structure reinforces government agencies power to act in their own or "national" interest.

These factors effectively circumvent the ability of individuals, communities and public interest groups to participate constructively in the process of project planning and decision-making. Moreover, they have resulted in government bureaucracies that are strongly hierarchical with little opportunity for the interagency communication, co-operation, and co-ordination needed for integrated environmental and natural resource management (Boyle, 1998).

2.5.2 Normal versus post-normal science

The development of the rational comprehensive planning model is closely aligned with traditional western scientific perspectives and procedures. Kuhn (1962) defined this as: "*'normal science' - research built upon a foundation of past achievements, involving theoretical activity and fact-gathering through experiments and observations.*" Normal or conventional science in Western society is based on the Positivism paradigm developed during the Scientific Revolution of the late 16th and 17th centuries (Kuhn, 1962). It is characterised by the belief in reductionist science to deliver a knowable, unified and objective truth. This is still reflected in today's institutions. Our present institutional arrangements and structures rely largely on conventional science, and moreover, rational comprehensive planning, to achieve their management goals through reaction to an ecological event through rigid reductionist and reactionary control measures (Lister, 1998).

2.5.3 Links with Planning Paradigms

In both the strong-holds of western civilisation (Europe and the US) it became clear that the de-politicising of planning was required if longer-term and wider community interests were to prevail over short-term interests of developers. So, from the turn of the century, implementers of planning shifted from religious people, social reformers, political campaigners, state functionaries, entrepreneurs and great landowners to state technocrats

(Low, 1991). A new process was contrived out of this 'depoliticisation' of planning - the 'rational-comprehensive' paradigm of planning:

> "Planning based on scientifically inferable knowledge of the public interests, centrally controlled co-ordination of implementing agencies and a rational foundation to planning and public management" (Low, 1991: p56).

Procedural planning focuses on a rational scientific approach to problem solving. That is a rational planning process analogous to scientific method. However, after many social and environmental failures in the 1960s, planning theorists began to question the effectiveness of this approach. Friedmann (1987), citing Breeheny and Batu (1980) and Taylor (1984), highlighted some major deficiencies in this planning paradigm. These can be summarised as follows:

- The process cannot be rational in reality because the connection between rational thought and action required facts - facts in the context of the natural environment are usually considered guesses and thus open to conjecture.
- Political consensus is assumed but is almost never achieved in reality.
- It is difficult to incorporate substantive issues in the process, e.g. in the past Maori issues have not been dealt with well in New Zealand planning legislation.
- Planners are not 'value-neutral' as they are required to be by the technocratic approach of rational-comprehensive planning.

2.5.4 Ecosystem Management

The international conservation community recognised the limitations of rational comprehensive planning and 'command and control' regulation approaches in the last two decades. In particular, it was noted that those communities next to protected area boundaries frequently bear substantial costs for the benefit of the wider community, usually without recompense (Wells *et al.*, 1992). The 1980 *World Conservation Strategy* reflects the view of numerous groups who state that linking protected area management with the economic activities of local communities is vital (IUCN, 1980). From this time recognition has grown that the successful long-term management of protected areas depends on the co-operation and support of local people. It is often neither politically feasible nor ethically justifiable to exclude local communities from their management (Wells *et al.*, 1992). Article 8 of the Biodiversity Convention (1992) is the nemesis of this concept of local community involvement.

The UNEP Biodiversity Unit (1997) consider that their overall goal is to make the environmental management of biodiversity an important part of, and fully integrated with, social and economic activities to ensure that environmental activities and development objectives become mutually supportive. As alluded to in this chapter, this integration and responsiveness can only be achieved through a systems based approach to biodiversity conservation management (e.g. Holling, 1984; Gunderson *et al.*, 1995; Lister 1998). A systems based perspective of living systems rests on the central tenets of complexity and uncertainty, and necessitates flexibility, anticipation and adaptation rather than reaction and control in conservation planning and management (Gunderson *et al.*, 1995; Lister 1998).

This systems approach to management of natural resources is an emerging ecological philosophy termed "*ecosystem management*" or "*ecosystem approach*" (Sunde *et al*, 1999). One definition of ecosystem management is:

> " a goal driven approach to restoring and sustaining healthy ecosystems and their functions and values. It is based on a collaboratively developed vision of desired future ecosystem conditions that integrates ecological, economic and social factors affecting a management unit defined by ecological, not political boundaries." (Szaro *et al*, 1996: p4)

The success of ecosystem management will depend as much on the management of social, economic and institutional factors as it will on the protection and management of the biophysical environment. The potential strength of ecosystem management is that it draws upon many different disciplines to present a holistic and integrated, rather than sectoral approach, to natural resource management (IUCN, 1997). Real examples suggest that it is critical that if local people are to become involved successfully in resource management, the framework is on an ecosystem management approach. Rösner & von Dorrien (1997), discussing evidence from fisheries management in the Wadden Sea, Netherlands, found that an ecosystem approach could well prove successful. However, they considered it is incumbent on the state to set clear objectives for integrated management and to demand of the different interest groups a constructive dialogue leading to the elaboration of detailed management plans at the local level.

2.5.5 Emerging Public Participation Models

There is a growing body of evidence that local people represent significant human resources in terms of their knowledge of their environment, their organisational capabilities, their institutions, and their creativity in implementation measures. Existing local "*social capital*" has not been adequately recognised and used in protected natural area management yet it is a key component of achieving a systems or ecosystem management approach to biodiversity conservation. Svennevig (1997) lists four reasons why local people should be involved:

> "- **practical,** the 'locals' (in the literal sense of the term) are the final decision makers when it comes to shaping a landscape;- **juridical**, in the Wadden Sea area, a number of 'locals' simply own the land(scape);- **normative**, because authorities in a democracy respect the people who are affected by their decisions;- **knowledge**, local people often know things about fluctuations and seasons in the area; things that 'we others' do not necessarily know. And, they naturally know what it is like living in the area..." (Svennevig, 1997: p3)

Public participation can mean quite different things to different people. In her seminal work Arstein (1969) describes how citizen participation can in actuality range from the empty ritual of policy rhetoric by the controlling agency to the significant exercise of power over outcome of the planning and implementation process. The extent to which citizens are able to provide input or exercise power depends in part on how citizens participate. In some cases citizens participate directly in public hearings, workshops, surveys or referenda. In other cases citizens are 'represented' by organisations constructed for that purpose. Arnstein (1969) refers to this continuum of public involvement that ranges from a more token and paternalistic approach to a more genuinely participatory approach as shown in Figure 2.3.

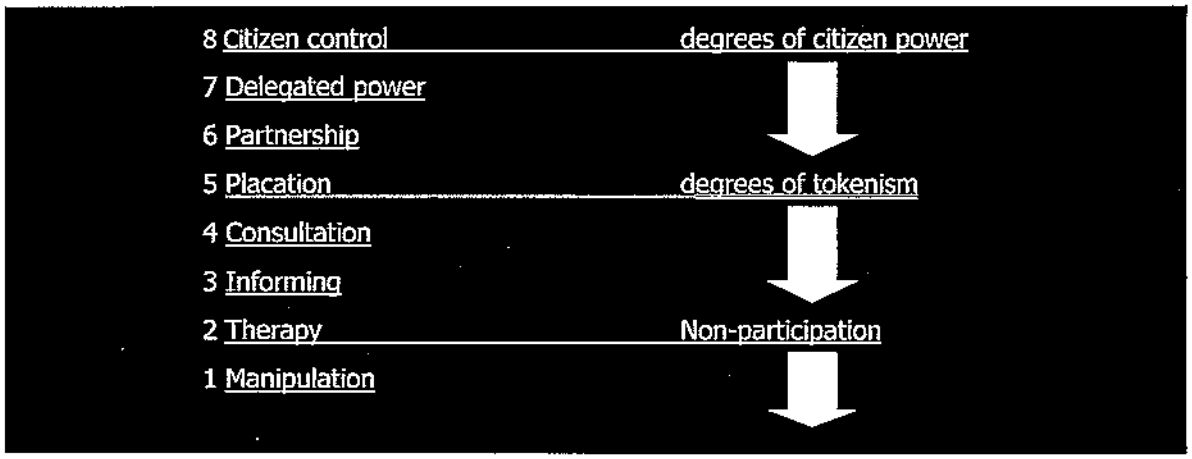


Figure 2.3 Arnstein's eight rung ladder of citizen participation Arnstein (1969)

The bottom rungs of Arnstein's ladder (rungs 1 and 2) describe levels of non-participation that are often contrived to substitute for genuine participation. Their real objective is to enable power-holders or decision-makers to 'educate' or 'cure' the participants in the process. Rungs 3 and 4 progress to levels of token participation that allow the public to have a voice, but prevents the power to ensure that their views are heeded. Placation (rung 5) is also a higher level of tokenism whereby the public may advise, but the decision-makers retain the right to decide. The top levels of Arstein's ladder (rungs 6-8) reflect increasing degrees of public decision-making power until total control is reached.

In many respects either extreme of Arnstein's ladder may not yield good sound decision making. However, it is suggested that a more participatory model is required which reflects a partnership between stakeholders and authorities and where opportunities and constraints can be explored and trade-offs negotiated (Coakes, *1998).* Literature in the social justice field (Thibaut & Walker, 1975) has indicated that an individuals' judgements of fairness are seen to be influenced by the procedures used in decision-making more than by the decision or outcome itself. Thus, non-control issues such as trust in the authority, the neutrality of the decision-making process and the voice in the process are key factors.

While stakeholder involvement and participation is often evident in the process, practice suggests that participation more often than not resembles a technical approach where 'objective' and scientific evidence is presented, which ultimately dominates the decision-making process (Coakes, 1998). Lane, Rosse and Dale (1997) suggest, however, that an integration of both political and technical approaches is preferable in providing information to decision-makers and contributing to community response and empowerment. Trust needs to be established between government authorities and communities. Furthermore, the methods chosen to deal with people will ultimately affect how they manage change. People must be involved in determining their own futures. By imposing decisions without consideration communities are left feeling victimised and helpless. There is a need to empower communities so that they are better able to deal with change in the future (Coakes, 1998).

2.5.6 Collaborative Management Concepts

The concept of collaboration (or co-management) was born as process to facilitate and formalise community participation in resource management. The process is a path to

provide empowerment of the local people to share in the management of the natural resources in their area (Sunde *et al*, 1999). It involves partnerships between government agencies, local communities and resource users, non-government organisations (NGO's) and any other interest groups. Negotiated authority and responsibility for shared management of a specific area is the key objective of the process (IUCN, 1997). Borrini-Feyerabend (1996) describes co-management as:

> "A situation in which some or all of the relevant stakeholders in a protected area are involved in a substantial way in management activities. Specifically in a collaborative management process, the agency with the jurisdiction over the protected area (usually a state agency) develops a partnership with other relevant stakeholders (primarily including local residents and resource users) which specifies and guarantees their respective functions, rights and responsibilities with regard to the protected area."

Athough it does not necessarily imply it, collaborative management may involve the devolution of a significant amount of authority from control agencies to local people. This means local participation in more than just a token role which is something more substantial than 'consultation' (refer to Figure 2.4). Cerna (1985: p233) regards local participation as:

> "Empowering people to mobilise their own capacities, be social actors rather than passive subjects, manage the resources, make decisions, and control the activities that affect their lives."

Two main approaches to organising and sustaining community participation in projects can be identified: employing agents of change; and building local institutions (Wells *et al*, 1992). The role of 'agents of change' is to foster grass-roots participation and build local institutions (Midgley, 1986). They are not usually leaders nor do they tell people what to do. Rather than having a catalyst role. Local communities would need to determine who the leader is, and that person is usually an existing well–respected figurehead of the community. The agent of change can be seen as the catalyst to stimulate self-reliance and establish self-sustaining local institutions (Wells *et al*, 1992). This will most certainly require a shift in the perception of roles government agencies play. Fisher (1995) suggests some of the new roles of government agencies in this new support and facilitation process may include:

- facilitating conflict resolution among groups of resource users;
- providing a back-up to groups who are involved in enforcement;
- ensuring less powerful groups in the community are heard; and
- providing advice on technical matters as required.

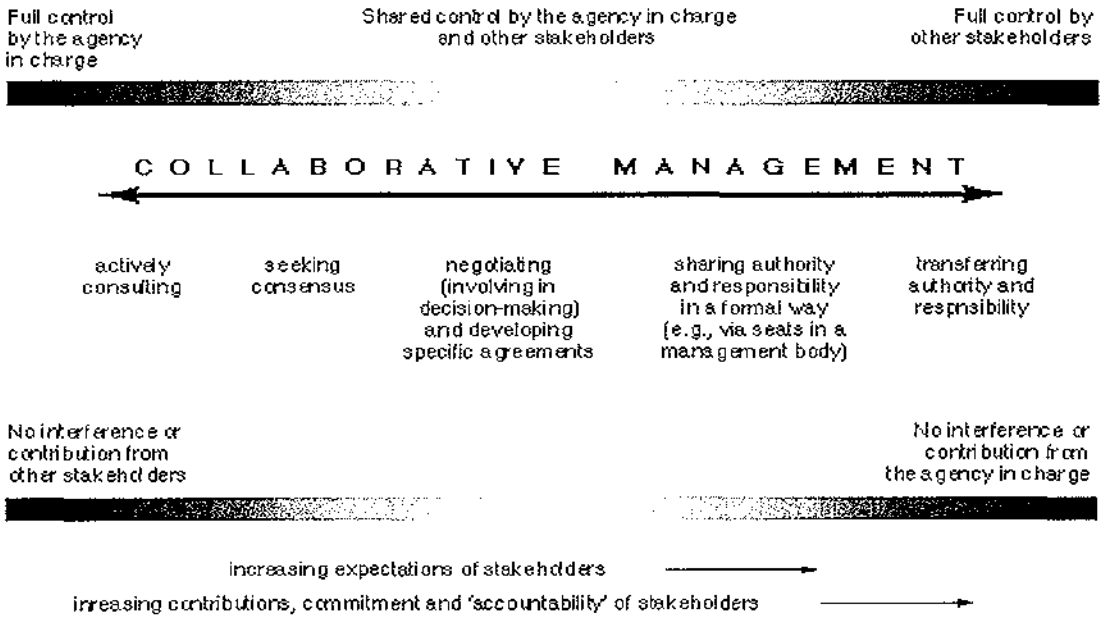


Figure 2.4 Degrees of Local Community Involvement (After IUCN, 1997)

There is conflict between the short-term objectives of a human management system with the long-term goals of on-going management needed to sustain sensitive ecological systems. This conflict requires resolution. More specifically, an agent of change and facilitator will not be involved in any project for very long (in a bio-physical time-frame). Therefore, local participation appears to be more effective and sustainable on a long-term basis when local institutions are established (Wells *et al*, 1992). Local institutions can act as a focus of mobilisation among local people and as a link between local people and external organisations (Wells *et al*, 1992). Local institution building has been defined as :

> "The creation of procedures for democratic decision making at the local level and the involvement of local people in these procedures to the extent that they regard them as the normal way of conducting community affairs." (Midgley, 1986).

IUCN (1997) define the process of collaborative management as a "*normalisation of local involvement*". It describes the process as:

> " a clear empowerment of the local people to mange the resources in their area. At a local level, the recognition of specific responsibilities and rights is endorsed through the adoption of bylaws and formal agreements. In some countries, legislation has been passed to specify the procedures and responsibilities. In order to work effectively, collaborative management has to be strengthened by building the capacity of these local institutions and groups to take sustainable management decisions and to implement them based upon sound technical and social advice."

While it may be the intention to involve local people in the design of projects, they may be sceptical about the project (often justifiably) when first approached. Local communities

are often happy to identify the problems which concern them, but (Wells *et al*, 1992) notes that true participation is only developed once the community sees tangible evidence of beneficial results. Other more significant barriers to local participation include:

- existing authority structures;
- limits to local empowerment by national or local government where they may feel their power base threatened ;
- the lead agency unwilling to change from a purely enforcement orientation to one more sympathetic to communities living around the protected area;
- limited economic gains or even losses for local people; and
- conflicts in the political values and ethical beliefs amongst the participants. For example, while an environmental NGO may be totally focussed on preserving the natural environment, a local farmer may believe that providing jobs and creating economic wealth is more important (Wells *et al*, 1992).

These conflicts will not disappear. Building trust and confidence of the community is critical. Short-term benefits are needed to establish the project's credibility and to overcome distrust among the target population. Only by a thorough assessment of the local social, political, economic, cultural and biological factors will the details of how to achieve these pre-requisites emerge (Well *et al*, 1992). Furthermore, almost every protected natural area provides for a diverse range of uses. Where there is a multiple use of natural resources, potential for competition and conflict is heightened (IUCN, 1997). However, conflict can be used positively by the manager as it provides the 'dynamism' for adaptive management and a basis for setting up collaborative management (IUCN, 1997).

Even at a professional level, the principles of collaborative management can be applied. One of the problems in the past has been the conflicts and tensions between different professional disciplines. Conventionally, different disciplines will emphasis their particular interests. This tension is often exacerbated by the lack of cross-institutional communication (IUCN, 1997). Partnerships, usually involving formal agreements between the organisations, can be a solution. However, there must be a clear definition of the roles and responsibilities of each of the partners. In effect such partnerships require a high level of trust between all involved (IUCN, 1997).

2.6 Barriers and Bridges in the Existing Institutional Framework for Implementation of Co-Management in New Zealand

2.6.1 The Conservation Act

In New Zealand, the management of both protected natural areas and the wider issue of natural and physical resource management outside of the Crown estate underwent far-reaching reform in the 1980s and 90s[2]. Environmental protection measures were scattered throughout a host of different Acts of Parliament and numerous regulations and Orders in Council. The desire to overhaul the country's natural resource management was reflected in the intense debate preceding the release of "*Our Common Future*", the report of the World Commission on Environment and Development in 1987 (Nuttall and Ritchie, 1995: p5).

In 1987 the New Zealand Forest Service, Department of Lands and Survey and the Wildlife Service disestablished in a radical restructuring of the management of officially sanctioned natural areas. Under the new regime the Department of Conservation became responsible for an estimated 80 per cent of the Crown's estate. The Conservation Act 1987 sets out the roles of the Department in section 6. These might be broadly considered to be a duality of function; the management of the conservation estate held on behalf of the citizenry under Crown title and the advocacy for conservation value in conservation management in all physical areas under Crown jurisdiction. Memon and Perkins (1993) consider that in spite of its title, the thrust of the Act is preservationist rather than conservationist:

> "Conservation means the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations." (Section 2 (1) Conservation Act 1987).

The Conservation Act provides that all natural and historic resources which are managed by DoC are subject to general policies, conservation management strategies and conservation management plans formed under the Conservation Act (s. 17A). General policies are intended to address policy issues of general application throughout New Zealand, although they can be applied to individual conservation areas or resources (s.17B(i) Conservation Act). Conservation management strategies (CMS) are designed to implement general policies and establish objectives for the management of the natural and

[2].A fuller description and analysis of the history of NZ resource management and protected natural areas control is beyond the scope of this paper.

historic resources managed by the Department (s.17D, Conservation Act). They cover the broad objectives of an area but are not intended to replace detailed management plans for specific protected areas. Conservation management plans implement conservation management strategies and establish detailed objectives for the management of conservation assets (s17E, Conservation Act). National parks are an exception as they have management plans of their own (s.45 National Parks Act 1980).

It is also worth noting that the Conservation Act contains the strongest reference to Treaty of Waitangi responsibilities of the Crown in natural resource management of any legislation currently in statute. Section 4 of the Act requires that DoC "*give effect to the principles of the Treaty of Waitangi*" in fulfilling their responsibilities under the Act.

Tilling (1989) and Candy (1990) have argued that the rational planning paradigm, combined with a single-use philosophy as the basis of the DoC administrative system has drawn rigid boundaries around indigenous ecosystems, thereby denying the opportunity to consider multiple-use options, even where they may be compatible. The Conservation Act stipulates that only intrinsic and recreation values may be fostered under the stewardship of DoC. Memon and Perkins (1992) consider that this has created an artificial barrier between DoC land, other Crown land and privately held land which bears no relation to ecological or societal realities.

2.6.2 The Resource Management Act 1991

In 1991, following two years of unprecedented public consultation, an overall legislative framework for all management of natural and physical resources was introduced in the form of the Resource Management Act 1991. The RMA amalgamated all planning, water and soil legislation when it was enacted in October 1991 and was subsequently given a comprehensive review in 1993. Seven hundred statutory authorities from harbour management trusts to drainage boards were abolished and 167 separate Acts relating to the management of natural resources were revoked, including the Town and Country Planning Act 1977 (Memon, 1991).

A genuine attempt was made in the introduction of the RMA and other related legislation (for example the Conservation Act 1987 and the Fisheries Act 1996) to provide an integrated framework for all aspects of resource management. While this has been

achieved to a degree, enough variance in wording, intent and implementation provisions of the legislation exists to provide ongoing barriers to the successful integration of these statutes in practical management (Nuttall & Ritchie, 1995).

Additionally, a failure to amend or replace other critical legislation in order to make for a seamless integration across the full ambit of statutory authorities remains a critical barrier. The Local Government Act (1984) stands out as a prime example in this regard. Nonetheless, when the Local Government Amendment Act was passed in 1989, a mechanism for the integration of ecological management, and social and economic considerations at a regional and district level could be established (Martin and Scott, 1990). By setting up a structure for local government based at a water catchment and sub-catchment level and by requiring local councils to produce annual plans, local government was immediately forced into considering land management in a more holistic way and also became more financially accountable to its ratepayers (Vossler, 1991).

2.6.3 Public Involvement Opportunities in the Resource Management Act and Conservation Act

Current practice in New Zealand provides for consultation as the primary mechanism for community involvement in resource management and DoC administered Crown lands. Sunde *et al.* (1999) considers that the RMA is a critical piece of legislation for implementation of collaborative management. There is a strong emphasis on public involvement in all levels of the statutory processes of the RMA with provision for consultation with sectoral interests and the general public *per se*. To a lesser extent, the Conservation Act also has a strong emphasis on consultation. Further amendments to this Act via the Conservation Law Reform Act 1990 strengthened community input in respect of Conservation Board functions and activities.

While consultation processes vary significantly among those required to carry out the functions these two acts, one consistent theme is that it seldom ensures communities understand or accept the range of effects a proposed activity or policy directive may have (Nuttall & Ritchie, 1995). These provisions might be considered to fall short of the general requirements of a collaborative management approach as outlined previously, in that the prescriptions given for consultation do not necessarily translate into direct provision for participation in management by all interests.

Primary responsibility for management design and implementation is established by the statute and designated to varying bodies with provision for minor flexibility. This leaves little room for all parties with a legitimate or moral stake in management of an area or resource to determine a management structure and process where power and decision making arrangements are negotiated between the stakeholders from the outset. In effect, both the RMA and the Conservation Act predetermine a hierarchy of control. As will be discussed in more detail below, this curtails the capacity of certain sectors to participate. A prime example is the unique situation tangata whenua organisations find themselves in (Grundy, 1995).

Collaborative management would take the consultation practice one step further by involving tangata whenua, communities, and landowners in the management of resources through a consensus based and inclusionary process. Collaborative management relies on an increasing level of dialogue between different groups within the community in order to articulate a range of common goals. In this approach, the technical skills held by local government may be directed more towards empowering communities in order to assist them in undertaking projects for the use, development or protection of local resources. The new philosophy behind resource management requires a range of mechanisms to be considered before regulatory regimes are put in place. This may include education of communities to ensure a greater understanding of the particular issue. Education and community empowerment are seldom used to their potential, thus creating an environment more suited to conflict and regulation than co-operation and understanding. All of these issues are represented in the Figure 2.5, which outlines a continuum of participatory approaches and the arrangements that may be used to implement them.

Perhaps the most important potential disadvantage of the RMA and the Conservation Act is the lack of recognition of social equity issues, which is a key concern of the Brundtland Report (Memon & Gleeson, 1995). Lucy (1994) puts it rather well:

> "In sum, public administration and policy analysists have limited potential for providing policy direction as long as they pay little heed to the quality of places and to the interaction of people with their environment - macro-economics acknowledge their approach does not guide value choices or provide leadership in any directions other than the current preferences of consumers." (Lucy, 1974: p56).

This also can be related to the difficulty of incorporating traditional Town and Country Planning Act 'public good' ethics into the RMA as this would be in conflict with the neo-classical economic doctrine of the time (Grundy, 1995). To elaborate, Kirkpatrick (1998), highlights the paradox: "*we live in an institutionally and ideologically growthist society based on ecologically dysfunctional beliefs that economic growth based on material resources can continue indefinitely*".

Kirkpatrick uses the Australian development of the Regional Forest Agreement (RFA) for indigenous logging as an example. The RFA used terms such as "Ecologically Sustainable Development" to give the appearance of being more politically and ecologically acceptable than it actually was. Further, the agreement was not successful as a serious attempt to produce an acceptable outcome as it did not involve all major interests in the process of drawing boundaries within the constraints provided by firm criteria. Decisions were made at higher bureaucratic and political levels which excluded key community groups, NGO's and even some conservation mandated government departments. The reality of the RFA process has been that it has not gained widespread acceptance amongst all of the stakeholders. Ironically, it is now used as a tool to justify continued unsustainable harvesting of indigenous forests (Kirkpatrick, 1998). The parallels of this experience with those of Timberlands' activities on the West Coast in the late 1990s are not dissimilar.

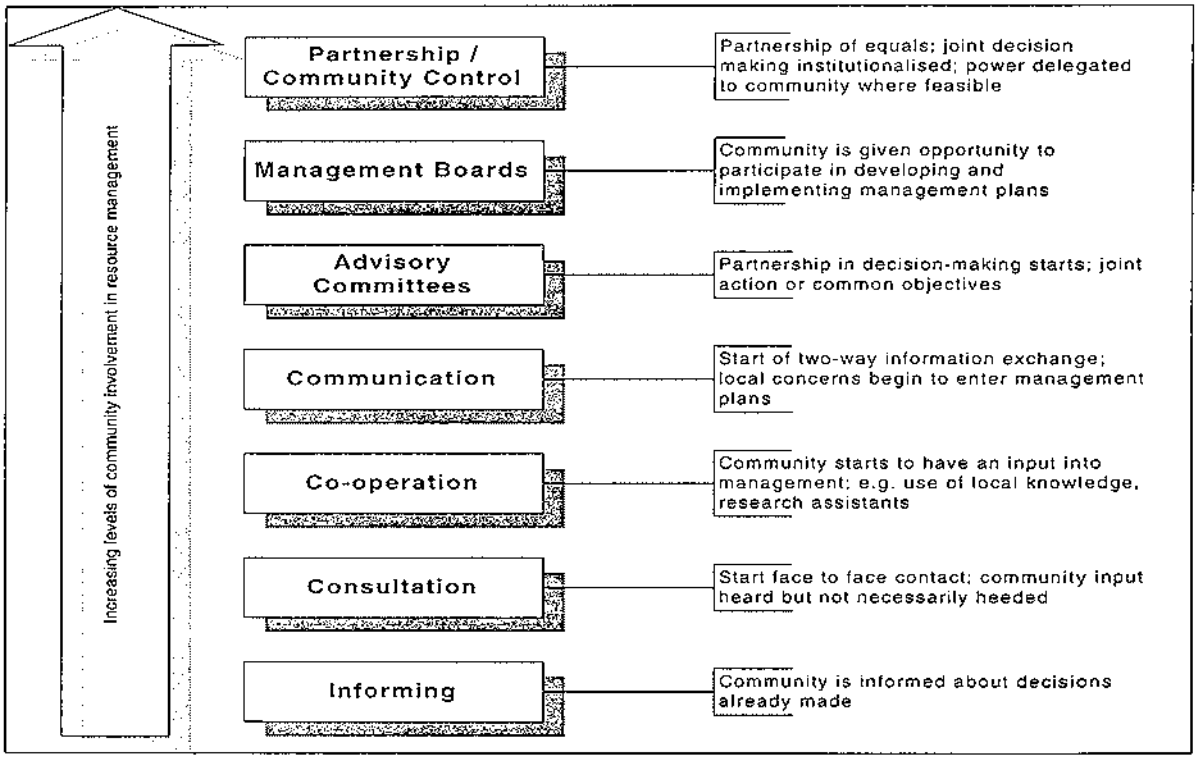


Figure 2.5 The Continuum of Participatory Approaches

2.6.4 Barriers to Tangata Whenua Participation in Natural Resource Management

The necessity of recognition and provision for involvement by indigenous peoples and their resource management paradigms has been consistently recognised by the ICUN and is recorded in Agenda 21. It follows that better and more effective environmental outcomes are likely to be achieved more efficiently when there are better processes in place between tangata whenua, councils and resource users (Nuttall, 1999).

The Treaty of Waitangi can be viewed as the overarching and founding document of New Zealand statutes (DoC, 1997). The principles of the Treaty of Waitangi are at the core of the legal interpretation of this document and originate from the Treaty of Waitangi Act 1975. The obligations placed on both the Crown and Maori by the Treaty of Waitangi would appear to imply that Maori have a higher status than other key stakeholders, apart from the direct representatives of the Crown, in any co-management model. The Treaty relationship means the status of Maori, as tangata whenua and kaitiaki, should be regarded as equal partners to the Crown in natural resource management (Nuttall, 1999). This position, while implied indirectly in the RMA and more directly in section 4 of the Conservation Act, has not been fully recognised in practice, as the Ministry for the Environment has noted:

> "Few statutory bodies have taken steps to enter into collaborative management arrangements even when there are ample opportunities to do so. This has led to growing Maori concern that their views are not considered to be a priority. This has amplified the frustration over the separation of processes for resolving land claims and ownership issues from the management of land and water, and their administration by local and regional authorities and the Department of Conservation (DoC)." (MFE, 1998: p9)

Matunga (1997) concludes the self-evident truth is that contemporary planning in post-colonial societies needs to recognise its dual heritage and tradition by reshaping the institutions and laws which govern current planning and environmental management so as to accommodate the coexistence of an indigenous planning system. In effect this means that government needs to give real meaning to kaitiakitanga as a resource management philosophy within the context of the RMA (Tomas, 1994). Tomas also acknowledges the practical difficulties of implementing kaitiakitanga under the RMA. The possibility of kaitiakitanga prevailing is further complicated when Tomas considers the holistic nature of a Maori view of management as opposed to a legal framework that differentiates between land, sea, water and air resources. There is no provision within the RMA or Conservation

Act that allows Maori interests to prevail over others, yet kaitiaki principle requires precedence or priority. Tomas concludes that:

> "In its Maori form, Kaitiakitanga is a universal principle incorporating the Maori cultural view of the world. Its inclusion in the RMA enables it to be both read down and applied narrowly.... given the cocktail of interests within which Kaitiakitanga finds itself enmeshed, recognition as a "Maori" principle, is, until the European mindset changes dramatically, practically impossible." (Tomas, 1994: p17)

Consequently, recognition of the rangatiratanga of iwi and hapu, affirmed in the Treaty of Waitangi, is often at odds with the council structures set up to manage natural and physical resources under the Resource Management Act. Maori feel strongly that there is now a need to move beyond the statutory consultation phase towards a more pro-active position that can guarantee effective participation and greater recognition of Maori rights and responsibilities (MfE, 1998).

The Ngai Tahu settlement has created new statutory instruments for active involvement in both RMA and conservation estate management, including statutory acknowledgement and advisor roles, topunui and deeds of recognition. These will, of necessity, require collaborative management approaches to be developed. The Waitangi Tribunal in its Whanganui-a-Orotu recommendation (June 2, 1997) also called for joint management of the Ahuriri Estuary (involving both DoC and territorial authorities). Other more recent reports have also called for the shared or joint management of rivers (i.e. Te Ika Whenua Report, 1998 and Whanganui River Report, 1999).

Chapter 3: Research Methodology

> "Enter into the world. Observe and wonder; experience and reflect. To understand a world you must be part of that world while at the same time remaining separate, apart of and apart from. Go then, and return to tell me what you see and hear, what you learn, and what you come to understand" (Patten, 1980).

3.1 Chapter Objectives

This chapter presents the research design and methodology of the thesis. The research approach used is based on Naturalistic Inquiry Research theory, while the techniques and methods of data collection revolve around unstructured interviews of key players as well as literature review. Analysis is based on a derivative of Naturalistic Inquiry termed the 'constant comparative method of data analysis'. These methods are explained, and their selection justified by a summary of their advantages and disadvantages as research instruments. Finally, this chapter presents the development and detail of the methods as they relate to the case study research investigations.

3.2 Research Design

3.2.1 Research Ambitions

Appreciation of the potential application of collaborative management theory to biodiversity conservation of the Whangamarino Wetland requires an understanding of both the ecology of the catchment and the historical anthropocentric influences on this ecosystem. An understanding of local community perceptions and reactions to existing management practices is also required. The reaction of the management institutions to the community's knowledge, values and norms need to be explored, because acceptance or otherwise of collaborative management assumes that the community's understanding of, and relationship to, the wetland is as valid as that of the management institutions'.

Thus the research ambitions of this thesis are centred on achieving understanding. In order to identify the important elements of community's interactions with resource agencies, cross-case qualitative studies are particularly appropriate (Shindler and Cheek, 1999). Synthesis of qualitative research has been acknowledged as a way to build theory through induction and interpretation (Noblit and Hare, 1988). The primary purpose of this form of evaluation is not causal determination or prediction. Rather, it seeks to identify social

patterns and extrapolate lessons into findings useful for making decisions. The emphasis is on illumination and understanding, particularly of the contextual elements that influence outcomes (Shindler and Cheek, 1999).

3.2.2 Positivist Approaches

The positivist paradigm, described by Kuhn (1962) as 'normal science', is based on solving a puzzle within a general pattern already outlined by the major theories of that science discipline. The positivist approach makes a supposition or forms a hypothesis, which is then used to test the data (Maykut & Morehouse, 1997). There is a rigorous way to collect and analyse data, defined by predetermined generally accepted methodology. Conventional research methods gain their rigour by control, standardisation, objectivity, and the use of numerical and statistical procedures. Kuhn argues that when a researcher finds new pieces of information that do not fit the prevailing paradigm, it becomes increasingly difficult to support those theories in the context of the research. When counter-evidence is found to falsify a theory, positivism calls into question the researcher, rather than the theory (Kuhn, 1962). Further, the empirical evidence of one science does not easily align with that of another science. Given that this research thesis crosses many scientific and social disciplines, paradigms and normative structures, it is considered that a positivist, quantitative research approach would have been insufficient to cope with the synthesis and analysis of this complex research case.

3.2.3 Naturalistic Inquiry

In order to cope with the broad questions asked by this thesis, the methodology selected for this research was based heavily on the process of 'Naturalistic Inquiry' as propounded by Lincoln and Guba (1985). Following on from this work a number of practical application techniques were developed by Maykut & Morehouse (1997).

Naturalistic Inquiry builds on the works of, amongst others, Schwartz and Ogilivy (1979), Glaser and Strauss (1967); Guba, (1978; 1981); Lincoln, (1981); Guba and Lincoln (1982). Naturalistic Inquiry claims to be more than an alternative social science research framework. Rather it purports to be a paradigmal shift from positivist approaches to research and understanding.

Lincoln and Guba (1985, pp36-38) contrast the central axioms of the positivist paradigm with the postpositivist (which they term 'naturalist') as follows:

Axiom 1: The nature of reality (ontology)

- *Positivist version*: There is a single tangible reality 'out there' fragmentable into independent variables and processes, any of which can be studied independently of the others; inquiry can converge onto that reality until, finally, it can be predicted and controlled.
- *Naturalist version:* There are multiple constructed realities that can be studied only holistically; inquiry into these multiple realities will inevitably diverge (each inquiry raises more questions than it answers) so that prediction and control are unlikely outcomes although some level of understanding (*verstehen*) can be achieved.

Axiom 2: The relationship of knower to known (epistemology)

- *Positivist version:* The inquirer and object of the inquiry are independent; the knower and the known constitute a discrete dualism.
- *Naturalist version:* The inquirer and the object of inquiry interact to influence one another; knower and known are inseparable.

Axiom 3: The possibility of generalisation

- *Positivist version:* The aim of inquiry is to develop a nomethetic body of knowledge in the form of generalisations that are truth statements free from both time and context (they will hold anywhere and at any time).
- *Naturalist version:* The aim of inquiry is to develop an idiographic body of knowledge in the form of "working hypotheses" that describe the individual case.

Axiom 4: The possibility of causal linkages

- *Positivist version:* Every action can be explained as the result (effect) of a real cause that precedes the effect temporally (or is at least simultaneous with it).
- *Naturalist version:* All entities are in a state of mutual simultaneous shaping so that it is impossible to distinguish causes from effects.

Axiom 5: The role of values in inquiry (axiology)

- *Positivist version:* Inquiry is value-free and can be guaranteed to be so by virtue of the objective methodology employed.

- *Naturalist version:* Inquiry is value-bound in at least five ways, captured in the following corollaries:
  - Inquiries are influenced by the *inquirer* values as expressed in the choice of a problem, evaluand, or policy option and in the framing, bounding and focussing of that problem, evaluand, or policy option.
  - Inquiry is influenced by the choice of the *paradigm* that guides the investigation of the problem.
  - Inquiry is influenced by the choice of the *substantive theory* utilised to guide the collection and analysis of data and in the interpretation of findings.
  - Inquiry is influenced by the values that inhere in the *context.*
  - With respect to the first four corollaries above, inquiry is either *value-resonant* (reinforcing or congruent) or *value-dissonant* (conflicting). Problem, evaluand or policy option, paradigm, theory, *and* context must exhibit *congruence* (value-resonance) if the inquiry is to produce meaningful results.

Lincoln and Guba then support the naturalist axioms with 14 characteristics of operational naturalistic inquiry, justified by firstly their logical dependence on the axioms that undergird the paradigm and, secondly, their coherence and independence[3]. They are: -

1. *Natural setting.* The inquirer (N) elects to carry out research in the natural setting and in a holistic manner.
2. *Human instrument.* N uses themself, as well as other humans, as the primary data-gathering instruments due to the superior adaptability of the human instrument over others. All instruments are value-based but only the human is capable of identifying and taking into account (to some extent) those resulting biases.
3. *Utilisation of tacit knowledge.* N claims the legitimisation of tacit knowledge in addition to propositional knowledge.
4. *Qualitative methods.* N elects qualitative methods over quantitative (although not exclusively).
5. *Purposive sampling.* N favours purposive or theoretical sampling over random or representative sampling.
6. *Inductive data analysis.* Inductive rather deductive data analysis is preferred.
7. *Grounded theory.* N prefers to have the guiding substantive theory emerge from (be grounded in) the data.

[3] This list is adopted from Lincoln and Guba, 1985. For overview of rationale behind these characteristics see 39 – 44. Chpts 3 –7 give greater detail to the 5 axioms; Chpt 8 details characteristics 1 – 13, Chpt 13 gives further detail on characteristic 14.

8. *Emergent design.* N elects to allow the research design to emerge (flow, cascade, unfold) rather than to construct it preordinately (*a priori*).
9. *Negotiated outcomes.* N prefers to negotiate meanings and interpretations with the human sources from which the data have chiefly been drawn.
10. *Case study reporting mode.* N is likely to prefer the case study reporting mode (over the scientific or technical report).
11. *Idiographic interpretation.* N is inclined to interpret data (including the drawing of conclusions) idiographically rather than nomothetically.
12. *Tentative application.* N is likely to be tentative (hesitant) about making broad application of the findings.
13. *Focus-determined boundaries.* N is likely to set boundaries to the inquiry on the basis of the emergent focus (problems for research, evaluands for evaluation, policy operation for policy analysis).
14. *Special criteria for trustworthiness.* N is likely to find the conventional trustworthiness criteria (internal and external validity, reliability, and objectivity) inconsistent with the axioms and procedures of naturalistic inquiry. Hence they are likely to define new, but analogous, criteria (credibility, transferability, dependability, confirmabilty) and devise operational procedures for applying them.

Naturalistic inquiry is defined, not at the level of *method* but at the level of *paradigm.* Heavy reliance is placed on the human as an instrument. It is assumed that the inquirer has accepted the stance suggested in the axioms listed above and it is recommended that the inquirer engage in prior ethnography to provide a springboard and benchmark for the more formal study (Lincoln and Guba, 1985).

Conventional positivist research tends to begin with a defined objective, follow a predetermined research strategy and analysis, and terminate in either reaching an intended objective or explaining why it did not. The concept of designing a naturalistic inquiry, on the other hand, anticipates a paradox. While a focus (either a problem, evaluand or policy option) is the starting point, the inquirer fully expects this focus to change as the research unfolds. At its heart, theory and method emerge from the naturalist inquiry; they are not *a priori.*

Similarly, sampling is not undertaken to achieve representation but in a contingent and serial manner, the objective being to maximise the scope and range of information

gathered. Since data sets are not being gathered in order to achieve a best fit with predetermined or underlying assumptions, data analysis is open-ended and inductive. "*What is at issue is the best means to 'make sense' of the data in ways that will, first, facilitate the continuing unfolding of the inquiry, and second, lead to a maximal understanding of the phenomenon being studied in its context*" (Lincoln and Guba, 1985, p224-225). In contrast to the conventional inquirer, who usually approaches a study 'knowing what is not known,' the naturalist adopts the posture of 'not knowing what is not known.'

It is in its outputs that naturalistic inquiry causes most difficulty for positivist or conventional methodologists. Naturalistic process does not set out to produce a 'finding' as such but to "*resolve the problem in the sense of accumulating sufficient knowledge to lead to understanding or explanation*" (Lincoln and Guba, 1985). "*It is to be expected at the commencement of the research that end products are difficult to specify. Probably all that can be promised in advance is that 'understanding will be increased*' " (Lincoln and Guba, 1985: p225).

It is not to be taken from the brief summary given above that naturalistic inquiry is a licence for the researcher to avoid method or discipline, or to "*get around the hard thinking*" or as "*a way of rationalising what is at the bottom 'sloppy inquiry'* "(Lincoln and Guba, 1985: p225). Rather, Lincoln and Guba prescribe a rigid process that is subjected throughout to 'trustworthiness', as tested by the criteria of 'credibility', 'transferability', 'dependability' and 'confirmability'. Naturalistic Inquiry, therefore, requires research methods and techniques which conform to the above criteria.

Accordingly, qualitative research techniques have been chosen to best fit the rigours of Naturalistic Inquiry.

3.3 Qualitative Research Techniques

Maykut and Morehouse (1997) suggest that Naturalistic Inquiry provide the philosophical basis for qualitative research. Maykut and Morehouse also provide a set of techniques and methods based on the implications of this new research paradigm. The research methods outlined in the methods section of this chapter are based on the techniques outlined by

Maykut and Morehouse. The characteristic of qualitative research are shown as Figure 3.1, which in turn is based on the seminal work of Lincoln and Guba (1985).

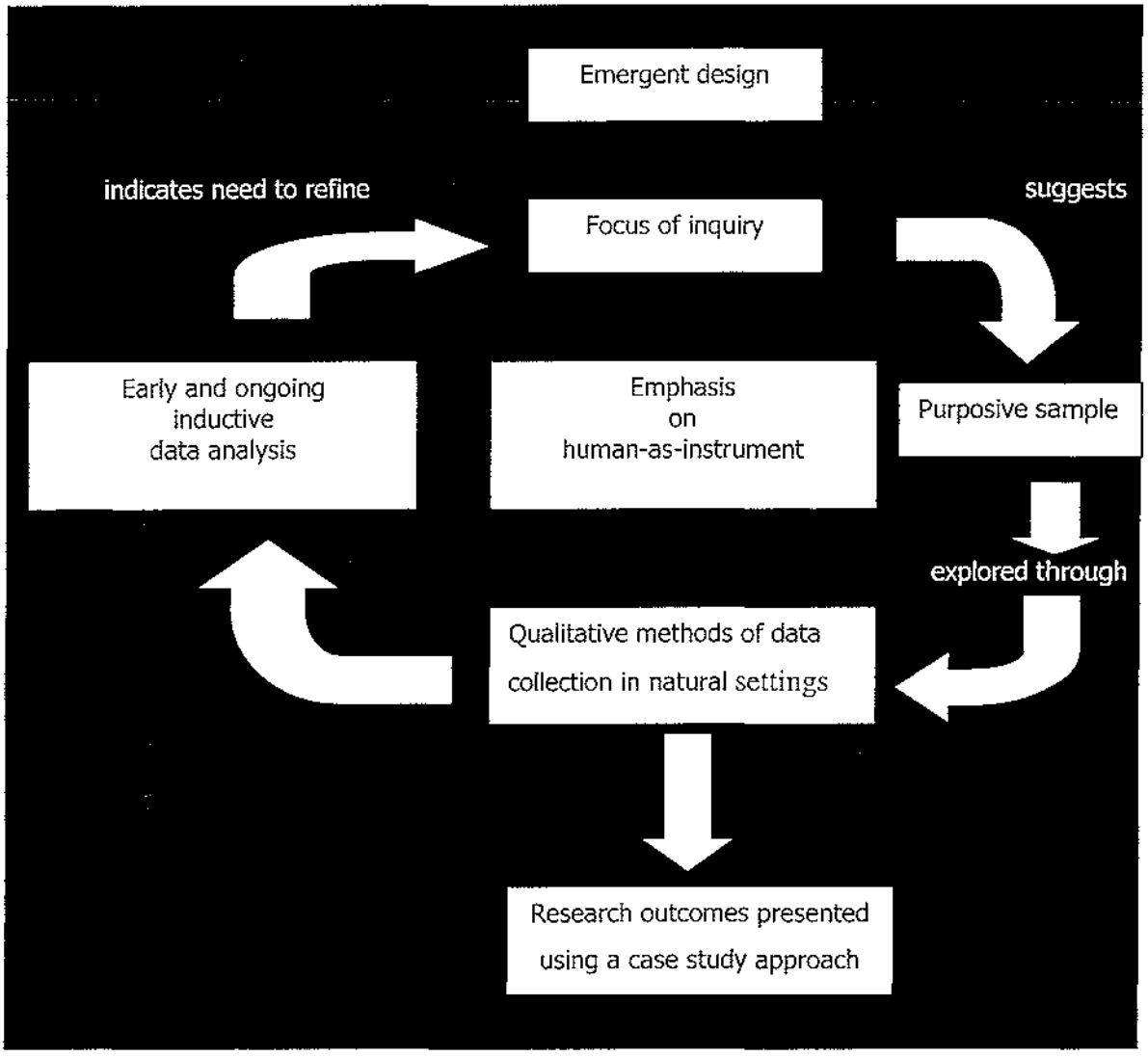


Figure 3.1 Characteristics of Qualitative Research
(adapted from Maykut & Morehouse, 1997:p48)

3.3.1 Data Gathering Techniques

The data gathering process of qualitative inquiry is most often people's words and actions, and thus requires methods that allow the researcher to capture language and behaviour (Maykut & Morehouse, 1997). Maykut and Morehouse consider that the most useful ways of gathering these forms of data are participant observation, in-depth interviews, group interviews and the collection of relevant documents. Observation and interview data is collected by the researcher in the form of field notes and audio-taped interviews, which are later transcribed into 'thick descriptions' for use in data analysis. Erickson & Wilson

(1982) also suggest that using photographs and video-taped observations as primary sources of data is a valid form of qualitative research.

3.3.2 Interviews

May (1993: p91) defines interviews as:

> "encounters between a researcher and a respondent in which the latter is asked a series of questions relevant to the subject of research. The respondent's answers constitute the raw data analysed at a later point in time by the researcher."

There are different types of interview used for different purposes in social research classified according to the amount of structure provided in the data-gathering process. Interviews can be placed on a continuum with structured interviews at one end and unstructured interviews at the other (Burgess, 1982). May (1993) outlines the three main types of interview used in social research (excluding group interviews). These are the *structured interview*, the *semi-structured interview*, and the *unstructured interview*. May (1993) notes that research may constitute a mixture of two or more types of interview.

The structured interview is generally associated with survey research (May, 1993). The questions, order and coding of answers are predetermined, and the respondent is presented with alternatives for each question so that the phrasing of responses is structured (Krathwohl, 1993). One of the main reasons for using this method is that it permits comparability between responses (May, 1993). However, according to Burgess (1982), the structured interview defines situations in advance, and does not allow the researcher to follow up any interesting ideas or unexpected surprises. Burgess (1984) argues that the structured interview also puts the interviewer in an unnatural relationship with those who are researched.

The semi-structured interview lies between the structured and unstructured interview and comprises techniques from both. The questions and order of presentation are predetermined, but the questions are open-ended (Krathwohl, 1993). The interviewer, who can seek both clarification and elaboration on the answers given, can then record qualitative information about the topic. This enables the interviewer more latitude to probe beyond the answers (May, 1993), and open up new dimensions of a problem (Burgess, 1982). The semi-structured interview allows respondents to answer more on their own terms than the structured interview permits (May, 1993).

At the opposite end of the continuum, the unstructured interview is usually used as an exploratory tool. The interviewer 'follows his or her nose', using a set of themes and topics to form questions in the course of conversation (Maykut & Morehouse, 1997). They describe this type of interview as qualitative and 'open-ended'. Mishler (1986) states that what characterises qualitative research interviews is the depth of conversation, which moves beyond surface talk to a rich discussion of thoughts and feelings. Critical to fostering this level of in-depth interview is the preparation of an 'interview schedule' or 'interview guide' (Maykut & Morehouse, 1997). A series of topics or broad interview questions which the researcher is free to explore is referred to as an interview guide. An interview format consisting of a detailed set of questions is called an interview schedule. Patton (1980) also notes that follow-up questions or 'probes' are important. And these probes should be noted on the interview schedule or guide and used as suitable situations arise.

3.3.3 Sample Selection and Sample Size

The selection of a sampling strategy depends on the focus of inquiry and the researcher's judgement as to which approach will yield the clearest understanding of the research topics. Maykut & Morehouse (1997) suggest that it is not the goal of a qualitative study to create a random sample but to select persons or settings that the researcher believes will represent the range of experience and knowledge on the research topic. Maykut & Morehouse state: "*it is our working knowledge of the contexts of the individuals and settings that lead us to select them for initial inclusion in our study.*" In building a sample further, qualitative researchers may use a technique called 'snowball' sampling, where one research participant or setting leads to another, and so forth (Maykut & Morehouse, 1997). In order to obtain variation, they recommend that the researcher uses this or other methods to locate subsequent participants or settings which are different from the first. In this way, maximum variation sampling is 'emergent and sequential' (Lincoln and Guba, 1985). Glaser and Strauss (1976) call this sampling approach 'theoretical sampling', because it allows the researcher to build and broaden theoretical insights in the ongoing process of data collection and analysis. A second source of information that may help with the sample selection process is "*experienced and knowledgeable experts*" (Lincoln and Guba, 1985). As Maykut & Morehouse (1997: p83) summarise:

> "as our focus of inquiry guides us in our initial sample selection, the early and ongoing analysis of the data will suggest what is important to explore further. We

would then seek participants (or settings) that can further illuminate our new understanding."

Sample size is simply determined in the qualitative research inquiry. Data is collected and analysed in an ongoing process, until no new information is uncovered (Maykut & Morehouse, 1997). Lincoln and Guba (1985) state that a carefully conducted study, where sample selection has been emergent and sequential, can reach saturation point with as few as twelve participants, and perhaps no more than twenty. But as Maykut & Morehouse point out, practically speaking, saturation point is usually constrained by limitations of time, money and other practical factors.

3.3.4 Qualitative Data Analysis

Maykut & Morehouse (1997) consider that the 'constant comparative method' of data analysis first suggested by Glaser & Strauss (1976) and refined by Lincoln and Guba (1985), has proven to be essential for rigorous qualitative analysis. The constant comparative method of analysing qualitative data combines inductive category coding with simultaneous comparison of all units of meaning obtained. As each new unit of meaning is selected for analysis, it is compared to all other units of meaning and subsequently grouped (categorised and coded) with similar units of meaning. A new category is formed if there are no similar units found. As the iterative process continues, refinement of the initial categories result in each category being internally consistent and also provides a basis for later tests of replicability (Lincoln and Guba, 1985). Through this process, clarity of key themes emerges and relationships between the themes are discovered as represented by the flow chart in Figure 3.2 (Maykut & Morehouse, 1997)[4].

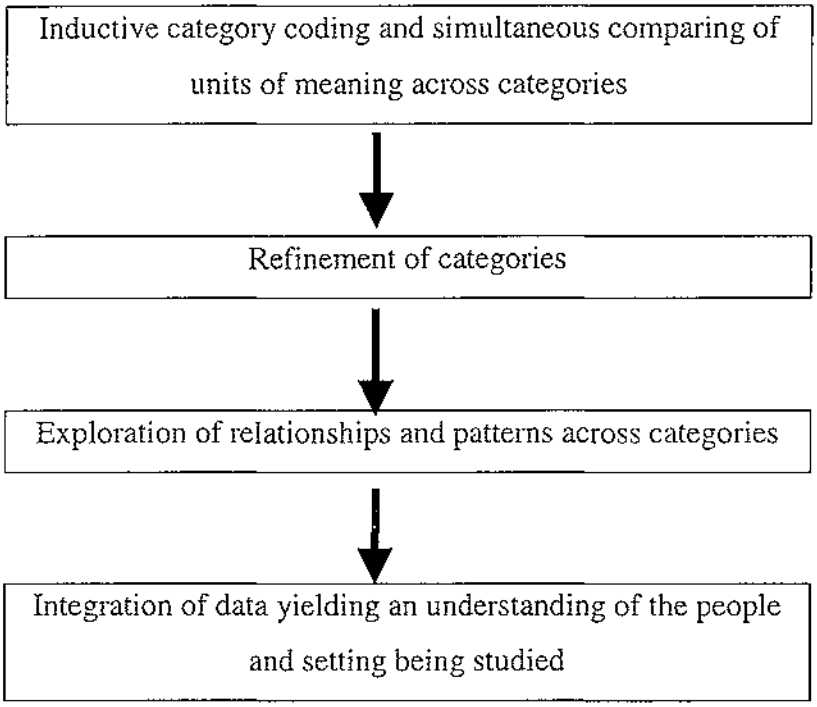
The five central axioms of Naturalistic Enquiry were used to develop a suitable case study in order to understand how a collaborative management approach be used as a method to achieve biodiversity conservation within protected natural areas. In terms of fulfilling the tenets of the five central research axioms, the Whangamarino Wetland as a case study is ideal because:

1. There are multiple constructed realities in the management of the wetland and its catchment that can only be studied holistically.

[4] Maykut and Morehouse (1997) detail specific methods for the Constant Comparative Method in Chapter 9, while presentation techniques are described in Chapter 10.

2. The inquirer's experience and dealings throughout the case study, the inquirer and the 'object' of inquiry interact to influence one another; knower and known are inseparable
3. The aim of inquiry is to develop an idiographic body of knowledge in the form of 'working hypotheses' of collaborative management and biodiversity conservation that describe the individual case.
4. The complex interactions, both natural and human, mean all entities are in a state of mutual simultaneous shaping so that it is impossible to distinguish causes from effects.
5. This inquiry is value-bound in that the *inquirer's* values, as expressed in the choice of a problem, have determined the case study; the inquiry is influenced by the choice of the *paradigm* that guides the investigation of the problem (in this case – biodiversity); and inquiry is influenced by the choice of the *substantive theory* utilised to guide the collection and analysis of data and in the interpretation of findings (i.e. collaborative management and adaptive ecosystems approaches to biodiversity conservation) which exhibit congruence.

Figure 3.2 Constant Comparative Method of Data Analysis
(Maykut & Morehouse, 1997: p135)



3.4 The Key Issues Explored by the Research Study

3.4.1 The Research Question

As discussed in Chapter Two, analysis of past and existing practice and theoretical literature has highlighted several commutable issues, or as Holling *et al* (1994) call them – 'barriers and bridges', when involving community based models in the management of protected natural areas. From this a fundamental question can be derived, which forms the basis for the research:

> Can a strategy of administrative adaptiveness and collaborative management in policy making and local implementation measures contribute to the social, economic and social well being of local people, as well as maintaining and enhancing biological diversity, in a multi-stake holder environment?

3.4.2 Interview Themes

On the basis that the Whangamarino Wetland and its community is the central case-study, the aforementioned question has been was broken down further into the following broad interview guiding theme questions. These are:

- What are the differing stakeholder perspectives of the economic, social, cultural and recreational use of the wetland?
- What is the historical background that has lead to the existing regime of resource use and management in and adjacent to the Whangamarino Wetland?
- How does each participant value the wetland and how important do they see these values being in relation to their personal values and norms (i.e. their 'world views')?
- To what extent does each participant understand the ecology of the wetland?
- To what extent does each participant understand the existing institutional frameworks and management policy and implementation measures?
- What does each participant believe to be the main issues in the management of the Whangamarino?
- Under what conditions would each participant's resources and knowledge be catalysed to assist with the implementation of a collaborative management regime for the wetland?

- How does each participant see the future management and landscape character of the wetland?

3.4.3 Interview Process

In order to identify and analysis these research questions, a qualitative, three-phase, action-research process was undertaken.

The first phase of research comprised of a series of interviews with people who are closely involved with the land adjacent to the Whangamarino Wetland or to those who gain some direct cultural, recreational or economic benefit by using the wetland's natural resources. The interviews provided the substantive information required to address the third objective of this thesis (refer to section 1.2.2). Analysis of the interviews also complemented the theoretical analysis undertaken in Chapters Two, helping to synthesise analysis for the fourth objective.

Interviews were arranged by phone, followed by an introductory letter and permission consent form. The interviews were all carried out in on a face to face basis. An interview schedule was developed to guide the interview process. This was initially tested in a pilot run with two independent people. The Schedule is appended as Appendix I. Interviews were recorded then transcribed into a 'thick description' – a full transcription of the each of the interviews and any additional observations the inquirer had at the time. This thick description was sent to each interviewee for approval before being used in the research.

Interviews were conducted with key representatives of Waikato Iwi. These included representatives of Waikato Raupatu Lands Trust, Te Kauhanganui; as well as local hapu representatives, including the chair of the Nga Muku Development Trust; Waahi Whaanui Development Trust; and Ngati Naho Iwi Management Board.

A summary of the key outcomes of these interviews was used to develop questions to a selection of key agency people directly involved in the management of the Whangamarino Wetland. These key people were then interviewed in order to gauge their reaction to the feedback from the local community interviews and to investigate possible collaborative management models for the Whangamarino. The interview schedule is appended as Appendix II).

Feedback from the key agency stakeholders provided an opportunity to directly assess limitations for integration from the perspective of both central government agencies. At the regional and local level, interviews took place with the planners responsible for preparing the *Proposed Waikato Regional Policy Statement* and the *Proposed Waikato District Plan* and the *Franklin District Plan.*

3.4.4 Sample Selection

The interviewees were selected, not to gain a representation of views, but by using the researcher's existing experience and knowledge of the area to allow a full insight into the ecological and societal factors. This allows for the examination of relationships between biodiversity conservation and opportunities and barriers for collaborative management in the Whangamarino Wetland case Study.

Naturalistic inquiry favours purposive or theoretical sampling over random or representative sampling (Lincoln and Guba, 1985). This sampling technique means that the participant selection process is iterative and diffusive. The participant list selected for the Whangamarino Case Study thus grew as the researcher's knowledge of theory expanded and initial participants suggested other people who were able to shed further light on the issues raised. The participants interviewed are listed below:

Maori

Tim Manukau, Waikato Iwi, Environmental Officer Waikato Raupatu Lands Trust – Te Kauhanganui - Hopuhopu.

Tahe Ngakete, Waikato Iwi, Horahora Marae, Chair – Nga Muku Development Trust, Board member – Tainui Maori Trust Board (1991 – 1998).

Hori Awa, Waikato Iwi; Waahi Whaanui Development Trust; Waikato Conservation Board Member (representing Te Arikinui, Te Atairangikaahu).

Malcom Wara, Waikato Iwi, Chair – Ngati Naho Iwi Management Committee Board, Meremere.

Local Community

Peter Buckley, second generation dairy farmer who bounds Whangamarino.

Mr Buckley, (deceased) first generation dairy farmer, Island Block Road, (transcripts from recorded interview by Sandra Gaude).

Bob Jefferies, dry stock farmer, upper Whangamarino catchment.

Tony O'Carroll, dry stock farmer, Island Block Road.

Murray Twining, dairy farmer, Motukaraka Drainage Scheme and Chair.

Jim Cotman, dairy farmer & Regional Representative for Landcare Trust Society.

Gordon Cottom, duck shooter and commercial koi carp fisher.

Jim Clark, Commercial eel fisher.

Public Representatives on Government, Academic or Non Government Organisations

Chris Kay, dry stock farmer, Waitomo Landcare Trust.

Gordon Stephenson, dairy farmer, founder of the Queen Elizabeth II National Trust, Chair of Waikato Conservation Board (1991 – 1996), Chair of Federated Farmers (1976 – 1979,) Chair of Wetlands Task Group (1982 –1984), Chair of National Wetland Centre Task Group.

Helen Ritchie, private consultant involved in a number of Landcare initiatives throughout the Waikato.

James Ritchie, Emeritus Professor – University of Waikato; Principal advisor to TMTB.

Mairi Jay, Senior Lecturer, Dept. of Geography, University of Waikato.

David Lawrie,– Regional Councillor and National Chair, Fish and Game Council; Waikato Conservation Board member, 1993 – 1998; Member, National Wetland Centre Task Group.

Keith Thompson, Senior Lecturer, School of Biological Sciences, Waikato University.

Megan Balks, Current Chair, Waikato Conservation Board.

Philip Hart, President, Waikato Brach, & member of National Executive, New Zealand Royal Forest and Bird Protection Society.

Peter Nuttall, past planner for DoC, Huakina Development Trust Board and Ministry for the Environment.

Judy van Rossen, National Committee, New Zealand Royal Forest and Bird Protection Society.

John Ash, Director of Black Water Rafting Company Ltd, Chair- Waitomo Landcare Trust.

Crown Administrators

Tony Roxburgh, Manager, Waikato Area Office, Department of Conservation.
Grant Barnes, Senior Conservation Officer, Waikato Area Office, DoC.
Rachel Kelleher, Conservation Officer, wetlands, Waikato Area Office, DoC.
Phil Teal, Officer, Fish and Game Council , Waikato.
Judy van Rossen, Manager, Environmental Education Group, Environment Waikato.
Helen Ritchie, Consultant to Environment Education Group, Environment Waikato.
Nicholas Manukau, Iwi Liaison Officer, Environment Waikato.
Guy Russell, Senior Engineer, Asset Management Group, Environment Waikato.
Allan Turner, Senior Planner, Waikato District Council.
Tim Mills, Drainage Engineer, Franklin District Council.
Steve Pullan, Fresh Water Fisheries Officer, Ministry of Fisheries.

3.4.5 Data Analysis

Thick descriptions were transcribed from each of the interview notes held with every participant in electronic format on a 'Microsoft Access' database.

Once the interviews were transcribed in thick description, the constant comparative method (as described by Maykut & Morehouse, 1997) of data analysis was used to tease out coding categories. Inductive category coding was carried out by forming several index cards together from recurring concepts and themes in the data. Key words were chosen which best fitted these themes and this was placed on each index card. Data was then systematically compared with each of the index cards, with new categories being formed as new themes emerged. A summary of the interview results in the form of the final themes derived from inductive category coding process are appended in Appendix III. From these categories, as well as information gained from existing policies, Crown files, general literature and scientific studies, a 'landscape' story was formed for the Case Study. This story describes the ecological and anthropogenic features of the Whangamarino Wetland that gives it its present characteristics. Existing threats and issues to the wetland, and attributes or barriers of the community are also described.

The understanding the inquirer gained from this naturalistic enquiry approach allowed for the development of seven 'propositional statements' to tease out how the barriers and bridges analysed in Chapters Two and Three relate to the Case Study. Lincoln and Guba

(1985) state that a proposition is: "*a general statement of fact grounded in the data.*" In other words, a propositional statement is one that conveys the meaning contained in the data cards gathered together under each category. The exploration of the relationships and patterns across categories was then carried out based on the 'rules' set by each of the propositional statements. For example, both positive and negative instances of the research focus of inquiry were formed from the reoccurring themes. In turn, rough drafts of the outcomes of the study were formed which led to the emergence of six 'statements of fact' – the propositional statements.

Figure 3.3 Waterfowl hunter's 'maimai'. Some of these huts and several generations of their owners have been in the wetland since the 1920s. Hunters will often stay for several weeks during the duck shooting season, bring in generators, TVs, fridges and all the other comforts of home.

Chapter 4: Whangamarino – Determination of the Landscape Story & Development of Management Systems

Geoff Park, in his seminal work '*Nga Uruora – Ecology and History in a New Zealand Landscape*' (1995), quotes Frank Gohlke:

> "Landscapes are collections of stories, only fragments of which are visible at any one time. In linking the fragments, unearthing the connections between them, we create the landscape anew. A landscape whose story is known is harder to dismiss." (Park, 1995: p293).

4.1 Chapter Objectives

This chapter attempts to narrate the connections between the natural and human realms of the Whangamarino Wetland Case Study and justifies the use of collaborative management as an approach to achieve successful biodiversity conservation. The story is based on a review of existing literature, the recurring themes derived from statements made by participants in the interview process and the experience and knowledge of the inquirer.

Only by exploring and understanding past biophysical events and human actions that have shaped the ecological landscape of the Whangamarino Wetland can links and possibilities between biodiversity and collaborative management begin to be analysed. In order to do so, the links between ecosystems and societies are first analysed by using ecological systems theory models developed by Holling (1984) and expanded by Gunderson *et al.* (1995) and Kay and Regnier (2000).

Chapter Four concludes with a brief analysis of an 'adaptive ecosystem approach' model proposed by Kay and Regnier (2000) and examines its applicability to the Case Study.

4.2 Establishing the Links Between Society Systems and Ecosystems

As discussed in Chapter Two, human economic activities depend on using resources created and sustained by natural ecosystems. Holling's four box model, as shown in Figure 2.1, shows the processes which involve the flows of material, energy and information within an ecological system. Ecological integrity of these natural systems is based on biodiversity and the energy links between and within them. When these systems are used, and therefore usually either altered or destroyed by humans there is, more often than not, a loss in biodiversity and a change in energy flows. In Chapter Two it was also suggested that the underlying causes of the economic, social and cultural factors that lead

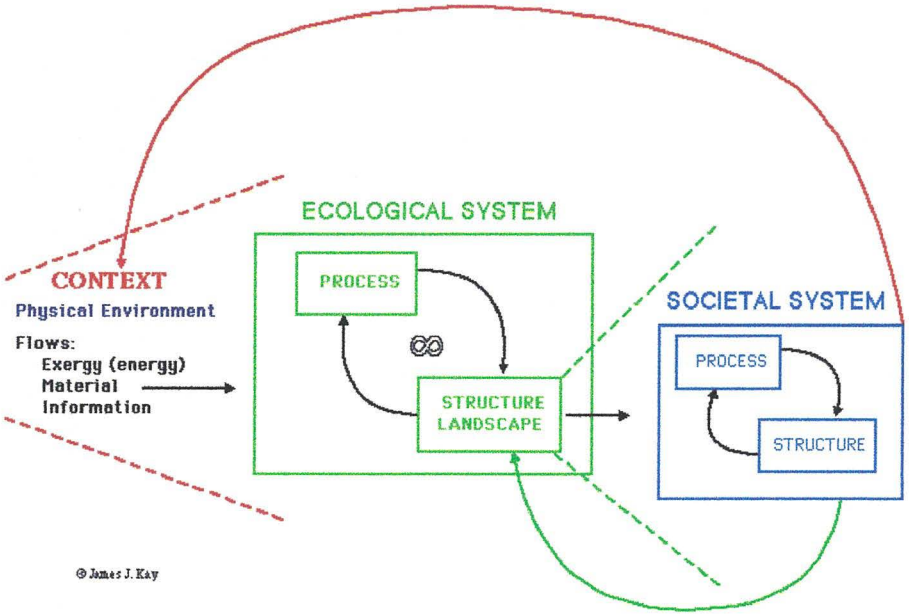
to biodiversity loss include the scale and growth of human population, culture and ethics, economic incentives and institutions (Barbier *et al,* 1994).

The ecological processes provide the context (i.e. energy, material and information) for the ecological systems, which in turn are required by the self-organising processes of the societal systems. Kay and Regier (2000) describe the effects of this relationship:

> "By changing the context of the ecological system, the societal system affects the ecological processes and, in turn, the ecological structure and ultimately the societal system's own context. For example, modifying the runoff into a waterway can dramatically alter the character of the waterway, and hence the type of fish found in it, and therefore the fishery and associated economic system." (Kay & Regnier, 2000: p 26).

These links are shown in Figure 4.1. The dotted lines represent one system forming the context for the other. The green arrow represents direct societal influence on the ecological system (i.e., changing structure). The red arrow represents indirect societal influence on the ecological system (i.e. changing the context for the ecological system in turn changes the societal system).

Figure 4.1 A Model of the Relationship Between Societal and Ecological Systems at one Bio-physical Level (after Kay & Regier, 2000)



In this way it can be seen from the following 'Landscape Story' that the Whangamarino Wetland has very much influenced the societal contexts of the local community as much as this society has influenced the wetland's ecology. Consequently, as the wetland's

landscape history and patterns have unfolded, the community (in terms of 'societal structure') adjacent or affected by the wetland has changed. Moreover, the relationships between both systems is implicit and totally intertwined, so that ecology, economy, culture and institutions essentially become in part, elements of the landscape in which they have evolved (Kay & Regnier, 2000). This concept may be self-evident to some, but it is important to note that until recent years, there has been little attempt by ecologists to conceptualise these links and feedback loops between society and ecology.

4.3 The Landscape Story of the Whangamarino Wetland

4.3.1 Summary of Major Landscape Changing Events

The present ecological state of the Whangamarino Wetland can be linked to human actions over the past 100 or so years, as much as to the natural biophysical processes which have shaped it in the prior millennia. A timeline can be composed which shows the key events that have occurred and how these are linked to the ecological crises associated with the wetland and this is shown as Table 4.1.

Figure 4.2 Reconstruction of the Weir - February 2000.

Table 4.1 Major Milestones or Crises in the Landscape History of the Whangamarino Wetland over the last 150 years

Date	Anthropogenic Event	Ecological Change	Societal Change
1862 –64	Waikato Land Wars	Little	Maori dominance changes to English dominance with associated changes on how natural resources are used.
19th century	Colonisation of Waikato by Europeans. Opening of first coal mine at Kopuku	Introduction of mammals such as rats, cats and mustelids leading to a reduction in indigenous bird life.	Reduction in food and resource supply for local marae. Increase in wealth for Pakeha settlers.
Early 20th century	Construction of Main Truck Line Railway.	Increased fire and introduction of willows.	Increased flow of material, people and energy through the Waikato.
1930's	Flax harvesting	Reduction in indigenous vegetation in the swamp areas.	Economic benefit to harvesters and build up of capital to establish farms within the wetland itself.
1940's	Government subsidy for returned soldiers to establish farms and fishing	Decrease in eel and mullet fishery and reduction in wetland habitat quantity and quality	Increase in population within the catchment wetland
1950's	Construction of coal mines at Kopuku, Meremere Power Station and causeway	Changes in hydrological and vegetation communities within affected wetland	Increase in wealth of the nation by the supply of low-cost energy.
1960's	Construction of Lower Waikato/ Waipa Flood Control Scheme. Waikato County Council focus on drainage. Wildlife Service advocacy for wetland for ecological values	Change in water levels and seasonal water fluctuations and reduction in wetland habitat.	Purchase of remaining undeveloped Maori wetland by Pakeha. Increase in wealth for Pakeha landowners. Reduction in whitebait and eel fishery production. Reduction in waterfowl hunting.
19th and 20th century	Recreational waterfowl hunting	Change in waterfowl population from largely indigenous to exotic. Retention and protection of large areas of swampland which otherwise would have succumbed to drainage for agriculture.	Increase in appreciation of wetlands by Pakeha.
1971	New Zealand becomes signatory to the IUCN "Convention on Wetlands of International Importance Especially as Waterfowl Habitat"	Little	General public begin to recognise value of wetlands
1981	Publication of Whangamarino Swamp Resource Study.	Little	Increased pressure to drain the Reao Arm for agriculture.
1983	Land Settlement Board's Wetlands Policy which includes support for preservation of wetlands meeting IUCN criteria for Wetlands of International Importance	Slowing down of drainage of wetland for agriculture	Change in thinking within Crown institutions, which had until then been focussed on drainage of wetlands for productive agriculture.

Date	Anthropogenic Event	Ecological Change	Societal Change
1985	Reao Arm Planning Tribunal Decision that preservation of private wetland in Reao Arm took precedence over drainage for agriculture.	Protection of a large and ecological segment of the Whangamarino	Decrease in economic potential for affected landowners. Local community realise that the Crown views the wetland as having values other than solely potential land for agriculture.
1987	Establishment of the Department of Conservation	Protection of Crown owned wetland under the Conservation Act	
1989	Fire through peat bog	Change in vegetation and native fauna	Perceived poor performance of DoC by local community – loss in faith in DoC as competent managers.
1989	Management Plan for the Whangamarino	Little	Compliance with requirements of statutes by DoC.
1991	Resource Management Act allows for recognition of wetland and tangata whenua values in national planning legislation.	Slowing down of wetland drainage on private land and gradual improvement in water quality.	Antagonism by landowners toward councils infringing on private property rights. Legal nation wide protection for wetlands on private land. Recognition of Maori values and Treaty of Waitangi.
1992	Ramsar recognition	Little	Widespread national awareness of value of conserving wetlands.
1991 – present	Weir planning process and construction, then subsequent collapse and re-construction	Little to date, but significant benefits predicted once constructed, (or no noticeable effect) according to opponents	Considerable ill feeling developed between local community, DoC and Fish and Game. Large financial costs for DoC, Fish and Game and adjacent landowners
1998	First Landcare Initiative in the Whangamarino catchment by farmers in the Motukaraka Drainage District		
2000	The Freshwater Fisheries Working Party	Little as yet. Predicted to progress sustainable management of largest eel fishery in NZ	Goodwill developed between MoF, Iwi and commercial fishers.

4.3.2 Tangata Whenua

The Waikato River and its resources have long been of spiritual, economic, and recreational value to the Tainui people. In particular, fish and birds (i.e. tuna (eels species), whitebait and matuku (Australasian bittern)) were important food sources (Ngakete, *pers comm.*), and flax was important for weaving baskets and traps, such as hinaki (Manukau, *pers comm.*).

There are at least nine former pa sites around the eastern margins of the Whangamarino Wetland and several more on the western side near the Waikato River. Most of theses pa sites are near the present day marae of Meremere, Horahora and Te Teokeo (DoC, 1989). Tahe Ngakete, a Nga Muku kaumatua, describes life at Horahora marae in the 1950s, which also gives some insight into life of Maori in the Lower Waikato before British occupation:

> "We used to catch migratory tuna in a certain type of the soft silty mud on the edge of the river. You would throw a spear into the mud and get one to three tuna with one hit. It was our job as kids to spear eels. We always looked for the place where water weeds grew with yellow flowers [may be water primrose (*Ludwigia peploides*)]. These plants and the mud no longer exist. And there are very few eels left. It could be the koi carp (*Cyprinus carpio*) or other weeds taking over.
>
> Also, there used to be a lot more bird life. You don't see matuku very much anymore. This was a prized bird to eat by us Maori. Matuku has an analogy for what women say to men courting them. The matuku makes a sound like "kau, kau, kau" which means "no, no, no" in Maori!
>
> We always hunted wildlife as kids for food for the family– usually anything that was illegal to hunt too! Bittern was the best eating and pukeko was the worst. You could boil a rock with a pukeko for a day and then throw away the bird and eat the rock.
>
> In the winter and spring we would hunt swan on Lake Whangape. Their eggs were also prized. We would eat both fresh and half-developed eggs. Our old people prized the eggs, which would float half way down a pot of water. These eggs had a partly developed embryo in them. They would boil the egg for a long time and then scoop out the "jelly" with a spoon. The old people were crazy about this kai.
>
> The Waikato River, lakes and swampland enclosed our marae. It was our food larder. The only things my mother used to buy was salt, flour and treacle. The mothers kept the fire burning. Our fathers would go shearing or work in the coalmines, but we kids did most of the food gathering.
>
> All the swamp around our marae is now highly developed and productive dairy land, owned by Pakeha farmers." (Ngakete, *pers comm.*)

The Time of the Farmer

Anthropogenic influences may have a significant role in a wetland's nutrient, hydrological and plant community composition (Johnson & Brooke, 1989). This is undoubtedly the case for the Whangamarino Wetland. The critical issue with respect to the ecology of the Whangamarino is the dramatic decline over the last 50 years in the abundance and numbers of indigenous species that are characteristic of the wetland (Blackett, 1996). Agriculture has been the prime cause of this decline. Thus much of the agricultural development of the area is linked to the decline of the natural environment. Drainage, soil loss, destruction of indigenous flora and replacement with exotic plants are the major contributing factors (Blackett, 1996).

When the colonisation of New Zealand by Europeans began in the early 1800's, a large percentage of the land in the Waikato was wetland. The new settlers viewed these areas as wasteland, to be logged and drained to create productive farmland (Park, 1995). Wetlands were also recognised as having other values by recreational duck shooters from this time. However, it was not until the early 1960's that hunters and conservationists became more vocal in their concern over the drainage of wetlands for agricultural use (Pike, 1991).

Thus, in the past century the Whangamarino catchment has been transformed from a vast temperate flood plain wetland into a highly managed, natural resource multiple-use system. Flooding and drainage has been the recurrent and dominant problem that has shaped most of the water management infrastructure in the Waikato River Watershed. The early European settlers were intent on reclaiming land 'lost' to natural flooding, in order to farm the fertile soils. Early attempts at drainage were able to control water levels during average wet conditions. The early history of the settlers remains undocumented. However, it was known that flax was harvested in large quantities in 1873. Twenty-five flax mills were operating in the Waikato alone (More, 1976).

The cutting of the railroad through the Whangamarino was another milestone. In 1877 the Main Trunk Line was extended from Mercer to Ngaruawahia, cutting through the west side of the Whangamarino Wetland in the process (More, 1976). It is suggested that sparks from the steam engines started many fires in the swamp (Buckley senior, *pers comm*). This may have eventually increased the process of exotic vegetation dominating the indigenous plant communities, as the exotic plants would have rapidly colonised the

bare exposed earth, exacerbated by flax harvesting and lowering of seasonal water-level fluctuations (DoC, 1989).

Mr Buckley (senior), describes life in the Whangamarino in the 1930s:

> "My occupation when I first arrived in the Whangamarino in 1929 was harvesting. I had bought 'Martintown' from Mr Martin who represented the British Israelites. They had bought the area, site unseen from London. This town was surveyed off in England, complete with parks, schools, a cemetery and 480 quarter-acre sections. This occurred at the eastern end of Island Block. There was no road into Island Block at that time. Boat, along the Whangamarino River was the only access into what was Martintown.
>
> Flax was the principal industry when I came here. This included harvesting, processing and transporting the flax to Australia. In the summer they had tramways with *jarrah* rails and willow sleepers. That's how the pussy and crack willow spread into the swamp, from the willow sleepers. Later on I bought 14 cows at Pokeno. At that time there was no recognised European grasses in the district. It was mainly scrub with a bit of brown top amogst it.
>
> The stock would forage in the swamp and swamp edges at will. At that time my 14 cows was the sum total of stock in the Whangamarino area. As there was still bush in the Mangaroa hills I would send them into there during winter. So although there was a dairy factory surveyed it was never built. In perhaps '30 or '31 the Government bought the rest of Island Block for the relief of unemployment and that's how it was broken in. The first year the settlers had a drought and had not fenced off the Island Block from the swamp, the cattle got mixed up so they milked them in whoever's cowshed was closest.
>
> Only about 400 acres was ever drained back then. They did have a scheme to drain all the land from the Kopuku Coal Mine down to Whangamarino River, but they didn't have the machinery to cope with the water flows in the swamp." (Buckley senior, *pers comm.*)

The second wave of 'ecological crises' to have affected the Whangamarino occurred in the post-war era. It should be pointed out that drainage is not some abstract event that occurred 100 years ago. Most of the drainage in the Waikato occurred after the Second World War with the advent of large mechanised diesel powered machinery (Buckley, *pers comm.*). In the fifties, the development of the hydraulic digger, the installation of large electric drainage pumps and large amounts of Crown subsidised capital being made available to agriculture, meant drainage pushed further into the swamp. By 1963 about 48,000 hectares of Crown, Maori and privately owned swampland were left in the Waikato County district. Of this, 30,000 hectares were earmarked for immediate drainage (More, 1976). Many of the people are still farming the same properties today or their sons and

daughters now farm the same properties (*pers obs.*). Mr Buckley comments on the effects of farming on the wetland during these years:

> "After the second war the eels were still thick in the swamp. After the war the government gave grants to returned soldiers to harvest eels. They had hinakis and a horse. They would throw the hinaki in the river, they were big traps, perhaps 20 feet long. And they would ship the eels they caught down to an eel factory to process.
>
> When I started bringing the swamp in I drained by pumps rather than gravity. The eels were so thick that the pumps couldn't cope with them. I carted 4 to 5 tons of eels out of the drain a day. Since there's been chemical sprays for buttercup and blackberry and weeds generally. It seeps into the drains and the eels can't stand the putrefaction of the water and they turn belly up.
>
> Since the land has been more efficiently farmed with more chemicals the fish population has gone down. For instance there used to be a thriving mullet fishery. It's hopeless now. They used to be quite an industry.
>
> The main thing in the physical appearance in the swamp was the take over by pussy and crack willow imported from the Yarra River in Australia. They kind of exploded in 1934 and consequently they stopped the bird life and the eels, who don't like to live under willows for some reason and I don't know why. There were also more eels under open swamp. Pukekos and mallard have taken over the swamp and bitterns and grey duck are almost extinct now." (Buckley, *pers comm.*)

The first records of central government interest in the ecological value of the Whangamarino were through R.T. Adams of the Wildlife Service, Department of Internal Affairs. He stated to a Waikato County Council hearing on the merits or otherwise of draining the Whangamarino Wetland in 1963 that: *"If the country had seven wonders, the Waikato Wetland would be one of them."* The Department's policy at that time was that it did not intend to oppose the necessary economic development into pasturelands of many of the major swamps, but had tried to align the wildlife requirements of the District with the drainage plans. In 1967 the Council considered a request by the Department of Internal Affairs for a total of 1,748 ha in the County to be preserved for wildlife. The Council did not favour the proposition, as "*too much quality farmland would be sacrificed for wildlife*" (Moore, 1976). It was contended that some 2,800 ha of swampland in the middle of the Whangamarino Swamp, an unclassified area already set aside for ponding floodwaters, offered the answer to all wildlife requirements and should be fully exploited instead of targeting additional land that was classified for rating. This land, the Council argued, could be reclaimed and had a high production potential. Lengthy negotiations ensued between the council, the Department of Internal Affairs, the Waikato Valley Authority and Federated Farmers. In a last effort to restrict the total destruction of the

wetlands, R.T. Adams literally begged to the Council: "I *do implore your Council seriously to consider wildlife in their districts as an asset of irreplaceable and increasing importance.*" Yet it appears that development of wetland into farmland still proceeded as rapidly as finances, technology and government subsidies would allow during the sixties, seventies and early eighties (Moore, 1976).

4.3.4 The Lower Waikato Waipa Flood Control Scheme

One year after the disastrous flood of the Waikato River in 1958, a flood control scheme was presented by the Waikato Valley Authority for the Waipa and Waikato Rivers (Russell, *pers comm.*). It became known as the Lower Waikato Waipa Flood Control Scheme. The intention of the scheme focussed on using Lake Waikere to detain water, which overflowed into it from the Waikato River at spillways near Rangiriri during flood periods. A channel between Lake Waikere and the Whangamarino Wetland was constructed so that additional storage could be gained within the Whangamarino as well. As a senior engineer for Environment Waikato (EW), explains:

> "During a 100 year flood the Waikato River flows at 1850 cu/mecs. The peak flow now goes into the lake so peak flows downstream is less. This meant the Valley Authority did not have to upgrade the protection works in the lower reaches of the Waikato [raise the stopbanks downstream of Rangiriri], which saved them lots of money." (Russell, *pers comm.*)

From an EW asset management perspective the flood control scheme has had enormous benefits:

> "The water used to flow naturally over land from Lake Waikere into the Whangamarino where Swan Road is. The Valley Authority managed it better for the benefits of the surrounding rural sector as well as flood control for the Waikato River. We continually maintain low levels in the lake to cope with flood storage if needed. At the recent resource consent renewal, Council reconfirmed this use, by allowing for it to continue for a further thirty-five years. There are three lake levels now – 5.5m in winter; 5.65m in October through to December and 5.6m from January until April." (Russell, *pers comm*)

However, staff from the Department of Conservation contend that this flood control scheme has been at significant ecological cost for both Lake Waikere and the Whangamarino Wetland. They refer to the collapse of the aquatic plant beds within Lake Waikere not long after the scheme became operational, stating that a reverse of natural lake water levels, combined with lake margin conversion into farm land and silt runoff from the surrounding farm, led to this state. Consequently, the eel and waterfowl

populations have dramatically declined since 1963. Further, the water from the lake is only released for short, controlled bursts into the Whangamarino, usually a week before opening day for duck shooting. This means that the level, seasonal fluctuations and duration of water the wetland receives is nothing like the natural regime, with negative effects on the biological and physical processes, as well as the recreational hunting use, of the wetland. In addition, the nutrient and silt laden nature of the incoming water has caused severe eutrophication of the wetland ecosystem, leading to a proliferation of the semi-aquatic weed *Glyceria maxima* choking indigenous open water herbfields (Roxburgh, *pers comm.*).

The Department was also disappointed at the way EW handled the resource consent renewal process for setting of lake levels in 1999:

> "While I know you can't turn the clock back, EW should have done an awful lot more than maintaining the status quo. Given the very poor ecological state of Lake Waikere, EW did not look at options such as restoring seasonal water fluctuations at all, which would have benefited the lake and the Whangamarino. This was despite strong submissions by ourselves and the Fish and Game Council." (Roxburgh, *pers comm.*)

Tangata whenua also appear to be dissatisfied with the consequences of the flood control scheme:

> "The 60s were the big change. Our marae [Horahora] was relocated and a stopbank was placed between the river and us in 1963. All the swamp between Lake Whangape and the river was drained. And also all the swamp between the Whangamarino and Lake Waikere was drained. All the streams were turned into drains and the stopbanks were placed hard up against the river. The Valley Authority tried to buy the land between the marae and the river where the stopbank and floodplain was, but our old people resisted and stopped them.
>
> The land between Lake Waikere and the Whangamarino was once all swampland owned by Maori. But in the late 1950s and early '60s some Valley Authority councillors started buying up this land from the Maori, very cheap of course as it was swamp. Then they built the channel to the swamp from Lake Waikere, drained the swamps in between, brought in heavy machinery to remove all the old logs and stumps and converted the area into productive pasture. This land was sold on to Pakeha farmers with a two thousand percent increase in value over what they originally paid for the land from the Maori owners." (Ngakete, *pers comm.*)

4.3.5 Energy and Mining

At the same time, coal extraction and power production also had a huge influence on the landscape of the Whangamarino Wetland. In 1956, while constructing the causeway on which the coal carrying ropeways were to be constructed for the Meremere Power Station,

engineers discovered that, in places, firm foundation through the peatbog was 19 metres deep. Finally, on 22 April 1958, the causeway was completed and another dramatic human induced change was forced onto the wetland. The Kopuku Coal Mine produced over 500,000 tonnes of coal a year , at peak production - about a quarter of New Zealand's annual production (More, 1976). The water that was required to clean and process this coal eventually ended up in the northeast arm of the Whangamarino as sludge and slurry. DoC officials have commented that for years they have tried to control the willows in the wetland with a cocktail of chemical herbicides. In fact, the waste slurry from Kopuku appears to be the only substance able to kill them completely. The Kopuku Mine supplied Meremere Power Station until it was mothballed in the 1994. The power station also has left its mark upon the wetland, including the large deposits of asbestos, which were removed from the station and buried nearby once its cancer causing properties were publicly known (Greenwood, *pers comm.*).

Manipulation of water levels by the hydropower schemes in the Waikato River has affected the levels of water within the Whangamarino Wetland, because the damming and release of water in the Waikato River is now subject to the demands of meeting electricity production rather than to ecological requirements. Sand extraction in the Waikato River has also adversely affected the water levels of the wetland by lowering the water levels in the river (Roxburgh, *pers comm.*)

4.4 The First Winds of Change

4.4.1 The Land Use Study

In 1984 a Land Use Study by the Department of Lands and Survey, following the Land Settlement Policy of 1983, concluded that development of the remaining portions of swamp was limited by the major physical requirements for development including drainage, stopbanking and pumping. Substantial shrinkage and subsidence of two to three metres were also predicted, compounding drainage and reflooding problems (Harvey, 1984). These factors included support for identification and preservation of wetlands meeting the IUCN criteria for Wetlands of International Importance, led to the recommendation that the Whangamarino Wetland should be protected from development for pastoral or other such use (DoC, 1989). A Court of Appeal clarification of the provisions of the Water and Soil Conservation Act 1967 and the subsequent Planning

Tribunal decision[5] revoked certain water rights to drain private land on the Reao Arm on the grounds that conservation values out weighed development benefits. This reinforced the protection and preservation options.

On 1 April 1987 the administration and management of the Whangamarino Wetland passed from the Department of Lands and Survey to the Department of Conservation as part of the Government's review of environmental administration dating back to recommendations put forward in the publication *"Environmental Policies in New Zealand"* (OECD, 1981). The Crown wetland had become a 'Stewardship Area' administered under the Conservation Act 1987.

In 1989, the Department published its intent to manage the Whangamarino as a Protected Natural Area, in the *"Whangamarino Wetland Management Plan. September 1989"*. The plan stated that the principal management issues to be addressed were:

- a review of the status and classification from stewardship land to a reservation and protection more in keeping with the wetland's ecological significance;
- a drop in water level fluctuations was seen as the most significant threat to the wetland and was identified as the principal management issue; and
- the invasion of willow into the mineralised swamp areas was considered the second most significant management issue.

Accordingly, policy was formulated to address these issues. Also of note was the recognition that the wetland lies within a larger area confiscated from the Tainui people in 1864 and that it is part of a larger area subject to claim to the Waitangi Tribunal. The Department stated that it was: *"committed to upholding the principles of the Treaty of Waitangi and to the management which is sensitive to the needs of the Maori people."* (DoC, 1989: p49). It proposed the establishment of a Consultative Committee, with direct input from Tainui and the Fish and Game Council, as well as those who made submissions to the management plan (DoC, 1989).

After four years of work and public consultation, the Waikato Conservancy released the Conservation Management Strategy (CMS), which had been approved by the New Zealand Conservation Authority (DoC, 1996) pursuant to section 17D of the Conservation

[5] Auckland Acclimatization Society versus Waikato Authority in NZ Town Planning Appeals, Vol. II, Part 2, pp33-41, Part 3. pp 168 -172

Act. Among the objectives and implementation measures stated within the policy, there was specific mention of working closely with tangata whenua and the community in the preparation of a wetland 'Conservation Action Plan'.

The Fish and Game Council was established under Section 26 of the Conservation Law Reform Act 1990, which guides the various regions of the Fish and Game Council in terms of their functions. The Auckland/ Waikato Fish and Game Council is essentially a name change of the Auckland/Waikato Acclimatisation Society, which had a long and proud history, dating back over one hundred years, as a non-government organisation protecting hunting and fishing. The Fish and Game Council's primary role is to protect and support waterfowl hunters' and sports fishers' use of the wetland, wildfowl and freshwater fish resources. The "*management, maintenance and enhancement*" (s26P) of sports fish and game within a region lies with the elected regional Fish and Game Council who report back to the National Committee. Anglers and hunters with full year licences may vote for, and be voted onto, the Fish and Game Council in their region. Thus the users manage the resource, and represent the interests of their fellow anglers and hunters in perpetuating a sustainable harvest, within an overall framework that is provided by the legislation. The unification of the Fish and Game Council with DoC under the same Act meant that the two bodies were forced to deal with each other more closely than they had done in order to conserve resources which often depended on the same habitat (Lawrie, *pers comm.*).

When the Resource Management Act 1991 was passed into law, wetlands were accorded statutory significance on private land. The Resource Management Act 1991 hinges on the assessment of environmental effects in both plans and policies as well as in day-to-day applications for consents. This is a significant change from the assessment of environmental effects under the Environmental Protection and Enhancement Procedures (1974-1991) which dealt only with effects of development proposals (Dixon, 1993).

The RMA requires local authorities to incorporate objectives and methods into district and regional plans, which require the adoption of policy to *"protect significant indigenous vegetation and habitats of significant indigenous fauna"*. Specifically in relation to wetlands and indigenous ecosystems, sections 6(a) and 6(c) and to a lesser extent section 7 of the RMA, are particularly important. However EW staff have strongly defended the protection of wetland on private land, where it has been threatened by drainage in recent years. This defence is reflected in the comments made in a staff report on a consent

application to drain 56 hectares of wetland near the Whangamarino for agricultural production:

> "Areas such as this are often perceived as worthless wastelands however, while many native species of plant may have been displaced by introduced plants and conservation values may have been lowered slightly, the natural wetland processes remain intact. To convert this area into dry pasture will result in the loss of these natural wetland processes. Staff consider that, given the importance of wetlands and the ecosystem values they provide, wetland quantity is currently a greater issue within the Waikato Region than is wetland quality and as such the loss associated with the applicant's proposal is significant." (EW, 1999)

The proposed Waikato Regional Policy Statement (RPS) contains objectives aimed at maintaining and enhancing the natural and physical environment and providing for existing and reasonably foreseeable future uses of the environment. There are two policies in the Waikato Regional Council proposed Regional Policy Statement (RPS), which have specific relevance to these objectives:

> "Policy One: Significant wetlands ensure that the natural character of significant wetlands are protected.
> Policy Two: Other wetland areas allow the use and development of other wetland areas while avoiding, remedying or mitigating any adverse effects on the wetland characteristics in the Region." (EW, 1998)

EW's emphasis in relation to implementation of these policies appears to be to use rules as 'environmental bottom lines', while community education is above that bottom-line – "*education is doing the right thing and about changing values*" (van Rossen, *pers comm.*). Over time, rules can be reviewed upwards to require higher environmental standards as the community becomes better informed and concerned to raise bottom-line standards.

The Waikato and Franklin District Plans have recognised the ecological significance of the Whangamarino Wetland by zoning the Crown and Fish and Game Council administered lands as Conservation Areas. The implementation methods in Section 53 of the Waikato District Plan that relate to privately owned native habitat areas – "*A schedule of "natural conservation areas" is included in the Plan and shown on the Planning Maps for information purposes.*" (WDC, 1998). No regulatory controls were associated with this schedule, nor with Franklin's District Plan. The Waikato District Council has not adopted any assessment criteria to determine how significant a site is on private land[6]. The District Plan refers to maintaining and updating a natural resource register. The schedule does not appear to have worked well for the following reasons:

[6] Environment Waikato is currently developing assessment criteria as a variation to the RPS.

1. Much of the information is inaccurate.
2. Many landowners misunderstood the schedule. They thought that they were no longer able to use these areas and that the Council was embarking on a 'land-grab' and this has lead to considerable ill feeling between landowners and Council.
3. The schedule has proved of little value during the consent process because of inaccurate information and because there are no regulatory controls associated with the schedule. (WDC, 1999).

Nonetheless rural landowner attitude to wetlands within the Lower Waikato has generally been supportive in recent years. In a survey of landowner attitudes to wetlands in the Franklin District in 1993, Jones *et al.* (1994) found that 89 percent of respondents (all of whom had wetlands on their land) agreed that protection of wetlands is an important priority in New Zealand. Sixty nine percent of these same landowners had carried out drainage of wetlands on their property in the past. However, 30 percent of respondents also reported that they had fenced or placed protective covenants on their wetlands. Notably, conservation incentives, voluntary mechanisms and education/advice were the preferred mechanisms and education were the preferred mechanisms for wetland protection of 85 percent of respondents.

Given that some 1,200 ha of wetland habitat within the Whangamarino is privately owned, how district councils interpret Part II of the RMA and how well they integrate district plan policy with regional policy statements and central government policy, will be critical in terms of achieving sustainable management of indigenous ecosystem remnants on private land (Dixon, 1993b). "*As far as wetlands are concerned I question whether Waikato District Council should have any involvement as it is EW's role under the RMA.*" was the comment made by one WDC planner (Turner, *pers comm.*). However, Section 74(2) of the RMA states that - "*when preparing or changing a district plan a territorial authority shall have regard to - management plans and strategies prepared under other acts*". Thus the CMS and the RPS in particular, should be essential considerations in the district plan preparation process.

Section 74 also provides a link between council's policy functions and its financial and resource allocation functions, in terms of recognition of its own annual or strategic plans. While there is no statutory requirement for council to prepare a strategic plan, strategic plan formulation is a necessary precursor to more specific, activity-centred policy

development (Vossler, 1994). Vossler (1994) believes that the way in which an authority can effectively implement methods (other than rules) to achieve district plan policies (such as rating relief, capital works programmes or business incentives) is through an effective strategic planning process.

The Waikato District Council is presently preparing a "*Draft Conservation Strategy*" which looks at the local issues and what the District Council, community groups and landowners could do about preventing the loss of native habitats. The Council is focussing on providing incentives to encourage landowners to protect significant natural areas rather use regulatory controls (WDC, 1999). To this end Waikato District Council has provided $50,000 a year to distribute to conservation measures through the annual planning process. This is focussed on subdivision but WDC hope the conservation strategy they are preparing will allow a more strategic distribution of the funds (Turner, *pers comm.*).

Territorial authorities "*shall have regard to any relevant planning document recognised by an iwi authority*" (section 74 (2bii), RMA). The Iwi Management Plan appear to be the only legislative tool by which Maori values and concerns can be addressed in district plans. Presently, regional or territorial plans and polices do little to acknowledge and promote Waikato Iwi in their preparation of an Iwi Management Plan for the Lower Waikato basin:

> "No, we [the District Council] have little proactive measures to involve Maori in resource management issues. There are no Iwi Management Plans. The river would be good to have an Iwi Management Plan for it, but dollars need to be targeted and proper identification of realistic outcomes required. I have concerns about the two faces of Tainui. The corporate should not be involved in the resource management side of things." (Turner, *pers comm.*)

Yet local hapu representatives are aware of the need for involvement in the planning process.

> "We want to prepare an Iwi Management Plan in the New Year, so we are not lost in the RMA process. We need to get our people to participate in the process so the next generation can further the goals we set in any management plan. But we need to get some more learned ones in the hapu to steer the process. The District or Regional Council show no interest in helping us." (Ngakete, *pers comm.*).

There seems to be some separation in views regarding this. EW staff consider that Maori representation and inter-organisational links are good (N. Manukau, *pers comm.*). Perhaps the problem relates to what Maori see as being important compared to what the Regional

Council sees as being important. While tangata whenua representatives talk of involvement in management and power sharing (Ngakete & T. Manukau, *pers comm.*), EW staff talk of monitoring and establishing indicators for wetland health and keeping Iwi "informed" (N. Manukau, *pers comm.*). The differences in the implication of these statements is significant and discussed further in Chapter Five.

4.4.2 Managing the Fishery

The Whangamarino Wetland, Lake Waikere and their catchments form part of the largest eel fishery in New Zealand, and the largest whitebait fishery in the North Island (Pullan, *pers comm.*). There are no recent figures, but the combined annual gross income of these fisheries was estimated to be well over $1.5 million per annum in 1993 (Stancliff *et al.*, 1988; Papa & Holmes, 2000). This commercial use is well documented. It is also evident, however, that while the Tainui rohe made use of the abundant tuna reserves in these wetlands for many generations, customary fishing for eel is little utilised today (Papa & Holmes, 2000; Ngakete; Jefferies; and Wara, *pers comm.*). And as the wetland provides habitat for adult whitebait (Galaxiid species), it is also important indirectly for the very large recreational whitebait fishery at Port Waikato. Limited recreational fishing is also of importance within the wetland (Roxburgh, *pers comm.*).

The reduction in size and quality of wetland, lake and river habitat, has drastically reduced the size of this fishery since the arrival of the British (Papa & Holmes, 2000). Introduced koi carp and catfish are also seen as having a major negative impact on the fishery (Roxburgh and Clark, *pers comm.*).

Management of this commercial fishery is presently vested in the Ministry of Fisheries (MoF) under the Fisheries Act 1996. DoC has statutory responsibility for managing native fisheries and the control of noxious fish, as well as regulating commercial and non-commercial activity within Conservation Estate. It is useful to outline DoC's responsibilities under section 6 of the Conservation Act at this point -"*The Department shall preserve as far as practicable all indigenous freshwater fisheries and protect recreational freshwater fisheries and freshwater fish habitats.*" (S6, Conservation Act)

Regional and district councils also have policy and planning functions under the RMA which regulate access, water quality and quantity and land use matters, all of which can directly impact on freshwater fisheries habitat (Taiaroa, 1994).

In December 1992, the Treaty of Waitangi (Fisheries Claims) Settlement Act was passed into law. This Act required the MoF, acting in accordance with the principles of the Treaty of Waitangi, to consult and develop policies to help recognise use and management practices of Maori in the exercise of non-commercial fishing rights (section 10(c)). Subsequent to an invitation by the then Minister of Fisheries in 1996, the 'Tainui Tuna Working Group" was formed. It consists of four representatives of Iwi and four from the eel fishing industry. The Working Group developed the following terms of reference:

1. To develop advice to the Minister of Fisheries on the most appropriate management strategies to sustainably manage the eel fishery for all parties within the Tainui rohe; and
2. To produce an eel management plan for the Tainui rohe encompassing the above advice. (Papa & Holmes, 2000)

The Management Plan was prepared by the Group between 1998 and 2000 and was distributed for final comment in January 2000 (Pullan, *pers comm.*). A number of objectives were suggested to improve and enhance the fishery and its commercial, customary and recreational use.

In apparent independence of this Management Plan, the Department of Conservation has decided to ban all commercial eel fishing within Crown land it manages in the Lower Waikato by mid-2000, as outlined in the Waikato CMS (Roxburgh, *pers comm.*). This appears to have been decided by DoC staff without prior consultation with MoF staff or the Tainui Tuna Working Group (Pullan, *pers comm.*). The Freshwater Fisheries Working Party, formed by the Treaty of Waitangi Fisheries Commission, made the following comments on the performance of DoC in 1994, which may have some application to this case:

> "The performance of the Department of Conservation in the above case [relating to the DoC prosecution of Maori customary fishing of whitebait using nets not meeting the Fishing Regulations] demonstrate that it is unfit to manage Maori customary fishing rights. This is because those exercising customary rights are forced into a situation where they are treated as guilty until proven innocent." (Taiaroa, 1994: p24).

4.4.3 The Saga of the Weir

In a combined effort to restore the water levels in the mineralised areas of the wetland, DoC and the Fish and Game Council began planning in the late 1980s to construct a series of weirs in the Whangamarino River below its confluence with the Maramarua River. It was hoped that water levels in 1,456 ha of the mineralised swamp wetland could be restored by this action (DoC, 1991).

In October 1989 the joint application was lodged for a Water Right to dam the Whangamarino River. In 1990 DoC and Fish and Game decided to discard the original three small weirs in favour of a single weir, sited further down stream. As the RMA was passed in 1991, the application then became subject to the provision of this act. A pre-hearing meeting was held late in 1991. According to Goudie (1994), it was only at this time that the local community discovered that the three weirs had been dropped for one large weir.

The Whangamarino Peer Review Committee was set up to organise a cohesive working party from the 1991 pre-hearing meeting. This committee was set up to investigate the effects of the application on the surrounding farmland. It was made up of representatives of local farmers, DoC, tangata whenua and the Fish and Game Council. However, the committee appears to have been disbanded after several years. The following quote reflects the perspective of one of the DoC staff on the usefulness of the committee:

> "The Peer Review Committee set up by our previous Regional Conservator was a waste of time and no help. The committee was a focus point for locals to have a bash at DoC and brought up frivolous issues such as mosquito population increases" (DoC staff, *pers comm.*)

The Resource Consent Hearing was held on 24 February 1992. The objectors of the proposal agreed with the applicant that it was important to restore the seasonally fluctuating water regime, because of the exceptional habitat values of these area (Goudie, 1994). The applicant's basis for restoration was restoring levels to a 1960s level. It was hoped that this would provide for the continuation of the species that have been put at risk by the loss of their habitat (DoC, 1991). It was decided to restore the levels to 1965, as the earliest recorded water levels go back as far as the 1960s. Goudie (1994) notes that local knowledge was not sought at any stage to gain impressions of the wetland prior to the

1960s. At that time residents were still alive who could give account of conditions back to the 1920s (O'Carroll, *pers comm.*)

The main thrust of Goudie's critique of the weir restoration project was that the Fish and Game Council and DoC had largely ignored local community knowledge or concerns. The second point she made was that there was insufficient or "*practically nil*" quantifiable data relating to the historical ecology of the wetland. Goudie found that recorded historical accounts given by two original settlers (Mr Buckley senior and Mr Bruce Lyons) give incredibly detailed information in their memories of events and recollections. She considered that the depth of this knowledge "*far surpassed anything yet uncovered during the research for this paper.*" and may have provided useful insights into where and how to construct a water retention system (Goudie, 1994: p7). That said, review of the evidence presented by the applicants in support of the weir was substantial and based on sound ecological principles (DoC, 1991).

A major issue developed with the weir shortly after it was constructed when it restricted and killed hundreds of elvers attempting to migrate up the Whangamarino River in the summer of 1993 (*pers obs.*). This potential problem was highlighted by the local tangata whenua and several farmers prior to the event at the resource consent hearing in 1992. However, it appears that no notice was taken of these concerns (Goudie, 1994).

During the first winter of operation, after the weir was officially opened by Sir Edmund Hillary in the summer of 1994, it collapsed as a result of the first winter floods and was rendered completely ineffective. Reconstruction of a new weir began at the same location in January 2000 and to date the weir has yet to be completed. It is noted that despite all of these setbacks, relations between the weir project partners - DoC and Fish and Game appear to be very good and have not been adversely affected by the failures (Roxburgh, *pers comm.*; Teal *pers comm.*)

4.5 Bridges to Future Management Options

Analysis of the Case Study suggest that the traditional 'command and control' management regime of the Whangamarino Wetland and its catchment was perhaps a necessary reaction to the drastic and rapid destruction of wetlands which had occurred in the Lower Waikato in the last century. However, the failings of this type of approach are

apparent. Despite a number of laws, plans, policies and rules the wetland is still declining in terms of biodiversity and ecological integrity. For example:

- pollution from agricultural land is still occurring;
- the Lower Waikato Waipa Flood Control Scheme is still causing significant adverse effects on the Whangamarino;
- introduced fish, plant and mammal pest populations are increasing and are devastating the indigenous fauna and flora and their habitats;
- the weir is still not complete, despite over ten years of design review, legal proceedings and negotiations; and
- tangata whenua still have no genuine involvement in the management or governance of the wetland.

As stated in Chapter Two, Gunderson *et al.* (1995) relate institutional frameworks for managing natural resources to following the cycle of ecological functioning of natural ecosystems, which is shown diagrammatically in Figure 2.1. They argue that when institutions do not adapt to the uncertainty and cyclic nature of ecosystem functioning they cannot manage that ecosystem effectively. C.F. Holling (in Gunderson *et al.*) concludes that the public frustrations at institutions' inability at managing ecosystems is caused in part by the following reason:

> "The problems are increasingly caused by slow [ecological] changes, reflecting gradual accumulations of human influences on air and oceans and decaying transformations of landscapes in terms of hundreds of years. These slow changes eventually cause sudden changes in fast environmental variables once the sustainability threshold is reached. This directly affects the health of people as well as ecological productivity and diversity. Therefore analysis should focus on the interactions between slow phenomena and fast ones. This means that monitoring and addressing slow changes in ecosystem structural variables is just as important as monitoring and addressing fast changes. The political window that drives quick fixes for quick solutions simply leads to more unforgiving conditions for decisions, more fragile natural systems, and more dependant and distrustful citizens." (Holling *in* Gunderson *et al*, 1995:p345)

Lister (1998) argues that in order to overcome traditional institutional inability to cope with ecological and societal uncertainties and volatility, the notion of biodiversity becoming heuristic and therefore useful in guiding conservation planning and management is a useful one. A pluralistic perspective of biodiversity is advocated to include information and culture. The potential for biodiversity conservation planning is, by virtue of its permeation through the whole living system, holistic rather than confined to a single

selected scale. Based on this holistic systems approach Kay and Regnier (2000) suggest an alternative model to the traditional 'command and control' approach to biodiversity conservation as shown in Figure 4.3.

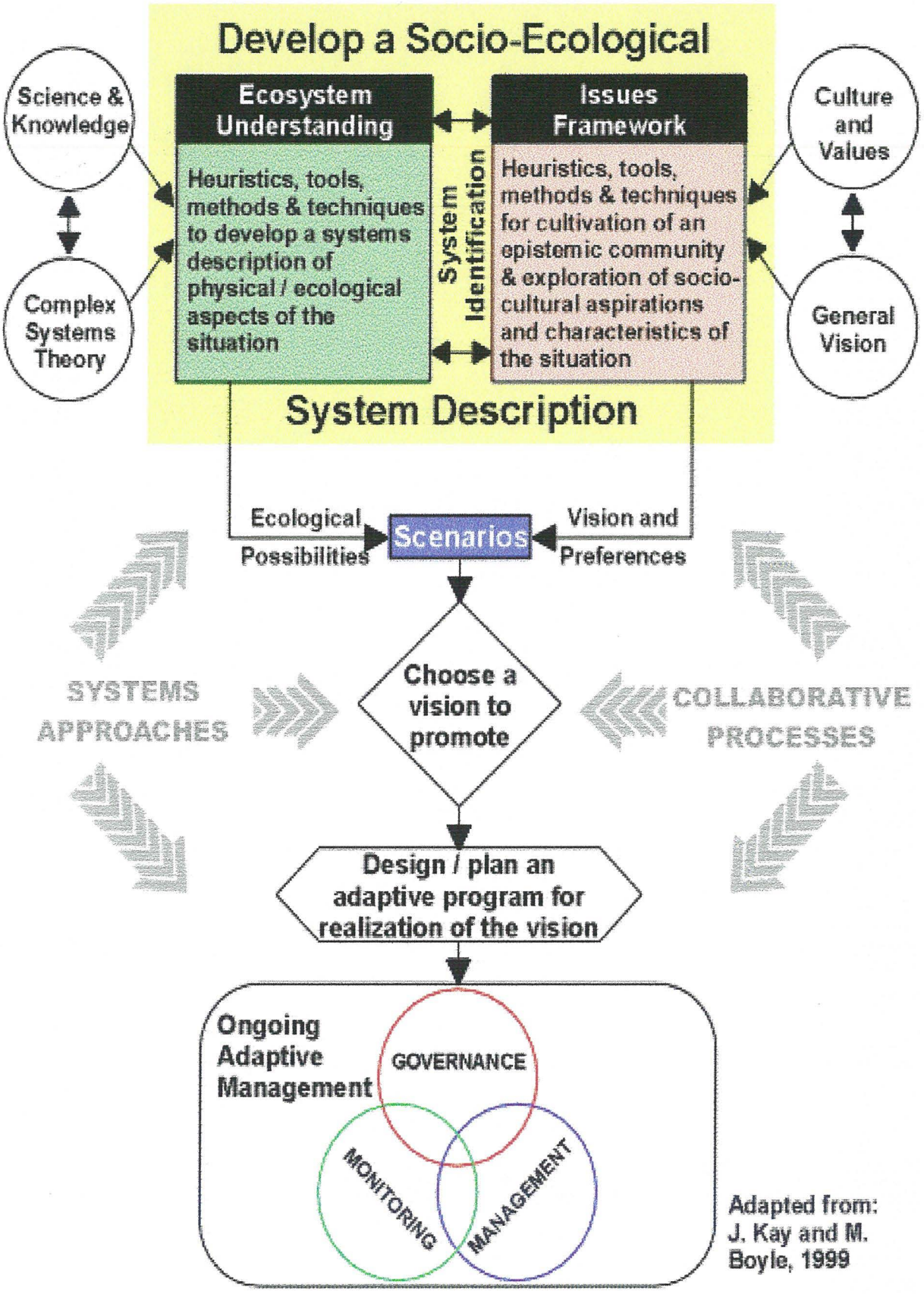
This model shows how an inter-disciplinary, participatory, adaptive and multi-scale management regime, which is grounded in complex systems theory might be implemented. In this system, those acting as scientists and/or those with knowledge, develop a scenario of how the future might unfold (see top left hand box of the model). This clarifies the ecological realities, constraints and possibilities of the situation. In the right hand upper box, establishing who the users and stakeholders are and what their concerns, values and visions for the future are, is conceptualised as the 'Issues Framework' box. Once this process has been completed an image of how participants would like to see the landscape of human society and natural ecosystems co-evolve will have been developed. The ways in which this can be implemented must be thought through and planned and this is shown as the diamond and hexagonal boxes.

This vision and plan must be framed in the ongoing triad of governance, management and monitoring. In this context Kay and Regnier (2000: p35) define these as:

> "Governance: the continuing process of learning, revisioning, resolving tradeoffs, and planning to adapt to the unfolding situation.
>
> Management: the activity of translating the vision into reality. It involves the development and implementation of strategies to promote or discourage specific forms of self-organisation in the context of the communal vision and plan.
>
> Monitoring: the activity of observing the human and natural systems and synthesising the observations together into a narrative form of how the situation has unfolded to date, and how it might unfold into the future."

Collaborative management between all participants at every stage appears to be one of the central tenets in the successful implementation of this model. An investigation of collaborative approaches as they might apply to biodiversity conservation issues for the Whangamarino Wetland forms the basis of Chapter Five.

Figure 4.3 An Adaptive Ecosystem Approach Model for Biodiversity Conservation



Chapter 5 Barriers and Bridges to Collaborative Management in the Whangamarino Wetland

E tapu te rangi na Io na te atua
E tapu te rangi ruanuku
Kia rere mai te maramara
Kua piri, kua tau.
Kia rere mai te kongakonga
Kua piri, kua tau.
Torotika e!

Sacred is the day of Io, of the gods
Sacred is the day of wisdom
Hasten the larger chips
And together cling.
Hasten the smaller chips
Altogether join
And the tree restore!

a Porihawa incantation to Rata circa 1150 – 1300 as told by Te Aote-rangi (Kelly, 1949: p 14)

5.1 Chapter Objectives

Propositional statements (general statements of fact grounded in the data - Lincoln & Guba, 1985) have been developed from the themes and concepts derived from the results of the Whangamarino Case Study in order to investigate the barriers and bridges to the implementation of collaborative management.

This chapter discusses and explores how collaborative management could be used as a process or model to implement an adaptive ecosystem approach (involving all aspects of governance, management and monitoring) in the context of the Case Study.

5.2 Development of Propositional Statements

5.2.1 Summary of Key Issues Raised in the Interviews

Table 5.1 summarises the key themes raised by the various participants interviewed. This summary was developed from material gleaned from the thick descriptions and the iterative, constant comparative process required to develop the inductive category coding data cards as summarised in Appendix III. The constant comparative method of analysing qualitative data, as detailed in Chapter Three, led to the crystallisation of twelve key themes emerging from the inductive category coding of the data obtained from the interviews and literature research.

Table 5.1 Summary of Key Themes Developed from the Whangamarino Case Study

Theme	Explanation	Supporting evidence*
Interjurisdictional issues	Overlapping functions, ill-defined roles and 'turf' protection within Crown management and research agencies and NGOs are limiting effective management and monitoring.	1, 2, 4, 6, 7, 8, 11, 12, 13, 14, 15
Internal and external politics	Conflict between Crown, local community and Maori over resource use and allocation has been directed by politics through disputes over key local issues such as the weir and the Kopuku Landfill proposal.	1, 2, 4, 5, 6, 7, 9, 11, 12
Regulation versus Voluntary	Landowners, EW, WDC, MoF and resource users consider voluntary measures to be most effective in addressing the effects of agriculture, while DoC consider regulation to be the most effective method.	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15
Differing understandings of what collaborative management entails	DoC and local government perceive collaborative management as informing and securing community assistance with informal management initiatives. Landowners and Maori regard collaborative management as partnerships and equal involvement in all levels of governance, management and monitoring.	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14
The role of Maori in collaborative management	Maori have been isolated from the management the Whangamarino for 150 years, yet legislation and the Treaty of Waitangi give them a clear mandate to be involved in all levels of governance, management and monitoring	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14
Communication	Communication between all parties could be improved at each level	2, 3, 4, 7, 8, 10, 11, 12, 13, 14, 15
Traditional and local knowledge	There is a lack of acknowledgement or respect for local and traditional knowledge by Crown agency staff.	2, 3, 4, 10, 11, 12, 15
Landowner Perceptions	Landowners and resource users almost universally consider that conservation of the Whangamarino Wetland is a worthy cause.	1, 4, 7, 10, 11
Resourcing	Inadequate funding of Crown agencies is severely limiting management and monitoring initiatives. Uncertainty about future funding will limit any future collaborative management initiatives.	1, 5, 6, 8, 11, 12, 15
Power sharing between Crown and Maori	Devolution of power by the Crown to Maori, is accepted as an outcome of the Waikato River Claim settlement process by most Crown agency staff and all Maori participants.	1, 2, 3, 6, 11, 13, 14
Key individuals	Leadership by key people have played critical roles in progressing new or alternative governance, management and monitoring initiatives in the past, and will be key to new initiatives.	2, 3, 5, 10, 12, 15
Trust & Respect	Maori, agency and local community generally do not trust or respect each other's ability or view point. Trust and respect are critical in successful collaborative management arrangements.	1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 3, 14, 15

* **Key to Supporting Evidence:** 1= DoC, 2= Tainui, 3= Hapu, 4= Landowner or resource user, 5 = Environment Waikato, 6= Waikato or Franklin District Council, 7= Fish and Game Council, 8= Conservation Board, 9= Forest and Bird, 10= Landcare Trust, 11= MoF, 12= academic or 'wise' advocate, 13= DoC policy, 14= Local govt. policy, 15= Literature

5.2.2 Proposition Statements for the Whangamarino Wetland Case Study

From the Case Study, six propositional statements have been developed from the key themes. These propositions, as evaluative tools, help to identify the interrelationships and hence the barriers and bridges to effective implementation of collaborative management. They also propose actions to overcome these barriers. While the six statements are grounded in data obtained from this research, a review of existing literature (e.g. Roberts, 1996; Shindler and Cheek, 1999; O'Brian, 1994; Steel *et. al*, 1998; Gunderson *et al.*, 1995; Sunde *et al.*, 1999) gives credence to their applicability to this case study.

- **Proposition One**

  Multidisciplinary, integrated and interagency partnerships will enhance biodiversity conservation management decisions as well as promote more efficient, effective and relevant monitoring programmes.
- **Proposition Two**

  Tangata whenua have a legitimate and equal status role in the governance, management and monitoring of the Whangamarino Wetland.
- **Proposition Three**

  Local communities and resource users are ready and willing to participate in a collaborative management approach to resource management issues within the Whangamarino sub-catchment.
- **Proposition Four**

  Crown agencies understand what collaborative management entails but there are political, personal, institutional and capital barriers to implementation.
- **Proposition Five**

  Skilled leadership, policy flexibility and a common vision amongst all parties involved will improve the quality of biodiversity outcomes.
- **Proposition Six**

  Incorporating local and indigenous knowledge, ideas and experience will produce better biodiversity conservation outcomes and monitoring processes, and build trust and support for natural resource institutions.

5.3 Proposition One - Integration

Multidisciplinary, integrated and interagency partnerships will enhance biodiversity conservation management decisions as well as promote more efficient, effective and relevant monitoring programmes.

> "Ultimately the District Council (WDC) will need to come to a partnership arrangement with Environment Waikato (EW) and the Department of Conservation (DoC). For example, DoC might do the monitoring, WDC may put up the fence and EW would control the possums." (Turner, *pers comm.*)

5.3.1 Existing Co-operative Mandates at the Governance Level

At a governance level, the RMA was supposed to establish a co-operative approach to inter-governmental planning (Berke *et al.*, 1999). Frieder (1997) argues that an integrated environmental management approach to resource management in New Zealand was at the core of what those drafting the Act wished to facilitate. However, Frieder (1997) found only some integration in the implementation of the Act, which was highly variable among regions. In a more quantitative and broader research investigation, Berke *et al.* found that regional staff capacity and the quality of regional plan policy statements had no relationship with district staff capacity and district plan quality. They asserted that because of this, regional and district planning were operating independently with weak inter-organisational co-ordination and variable policy directions. Berke *et al.* (1999) concluded that: "*This suggests that, in spite of the intended co-operative partnership roles of regional and district councils, there is little, if any, integration and co-ordination between them.*" Crawford *et al.* (1997) had concluded earlier that lack of resources, turf protection, and conflict generated by uncertainty in roles by each level of government are key reasons for this disconnection.

If this is the case for local authorities, one could expect that relationships between DoC and local government is even more disconnected and uncoordinated. Stephenson (*pers comm.*) noted that different agencies are still addressing individual ecological issues in an ad-hoc manner within the Whangamarino, with no single organisation looking at the whole picture. Berke *et al.* considers that the RMA's hierarchical structure rests on the assumption of co-operation between levels of government and that central government will assist lower government levels with capacity building (for example, provision of technical information, draft plan reviews, guidance and interpretation of mandate provisions).

Interviews with key agency staff associated with the Whangamarino suggest a number of informal, but solid networks exist between DoC, Regional Council, District Council and Fish and Game Council staff. Despite these informal links, agency staff spoken to highlighted a need for direction at a regional or national level in terms of wetland conservation. In particular, both DoC and Waikato District Council staff commented on the poor and weak direction given by the Regional Council in terms of policy and resource consent implementation (Roxburgh, *pers comm.*; Turner, *pers comm.*).

5.3.2 Informal Links

The 'Waikato Wetlands Forum' is an informal association of Waikato agencies associated with wetland management and comprises representatives of Regional and District Councils, Department of Conservation, Fish and Game Council, research representatives, and "*in the near future*" iwi representatives (Turner, *pers comm*). The Forum meets several times a year to discuss common wetland issues.

While such informal links exist between EW, DoC and the territorial authorities, little formal assistance or co-ordination is in place between them in terms Whangamarino management or the development of policy. It appears that the only way DoC can express concerns over the management of the Waikato Waipa Lower Flood Control Scheme to EW is at formal resource consent hearings, such as the renewal consents for Lake Waikere's Flood Control Gate operation. It is very difficult for complex issues or innovative ideas to be fully appreciated in a formal and restricted council hearing forum (Roxburgh, *pers comm.*). Thus opportunities are lost to improve management, and feelings of distrust are exacerbated between agencies (Roxburgh, *pers comm.*). At a national level the links exist with the Ministry for the Environment, but these appear to be very much directed only at an 'indicator/monitoring' level (see below).

5.3.3 Technical Information Dissemination

A worrying aspect of Berke *et al.*'s (1999) research finding was that only about 20% of Regional Council planners viewed DoC or MfE, the two leading Crown agencies, as providing useful information. About 50% of District Council planners viewed MfE information as useful, yet only slightly more than 10% viewed DoC as providing useful information.

At a resource information gathering level, interagency coordination within the Waikato appears to be better than Berke *et al.*'s research suggests. Both WDC and EW have worked closely with Landcare Research to establish a detailed geographic information system (GIS) inventory and database of wetlands. DoC has yet to implement its GIS database (Barnes, *pers comm.*). However the "WERI" Database and Inventory of Wetlands is a useful, albeit very general, source of information on Crown owned wetlands (Cormarty and Scott, 1995). DoC Waikato's Draft Wetland Management Strategy relies on input from the National Institute of Water and Atmospheric Research (NIWA) and Landcare Research, and there appears to be good co-ordination between these three Crown agencies (Kelleher, *pers comm.*).

The Ministry for the Environment, DoC and a number of regional and district councils are involved in a national project to investigate techniques to provide a consistent approach to monitoring wetlands in New Zealand through UNEP/GRID. This involves development of a national wetland classification system, practical application of this system to determine spatial extent of wetlands, trialing the capability of remote sensing techniques for measuring and monitoring the spatial extent of wetlands. This work was presented at the end of 1999 (Ward and Lambie, 1999). The project is also developing a framework to incorporate iwi values into wetland monitoring. In the second phase of the project, site specific indicators for measuring determining factors such as hydrological regime, biotic elements, trophic state, salinity regimes, and buffers will be developed (McKessar, 1997).

A second project is a regionally based pilot on developing a process for integrated environmental monitoring, intended for expansion to national applicability (i.e. used by all regional councils). One of the issues being used to demonstrate the process is the protection of indigenous flora and fauna including that found in wetlands.

5.3.4 The Missing Link

O'Brien (1994) suggests, in the case of knowledge of riparian issues, there is an increasing gap between the knowledge generated within research agencies in New Zealand and overseas and the putting into practice of this information. Implicitly, riparian management and restoration needs to be acknowledged by DoC and regional councils as a social

problem (O'Brien, 1994). Gunderson *et al.* (1995) also notes a disconnection between knowledge and action. When action fails to contribute to knowledge, affected communities and agents lose the core output of the adaptive management process.

Since O'Brien's work there has been a huge shift in utilising new ways of education and implementation measures, particularly by regional councils (H. Ritchie, *pers comm.*). Landcare initiatives with local communities, and in the case of the Whangamarino, farmers, offers the most promising method of disseminating technical and scientific information to the local community. The Chair of the Motukaraka Landcare Scheme noted that since they have been involved in monitoring they are aware of what the catchment (the Motukaraka Drainage Scheme) is producing in the way of non-point source pollution and where the nutrients are coming from – "*I can understand what water quality monitoring results mean now and we can look at ways to address the problem of non-point source pollution.*" (Twining, *pers comm.*)

5.4 Proposition Two

Tangata Whenua have a legitimate and equal status role in the governance, management and monitoring of the Whangamarino Wetland

> "*I feel powerless. I want to sit down and talk to those people who presume they have the 'God-given-right' to rule over us.*" (Ngakete, *pers comm.*)

5.4.1 Asserting Partnership

The Treaty of Waitangi suggests Maori should have an equal status to the Crown in the role of governance, management and monitoring of ancestral lands and waters, such as the Whangamarino Wetland, but as shown in Chapters Two and Four this has not been attained in practice. Maori also have legitimate and legally enforceable roles in terms of kaitiakitanga, of tikanga Maori and of tino rangatiratanga. The Parliamentary Commissioner of the Environment found that of the 59 recommendations given by the Waitangi Tribunal to date only 21 have been fully or partially implemented (Nuttall, 1999). The findings of the Waitangi Tribunal and the Courts in regard to the definition of the principles of partnership, rangatiratanga and active protection were endorsed by the Commissioner who concluded that the:

> "...principal change implied for the [then] existing environmental management system is a greater share of decision-making power between Crown/Pakeha and Maori

partners to the Treaty and greater cognisance of Maori cultural values in the protection of resources and other taonga." (Parliamentary Commissioner for the Environment, 1988: p iii.)

Amongst a number of recommendations the Commissioner made to various Crown Ministers was the following made to the Minister of Environment:

> "Recommendation 4:
> That the Crown recognise generally, and particularly in the context of the current Resource Management and Local Government Law Reform programmes, that:
> the implementation of the Treaty principles of partnership and tribal rangatiratanga requires a change in the existing power equation between the Treaty partners, giving tangata whenua an increased share in actual decision-making power at both central and regional levels; and
> the implementation of the Treaty principle of active protection requires proactive initiatives for environmental management in both statute and policy to:
> i. protect Maori taonga according to Maori cultural preferences;
> ii. provide rehabilitation or compensation for mismanagement of natural resources where valid Maori grievances under the Treaty have been established." (Parliamentary Commissioner for the Environment, 1988: p 8)

Nuttall (1999) considered that the Crown response in amending resource management legislation to incorporate statutory recognition of the Maori Treaty interest cannot, by the Tribunal's findings, be considered sufficient to meet its Treaty responsibilities. Successive reports since the landmark *Ngawha Report* have reiterated that Part Two the RMA remains flawed in this regard.

The Conservation Act has even more strongly worded direction to the DoC to have regard to the Treaty of Waitangi. At a national level DoC place appear to place genuine importance to meeting its Treat of Waitangi obligations. The Kaupapa Atawhai Strategy emphasises the Treaty principle of partnership (DoC, 1997). The Strategy lists those elements of partnership to include: "*reasonableness, awareness of the other partner's views, a willingness to accommodate those views, fairness and good faith.*" (DoC, 1997: p3). Yet it appears that active partnerships between DoC and Maori, more than twelve years since the Act has been passed into law, in the Waikato in any case, are exceptions rather than the norm.

An interesting development in recent years has been the Environment Court making rulings for active involvement of iwi or hapu in management and strategic planning. It appears that the judicial system is therefore forcing the Crown to meet its partnership

obligations. The *Whanganui-a-Orotu Report* recommended, amongst other matters, that a collaborative management regime be established for the Napier estuary. The *Turangi Tukua Report* and *Whanganui Report* also recommended that the Crown facilitate the development and implementation of an Iwi Management Plan by the claimants to be resourced via the Crown (Nuttall, 1999). This would effectively include both the Hawkes' Bay Regional Council and DoC, and link obligations of DoC under the both the Conservation Act and the RMA, as the estuary lies within the Coastal Marine Area as well as involving protected threatened fauna species under the Wildlife Act.

5.4.2 Giving Effect to the Partnership

Allen *et al.* (1998) proposes that the term partnership is consensus-based with decision-making power being shared equally among the various stakeholders. Therefore, if thisdefinition was applied to a partnership arrangement between the Crown and Maori, then ideally the distribution of power on the 'partnership table' would look something like the arrangement shown in Figure 5.1.

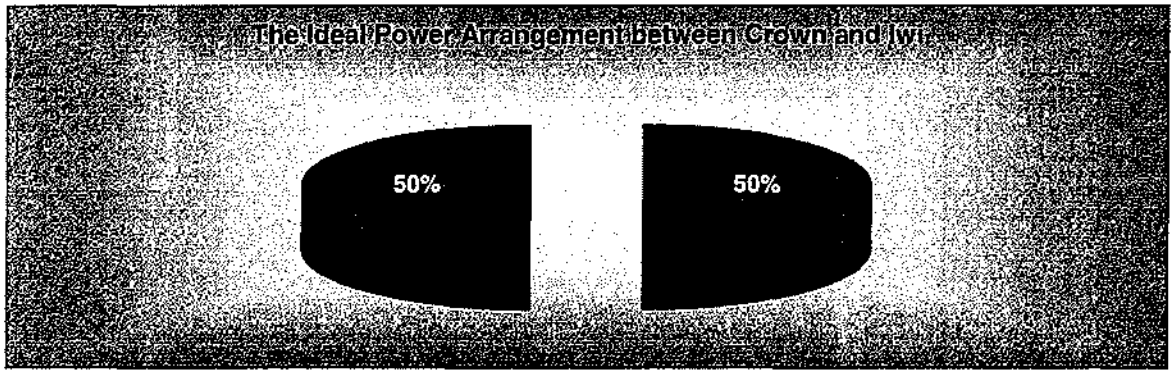


Figure 5.1 The Partnership Table

At present, tangata whenua can theoretically have input into the Whangamarino by the following processes:

A Governance /Political

i. Through their representative in Parliament

ii. Representation on the Conservation Board

iii. Representation on local government Councils

iv. Representation on Fish and Game Council

v. Representation via an NGO (e.g. Federated Farmers)

vi. Direct action

B Management

i. During RMA, Fisheries Act, or Conservation Act, public consultation processes

ii. Inclusion in community initiatives

iii. Inclusion in EW initiated Landcare projects

C Monitoring

i. Inclusion in Sustainable Management Fund, MfE, DoC or local government initiatives

ii. Inclusion in an EW initiated Landcare project

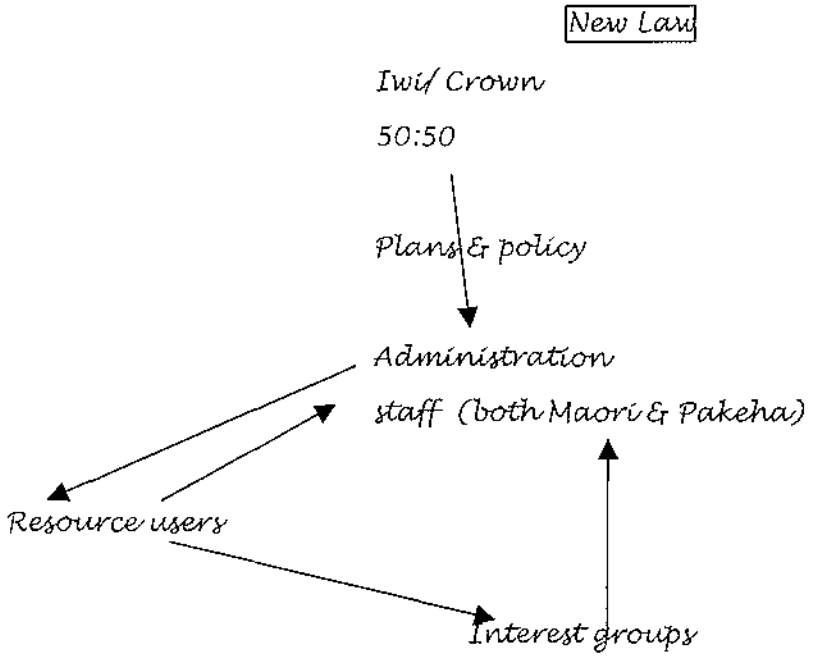
The Waikato Conservation Management Strategy (CMS) states as one of its objectives is to give effect to the Treaty of Waitangi by "*ensuring early and effective involvement of tangata whenua in the preparation of a wetlands Conservation Action Plan*" (DoC, 1996: p78). Yet it appears that DoC has not involved tangata whenua in the draft Wetland Conservation Strategy (DoC, 2000). However, there are many informal and robust links between the Waikato Conservancy and Tainui, through the Conservation Board and between Waikato Raupatu Lands Trust – Te Kauhanganui and DoC staff. That Maori have an equal status to the Crown in the role of governance and management in the Case Study has been widely accepted by DoC, District Council, Ministry of Fisheries and the Fish and Game Council. It appeared to be less widespread within Environment Waikato, although tangata whenua input into management and monitoring is supported. All agreed, to varying degrees, that at present tangata whenua involvement in the governance and management of the Whangamarino is inadequate, although Environment Waikato staff spoken to felt that tangata whenua involvement in monitoring programmes is good.

Maori themselves were quite clear on the distinctions between governance, management and monitoring and their role within each of these realms. Maori representing Tainui at Trust Board, hapu or marae level considered that the 'power distribution table' was in fact two tables. One which was split equally between the Crown and tangata whenua (governance) and another, 'lower' table (management and monitoring) which was equally split between the local (or Pakeha) community, and the Maori (or mana whenua) community. A key distinction between the Pakeha and Maori interviewed was that while the Crown representatives talked of the Whangamarino as a distinct unit, Maori spoke not of the Whangamarino, but of the Waikato River, implicitly stating that the Whangamarino was part of the River, and neither should be considered in isolation.

Both Crown agency staff and Maori interviewed were asked to draw a model of how they thought an ideal collaborative management arrangement would be structured for the Whangamarino. In Figure 5.2, three models have been transcribed from the thick descriptions, indicating the differences and similarities between Crown and tangata whenua. In all models drawn, the Crown (represented by EW or 'The Crown') and Tainui were recognised as having an equal standing at a governance level. At the management and monitoring levels, DoC appear to consider that they have the lead role. On the other hand, Tainui consider DoC to be more of an advisory agency, with governance and management being a partnership between Environment Waikato and tangata whenua. Once tangata whenua have been adequately resourced and upskilled (in terms of ecosystem management), they consider that DoC would no longer have a role to play.

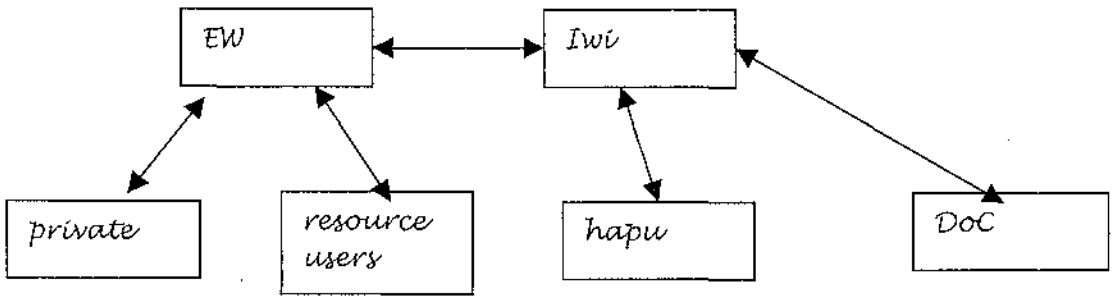
Figure 5.2 Different Models of Tangata Whenua Inclusion in the Role of Biodiversity Conservation of the Whangamarino

View of Tainui Iwi Representative

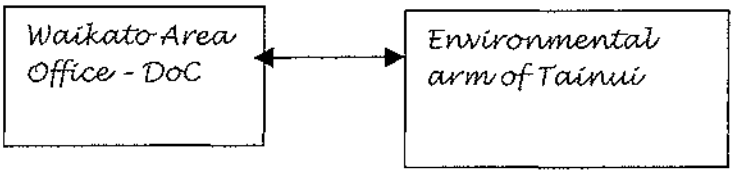


View of a DoC Manager

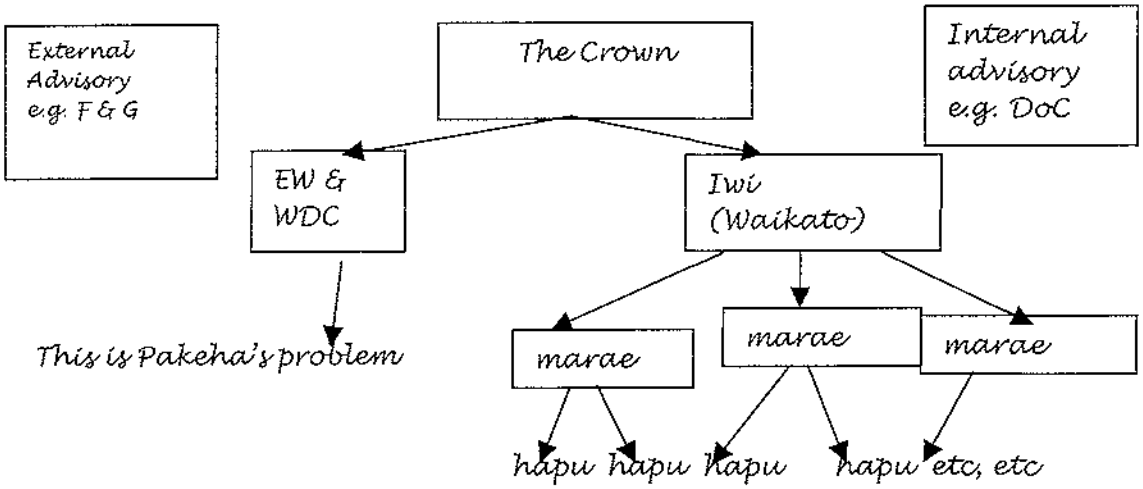
At a Policy Level.....



At a local level....



View of a Nga Muku kaumatua



Most landowners and Forest and Bird Society representatives interviewed spoken to were opposed to Maori participation in management. Many also expressed concerns based on past experience, that Maori were often not motivated to participate, even when they had been invited to do so. Maori felt however, that they are only involved in the Whangamarino in a *reactive* mode at present, rather than a *proactive* role (Ngakete & Manukau, *pers comm.*). Two major issues will need to be resolved before this changes – provision of adequate resourcing (in terms of money and technical knowledge); and removal of institutional barriers (e.g. turf protection and racism) by the Crown agencies (Nuttall, *pers comm.*).

5.5 Proposition Three

Local communities and resource users are ready and willing to participate in a collaborative management approach within the Whangamarino sub-catchment.

"*Perhaps all of the Whangamarino Catchment needs to come in now. I can see a day when all of the farmers in New Zealand are part of Care Groups*" (Twining, *pers comm.*)

5.5.1 A Shift in Values

Analysis of the data of the Case Study confirms the anecdotal evidence of the inquirer that over the last ten years there has been a clear shift in the attitudes of local farmers toward

the Whangamarino. From a position of almost unilateral promotion of drainage of the Whangamarino Wetland for agriculture, as well as opposition to everything that DoC stood for, attitudes have moved to almost total support of protection of the wetland and broad endorsement of DoC's position. This evidence builds on the finding of the more quantitative study of Lower Waikato landowner attitudes toward wetlands by Jones *et al.* (1994) (as summarised in section 4.4.1). It is beyond the scope of this research to investigate why this attitudinal shift has occurred. It is likely to be a result of a number of influences on farmers at all levels of society, including forced interaction with DoC and EW as part of resource consent processes for the weir, which in turn may have allowed both parties to understand each other's view point.

5.5.2 Existing Opportunities for Participation

The Waikato Conservation Management Strategy states that the Department shall: "*involve tangata whenua, key associates and other interested parties in management of wetland areas administered by the department and work with such groups on a cooperative basis on joint management committees.*" (DoC, 1996, p77). At present, the local community and resource users can, along with tangata whenua, theoretically have a number of opportunities to input into the Whangamarino, as outlined above (5.4.2).

5.5.3 Inclusiveness

Watson *et al.* (1996) and Dixon (1993a) suggest that participatory approaches dealing with resolution of substantive issues associated with an environmental "meta"-problem, are at least as important as relying on the procedural constructs of the institutional framework.

In an institutional analysis of adaptive management, Shindler and Cheek (1999) argue that those governed or affected by a management regime need to be involved in the *processes* of the design of institutional reform. Curtis *et al.* (1995) acknowledged this view in citing inadequate representation of community interests as a key factor in why early attempts of the Australian Landcare policy failed. In other words, Curtis *et al* express the need for community to be involved in policy development or governance, not just management or monitoring.

Public involvement is usually considered more successful if the processes employed include all affected parties and aim for broad representation (e.g. Lawrence and Daniels, 1996). Knopp and Caldbeck (1990) observed that having an open, easily accessible programme in which citizens are encouraged to become involved and speak up is important, because it cannot simply be assumed that volunteer organisations or public interest groups will adequately or fairly represent the total spectrum of public values. Consequently, because - *"there is no absolute standard by which to determine whether a fair balance has been reached"* (Knopp and Caldbeck, 1990: p14), having a variety of mechanisms for people to express themselves is essential in order to include various segments of the population who have differing abilities to participate.

The issue, then, is not whether *all* groups are represented, but whether those that are affected by, or are interested in, the outcome of a decision are given the opportunity to participate. On the other hand Cuthbertson (1983) challenged the idea that lack of participation by a significant social group is a sign of failure of a public involvement program. He acknowledged that people might not be involved because *they are not fully aware of their self-interest* in an issue, but he asserted that it could equally be argued that *people are aware* and simply choose to focus their energies on other priorities. Moreover, Cuthbertson (1983) argued that the inclusiveness issue may be related more to the quality than to the magnitude of participation. In this regard, the magnitude of participation available to the local community in the Whangamarino may appear adequate insofar as there are a number of legislative methods that involve a formal public consultation process. However, the quality of this participation may be poor because people feel their concerns will not be seriously considered by the establishment and therefore choose not to participate (e.g. Jefferies, *pers comm.*; Buckley *pers comm.*; O'Carroll, *pers comm.*). Proposition Five and Six below, discuss some of the ways in which the quality of participation may be improved.

5.5.4 Property Rights

All ecological threats facing the Whangamarino Wetland are, either directly or indirectly, caused by anthropogenic activities occurring outside the legal boundaries at a sub-catchment or watershed scale. DoC appear to have had very limited success in trying to influence such resource management decisions outside of the protected natural area

boundary. *"It's difficult to require collaboration outside of a Protected Natural Area. DoC can only influence off-site by advocacy."* (Roxburgh, *pers comm.*)

The interviews with farmers within the Case Study indicated that there is an underlying tension between landowners and the resource management organisations within the Whangamarino. This may be because government seeks to control the effects of farming on wetlands and on water. Policies imposed by the local authorities restrict drainage of wetlands (for example, refer to Waikato Regional Policy Statement). This means the landowner cannot utilise the full economic potential of the resource for the benefit of the 'greater public good'. The RMA, in effect extends the Crown's influence over the use of private land by imposing direct controls on the utilisation of indigenous ecosystems on private land (Memon, 1993).

The concept of private property rights and traditional resource and land uses (such as agriculture) have significant influences on how protected natural areas are managed, particularly on how they are managed outside legal boundaries, which often do not respect ecological boundaries (Rösner & Dorrien, 1997). Traditionally, resource users, and farmers in particular, had usually claimed usually exclusive and free resource use rights in New Zealand wetlands. They are only now being affected by nature conservation measures outside protected natural area boundaries through the RMA Nonetheless, farmers have asked for financial compensation for the direct economic cost to them involved in protecting a natural feature for the 'greater common good'. In developing countries such compensation has been offered to local people for the economic losses caused by the establishment of a protected area. Alternatively, substitutes for resources to which access has been denied, such as grazing land, have also been provided (Wells *et al*, 1992).

There are some useful analogies to this approach for a New Zealand situation. For example, in recent years farmers have begun to demand compensation for loss of income for ecological significant areas on their property listed in district plans. Determining such compensation could be a complex issue because it needs to address who should benefit, by how much, and for how long (Wells *et al.*, 1992). Wells *et al.* (1992) recommends that addressing these questions requires identifying the appropriate community forum and making the case that continued compensation depends on effective conservation of the protected area. Whether compensation should even be considered, as much of existing land still in a natural has no potential productive value in any case. Furthermore, for

compensation to be effective, specifying the rights and obligations of the respective parties should be documented in a formal agreement.

It could be assumed that this re-definition of property rights would be perceived by the farmers as a significant threat to their private property rights. Yet the majority of landowners interviewed were happy to protect wetlands on their land, and many expressed regret at having drained so much wetland in their youth. All supported voluntary measures to assist with the conservation of wetlands on their property. And while most opposed regulations, others saw rules as necessary 'bottom lines' which controlled the "*one percent of landowners who have no regard for the environment.*" (Twining, *pers comm.*). Perhaps then, the tension is caused not by *why* the Crown agencies want to control landuse on private land, but by *how* they would control this landuse. A farmer adjacent to the Whangamarino expressed this view as:

> "I don't want to see the wetland destroyed or even touched, but for God's sake I wish DoC would manage it before poking their nose over the fence. They can't bring themselves to do it. They go into raptures about how wonderful it is but they just lock it up and do nothing. Efficient, effective, genuine management is what people would support. The weir is a standing joke around here. The sad thing is that at the moment the Whangamarino's an eye-sore and a criminal's playground. When they sort out their land maybe then they might have earned the right to tell me what to do on my land." (O'Carroll, *pers comm.*)

5.5.5 Common Property Rights & Community Initiatives

Another issue is one of *common* property rights. Where there is no individual or clear responsibility for resource use allocation or indistinct boundaries (e.g. legal, ecological, cultural, recreational) there is greater potential for misuse of those resources (Gunderson *et al.*, 1995). For example, a dominating common property right issue is the management of water via the Lower Waikato Waipa Flood Control Scheme. The scheme is managed by the Regional Council to protect agricultural and residential land from flooding (Russell, *pers comm.*) There are huge ecological disbenefits associated with the existing management of the scheme (Roxburgh, *pers comm.*). Yet the only reason for the flood control scheme's continued existence is that the additional economic costs associated with raising the stopbanks along the Waikato River, which would apparently negate the need for the Flood Control Scheme using Lake Waikere and the Whangamarino Wetland, are deemed too high (Russell, *pers comm.*). And despite years of DoC lobbying the Regional Council about the ecological damage caused to Lake Waikere and the Whangamarino

Wetland, the management regime is basically the same as it was in the 1960s when the scheme was built (Roxburgh, *pers comm.).*

This management regime must represent a classic case of the 'tragedy of the commons' as first described by Hardin (1968). In his seminal work, Hardin predicts the demise of any resource held in common where access to the resource is freely available to all. Hardin postulated an agrarian community where all citizens graze their livestock on a commonly owned field. The field can only support a limited number of animals before it is denuded and ruined. Hardin pointed out that because each individual farmer is acting as a rational being, they will always add more animals than the field can sustain in the long-term. The reason being is that there is an immediate benefit to that person by adding another animal, which far outweighs the more remote, less visible harm of degradation to the commons as a whole. What is more, the benefit from the additional animal belongs to the individual farmers alone, while the harm to the commons is shared proportionally across all its users.

Nonetheless, a surprising number of cases do exist in which users have been able to use shared or common resources, such as grazing lands, forests, fish, wildlife and water, sustainably. A number of long-enduring, self-organised and self-governed common property institutions have been analysed by Ostrom (1990). Examples from Ostrom include communal land tenure in high mountain meadows and forests in Torbel, Switzerland; common land management in Hirano and area villages in Japan; and the Huerta irrigation system in the Valencia area and elsewhere in Spain. Indigenous and tribally based customary management regimes have also proven to be successful over the long term (Ecologist, 1996).

The main lesson from the common property literature is that, given a resource management problem, a group of people often organise themselves to deal with it in a manner similar to the formation of a 'bucket brigade' to put out a fire in a rural neighbourhood (Ostrom, 1990). These common property institutions are found with all resource types, many of them non-traditional, covering a wide range of regions and cultures throughout the world. Specific institutions can arise in less than ten years, and may endure over centuries, while constantly evolving (Ostrom, 1990). In these institutions, one of the critical variables is the number of functional units. Many simple common property systems involve of the order of one hundred users or so (Ostrom, 1990). This self-organising ability at a local scale could be an ideal method of utilising local

community resources at a sub-catchment level in the Whangamarino. The community has already shown itself able to rally together in times of 'crisis', such as fighting the weir proposal or the Kopuku Landfill proposal (O'Carroll, *pers comm.*). Another working local example is the Motukaraka Drainage Scheme as a successful Landcare Project. It appears that when these individual owners organise themselves into a local community "action group", the private property right becomes a common property right and limited local community resources are combined in working toward a common goal. However, as van Rossen (*pers comm.*) reminds us: "*Landcare is about taking ownership of common issues. It's not an equal partnership whereas I see that collaborative management is.*"

O'Brien (1994) states that authorities, by enabling communities to promote local guardianship, involvement and education, will enhance the sense of community control of the project. Yet, residents in O'Brien's research felt that private ownership should be maintained. It was seen as being their responsibility. If council took over they would not be so interested as the problem will not be "theirs". Gordon Stephenson confirms this ownership and guardianship ethic to be absolutely essential in his long and successful experience with community initiatives in biodiversity conservation (*pers comm.*). He cites the success of Open Space Covenants through the Queen Elizabeth the Second National Trust as the outstanding national example of how this ethic and pride can be harnessed to achieve conservation of biodiversity on private property.

5.6 Proposition Four

Crown agencies understand what collaborative management entails, but there are political, personal, institutional and capital barriers to implementation.

> "DoC staff are pretty protective and reluctant to share the management of 'their' patch. Even now I am not so sure that they really accept the management committees in the Whangamarino or Kopuatai. But attitudes are changing at the Head and Regional offices. Unfortunately they still use OSH and resource/supervision issues as excuses rather than valid reasons not to allow further community involvement." (Lawrie, *pers comm.*)

5.6.1 The Culture of Crown Institutions

Do our natural resource institutions possess the capacity or have the will to capture the potential of collaborative management? Walters (1997) cited monitoring, lack of long-term commitment, inadequate funding, and a collection of "*management difficulties*" he

articulated as risk aversion, inability to admit failure, and perceived threats to professional interests, as key impediments to collaborative management in the United States. Crawford *et al.* (1997) noted that in New Zealand, regional and district planning are operating independently, with weak interorganisational coordination and variable policy directions. They concluded that lack of resources, turf protection and conflict generated by uncertainty in roles by each level of government are key reasons for this disconnection.

Roberts (1993) noted that, from a Canadian perspective, a major aspect of collaborative management is dealing with overlapping jurisdictions, within government, between claimant groups and between claimant groups and government departments, (federal/territorial, claimant group/claimant group). This also appear to be a potential issue in the New Zealand context based on comments made by the Case Study interviewees. The management of freshwater fisheries, which involves both DoC and MoF, is a useful example. MoF is presently developing a collaborative management approach to the preparation of the tuna (eel) management plan (see Chapter Four). At the same time DoC is proposing to ban all commercial eel fishing without any prior consultation with tangata whenua or commercial fishers. There appears to be some conflict between MoF staff and DoC staff in relation to this approach. MoF staff consider that a blanket ban of eel fishing in the wetlands is not supported by adequate scientific information (Pullan, *pers comm.*). DoC considers that there is a matter of principle at stake – no reserve should have resources made available for commercial exploitation (Roxburgh, *pers comm.*). Thus there is a fundamental difference in both community involvement and resource use allocation between these two Crown organisations.

There were other obvious uncertainties about which agency is responsible for wetland management issues outside the protected natural area boundary in the Case Study. Both DoC and Waikato District Council staff stated that Environment Waikato had the statutory mandate to deal with wetland issues on private land. The RMA is clear in terms of what responsibility Environment Waikato has in terms of the sustainable management of wetlands (i.e., Section 30, RMA). However, territorial authorities also have obligations. Section 31 implies that territorial authorities, as much as regional councils, have an obligation to give effect to Part II of the RMA in terms of protecting and sustainably managing wetland habitats. To quote Section 31(a) RMA - Functions of territorial authorities - states that:

> "Every territorial authority shall be responsible for ... the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district."

Differing functions within organisations can also cause internal conflicts, and constrain initiatives. These personal prejudices or world views of agency staff also appear to have a significant bearing on the success in the implementation of new initiatives, such as collaborative management. The management of the Lower Waikato Waipa Flood Control Scheme is a case point. An EW asset management engineer articulates his view of the situation:

> "There is potential for conflict but the RMA talks about social and economic effects as well as ecological, so there needs to be some balance. Most schemes were built in the 50s and 60s under the 1941 Soil Conservation Act. It was all about development of swamp into farmland. You can't have it two ways. If we want economic wealth we've got to draw a line on a plan. Landuse will either be pasture or conservation." (Russell, *pers comm.*)

As in the case of the CMS (DoC, 1996) and the National Strategic Business Plan (DoC, 1998), DoC policy gives clear guidance toward establishing closer links with local communities. However, individual DoC staff spoken to in the Case Study appeared to find a number of reasons to slow down and even stop the implementation of this policy. Some DoC staff expressed concerns or reservation about implementing a collaborative management mandate at a governance or management level. A selection of quotes from the thick descriptions follow :

- *"Basically, as far as the farmers are concerned, it's letting them know what going on and working with individuals on particular issues. They have no role in the direct management of the Whangamarino."* (DoC staff, *pers comm.*)
- *"I can see local community input for setting management objectives priorities for specific areas on an informal basis. Formally no – there would be too many individual interests to resolve"*. (DoC staff, *pers comm.*)
- *"The Peer Review Committee [for the Weir consent process] set up by our previous Regional Conservator was a waste of time and no help. The committee was a focus point for locals to have a bash at DoC and brought up frivolous issues such as mosquito population increases."* (DoC staff, *pers comm.*)
- *"It's difficult to require collaboration outside of a PNA. DoC can only influence off-site by advocacy."* (DoC staff, *pers comm.*)

These comments contrast sharply with Objective 4.2.3 of the Department's Strategic Business Plan: "*Conservation success depends on community support and involvement including constructive relationships with a range of important stakeholders. Community support and involvement depends on an understanding of conservation needs and realities.*" (DoC, 1998:p26)

These local staff concerns may be justified based on personal experience or they may simply be based on individual prejudices. But they also filter down an organisation from senior management. Both Ngakete and Nuttall (*pers comm.*) noted difficulties in dealing with senior Environment Waikato management in terms of attempting to build relationships at a governance level between tangata whenua and Environment Waikato. EW does not have the same extent of tangata whenua representation at a staff or political level as DoC. While there are four tangata whenua representatives on the Conservation Board, including a representative of the Kahui Ariki (Waikato Raupatu Claims Act 1995), there are none represented at a political level within the Regional Council as councillors. While DoC has a network of Kaupapa Atawhai managers throughout the country in senior management positions, EW has one junior staff member dealing with tangata whenua 'issues'.

5.6.2 The Role of the Fish and Game Council

Fish and Game appear to have a more open and receptive approach to working with Maori in a collaborative management role (Lawrie, *pers comm.*). Two reasons are likely for this. The Fish and Game Council is essentially a recreational hunting management group and has a long association and history with managing the hunting and harvesting of indigenous and introduced waterfowl, game and fish, so it does not appear to have the 'preservationist' ethic that DoC does. The other reason is that the Fish and Game Councils, at the grass-roots level, like local communities and marae-based hapu, are largely rural, or small-town based. They also appear to better relate to landowners and tangata whenua than urban-based Crown or Regional Council staff or politicians (Nuttall, *pers comm.*). Fish and Game have already established a number of collaborative management regimes throughout New Zealand with DoC, businesses (such as in the past ECNZ) and private landowners (Lawrie, *pers comm.*).

While not strictly an NGO, the Fish and Game Council have many of the advantages that characterise the ability of NGOs to bridge the gap between local community and government. Sinaavaiana (1993) suggests that another advantage of local NGOs over government agencies is that they are autonomous from the "*quagmire of business interests and political partisanship*" (Sinaavaiana, 1993: p122). The roles of non-government organisations (NGOs) can, therefore, be an essential element of successful collaborative management models (Wells *et al*, 1992). Some of the roles of NGOs may include:

- forming umbrella organisations, representing the interests of smaller, local groups at a national level;
- acting as intermediaries between government agencies and local people;
- providing technical advice and training for local management groups; and
- providing avenues for funding specific tasks or projects undertaken by local management groups (IUCN, 1997).

5.6.3 Resources and Capacity Building

Once a community initiative has been established, finding ongoing funds year after year may be the key constraint to its ongoing success. The capacity question is central to effective implementation of collaborative management (Shindler and Cheek, 1999). Helen Ritchie (1999) notes that the widely acclaimed Whaingaroa Harbourcare Land Care Trust is finding it increasingly difficult to raise funds each ongoing year. Currently, few organisational incentives for such resourcing or capacity building appear to exist in the context of the Whangamarino Wetland. A landowner involved with the successful Waitomo Land Care Trust initiative stated that the Trust would most likely disband in 2000, as the Regional Council has reduced funding, and funds from other organisations are becoming very difficult to access (Kay, *pers comm.*).

Landcare initiatives do receive a substantial amount of funding from EW, yet progress appears to be slow. The manager of the Landcare programme for the EW stated that

> "EW has invested a lot of dollars into Landcare projects in terms of staff time. I am not sure we have had the most cost-effective return. There is still only a very small number of Waikato farmers involved (500 out of 16,000). There is a lot of inefficiency in working with large and geographically diverse groups and communities. It is very difficult to measure success. There is a very slow implementation time frame. I believe Guy Salmon may be right when he said if we relied only on Landcare groups it would take 2-3 centuries to fence all of our streams." (van Rossen, *pers comm.*).

At issue then, is the ability for these efforts to be sustained in any meaningful way in the long-term. In a tight financial world, community resources need to be harnessed to help meet the objective, as State funding is never likely to be enough (O'Brien, 1994).

5.6.4 Racism

Manukau (*pers comm.*) considered that racism on the part of the Crown agency and local authority staff is a significant barrier to inclusion of Tainui in the management and governance of the Waikato River (and by implication the Whangamarino Wetland). While no racist comments were made by any of the Crown agency staff interviewed, it was noted that tangata whenua involvement in the governance, management or monitoring of wetlands is still limited. The obvious indication of this is that tangata whenua groups are not involved in most governance or management decisions made by Environment Wikato, DoC, Waikato District Council or the Fish and Game Council. This perceived racism extents to some established environmental NGOs as well. The Royal Forest and Bird Society representatives interviewed express concern about Maori wanting traditional gathering and hunting rights involving threatened indigenous species: "*I am nervous about Maori involvement, particularly with endangered species management, which is so critical. They haven't got the skills or knowledge.*" This statement may be based on genuinely held believes that Maori do not have the know-how (or perhaps even the suitable conservation 'ethic') to be entrusted with indigenous species management. Other, however, might consider it to have racist overtones.

Sinaavaiana (1993) suggests that this 'racism' is part of very different and deeply embedded worldviews and assumptions held by 'western' communities and indigenous Pacific communities. These differences can be defined as a number of differences in each culture's normative views. This is shown below as Table5.2.

Western/ 'government'	Indigenous/ 'community'
1. the individual	group and relationship
2. 'private' property	communal 'ownership' *viz* stewardship/relationship
3. ability to view/react to others as isolated parts or roles versus total personality	view of the others as whole & indivisible
4. humans as separate from/ superior to nature	humans as interrelated with nature
5. objective/impersonal	subjective/personal
6. materialistic/ tangible	spiritual or intangible
7. direct, confrontational communication styles	circumspect, indirect communication style
8. centralised mode of society's organisation	decentralised, factional modes of social organisation

Table 5.2 Comparison of Worldviews (after Sinaavaiana, 1993: p121)

5.6.5 The Role of Women

International research suggests that although women are active participants in natural resource management groups, they are not well-represented in positions of decision making within those groups (Brasell-Jones, 1998). Brasell-Jones (1998) investigated the experiences of women in Landcare groups in twenty-two New Zealand situations. She found that women are under-represented at the decision-making level of collaborative management and disproportionally represented in secretarial roles. She suggested the barriers to women's involvement in decision making are very subtle, in terms of power inequalities between the males and females and the traditional role each plays in public interaction.

At an institutional level, Brasell-Jones also suggests there is a lack of gender awareness within the environmental planning profession and a lack of importance placed on gender issues in planning in New Zealand. These constraints are a product of the wider institutional construct in which collaborative management groups are set. Brasell-Jones states th

> "Women's needs and interests are not addressed by planners because of a culture which does not currently adequately value a holistic and participatory approach to natural resource management, as well as to lack of training at the tertiary level preparing planners on how to plan to meet women's needs and interests." (Brasell-Jones, 1998 :p17)

Yet women appear to have a wider view of environmental issues than men. Men tend to focus on economic, scientific and technical issues, while women explore the connection between the environment, community sustenance and political justice. Notably, these are usually issues which affect the health of their children and family (Brasell-Jones, 1998). One landowner interviewed held similar views on the role of women: *"One thing I've noticed also, is that you should always have women on the committee. Because the men do all the talking and the women do all the work. Men are great philosophers, but not great doers."* (O'Carroll, *pers comm.*)

5.7 Proposition Five

Skilled leadership, policy flexibility and a common vision amongst all parties involved will improve the quality of biodiversity outcomes

> "Fish and Game, surrounding farmers and DoC all do pretty much their own thing with no one looking at the whole system. It is to do with ownership of the place. We all own the management of the Whangamarino. If you got all these parties sitting round thrashing and working through the problems and given time to work it through, they will come to the right conclusion. You can't force solutions." (Gordon Stephenson, *pers comm.*).

5.7.1 Leadership

To combat the growing ambivalence toward bureaucratic institutions, adaptive management will require leadership that is viewed as sincere, open, and honest (Shindler and Cheek, 1999). For example, H. Ritchie and van Rossen (*pers comm.*) found that people identified Environment Waikato Landcare efforts as successful when dedicated, open-minded individuals were willing to try more innovative approaches suited to a particular community's circumstances. Productive interactions usually begin with agency staff who understand the need to speak the public's language and learn about people's concerns and ideas, rather than simply trying to educate people about agency programs (Stephenson, *pers comm.*; H. Ritchie, *pers comm.*). Balks (*pers comm.*) asserts that: "*Collaborative management is feasible but a key person is required and that energy has to be sustained over a long period of time.*"

Many effective public processes can be traced to the presence of one or two agency individuals who are not only good leaders, but also demonstrate genuine interpersonal skills (Andersen, 1999). In the case of the Whangamarino Weir consents, it appeared that

the Regional Conservator of the time was respected and felt to genuinely listen to local farmers concerns (O'Carroll; Buckley; Cotman; *pers comm.*). Gunderson *et al.* (1995) noted it is difficult to institutionalise leadership and thus, productive collaborations. This may be particularly true when resource managers are placed in a role which requires people interaction without adequate attention having been paid to whether they possess the requisite skills.

5.7.2 Agency Staff

Social values are at the root of many environmental conflicts, but managers are traditionally unprepared to deal with value-laden questions or to facilitate public discourse about difficult choices (Gunderson *et al.*, 1995). Shindler and Cheek (1999) note three typical shortcomings in resource professionals that contribute to the problem. First is an attitude of "we know best," in which professionals doubt the validity of public input and feel that the public lacks sufficient knowledge, as indicated in discussions with Waikato Area Office DoC staff. Second is a feeling that resource professionals are above politics, as expressed in discussions with Waikato District Council staff. Third is the use of technical jargon, which discourages the public's expression of personal values when presenting views about resource management. This was a problem Gordon Stephenson (*pers comm.*) noticed of DoC staff during his time on the Waikato Conservation Board. It was also expressed as a problem by landowners and tangata whenua alike (Ngakete, *pers comm.*; P. Buckley, *pers comm.*)

In contrast to a resource professional's (technical) response to a situation, a citizen's reaction may be emotional and expressed quite differently (Shindler and Cheek, 1999). In this respect John Ash (*pers comm.*), of the Waitomo Landcare Trust, talks about people's "passion" in what they are doing, which Gordon Stephenson (*pers comm.*) equates to their close association with the area they live in. Agency personnel need to recognise these differences, and the legitimacy of citizens' responses based on feelings, in order for effective communication and public involvement to occur (Shindler and Cheek, 1999).

It is evident that agency staff with good interpersonal skills and sympathetic attitudes are needed in positions where public contact is essential. Environment Waikato appear to have recognised this need at a 'coal-face' level (van Rossen, *pers comm.*). It appears to be less recognised in DoC, particularly at the field staff level. These staff dealing with

protected natural areas need to have good technical skills, and are not necessarily expected in their training to have to deal with people. Nevertheless, even without formal training, demonstrating basic communication skills often proves valuable in their day-to-day work.. For example, Shindler and Cheek (1999) found that citizens preferred leaders who were seen as regular, honest people rather than polished professional facilitators. Farmers in the Whangamarino strongly endorsed this view. For example Peter Buckley (*pers comm.*) expressed concern at the number of DoC staff he had dealt with who had never been engaged in any field work, and how he related particularly well to one Waikato DoC officer who was "*practical and down to earth*". Another Whangamarino farmer stated that he would not undertake any more stream-side planting on his property after dealing with an Environment Waikato staff member who had an "*arrogant and off-hand manner.*" (Jefferies, *pers comm.*). Stephenson (*pers comm.*) noted that a genuine communication style often results in better understanding of natural resource issues, increased support for decisions, and greater ownership in a project by the affected community.

There appears to be a common message in these ideas, one that was recognised by both agency and public participants: "*basic organisational skills, attention to detail, commitment to constituents, and good leadership - all things that people normally expect from our natural resource agencies - often mean the difference between success and frustration.*" (Shindler and Cheek, 1999; quoting Neburka 1997: p19). In turn, better relationships between agency and community will result in better conservation outcomes.

5.7.3 Management Flexibility

In New Zealand's Western dominated society, rationality and empirical science are highly valued. Only those values that can be empirically measured are counted as 'real' (Sinaavaiana, 1993). But a paradox exists. Those social values that are the most difficult to measure and define are the very ones that appear to be of increasing importance in resolving complex resource management issues (Shindler and Cheek, 1999). As a consequence, it is unlikely that we can solve the natural resource debate by simply counting better. The freedom to attempt innovative public involvement strategies in policy and management seems essential to making adaptive management work (Kay & Regnier, 2000).

A local farmer was very disappointed that his planting of flax along a 5 km tributary of the Whangamarino did not receive any financial assistance from Environment Waikato, because the funding is only distributed to projects which have educational value. Projects that have ecological value alone do not receive funding on individual properties (Jefferies, *pers comm.*). This policy rigidity (as well as the attitude of the Council staff who visited him) meant that the landowner is not now willing to complete the protection of the remaining riparian margins his property.

Flexibility in citizen-agency interactions seems particularly relevant in the context of collaborative management approaches. For Crown agencies, being flexible often means straying from traditional approaches and allowing local people the freedom to solve local problems and serve local priorities. For example, Shindler and Cheek (1999) noted that in local communities affected by forest harvesting in the US, success is often measured by the extent to which their own ideas and concerns are given serious consideration and where the agenda is not driven by agency politics or national debates. However, citizens in these forest communities described a more typical approach as the "*three I's of federal public involvement: Inform the locals, solicit their Input, then Ignore them.*" (Shindler and Cheek, 1999: p5).

The Chair of the Motukaraka Drainage Scheme tells a tale with some useful analogies:

> "I was involved in Tomorrows Schools as the Chairperson for the local School Trust Board. Basically we rewrote the rules supplied to us by the Ministry of Education because we were not happy with them. The Ministry representative saw that what we had done was not to national policy but that it worked for our local school. So he wrote recommendations to the rules we had developed, which were approved by Head Office. Instead of the Ministry of Education enforcing the letter of the law, they took into account our local school's particular needs and circumstances. I think that type of management style needs to be allowed to happen in the Whangamarino Catchment is long as the end outcome is the same." (Twining, *pers comm.*).

5.7.4 A Common Vision

Borrini – Feyerabend (1996) suggests that collaborative management stands on the principle of common good. By this it is meant that: "*the participants need to develop common goals that are decided collectively and, if possible, a shared vision or visions that are mutually acceptable.*" (Sunde, *et al.*, 1999: p83).

Many of those interviewed commented that collaborative management or community initiated projects were much more successful when the purpose was defined and an anticipated end product, or vision, was identified at the outset – *"You need a set of objectives between the parties, such as a memorandum of agreement. You are more likely to achieve the objectives if they are written down. It needs to be very explicit about what each party contributes."* (van Rossen, *pers comm.*). The two fundamental organising strategies for collaborative management are:

- defining roles; and
- setting good goals and objectives. (Shindler and Cheek,(1999)

O'Brien (1994) suggests that the vision or goals can be achieved by:

- "Working towards a structuring of tasks so that they may provide for a positive experience and sense of accomplishment", i.e. incorporating the notion of 'small wins',
- Working with the energy of the community considering specifically what they are motivated to do and what it is that they want to accomplish."(O'Brien, 1994: p26)

In order to achieve O'Brien's key criteria, collaborative management should begin with the establishment of clear and unambiguous management objectives and the formulation of performance indicators as benchmarks against which the effectiveness of management can be assessed (van Rosen, *pers comm.*). Borra-Feyerabend (1999) states that when these management objectives are formulated it is vital to recognise the validity of different values, interests and concerns involved of the local communities.

A path of how this could be developed is shown as Figure 5.3. The first step is to develop a formal binding document, such as a memorandum of agreement, preferably including legal safeguards. Once the terms of reference have been established, the visions and objectives of the arrangement can be negotiated. This allows for the creation of the management regime, and hence the implementation methods, to achieve the objectives of the partnership. The last box suggests that eventually the legal and institutional framework in which the partnership has been created will have to be formalised in law. Pinkerton (1999) considers that formalising the link between the local partnership arrangement and the national institutional framework is essential if implementation measures are to be successful in the long term.

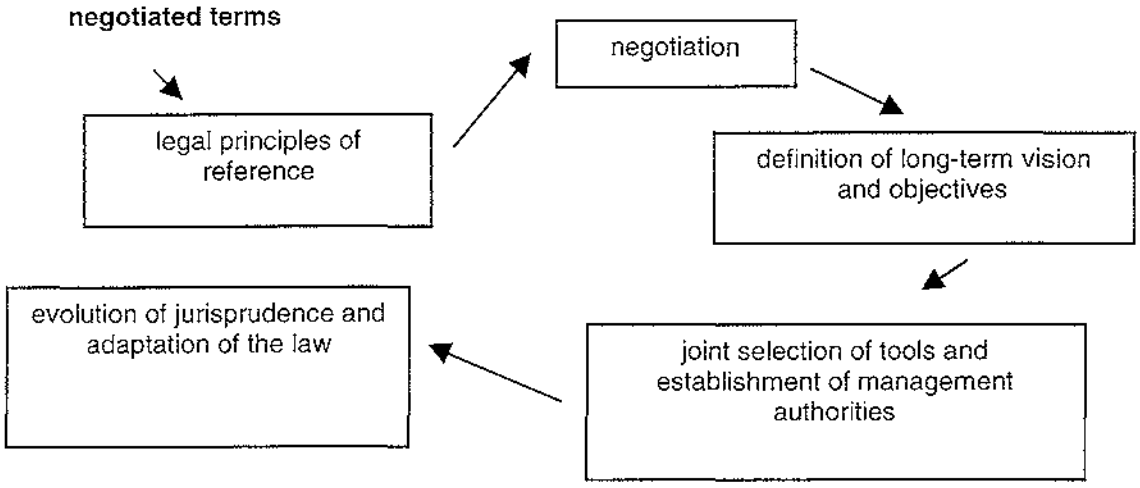


Figure 5.3 The Different Phases Involved in Establishing a Conservation Partnership (adapted from Borrini – Feyerabend, 1999)

In this way, the stakeholders in a collaborative management arrangement can function in a pluralistic fashion where autonomous and independent groups freely interact and collaborate on management issues on the basis of different views, interests and entitlements, while working toward achieving a 'common good' vision. As O'Carroll (*pers comm.*) stated:

> "Forget about process – we need a vision and goals. That's what we go for. We won't get hung-up on process. And that was the key to our success with the Kopuku Landfill committee. I've been in many committees where the whole thing gets bogged down in process rather than at looking at what you want to achieve."

5.8 Proposition Six

Incorporating local and indigenous knowledge, ideas and experience will produce better biodiversity conservation outcomes and monitoring processes, and build trust and support for natural resource institutions.

> "In its cultural aspect, the community is an order of memories preserved in instructions, songs, and stories, both consciously and unconsciously. A healthy culture holds preserving knowledge in place for a long time. That is, the essential wisdom accumulates in the community much as fertility builds in the soil." (Berry, 1997: p149).

5.8.1 Indigenous Knowledge

Indigenous knowledge is local knowledge that is unique to a given culture or society (Warren, 1987). According to Rajasekaran (1993), indigenous knowledge is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. Haverkort (1991) considers that indigenous knowledge is the actual knowledge of a given population that reflects the experiences based on traditions and includes more recent experiences with modern technologies.

This indigenous knowledge is dynamic, changing through indigenous mechanisms of creativity and innovativeness as well as through contact with other local and international knowledge systems (Warren, 1991). They are often elaborate, but are adapted to local cultural and environmental conditions (Warren, 1987). Indigenous knowledge systems are tuned to the needs of local people and the quality and quantity of available resources (Pretty and Sandbrook, 1991). They pertain to various cultural norms, social roles, or physical conditions. Their efficiency lies in the capacity to adapt to changing circumstances. According to Norgaard:

> "Traditional knowledge has been viewed as part of a romantic past, as the major obstacle to development, as a necessary starting point, and as a critical component of a cultural alternative to modernisation. Only very rarely, however, is traditional knowledge treated as knowledge *per se* in the mainstream of the agricultural, development and environmental management literature, as knowledge that contributes to our understanding of agricultural production and the maintenance and use of environmental systems." (Norgaard, 1984: p7).

Sinaavaiana (1993) considers that there is an essential correlation between biodiversity and indigenous knowledge. Sinaavaiana states:

> "we simply cannot have the former without the latter. The keys we are looking for to solve environmental (and other) crises of our time lie embedded within the wisdom and ancient practices of indigenous societies." (Sinaavaiana, 1993: p119).

A great deal of information has been compiled in recent years on traditional ecological knowledge both in New Zealand and internationally. From sub-arctic Amerindian hunters and Pacific Island fishermen to Scandinavian herders and Amazon horticulturists, generations-old adaptations and knowledge help various groups survive in the long-term (Berkes & Folke, 1993). Gadgil (1987) observed that human cultural diversity and

biological diversity go hand-in-hand as prerequisites to long-term societal survival. Diverse cultures hold the key not only to diverse adaptations to the environment, but also to a diversity of worldviews, philosophies, and ethics that underpin these adaptations (Berkes & Folke, 1993). Different human societies have elaborated a great diversity of ways in which traditional resource use practices were organised and natural capital used without depletion. This diversity represents a pool of social system adaptations spanning many millennia: "*...a 'library' from which a new science of sustainable resource use can be synthesised from the best of traditional and scientific knowledge*" (Berkes & Folke, 1993: p12).

For Europeans, natural resource management is portrayed as a science-based, strategically directed and goal-oriented exercise aimed at achieving specific ecological outcomes (Anderson, 1999). In contrast, Anderson suggests, using landscape burning by Aboriginal people in the Northern Territory as a case study, that management is more of an emergent property, diffusely arising from many uses of fire that serve social, cultural, and spiritual, as well as ecological, needs. He states that Aboriginal knowledge is acquired through tradition and personal experience of being part of the landscape, rather than through the detached scientific paradigm of hypothesis testing. In the same way it is evident that the Whangamarino Wetland is seen by Maori as an inseparable part of the Waikato River, and also an inseparable part of Waikato Iwi's social, cultural and spiritual needs (Ngakete, *pers comm.* and Manukau, *pers comm.*).

As shown in Chapter Four, Maori knowledge, or matauranga Maori of the Whangamarino Wetland is now limited to the personal experiences of perhaps two or three surviving kaumatua (Ngakete, *pers comm.*). It appears that almost all of matauranga Maori relating to the Waikato wetlands has been 'lost'. An analogy that can be used to explain the reason for this was described to the inquirer thus:

> "Imagine if an alien race from outer space conquered humans today. Then they outlawed or actively discouraged all science related education, research and practice for the next 150 years. Also, the aliens would promote amongst the humans that all scientists are evil witch doctors. Obviously, western science would be unlikely to survive, or only survive in a subculture environment. And that is precisely what has happened to Matauranga Maori in the past 150 years." (Nuttall, *pers comm.*)

In the same respect the intellectual knowledge base of the Maori has either been almost totally destroyed or no active provision has been made for its protection. In either case the

Crown has an obligation to assist in restoring Matauranga Maori. Sunde *et al.* (1999) suggest two main ways in which this can be done:

- Western based science and management systems must legitimise Maori knowledge and recognise it as a valid basis for decision making; and
- The Crown must facilitate capacity building, in order to rebuild the skills, knowledge and understanding lost.

5.8.2 Inclusion of Local Community and Indigenous Knowledge

Local people, including farmers, labourers, women, and service industry persons are the custodians of local knowledge systems. Moreover, these people are well informed about their own situations, their resources, what does and does not work, and how one change impacts on other parts of their system (Butler and Waud, 1990).

Local knowledge systems can provide the following benefits:

- Adaptive skills of local people usually derived from many years of experience, that have often been communicated through "oral traditions" and learned through family members over generations (Thrupp, 1989).
- Time-tested agricultural and natural resource management practices, which pave the way for sustainable agriculture (Venkatratnam, 1990).
- Strategies and techniques developed by local people to cope with the changes in the socio-cultural and environmental conditions (e.g. O'Carroll, *pers comm.*).
- Practices that are accumulated by farmers due to constant experimentation and innovation (e.g. P. Buckley, *pers comm.*).
- Trial-and-error problem solving approaches by groups of people with an objective to meet the challenges they face in their local environments (Roling and Engel, 1988).
- Decision-making skills of local people that draw upon the resources they have at hand (e.g. Twining, *pers comm.*).

Despite a number of successful community based initiatives by DoC in the Waikato Conservancy, most Crown agency staff and scientists interviewed in the case study appeared to be dismissive of local knowledge. Yet there is much to be gained from the observations of people living 'on site' for many years. Unfortunately, it is often apparent that local knowledge is not credited as valid by agency staff or scientists:

> "Local knowledge should not be totally dismissed as it is now. It should be part of the overall management. Scientists have to believe in local knowledge and process those comments in a form that makes them relevant. But in any case, as I understand more about the science its pleasing for me to see my initial 'dumb farmer' observations are being validated by science." (Twining, *pers comm.*)

While the rural community in the Whangamarino catchment is willing to help with the protection of the wetland, they also expect that something will actually result from their efforts. Currently they express a great deal of frustration in the way both DoC and the Regional Council take no notice of their suggestions and observations or the 'double standards' EW apply when dealing with DoC and the Fish and Game Council (O'Carroll, *pers comm.*). Shindler and Cheek (1999) consider that an essential, overriding principle in any public process is that citizens should be able to see evidence that their comments or suggestions are actually incorporated into decisions. At a locality level Shindler and Cheek noted that local people have a direct, personal interest in recognising problems and, thus, are often able to bring intensive, detailed knowledge of specific conditions to the management of an area. When people are able to trace the steps used in coming to a decision, understanding improves and they are more likely to support the outcome. This support from the community would be essential in the management of the Whangamarino Wetland, because farming activities in the catchment as a whole have direct effects on the ecology of the wetland.

The above statements clearly illustrate that local and indigenous knowledge systems are invaluable, diversified, and comprehensive, although this is not always the perception among outsiders (Thurston, 1992). They are often overlooked by western scientific research and development because of their oral tradition (Warren, 1990). Hence, by facilitating these systems, outsiders can better understand the basis for decision-making within a given society. Furthermore, by comparing and contrasting indigenous or local knowledge systems with the scientific technologies of research institutions, it is possible to see where technologies can be utilised to improve local systems (Warren, 1987).

Rajasekaran (1993) suggests that policy actions should give attention to actively preserving this diversity of knowledge. This can be done by documenting, incorporating, and disseminating indigenous knowledge and by creating awareness and supporting projects among local populations. O'Brien (1994) notes in the New Zealand context, that while the ecological values of riparian margins are well understood, the community values

of riparian areas are less well understood. She suggested that guidelines to maintain and protect the ecological values of riparian areas need to be supported by sound analyses of the social implications of different management scenarios. This will require an understanding of how riparian areas are perceived by the community, and what benefits are to be gained from these areas, whether by users, landowners or the general public.

One significant improvement in the relationship between local government and tangata whenua would be recognition of iwi management plans as 'higher' level documents, similar to district or regional plans. These documents are currently being prepared by a number of iwi, and provided to local government, but little action in terms of incorporating the policies of these plans in resource management processes is apparent to date (Nuttall, 1999). Iwi or hapu management plans provide a framework for indigenous resource management and development. The proactive approach taken by iwi/hapu in preparing these plans should enable local government to provide more effectively for the concerns of tangata whenua. This in turn has advantages for both tangata whenua and other parts of the community, as a clearer understanding of positions is possible. Iwi management plans could also act as policy documents to address issues associated with the transfer and administration of powers and functions under section 33 of the RMA.

5.8.3 Conflict Resolution Processes

As the Case Study highlights (summarised as Table 5.1), there are many disagreements and issues which would have to be acknowledged or resolved between the various parties. Dealing with conflict such as this has been the focus of considerable research and analysis in recent years (e.g. Moore, 1986; Carpenter & Kennedy, 1988; Benveniste, 1991; Forrester, 1989; McClendon, 1993; Williams, 1995). Moore (1986) suggests that there are four basic tools used in a dispute resolution process:

1) Framing the issue
2) Coalition building
3) Conflict analysis
4) Joint fact-finding

Assisted negotiation may be required for the Whangamarino because in this multi-party situation the disputes involve emotional, psychological and financial stakes, which are too high for the stakeholders to reach by unassisted negotiation (Williams, 1995). The stances

of these parties may to be so entrenched that the substantive involvement of a mediator also requires confidential interaction with the parties (Williams, 1995).

The mediator should work toward an 'all-gain' solution. All-gain agreements can only be achieved when the parties stress the cooperative, not just the competitive, aspects of their relationship. The mediator must control the negotiations so that 'log rolling' does not occur, which will lead to unstable politically based compromises. Thus, four characteristics of a good negotiated settlement are fairness, efficiency, wisdom and stability (Carpenter & Kennedy 1988). In order to determine fairness, the mediator will need to evaluate the attitudes and perceptions of the parties most affected. In order to foster negotiations based on wisdom and stability the mediator will need to:

- Establish trust and credibility early on. To this end, it will be most important for the mediator to gain some 'mana' with the tangata whenua.
- Grasp an idea of people's interests as opposed to their positions. The position a person or group takes is often determined by a combination of motives rather than a single objective.
- Allow plenty of time for the parties to develop some form of working relationship. It may be that the hearing could be delayed if the mediator felt that real progress was being achieved through the mediation process.
- Be aware of power and information inequalities between the various parties. The mediator will have to make some allowances for 'empowering' the less well resourced parties. (after Williams, 1995)

Inevitably trade-offs will have to be made. A fair process may not be enough to guarantee an 'all-gain' outcome when dealing with 'subjective' and 'emotional' community concerns and a 'fixed pie' in relation to resource distribution. As long as the mediator ensures all parties are represented in open discussions about these tradeoffs, the parties should feel they have ownership both of the process and the final agreement (Crawford, 1994).

5.8.4 Trust and Credibility

Shindler and Cheek (1999) consider that issues of trust and credibility are of particular concern for the parties involved in a collaborative management initiative. While agency staff, and particularly managers, are part of a larger institutional culture that influences their ability to provide effective leadership on the local level, every public interaction is

influenced by a social history tied to previous encounters with that agency or agency representative (Gunderson *et al.*, 1995). Interpersonal trust is characterised, in part, by an individual being able to respect what another says and to believe that the other person is interested in joint gains. It is not just personal gains which are essential to the functioning of groups and, ultimately, to decision-making (Shindler and Cheek, 1999).

This interpersonal trust appears to be extremely important for farmers and tangata whenua within the Whangamarino Case Study:

> "Most DoC bureaucrats should never be allowed near the public – too cunning too smart. But Stella [ex Waikato Conservancy Regional Conservator] was very good – all sweetness and smiles and she would listen to what you had to say. She might not necessarily agree with you but at least she would listen. She did a lot to repair the harm DoC did to the farmers. Anyone who wanted to talk to her could. She was always available for discussion. She wasn't saying I have the right by legislation to tell what you can and can't do." (O'Carroll, *pers comm.*)

Steel *et al.* (1998) found that members of rural communities were more likely to trust the information provided by local resource managers, whereas urban residents preferred information from university scientists. Such findings may be useful in guiding collaborative management arrangements across different settings. Ostrom (1990) acknowledged that achieving trust in the complex, conflict-ridden natural resource environment requires considerable time. From an organisational standpoint, staff empowerment to achieve results often depends on internal support from supervisors and co-workers. The clarification of roles and agency commitments is particularly important to front-line personnel who are being asked to engage the trust of the community.

Steel sums up the effort needed to give effect to 'trust':

> "In order to generate change authorities need to overcome the "them and us" attitude which has been accentuated in the past (by over-regulation), the community is implicitly asking for a partnership that will require change on both sides (O'Brien, 1994). Building public trust is difficult; it takes great patience, requiring many opportunities for parties to interact, to get to know one another, and for participants' voices to be heard." (Steel *et al.*, 1998; p4) .

And notably, the local farmers interviewed in the Case Study realised more frequently than others, that trust and respect are the key, and an important bridge to the successful implementation of collaborative management within the Whangamarino Wetlands.

Figure 5.4 Commercial Eel fisherman working in the Whangamarino River

Figure 5.5 Elvers (juvenile eel) attempting to scale the Karapiro Dam

Chapter Six Conclusions

6.1 Key Findings

6.1.1 Defining the Context

Biological diversity is a concept which describes "*the variety, distinctiveness and complexity of all life on earth*" (Lister, 1997). It is a concept derived from the scientific discipline of ecology, which attempts to understand the biophysical processes that sustain life on the planet and investigates how these processes interact with societal factors (Odum, 1983). For humans the primary role of biodiversity to humans is to make available the biological resources and ecological functions which provide the productivity services to economies and, ultimately, human existence. The rapid and ever increasing loss of biodiversity is overwhelming. This loss is largely undisputed as one of the key issues facing the survival of the human race. The United Nations General Assembly has stated that biodiversity depletion is one of the nine serious threats facing the planet (Barbier *et al.*, 1994).

Legally defined protected natural areas have formed the basis of most biodiversity conservation in Western countries for the past one hundred years. The use of this 'national park' approach, combined with rigid rational comprehensive, 'command and control' mechanisms appear to be insufficient to conserve biodiversity. This Western positivist approach has also created barriers between indigenous peoples, local communities and the controlling authorities. Biodiversity conservation of protected natural areas is neither an ecological problem, a social problem, nor an economic problem. It is an integrated combination of all three. Effective biodiversity conservation should simulate the adaptive capabilities of people and nature. Adaptive, ecosystem management is offered as a framework. It is based on a collaboratively developed vision of desired future ecosystem condition that integrates the ecological, economic and social factors affecting a management unit defined by ecological and not political boundaries (Szaro *et al.*, 1996).

6.1.2 Collaborative Management – a Realistic Alternative?

The Whangamarino ecosystem is a product of the natural systems and human communities that have evolved over time, forming distinctive landscapes derived from a synthesis of society and ecology. This has occurred where ecology and society driven changes caused

either chronic or acute crises, from which both systems have had to adapt in order to survive. The management of the legally protected portions of the Whangamarino cannot be conducted in isolation of society or the wider ecosystem energy flows that affect it.

New management approaches, rather than 'command and control' regulatory methods, are required to address these issues. A model of an adaptive ecosystem management approach is suggested, where collaboration with all parties is an integral part of the process. This model attempts to link science and community together in order to establish management scenarios, achievable by working toward a common vision. The key societal realms involved can be conceptualised in terms of governance, management and monitoring. New governance, management and monitoring contexts are needed to cope with these complex interactions. The public, and in particular the local community, needs to be included in this approach as a prerequisite for its success.

The Conservation Act and the Resource Management Act allow for extensive public consultation at the policy development stage. However, the prescriptions for this consultation do not necessarily translate into direct provisions for participation in management by all interests (refer to Figure 2.3 and Figure 2.4). The consultation processes of these Acts tend to be inflexible, rigid, formal and ultimately exclusionary. Despite more than twelve years of legal and institutional mechanisms, the biodiversity of the Whangamarino Wetland continues to decline and Maori and the local community do not consider themselves to be part of the decision making process. This has led to conflict between the local community, who rely on the use of the wetland's resources for survival, and DoC who wish to restrict resource use. A lack of goodwill between the DoC and the local community has meant that attempts by the DoC to achieve conservation management initiatives within the protected natural area, or on private land within the subcatchment, have been resisted by the community. Maori have been almost totally isolated from management of the wetland since the 1860's. Further isolation from the natural system occurred when the Lower Waikato Waipa Flood Control Scheme was instigated. Large areas of Maori owned wetland was purchased by Pakeha and drained for farmland. In recent years, changes in law have allowed Maori to reassert, to some degree, their kaitiakitanga and traditional relationships through the Treaty of Waitangi provisions in the Resource Management Act, Environment Act, Conservation Act and the Waikato-Tainui Raupatu Settlement Act. However, all those spoken to considered that present tangata whenua involvement is still inadequate.

Collaborative (co-management) may be the process, which allows for an participatory, ecosystem approach to biodiversity conservation of a 'protected natural area'. Collaborative management has been used loosely to describe a variety of institutional arrangements encompassing consultation through to the devolution of administrative, if not legislative, authority and multi-party decision-making. Collaborative management is essentially a form of power sharing, although the relative balance among parties, and the specifics of the implementing structures can vary a great deal. The IUCN (1997) define the process of collaborative management as a "*normalisation of local involvement*". It describes the process as:

> " a clear empowerment of the local people to mange the resources in their area. At a local level, the recognition of specific responsibilities and rights is endorsed through the adoption of bylaws and formal agreements. In some countries, legislation has been passed to specify the procedures and responsibilities. In order to work effectively, collaborative management has to be strengthened by building the capacity of these local institutions and groups to take sustainable management decisions and to implement them based upon sound technical and social advice."

There are bridges to the implementation of collaborative management already in place in the legislation, which are little utilised at present. The RMA and Reserves Act have provisions that allow for either power sharing or complete handover of management to local communities or tangata whenua. The Treaty of Waitangi is the bridge that provides the constitutional framework on which partnership between the Crown and Maori can be formalised at a governance level. At a local level, collaborative arrangements could involve hapu, farmers, recreational users (e.g. through the Fish and Game Council), commercial users (as MoF is attempting to implement at present), urban dwellers (e.g. through Forest and Bird), with DoC, MoF and the local authorities providing technical and resource support. There are many informal links now in place, such as Landcare, the Waikato Wetlands Forum and the Wetland Centre Trust. These informal arrangements could be integrated and formalised to make this happen.

6.2 Reflections on the Research Findings

6.2.1 Clarifying the Roles of the Players

Gunderson *et al.* (1995) describe six critical roles of various players which exemplify functions of each of them in a natural resource context, using the Everglade Wetlands as a case study:

1. The creatively destructive role of public interest groups, which can expose central government failings.
2. The alerting role of loyal heretics within agencies.
3. The importance of 'grey eminence's' - respected, wise individuals who synthesise, integrate, and communicate information.
4. The redefining role of informal collegia of natural scientists, engineers, and social scientists operating outside formal institutions.
5. The strategic design and research role of institutions.
6. The democratic political role of citizens.

6.2.2 Politics, Power and Money

The propositional statements derived from the data in the Whangamarino Case Study suggest the aforementioned six roles are critical in the context of this inquiry. A significant weakness of the Adaptive Ecosystem Approach model presented as Figure 4.3 is that it does not deal with power relationships between these roles and its applicability requires caution for this reason. Power is typically absent from temptingly elegant adaptive or collaborative management models, but always present in the reality of political systems. Power can be variously conceived as a constructed collective output of society (the power of the electorate); as control of individual or collective action possibilities; and as an ability to 'do' something, as opposed to controlling things (Pritchard and Sanderson. 1999). The roles of people in this Case Study relate to the political interactions between the players and how each role is perceived by those in power. Professor James Ritchie has stressed that collaborative management is not about 'Landcare' programmes or planting trees. Collaborative management is about creating structures that empower people. Before any initiative is started, it is necessary to settle what the power relations are as tangata whenua, the Crown and landowners perceive them. It is also necessary to understand how these groups want these power relationships institutionalised (*pers comm.*).

A core argument of this thesis is that adaptation or even radical change of the positivist and regulatory paradigm prevailing in present institutional frameworks is critical if collaborative management arrangements are to succeed in achieving biodiversity conservation. Whether these changes should involve refinement of current directions or a radical change in the overall approach will be open to ongoing debate. From the perspective of the research of this thesis, what is apparent is that unmodified progression

along the existing dominant 'command and control' regulatory paradigm will be insufficient to achieve long term and sustainable biodiversity conservation. More importantly, examination of the societal landscape of the Whangamarino catchment suggests that the major barriers to the successful implementation of collaboration arrangements are not related to the existing legislation. Rather, the barriers lie in the distrust and the resistance to change of the management agencies administering the legislation.

Further, as long as there is a lack of broadly organised political support at a national or local level, resourcing for collaborative initiatives will not emerge. This means that the willingness and support of politicians will be at the heart of settling these power relations, as well as in facilitating and resourcing suitable collaborative management structures. Further iterative cycles of the Naturalistic Inquiry method as applied to this Case Study could involve the political interactions of the local and national politicians that have a stake in the Whangamarino Wetland.

Horsley *et al.* (1999) state that moving towards greater community involvement in resource management decision making means a change in the traditional role of local government politicians, council officers, and other agency managers. Those with significant influence need to become familiar with alternative ways of achieving biodiversity outcomes. This requires a shift on the part of local government to redefine civic leadership to enable greater degrees of collaboration with both tangata whenua and wider communities. When local organisations solidify agreements among themselves (and usually with management agency) and regularise new practices in decision making, they are said to have created new institutions, in the sense of new arrangements and procedural rules for how decisions are made. The ability to devolve power to other authorities (such as an iwi authority) already exists in the RMA and Reserves Act. There are also other extremely successful mechanisms, such as Queen Elizabeth II National Trust Open Space Covenants, which could be used in tandem with collaborative management arrangements in order to address indirect effects on the protected natural area as well as protect privately owned wetlands.

However, in the decade since the passing of the Conservation Act and RMA (including the extensive local authority and Crown plans and policy documents) Waikato Iwi or local landowners still have no real involvement in biodiversity management decisions in the

Whangamarino catchment. With the notable exception of the Ministry of Fisheries Tuna Management Plan, tangata whenua and the local community are 'informed', 'educated' or 'consulted', rather than involved in participatory or partnership arrangements.

For what ever reason, the continued inability of local government and Department of Conservation representation structures to provide for a genuine participatory relationship with Maori and local community mean that many biodiversity conservation issues will remain unresolved. Consequently, the biological diversity and ecological integrity of the Whangamarino Wetland will continue to decline until these barriers to participation are confronted and addressed.

The point made by Grundy (1995) and Kirkpatrick (1998) that the prevailing economic doctrine based on growth using undervalued or 'free' and 'limitless' natural resources will constrain sustainable management also has particular relevance. Implementation of collaborative management regimes with biodiversity conservation aims may be seen by some development orientated individual as a threat to economic exploitation of the Whangamarino catchment's natural resources. Care is needed when developing collaborative management arrangements, particularly those based on informal 'memorandums of agreement', that the process is not highjacked by stakeholders who have hidden agendas based on unsustainable economic growth (Kirkpatrick, 1998).

6.3 Bridges to the Future

6.3.1 We Don't Have to Reinvent the Wheel

Leadership from central government to encourage the implementation of positive, proactive and long-term links between iwi, the wider community and councils is happening in New Zealand. The focus on community participation in the New Zealand Biodiversity Strategy and Associated reports is gaining widespread support.

There are also a number of successful collaborative management regimes already in place in New Zealand, for example, the arrangement between Ngai Tahu and the Fish and Game at Lake Ellismere (Lawrie, *pers comm.*). In this case Ngai Tahu and Fish and Game both worked together to prepare a written agreement for joint management of the lake. Ngai Tahu's claim was initially for full, undisputed ownership and no Crown involvement. However as the two parties worked together they found they had common goals and

issues. Ngai Tahu people discovered that creating water fowl habitat was also going to enhance whitebait and tuna habitat (Lawrie, *pers comm.*). The agreement is that now the Fish and Game Council assist Nga Tahu in the lake's management in lieu of hunting rights for the public hunters in general (Lawrie, *pers. comm.*).

In the Waikato basin itself there are several excellent examples of what communities can achieve if they are allowed to. One in particular is the activities of the Waitomo Landcare Trust, where Environment Waikato, DoC, the QEII National Trust, the tourism industry, farmers and Ngati Maniapoto have been implementing a collaborative management arrangement over the entire catchment for the past ten years. Amongst a great variety of conservation based actions, this initiative has seen almost all of the native forest remnants in the area being covenanted by the QEII National Trust. Ongoing management of animal and plant pests is subsidised by the Trust. Further, all of the major stream margins in the catchment are fenced from stock. The Trust has assets over $600,000 in fences alone. Iwi have a true partnership with the Crown in the management of the caves and receive an economic return from the use of them. The tourism industry has had direct economic benefit from the ecological enhancement work in that two of the main attractions, the abundance of glow worms and the formation of the unique karst features, are directly related to water quality (Ash, *pers comm.*).

It could be suggested that the relationship between the Department of Conservation and the Fish and Game Council within the Whangamarino Wetland to be an example of co-management in operation. However, it is not because the arrangement only involves two of the parties. Apart from the fact that the usefulness of this arrangement is limited by the confines of legislative powers and the abilities and resources of the two organisations, it is not collaborative management as it excludes that other key parties.

6.3.2 Realising the New Way

Recent biodiversity initiatives appear to be committed to addressing biodiversity conservation through collaborative approaches (e.g. DoC/MfE, 1999; DoC/MfE, 2000 and Kneebone *et al.*, 2000). In particular the report - "*Bio-What? Preliminary Report of the Ministerial Advisory Committee*" suggests the use of 'local accords' as a method to establish and implement collaborative management of specific areas in order to improve the conservation of biodiversity (Kneebone *et al.*, 2000).

These central government policy initiatives will, however, need to be backed in the long-term by adequate financial resources, training programmes for facilitators, education programmes and web-based information networks. A compelling vision will also need to be articulated which can enthuse tangata whenua and local communities that they have a vital role to play in biodiversity management. Such a vision could be a part of the proposed Aotearoa Accord on Biodiversity and Land Management. It remains to be seen whether New Zealand has the foresight to reaffirm and renew the dynamic relationships that lie at the heart of sustainable based collaborative management initiatives.

> "We propose the development of a second biodiversity accord, to be known as the Aotearoa Accord on Biodiversity and Land Management. This Accord – or reaffirmation – is focussed on the relationship between Maori and their Treaty partner, the Crown." (Kneebone, *et al.* 2000: p49)

Figure 6.1 The 'Rice Bowl'. One of the last remaining open water herbfields in the Whangamarino Wetland. The area is still grazed, is the centre for a community initiated revegetation programme, is subject to unnatural influxes of water from Lake Waikere and is used extensively for recreational waterfowl hunting, yet has higher ecological values than the willow dominated mineralised swamp habitats within the Whangamarino where no or little community use and involvement occurs .

APPENDIX I:
INTERVIEW SCHEDULE FOR LOCAL COMMUNITY

Suggested Interview Schedule for Semi-Structured Interview process – Local Community:

Introduction - I would like to better understand how the management of the Whangamarino Wetlands affects you, and if the wetland is a hindrance or benefit to your lifestyle and/or business.

Why are you farming or involved in a venture in this area?

What challenges have you found in farming/ using the wetland here?

Do you know where are the legal boundaries of the Whangamarino Wetland are in relation to your use of the wetland?

What past involvement have you or your family/group/organisation had in the management of the Whangamarino Wetland?

If you would have been in charge of the management of the Whangamarino Wetland for the last ten years, name three things you would have done to manage it?

How would the things you would have done affected yours and other peoples use of the wetland? Do you consider their uses of the wetland to be as important as yours?

Wetlands have many uses - flood control, water supply, disposal of drainage and stormwater, seasonal grazing, but not so we understood are the biological, recreational and cultural aspects of wetlands. Some wetland managers are particularly concerned that we have wetlands which can support a wide range of native and exotic plants and animals for future generations to use and enjoy? Can you relate to this idea of how wetlands are valued?

Who are the key organisations presently involved in the management of the Whangamarino Wetland? What are the legal functions of each of these organisations?

What do you see are the main issues and problems in the present management regime of the Whangamarino Wetland and its water catchment?

Have you any solutions you think are appropriate in addressing potential issues and problems?

Would you be interested in becoming directly involved in the future management of the Wetland? Do you foresee any problems/restrictions/benefits in becoming actively involved in the day-to-day management of the Whangamarino Wetland? Issues to prompt interviewee with are: time, cost, interest, weeds and pests, water level management, stock grazing, hunter use and development,

Councils and DoC have several means under the RMA and Conservation Act to promote conservation of the areas natural resources. These include:

⇒ education/ advocacy;

⇒ service delivery like provision of labour, planting costs, provision of technical advice and facilitation of joint agreements;

⇒ economic instruments such as rating relief, subsides and grants;

⇒ regulation and rules;

Do you like any or some of these methods? Do you have any thoughts on other ways these agencies could improve communication linkages with you?

How do you think your land/use and the Whangamarino Wetland will be managed and how will the landscape look like in 50 years from now?

APPENDIX II:
INTERVIEW SCHEDULE FOR CROWN AGENCY STAFF & KEY STAKEHOLDERS

What is your title and how long have you had an association with the management of the Whangamarino Wetland?

What are the key issues and threats facing the sustainability of the wetland?

What policies and/or implementation measures have you in place to address these issues?

Have you heard of co- or collaborative management? What do you think it means in relation to the management of the Whangamarino Wetland?
Have you any existing community initiatives with the Whangamarino Wetland or its catchment?

What role do you see for each of the local community sectors I interviewed?

Do you think their feedback represents a true indication of how you have found the local community to perceive the wetland, and your organisation, in general?

Do you consider any of the comments of the local community to be factually incorrect? If so which ones and why?

What is your organisation's commitment to on going research and monitoring in the wetland?

Can you foresee a time when the local community has an active role in the day–to-day management of the wetland, from policy development to implementation?

Do you see a role for Tangata Whenua in the management of the wetland? If so what would it be?

What do you see as being the important values of the Whangamarino Wetland
How do you relate these values to those which the local community perceived as being important?
What measures have you been directly involved with to maintain and enhance these values?

How do you think these measures compare to with the local community's idea about managing the Whangamarino Wetland?

Do you think local community input into the day-today management of the Whangamarino Wetland is a realistic proposition?

APPENDIX III:
SUMMARY OF DATA CARD THEMES

Glossary of Terms and Acronyms

Adaptive management. A management approach that acknowledges the lack of unequivocal and definitive knowledge of the way in which ecosystems work, and the uncertainty that dominates our interaction with them.

CMS — Conservation Management Strategy

Conservation — In respect of conservation areas means the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations (Conservation Act 1987)

Conservation Management Plan — The purpose of the CMS as stated in the Act is to: "*implement general policies and establish objectives for the integrated management of natural and historic resources, including and species, managed by the department.*"

Conservancy — The Department of Conservation has 14 regional offices in different parts of the country called conservancies.

Consultation — Genuine invitation to give advice and genuine consideration of that advice. To achieve consultation, sufficient information must be supplied and sufficient time allowed by the consulting party to the consulted to enable it to tender helpful advice. It involves an ongoing dialogue (Air NZ vs. Wellington International Airport, CP. 403/91, 1992)

Collaborative -management — Also referred to as co-management, participatory management, joint management, shared-management, multi-stakeholder management or round-table agreement) is used to describe a situation in which some or all of the relevant stakeholders in a protected area are involved in a substantial way in management activities. Specifically, in a co-management process, the agency with jurisdiction over the PNA (usually a state agency) develops a partnership with other relevant stakeholders (primarily including local residents and resource users) which specifies and guarantees their respective functions, rights and responsibilities with regard to the PNA.

In general, the partnership identifies:

- a protected territory (or set of resources) and its boundaries;
- the range of functions and sustainable uses it can provide;
- the recognised stakeholders in the protected area;
- the functions and responsibilities assumed by each stakeholder;
- the specific benefits and rights granted to each stakeholder;
- an agreed set of management priorities and a management plan;
- procedures for dealing with conflicts and negotiating collective decisions about all of the above;

- procedures for enforcing such decisions; and
- specific rules for monitoring, evaluating and reviewing the partnership agreement, and the relative management plan, as appropriate (Borrini-Feyerabend, 1998).

DoC	Department of Conservation
Intrinsic Values	Are those aspects of ecosystems, and their constituent parts which have value in their own right, including: - Their biological and genetic diversity; and - The essential characteristics that determine an ecosystem's integrity, form, and functioning and resilience.
Inquirer	The person undertaking Naturalistic Inquiry research is referred to as the 'inquirer'. The American spelling of enquiry is used in order be consistent with the spelling used by Lincoln and Guba, (1985). The word inquiry and its directives as the same meaning as 'enquiry' (Oxford Concise Dictionary).
Eutrophic	Nutrient rich water.
EW	Environment Waikato
Governance	the complex of different ways by which individuals and institutions, public and private, manage their common concerns
Hapu	Term for a collective group of whanau, operating as a unit in a range of activities. Membership like that of a whanua, is genealogically defined and determined, as are all other rights and mana. Each hapu has their own territory or boundary of its various whanau members.
Heuristic	Serving to discover, proceeding by trail and error; heuristic method, system of education under which the pupil is trained to find out things for them selves.
Kaitiaki	Guardian, protector
Kawanatanga	The authority vested in the Crown; in the modern context, the processes of Government
Local Community	For the purposes of this thesis, 'local community' refers to people who live, work or recreate within the catchment of the Whangamarino. This therefore excludes people from their settlements of Mercer, Te Kauwhata or Rangiriri.
Intrinsic Values	means in relation to ecosystems, those aspects of ecosystems, and their constituent parts which have value in their own right, including: 1 Their biological and genetic diversity; and

	2 The essential characteristics that determine an ecosystem's integrity, form and functioning and resilience. (RMA)
Iwi	This is a collective term for all whanau and hapu in occupation of a clearly defined area in contrast to other neighbouring Iwi. All rights including membership are defined by genealogy. In the context of this thesis it usually refers to Waikato-Tainui.
Maori	Used throughout this document as a generic term covering Iwi, hapu and tangata whenua
Mataurangi Maori	Maori knowledge
Monitoring	The act of measuring change in the state, number or presence of characteristics of something.
Papatuanuka	Earth Mother
Palustrine	A wetland hydrosystem including lands bound by dry land or by any other hydrosystem, where attached/rooted vegetation is emergent (c.f. *Riverine* or *Lacustrine*) permanently or seasonally above freshwater (<0.5% salinity), non-tidal surface water or groundwater. Palustrine wetlands include marsh, bog, swamps, fens, bog, marshes, seeps and flushes. Palustrine wetlands exclude wetlands influenced by saline water such as saltmarsh."
Pluralism	A situation in which autonomous and independent (inter-dependent) groups freely interact and collaborate on management issues on the basis of different views, interests and entitlements.
PNA	Protected Natural Area
Protected Natural Area	Is a legally protected area, characterised by indigenous species or ecosystems of landscape features, in which the principal purpose of management is the retention of the natural state. In this thesis the term is used synonymously with protected area.
RMA	Resource Management Act 1991
SMF	Sustainable Management Fund administered by the Ministry of the Environment and used to contribute to projects involved in sustainable management research of natural resources.
Stakeholder	Stakeholder/ Party Institutions, social groups and individuals who possess a direct, significant and specific stake in the protected area are referred to as its 'stakeholders' or affected 'parties'. As mentioned, the stake may originate from institutional mandate, geographic proximity, historical association, dependence for livelihood, economic interest and a variety of other capacities and concerns. In general:

- stakeholders are usually aware of their interests in the management of the protected area (although they may not be aware of all its management issues and problems);
- stakeholders usually possess specific capacities (e.g., knowledge, skills) and/or comparative advantage (e.g., proximity, mandate) for such management; and
- stakeholders are usually willing to invest specific resources (e.g., time, money, political authority) in such management. (Borrini-Feyerabend, 1998)

Taonga	Highly prized, a treasure for Maori
Tikanga Atawhai	Title for customary practices
Tikanga Maori	Maori customary practices
Tino Rangatiratanga	The authority vested in tribes; in the modern context, Maori self determination
Tuna	Both species of New Zealand's fresh water ell
Waahi Tapu	A sacred place
WDC	Waikato District Council
Wetland	Permanent or intermittently wet land, shallow water and land-water margins. Wetlands may be fresh, brackish or saline, and are characterised in their natural state by plants or animals that are adapted to living in wet conditions. They include swamps, bogs estuaries, braided rivers, and lake margins.

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