AN APPRAISAL OF

WATER USE MANAGEMENT

IN NEW ZEALAND

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ABSTRACT

Water use management is defined in the context of the New Zealand law and overall water resource management. A simple descriptive model is then introduced as a theoretical framework for examination of the management structures and procedures which are shown as links between the social and biophysical systems.

A brief history of the evolution of water use management in New Zealand is outlined, using the development of legal controls as an index. The provisions of the principal enabling law, the 1967 water and Soil Conservation Act, and its subsequent amendments are detailed, and present the management regime discussed in terms of the general model.

Problems and Issues with the present management framework are described. The Water Rights system and Water Quality Management (in particular - Classification) are dealt with in detail as the two major procedures, and other technical, administrative and legal issues are identified.

The appropriateness of the present Water Rights and controlling agencies (the Regional Water Boards) for water use management is discussed. The topical subjects of land use planning and regional reorganisation are included.

An attempt is made to place the New Zealand management in perspective, particularly in terms of overseas experience, and the study is concluded with a view of the prospects for the future.

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INTRODUCTION

Water was considered by both the early Chinese and Greek philosophers to be one of the four cardinal elements of existence, along with earth, fire and air. In the ancient civilisations of Mesopotamia, China, Egypt, and Middle America, water was recognised as the base of all living things, and these societies owed their development to an ability to manipulate water and water use. Teclaff and Teclaff (1973) present a good review of the historical aspects of water use and development, and comment that although water control had a major influence on the social structures of these fluvial civilisations, this was under the 'spur of aridity', and the approach in relatively water-rich Western Europe was considerably more leisurely. Attitudes changed rapidly however with the Industrial Revolution and experience with different water regimes in the colonies. The social implications and broader environmental effects of water use were overshadowed to a large extent by a preoccupation with the increasing technology of water development.

More recently, in the face of vastly increased demands for water resulting from higher populations and higher standards of living, the environmental and social impacts of water use are being re-examined. This is often within the broader context of what has become known as resource or environmental management. These terms are considered in some quarters to be simply new labels for many existing activities, such as water management, but they do reflect a change in attitude to man's relationship with his physical or 'natural' environment.

O'Riordan (1971 a) in discussing emerging views of environmental management comments that the natural or biophysical environment cannot conveniently be separated from the socio-cultural context in which it is viewed, and that "the emphasis is not so much upon man and environment as upon the man-environment interface, that complex boundary where biophysical and socio-cultural systems

interact" (p 177). Both O'Riordan, and Powell (1972 a) observe that the geographical discipline has a traditional interest in the relationship of man and environment, but that this concern is not unique to geographers (O'Riordan, 1970, 1971 b) and that many disciplines must work together to achieve effective management.

Management of water use, as a part of overall water resource management, clearly lies at this interface, and can be considered to be the framework of structures and processes that link the physical and social systems. This management involves the manipulation of people in their contact with water, and should be based on knowledge of the resource. As such, specialist contributions from a wide variety of disciplines including hydrology, biology, chemistry, engineering, management and law, are essential for effective management.

This thesis will examine the status of water use management in New Zealand, and appraise the performance of the present structure in linking the physical and social systems. The extent to which the resources are understood; the extent to which public attitudes are recognised by the management process, and reflected in the existing organisation; the suitability of this organisation, particularly at the regional level, for the management task; and the appropriateness of the legal framework, will be considered. It is worth noting here, that management structures and functions are almost invariably rooted in law, a fact that is often under-emphasised by many disciplines including geography (O'Riordan, 1971 b). Recognition of this is increasing, both overseas (Sax, 1972) and in New Zealand (Powles, 1970) particularly with regard to water quality control (Bellamy, 1975 b). It will become evident that many of the strengths and weaknesses in control of water use in New Zealand can be directly related to legal provisions.

The principal act in the family of law concerned with water use management came into force eight years ago. There have been a number of problems with application of the principles and implementation of the procedures expressed in it. This thesis examines these issues, and may be

considered to be a hindsight review of the operation and implementation of the management role.

Initially, water use management is defined in the context of the New Zealand law and overall water resource management. A simple descriptive model is then introduced as a theoretical framework indicating the structures and processes linking the social system with the biophysical. This is followed by a brief history of the evolution of water use management, using the development of legal controls as an index. The present form of management is described, and the model further expanded. Detailed analysis of the problems of and arguments arising from present management appears as Part II, and the technical, legal and administrative issues are identified and related to the model. The fit of the management units with the present formal water regions is discussed, and the topical subjects of land use planning and regional reorganisation included. Chapter 9 attempts to place New Zealand management in perspective both in terms of overseas experience, and the attitudinal climate of the public, politicians and managers. Chapter 10 concludes with a personal view of the prospects for the future.

Definitions

Water resource management can be separated into two main aspects. The first, water use management can be regarded as management of man in his contact with water. That is, management of water users including individuals and social groupings such as companies, recreational groups and communities, rather than control of water per se. This is undertaken by intervention in the socio-economic (or socio-cultural system), and can be distinguished from water-as-entity-management which usually involves structural controls, with physical intervention in the biophysical system. In this second category can be placed functions such as flood control, erosion control, drainage and coastal protection. These could perhaps be characterised as 'non-uses' or 'negative water use' (Isaac, 1972). Social links, are indirect through control of land use. Control of water

as an entity occurs at another level, not within the 'natural' physical environment, in the engineering aspects of water distribution systems both for supply and power generation, and treatment of water-borne wastes. This is often a subset of water use management, as both water supply and waste disposal are clearly uses.

Kneese and Bower (1968) in discussing water quality management, see management as involving "the whole range of activities from data collection, research and analysis, through operating water quality monitoring networks and treatment plants, evaluating performance of system units, setting standards and charges, and so on" (p 6). They see management as the whole 'bundle' of activities detailed in Figure 1 including both structural and non-structural measures, and are more concerned with management agencies in a construction and operational role than as regulatory bodies.

As will be shown later, the law which was intended to co-ordinate all water resource management in New Zealand, the 1967 Water & Soil Conservation Act, has left many of the structural measures outside its scope. Generally, implementation of these is controlled by other legislation. For example, the responsibility for community water supplies and waste disposal systems still lies with the territorial local bodies, under older legislation. In contrast, the national overview and financing of flood control, drainage and rural water supply schemes have been included as functions of the national organisation set up by the 1967 Act, even though the enabling legislation still lies outside the integrating law. The fact that this law, with all its amendments to date, is mainly concerned with water use management and non-structural controls, in part reflects the previous emphasis on structural control in other legislation, and the present extent and type of demand for water in New Zealand. There is now also an increasing tendency for the water use management agencies to be involved in development and design of water supply schemes, and in this way integrating both regulatory and structural management functions.

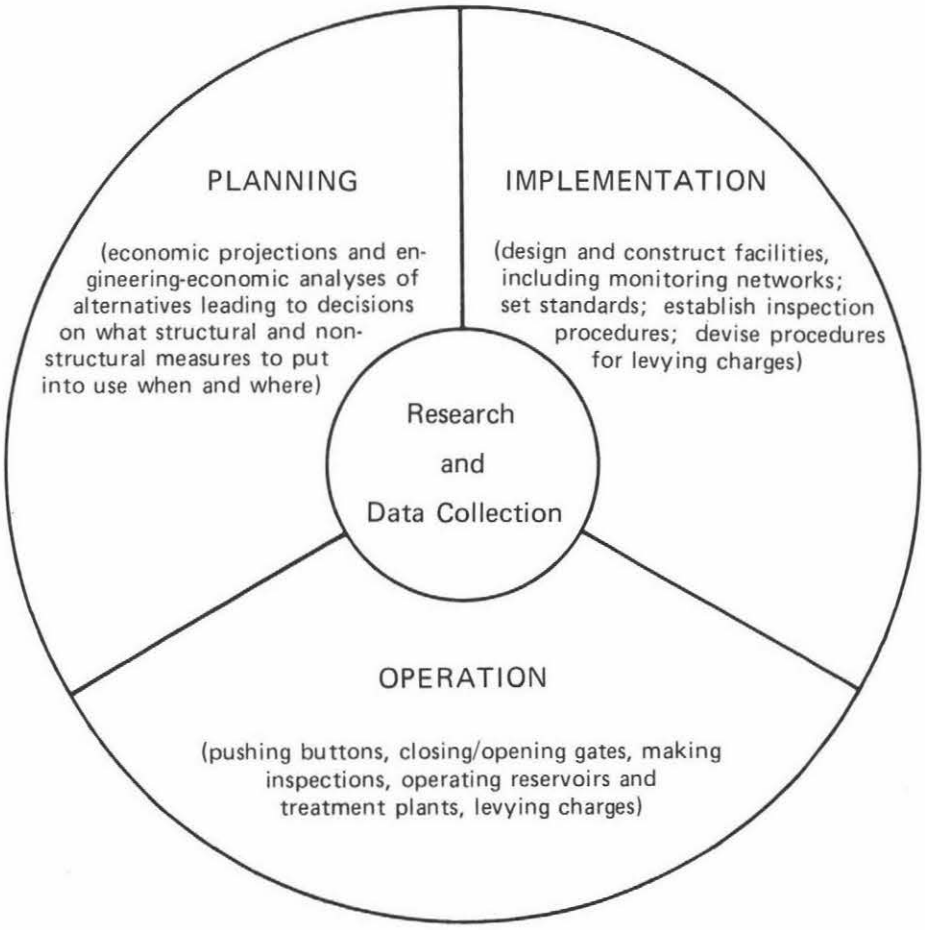

Figure 1
Activities in water quality management
Source: Kneese and Bower, 1968

Craine (1969) discussed the progression of governmental involvement in water use, and Figure 2 depicts this pattern. The early stages are devoted largely to influencing private and public water users and development agents by the creation of an information (stage 2) and a policy environment (stage 3). Further involvement (stage 4) results in government, or its agencies, performing much of the implementation role, finally entering into regional schemes (stage 5). In New Zealand at present stage 3 has been reached, with predominantly non-structural regulatory control, although some progression towards stages 4 and 5 is evident, in some regions. Gibson (1971), in reviewing Craine's analysis, notes that all five aspects of management are essential to fully integrated water resources management.

Traditionally, distinction has been made between 'consumptive' and 'non- consumptive' uses of water and several different classifications of uses are available. The following listing is adapted from Grava (1969), van Hylckama (1971), and Ministry of Works (1965) :

1) Consumptive Uses. These include any uses which are 'consumptive' of either quantity or quality of the resource, and therefore affect any other actual or potential uses. The first three of the following are sometimes termed 'withdrawal' uses.

i) Human and animal consumption, directly by domestic and stock water supplies, whether on an individual or group basis. Other maintenance uses for man (washing laundering, use in home gardens and amenity areas) and stock (farm dairy shed and piggery washdown) can be included.

ii) Water incorporated in or used in production of goods for human (and sometimes animal) consumption, again both in community and self-supplied situations. This includes uses in food processing (vegetable washing, hygiene, freezing works, abattoir, dairy factories etc); agricultural uses, particularly irrigation; and industrial uses in processing, cooling, washdown etc.

iii) Fire fighting.

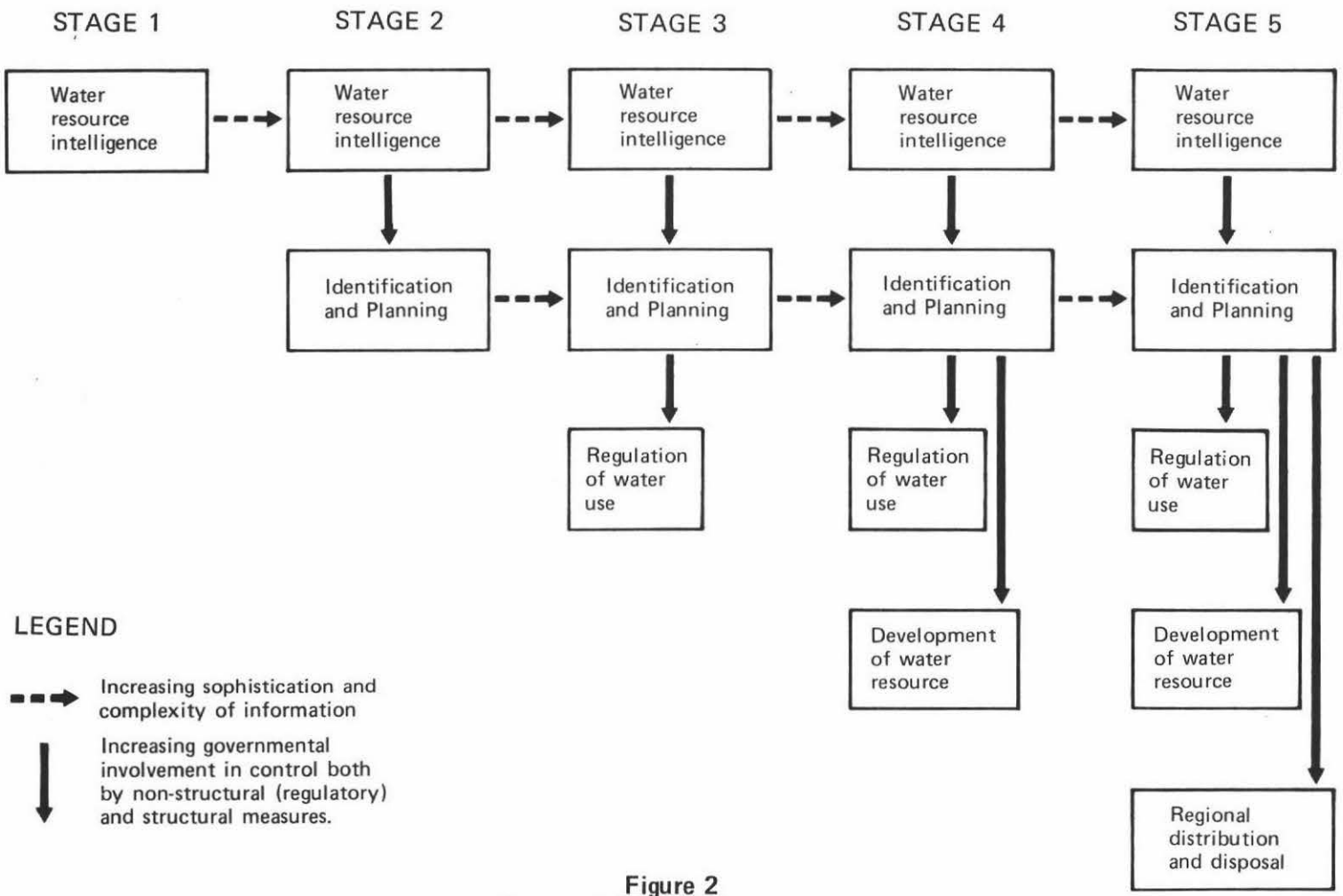

Figure 2
Stages of control of water use after Craine, 1969

iv) Waste disposal. Use in dilution and dispersal of water-borne wastes including domestic and industrial sewage (and heat), and to a lesser extent disposal of solid wastes.

2) Non-Consumptive Uses. Although these may depend on particular quality and quantity being available, they themselves do not usually reduce or affect either quality or quantity.

i) Recreational Uses. These can be direct (also considered as active or contact) uses such as swimming, paddling, diving etc; semidirect (again active, but not necessarily contact) such as boating, sailing, water skiing, fishing; or indirect, usually visual or aesthetic considerations, often termed amenity uses.

ii) As life medium for acquatic biota. This includes both marine and freshwater, flora and fauna, including fisheries. This does not necessarily represent a use in human terms, but is an obviously essential requirement for other organisms, and is often closely linked with aesthetic responses as above.

iii) Power production. This is generally not consumptive, although substantial alterations in position of the resource can place it in conflict with other uses. In certain circumstances quality can be detrimentally affected by impoundment, although the reverse is often also observed.

iv) Transport and Navigation. Non-consumptive directly, this use can be indirectly competitive with other uses such as recreation, and both spillages and wastes associated with vessels and shore facilities can affect quality. There is a clear link here with boat-based recreation.

Many of these water uses are interrelated. Some uses affect groundwater as well as surface water, some are restricted to inland freshwater situations, others are exclusive to the marine situation. Any such classification cannot indicate the complex interactions between the uses. O'Riordan and More (1969) represent them, with the addition

of flood protection, as a system of "interlinked multipurpose demands, some conflicting and other complementary" (p 549), but do not point out that uses which in one situation may be in conflict, may be complementary elsewhere. For example, they show irrigation in conflict with power generation. In New Zealand irrigation and power schemes can be compatible, as is intended in the Clutha Scheme.

Transport and Navigation do not sit easily in this separation, and in fact they are either ignored or accorded only passing mention in the literature. This is possibly because they are not considered as resource management functions, and control even in the recreational context does not come within comprehensive water legislation. Certainly, in New Zealand control exists in a substantial body of internationally-based law some of which has only recently been enacted. For this reason, and as New Zealand's inland waterways cannot be used by modern commercial transport, these uses will be considered only in their recreational implications.

It is precisely the complexity of the interactions between these uses, and the pressure on the overall resource caused by the greater demands of higher populations and standards of living, that has focussed attention on the management of the resource. Particular aspects of water use management, especially water quality control, are receiving a great deal of attention both by the public and in the literature, often in the more restricted form of water pollution control. In contrast with the continuing examination of various narrow aspects of water quality management, Kneese and Bower (1968), Craine (1969) and Gibson (1971) have stressed that water quality management must be an integral part of water resources management. In fact Gibson sees water quality management as the integrator of the technical, engineering and policy measures involved. This attitude is being echoed in New Zealand, with calls for greater cohesion within the overall water resource management structure and extension of responsibilities into areas such as regional planning, presently outside the structure (Norton, 1973; Bellamy 1975 a; NWASCO, 1975 a).

This growing recognition of the need to integrate all aspects of water resource management and to link water use management with land use management and planning, emphasises that water resource management itself, is only one part of environmental management. There has been a rapid increase in discussion of environmental management and planning, although it should be noted that the expressions 'management' and 'planning' appear to be interchangeable in much of this literature. Where they are used here, planning will be regarded as the long-range or future considerations of management. Also, suggestions have been made by planners, that environmental management is not a new field at all but simply a section of comprehensive planning, and reflects a change of emphasis but not of scope (P.H. Phillips pers. comm.).

A Simple Model

In the burgeoning literature on environmental management there is considerable emphasis on systems analysis. This approach grew out of the intensive and highly technical field known as systems engineering, and as Catanese and Steiss (1970) point out, the term system analysis has become a catchall phrase for many aspects of applied science. However, the procedure in systems analysis and the closely related field of modelling, which involves examination of the interrelated parts of any system and identification of the processes linking those parts, has proved to be a valuable tool in explaining complex interactions in both bio-physical and social systems. Jeffers (1973) provides a good review of the present standing of systems modelling and analysis in resource management.

Systems analysis has often been used in examination of water problems, and modelling is an accepted part of hydrological investigation. As Grava (1969) notes, this approach has been primarily concerned with either economic or physical models. Analyses of water as a physical system can be found in Barry (1967) who discusses meteorological models; in More (1967, 1969) who models basin hydrological cycles; and in van Dyne (1969). In this last collection, the papers by

Bormann and Likens, and Cooper both present a broader water-shed ecosystem approach. A more specific application of systems analysis, to water quality appears in the first part of Thomann (1972). Chorley and Kennedy (1971) discuss the application of the systems approach to all aspects of physical geography.

Thomann also includes a section on economic analysis, and this application of the systems approach can be found in Maass et al (1962). These texts, and Cooper (1969), include both economic and physical approaches linked into an analytical framework that has been called hydro-economic (O'Riordan and More, 1969) or engineering-ecologic-economic (O'Riordan, 1971 b).

Attention is paid to the administrative, political and legal problems by these authors, and Maass et al (1962), Kneese and Bower (1968), and White (1969) also refer to a number of earlier studies of administrative systems. The emphasis is on specific case studies of existing agencies however, rather than on an examination of the role of administration as a vital part of the overall system. O'Riordan (1971 b) comments on the recent trend to graft a socio-political component on to the hydro-economic models, but much of the discussion of the socio-political aspects does not occur in a systems context. One area of study which is linked only tenuously with the systems approach is that of determining the public's perceptions, attitudes and preferences (Haefele, 1972; White, 1966, 1969). Similarly, examinations of politics and administration (Caldwell, 1966, 1971) and legal approaches (Sax, 1972) are not related to any systems concept. Odum's (1971) extension of the energetics model to socio-political levels again does not constitute a useful input to a systems approach to problem solving.

Catanese and Steiss (1970) briefly discuss the political system as a cybernetic model, and both Chorley (1971) and Edmunds and Letey (1973) produce isolated diagrams of 'environmental decision models'. Grava (1969) and Gibson (1971) deal with administrative aspects in discussing water quality management systems, and Millar et al (1971) develop a 'clean' water model which includes

social, economic and political inputs, but all these are developed at a river basin level. Sewell (1973) provides probably the most comprehensive analysis of the broad social and institutional aspects which need to be incorporated in resource management decision making. Weiner's (1972) jargon-ridden treatise on comprehensive planning of water development does deal with organisational aspects, but does so in a synthetic way more applicable to developing countries without an established management structure.

Thus although there are ample precedents on which to base detailed discussion of the biophysical and economic components of a management system, and also guidelines as to what should be included in the socio-political component, there is no general analytical framework for appraisal of an existing system, such as the water use management organisation in New Zealand. Figure 3 is a simple descriptive model which identifies the principal components in a water use management framework at a national level. The biophysical system, i.e. the water resource, and the socio-economic system are shown, with linkages and influences indicated by the arrows. The socio-economic system consists of two major blocs or components: the water users; and the water use management agencies. Both of these groups are 'bathed' in a milieu of social attitudes and values, economics, legislation and technological development. These influences have in turn been moulded by the past and present status of the biophysical system. The water users and the management agencies both receive information directly from the biophysical system, although the type of information may differ significantly. The water use management agencies are influenced by user demands, and in return influence the water users by policies and control measures.

This model provides a theoretical framework within which to examine the technical, administrative and legal aspects of water use management in New Zealand. It will be expanded in later chapters to allow detailed comment on the structures and connections in the socio-economic system, and the linkages between the structures and the

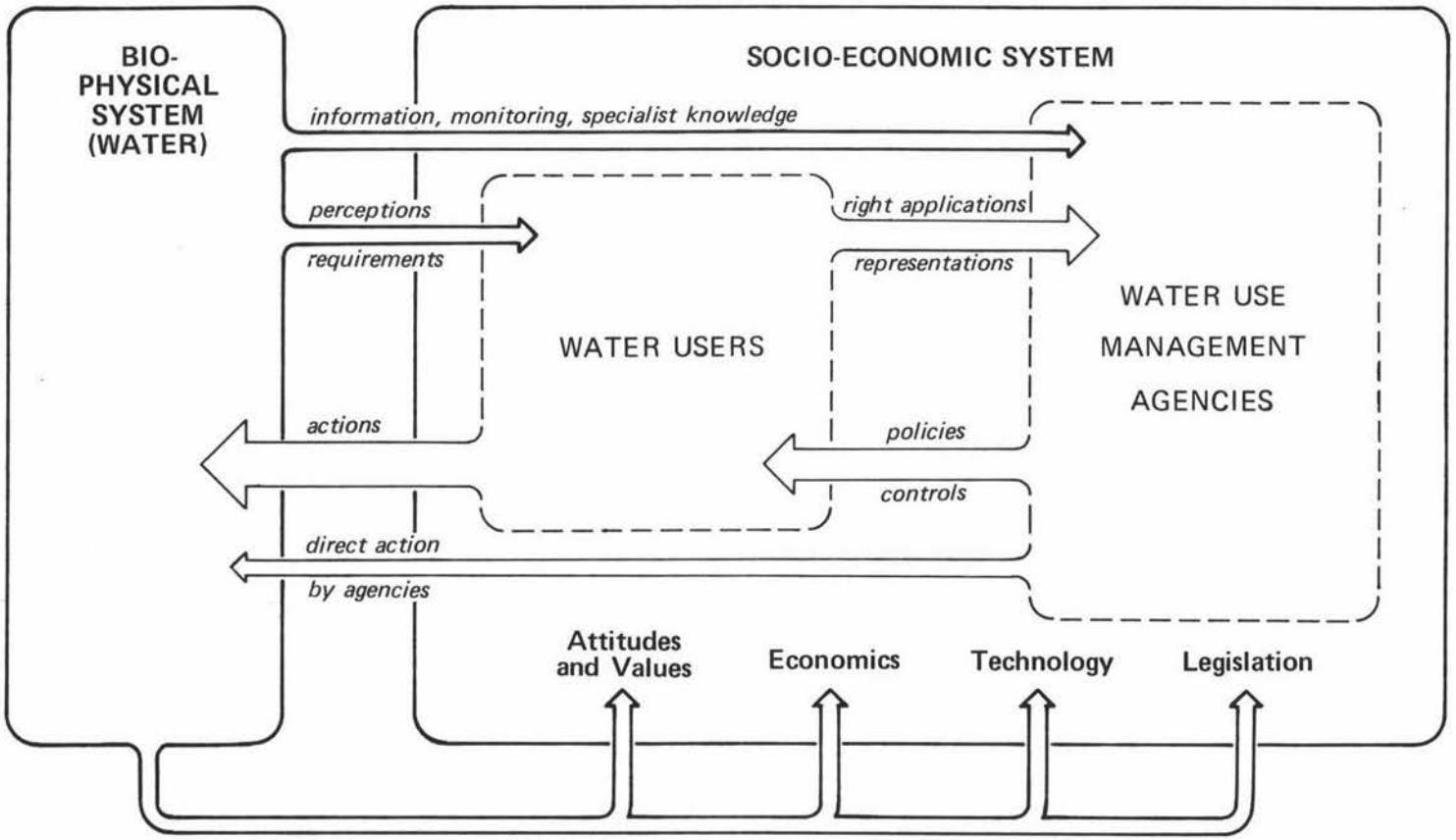

Figure 3
General water use management model

bio-physical system. On a theoretical basis it could be anticipated that the major problems and issues of management would arise where the user/agency blocs interact, and where information is derived from the biophysical system. It will be shown later that major issues do arise at these critical linkages, but that there are also problems of structure which arise from other broader socio-economic and administrative influences.

PART I

BACKGROUND TO THE PRESENT SITUATION

CHAPTER 1

THE EVOLUTION OF WATER USE CONTROLS

Tracing the development of management structures and their legislative base is much simpler than following changes in public attitude, even assuming that this can be measured at any time. In a democratic system, laws do theoretically develop from public opinion through the political and legislative processes. Collins (1968) maintains, in discussing the development of rivers control and drainage in New Zealand, that the law and the activities of government bodies are merely reflections of social needs. Although this perhaps underestimates the influence of pressure groups and specialist lobbying both outside and inside government, the legislation does provide a useful indicator of attitudes. The development of legal controls of water use will be used in this chapter to follow the evolution of management in New Zealand.

In general, a progression can be seen through three phases of legal control : from simple mores, to simple law; from simple law to more complicated single purpose legislation; from this complex, fragmented law to comprehensive rationalising water law. Control exerted by the mores of a particular society was soon codified as law, and controls in the early fluvial civilisations were strict. For example, the Talmud, the ancient Jewish law, laid down precisely the sequence of uses and users of a community spring :

> A spring owned by the people of the city : their lives and the lives of others - their lives take precedence over those of others;-their beasts and the beasts of others - their beasts take precedence over the beasts of others; their laundering and the laundering of others - their laundering takes precedence over the laundering of others; the lives of others and their laundering - the lives of others take precedence over their laundering. (Talmud Bavli, Nedarim 80 b, quoted in Teclaff and Teclaff, 1973, p 30)

The next phase, seen particularly in western law in the last two centuries, involves the development of an increasingly complex body of law drawing on many sources, with

control exerted by a large number of agencies with a variety of purposes. However, unprecedented demands for water resulting from population growth and the accompanying pressures of agricultural, urban and industrial expansion (United Nations, 1972), proved the fragmented, inherited systems of control inadequate.

The response to this (the third phase) has been world wide modernisation of water law, often by substantial alteration or complete replacement of previous systems. There has been a marked trend towards state or public ownership of waters, and state control of water use. Within the last decade, many western countries have enacted large, comprehensive water laws to rationalise confused single-purpose legislation, and reduce the number of agencies involved in administration.

New Zealand is no exception and a similar sequence was applied to this country by H.R.C. Wild, then Solicitor-General, in the recommendations of a symposium on 'The Use and Control of Water in New Zealand' in 1964 (New Zealand Institution of Engineers (NZIE), 1964). This is an excellent summary of the situation and attitudes at that time, and a substantial part of his address is included:

> There have been two central themes that have been discernible throughout the whole of your discussions. One is the technical side relating to the need for collection and accurate collation of information and data. The other, which is of wider interest than just the technical side, and which relates to the legal side, is the need for comprehensive legislation relating to water.
>
> I thought it might be appropriate to mention the three broad stages of the development of the law relating to water.
>
> First of all, there is the common law, the keynote of which is - first come, first served - everybody being anxious to protect his own position, and nobody caring about the community position. The characteristic of that original stage of the development of law was concentration on the rights of the individual; each man's right to take and use water and to protect his own rights in contra- distinction to any concern about the community as a whole. That was all right for primitive agriculture but it is no good at all when industrial development sets in. That brings us to the second stage - the stage of statutory regulation and control, which came with the growth of industry, mining, canals, electricity and so on. The characteristic of that stage,

> and this I think is the stage New Zealand is in now, is that such regulation as does occur is carried out by separate Acts of Parliament, each one being based on the premise that there is enough water for everybody. Now that is a fallacy, as I understand it, from your technical point of view. The characteristic then of this second stage is that we have separate Acts to deal with urban water supply, electricity, mining, navigation, drainage, sanitation, and so on. Viewed from the community's real interest as a whole this is a negative rather than a positive approach to the problem of water control because there is a complete absence of co-ordination in the national interest.
>
> From there you get to the third stage where over-all control becomes the dominant keynote, involving recognition that our water is a national asset, and as the lawyers would say a wasteable or a wasting asset. Water then is a precious asset to be appreciated and controlled to the national use, to be co-ordinated for the benefit of the whole community...
>
> .....
>
> Where does New Zealand stand? The general theme of this symposium surely demonstrates that New Zealand is moving to this third stage. If our position is that the quantities of water we have in this country are not sufficient to allow indiscriminate use under separate Acts of Parliament, each aimed at a different purpose, and that there is likely to be conflict amongst different users of water, then the need at once arises for a national over-all system of control, national legislation. (New Zealand Engineering 1965, p 106 - 107).

This third phase integrating legislation did follow, in the form of the Water and Soil Conservation Act, 1967 which came into force on 1 April, 1968.

It is worthwhile examining in further detail attitudes to water, and the development of the law in New Zealand.

1.1 Attitudes to Water

There appears to be a general belief that New Zealand has abundant water, a belief that is repeated in many publications including reports from specialist groups, for example the 1970 Physical Environmental Conference (McMahon, no date). This attitude probably stems from the early settlement of the wetter parts of New Zealand, and particularly establishment of towns at the swampy mouths of rivers where the immediate impression would have been one of over-abundance of water. Movement into the drier central regions, especially of the South Island during the gold-mining era, no doubt resulted in regional recognition of shortages, but

in many areas the belief that water is plentiful nationally has persisted.

Recent hydrological information substantiates this attitude (Toebes, 1972), and it has been maintained that the country has "more water over a given area and for each person than any other country in the world". (Soil and Water, September 1973, p 3). However, such observations are qualified with the recognition that this supply is not well distributed in time or space, and that severe regional shortages do occur. During discussions prior to the 1967 Act it was commented that repetition of statements that there was water in plenty were unhelpful, and tended to reinforce a developing recklessness, particularly with regard to water quality.

1.2 Development of Legal Control

Figure 4 represents the development of legal control over water uses from the initial common law, through the various statute laws, to the present day. The water use categories shown (columns) are adaptions of those discussed in the introduction, altered to fit in with the pattern of development of the law. For example, water conservation has been included, although this can be considered as simply an aspect of supply. Underground water has also been separated, to indicate the way in which control of use of water from this source has evolved. Obviously groundwater use control influences both rural and urban water supplies, but the 1953 Underground Water Act has been included in the groundwater column instead of the supply columns. Water supply (urban and industrial) includes all industrial uses whether self or municipally supplied, and water supply (rural) includes rural domestic uses as well as all agricultural uses. Waste disposal includes both water-borne wastes and solid wastes, and is often complementary to Pollution Control. The remaining column titles are self-explanatory.

The statute laws included are the major Acts concerned with the control of the water uses, and this listing is

Legend, Figure 4

1967 Water and Soil Conservation Act and Amendments

1953 Underground Water Act

1953 Waters Pollution Act, including 1963 Waters Pollution Regulations

Remaining blank columns include all other law, both prior to and since the 1967 Act, including common law where applicable.

NOTE: The width of columns and the shaded portions are a subjective assessment of the relative extent of control, particularly contrasting the 1967 Act and amendments with the residue of other laws.
The numbers indicate significant changes in control, and are referred to in the text under the section 'Development of legal control' Chapter 2.

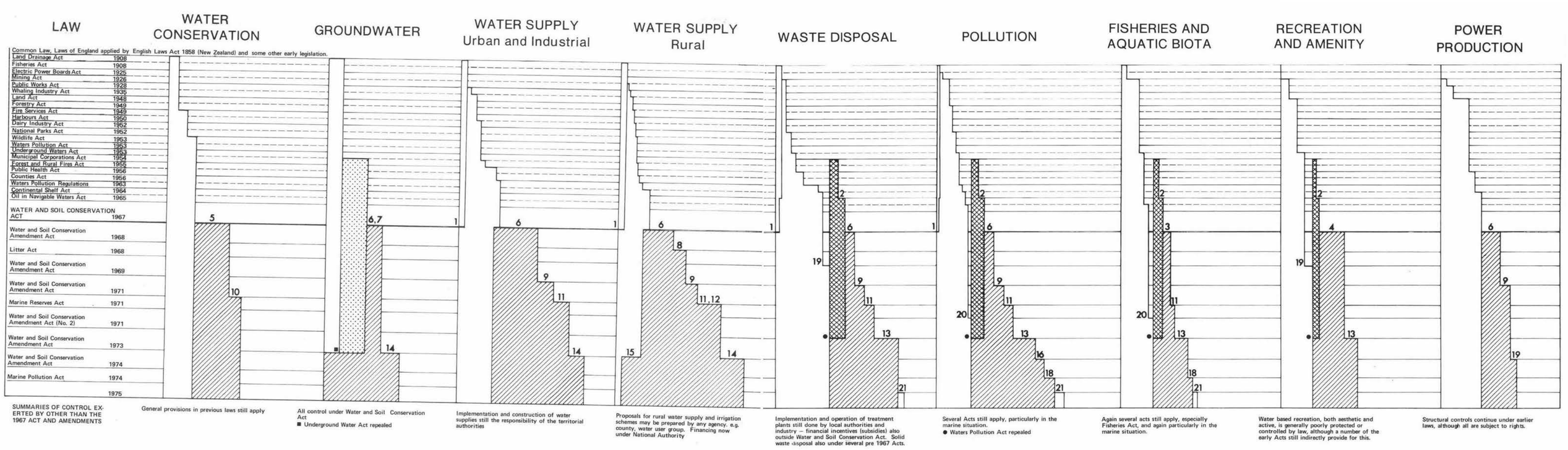

Figure 4

Development of legal control of water use in New Zealand.

drawn from Cowie (1959), Ministry of Works (1965), Kember (1972) and Commission for the Environment (1975). It does not include the following:

1) The Water and Soil Conservation Amendment Act 1972. which did not affect any of the uses directly, and simply added a representative of the Catchment Authorities Association to the membership of the National Authority.

2) Amendments of Acts prior to the comprehensive legislation in 1967 eg: Fisheries Amendment Act, 1931. The minor Waters Pollution Amendment Act 1970 is also excluded.

3) Regulations, except for the Waters Pollution Regulations 1963 which are included because of their importance in the control sequence, involving a drastic change from advisory to truly regulatory control.

4) Local Acts, such as the Tasman Pulp and Paper Company Empowering Act, 1954, which authorised taking from and discharging to the Tarawera River; the Whakatane Board Mills Water Supply Act, 1961; and more recently, the Wellington Regional Water Board Act, 1972, which set up the Regional Water Board in Wellington.

5) Acts relating to construction aspects, which are of limited significance and although their provisions still apply, are subject to later legislation. e.g.: The Construction Act, 1959; the Government Railways Act 1949; and the consolidating Electricity Act 1968.

6) Acts referring to specific places. For example; the Hauraki Plains Act, 1926; the Christchurch District Drainage Act, 1951; and the Lake Wanaka Preservation Act, 1973.

7) Acts with very general application. For example, the Police Offences Act 1923; and the Crimes Act 1908; both of which deal with wastes in streams.

As noted in the legend, the width of the columns, and the relative widths of the shaded portions, are a subjective assessment of the relative extent of control, particularly contrasting the 1967 Act and amendments with the residue of other law. A brief summary of the present control by the

legislation other than the 1967 Act appears at the base of the columns. The numbers indicate significant changes in the management of the uses, and are referred to later in the text.

1.3 Early Legal Control in New Zealand

The common law as to the taking and use of water, prior to the 1967 Act, was considered to follow the principle of riparianism. Salmond (1961) describes this:

> A riparian owner has right to the undiminished flow of the water in a natural stream, subject only to the reasonable use of the water by other riparian owners for the purposes of their riparian property.

He also comments that this principle was established only after some hesitation. This doctrine derived from English Laws Act, 1858 (New Zealand), which applied the laws of England existing on 14 January 1840 including common law, to New Zealand. However, it has been suggested that as this riparian principle was only established by a court ruling in Britain in 1833, it applied to New Zealand virtually by accident, and as such has no sanctity as the ancient law of England. Water user dissatisfaction with riparianism was common as soon as demand caught up with supply, and it was found to be impractical in the mining districts of New Zealand as early as the Goldfields Act of 1866, when rights were determined by mining legislation.

An alternative doctrine of 'prior appropriation' developed in the arid western states of America, about this time, and in brief held that title to all water vests in the State or the Public; that individuals can appropriate water for beneficial use; that as between appropriators, first in time is the first in right (University of Michigan Law School, 1958). Although this principle did not strictly apply to the New Zealand law competitive situations were very often settled by appropriation (New Zealand Parliamentary Debates, 1967 a) until the passage of the 1967 Act, except in mining districts where priorities were determined by the mining licences.

As well as the residue of this common law (1, Figure 4). a large number of statutes applied to the various water uses.

The most important are shown in the diagram. During the introduction of the Water and Soil Conservation Bill in 1966, Hon. P.B. Allen, Minister of Works commented:

> In force in this country at present is the residue of the common law relating to water together with more than 50 principal Acts of Parliament dealing with different aspects of water. The administration of these Acts is divided between 11 Government departments. In some instances more departments than one share in the administration of a single Act. There is reference to water in more than 30 other Acts, making a rather ridiculous total of over 80 Acts. Such fragmentation leads to confusion in interpretation and makes administration almost impossible (ibid, p 2591).

1.4 Water Pollution Legislation

One of these Acts deserves more attention than the others, in that it represented in itself an attempt at consolidation of some of this fragmentary control, although it was later to be incorporated in the comprehensive legislation. This was the 1953 Waters Pollution Act, which attempted to give some cohesion to pollution control which Cowie (1959) noted as being exerted by eleven Acts, administered by six departments before this date. An inter-departmental committee, whose recommendations formed the basis of this Act (cited Cowie, 1959; and Scott, 1972), reported that there had been little application of these earlier powers, with a few prosecutions only under the Fisheries Act 1908, and the original Health Act, 1920.

The 1953 Act included some useful definitions, a section on Trade Waste By-laws to enable communities to control tributary wastes to their systems, and formed a national body, The Pollution Advisory Council (hereafter PAC). The Council's function was to "inquire into and make reports and recommendations to the Minister of Marine on such ways of preventing or reducing the pollution of waters and of co-ordinating the functions of persons or bodies charged with the duty of preventing or reducing the pollution of waters". Regulatory control existed only under other enabling law, such as the Tasman Pulp and Paper Company Empowering Act mentioned, or by regulations issued

under the Act. The work undertaken by the Council was largely in co-ordination and education, with some technical publication (PAC 1956, 1959; McDowall and Thomas, 1961) and promotion of water quality surveying (Ministry of Works, 1962).

The Council's stated policy of persuasion and education has been recognised as ineffective (McLeod, 1970 a) and it seems that this Act was ahead of public opinion at that time. In 1962, a minor amendment added an appeal provision, indicating that the Council was assuming regulatory functions, and this trend was confirmed by the far reaching 1963 Waters Pollution Regulations (2, Figure 4). These added further definitions, but also gave the Council investigatory and control functions and powers.

These were contained in a set of procedures known as Classification of waters. These remain virtually unchanged in the present law, and as will be shown later are a major source of controversy in the present management regime. In this control system, the Council could classify waters according to use, and to defined use categories certain standards were attached (Appendix A). Procedures for registration and issuing of permits for outfalls by the Council were established to ensure that these essentially receiving water standards were not contravened. There were provisions for objections and appeals to the Council on classifications and against conditions imposed on the permits. Temporary permits could be issued for existing polluting discharges. The Marine Department continued to service the PAC, although the Health Department was involved in surveying of uses before classification and local policing of the permits. Further details of this system can be found in a survey of pollution legislation prepared by World Health Organisation (1967).

The PAC was later included in the national organisation set up by the 1967 Water and Soil Conservation Act, and in classified areas a dual system of permits and rights for discharges was created. There was increasing dissatisfaction at this time with the permit system. Kirk (1970) comments on the ineffectiveness of control, and it became apparent that the system, even without full coverage of the county by

classification, was overstretched. A number of prosecutions were attempted, but failed, and virtually automatic renewal of temporary permits developed. For example, records held by the Manawatu Regional Water Board show that a major discharger in the Manawatu held no fewer than eighteen temporary permits over a period of eight years (1964 - 1972). McLeod (1970) and Cowie (1971) both indicated that policy and structural changes were imminent.

The Waters Pollution Control Amendment Act 1970 subsequently altered the name of the PAC to the Water Pollution Control Council (hereafter WPCC) and shifted the servicing ofthe Council to the Ministry of Works. Shortly after this, the Water and Soil Conservation Amendment Act (no. 2) 1971 transferred the system over to the relatively recently established regional agencies by deeming permits to be rights. Classification was retained as a function of the national body, which was reformed as the Water Resources Council (hereafter WRC or the Council). The Waters Pollution Act and Regulations were repealed. For the extent of classification, and progress in issuing permits at this time, see Appendix B.

There were criticisms of the motives for this rapid move (NZ Environment, 1972) as well as developing dissatisfaction with both the philosophy and technical provisions of classification (Knox, 1970; Scott, 1972).

1.5 Background to the 1967 Water and Soil Conservation Act

This water pollution legislation is thus not a direct antecedent of the 1967 Act, but a parallel development, as the first moves towards comprehensive water legislation began in the early 1960's. There is no evidence of an upsurge in general public interest in water use management at this time, and it is considered that the initiative for the consolidation lay in the personal interest of the then Minister of Works, the Hon. P.B. Allen (N.W. Collins pers. comm.). This was thought to have been reinforced by direct representation to the Minister by the farmers of South Canterbury, who wanted rationalisation of water control in that area, which suffered from severe water shortages. This led to the formation of an

interdepartmental committee on water, which was set up in 1963 with the following order of reference (McLeod, 1970 b, p 21.1):

> (1) To ascertain and report what are the present and likely future uses of water in New Zealand and how these can best be provided for.
>
> (2) To consider what problems, including deficiencies and superfluities, relating to the control, conservation, quality, quantity, diversion, availability, abstraction, use, return, disposal, and dispersal of water exist in New Zealand now or are likely to arise here; and to make recommendations.
>
> (3) To consider what difficulties arise in respect of ownership of river beds, riparian rights, use of water as highway, and accretion and erosion of land both inland and adjoining the sea.
>
> (4) To consider what laws apply to the foregoing matters and what difficulties, if any, arise out of the law.
>
> (5) To consider what difficulties exist in the efficient administration of any of the foregoing; and to make recommendations.
>
> (6) To consider whether a comprehensive Water Act is necessary or desirable and if so what should be embraced within it.
>
> (7) To recommend what (if any) changes of law or administration are necessary or desirable in respect of any of the foregoing matters.

This committee reported in March 1965[1] (Ministry of Works, 1965), and its recommendations formed the basis of the Water and Soil Conservation Bill. However, there were a number of other influences at that time. O'Riordan (1971

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1. This committee was chaired by the retired Ministry of Works Solicitor Mr G. Wakelin, and although entitled 'New Zealand Law and Administration in respect of water' is often referred to as 'the Wakelin Report'. The committee's recommendations were produced as a confidential report to cabinet, and although its confidentiality has been maintained even after ten years, permission to read the report was given by the Director of Water and Soil Division, Ministry of Works. As a confidential report no direct quoting from or reference to it can be made, but a number of points of fact rather than opinion (such as the legislation list in Figure 4) have been drawn from the report. I would like to thank the Director for making the report available to me.

c) considers that the Government was affected by the passage of the comprehensive British Water Resources Act, 1963. It seems likely that a more important factor was the symposium held by the New Zealand Institution of Engineers (NZIE, 1964). The NZIE certainly considered that the policy had been "unquestionably influenced" by this forum and their discussions had helped "to lay the basis for unified administration in all fields relating to water use, soil erosion, river control, drainage, pollution and water allocation" (NZIE, 1970, p 59). Also a report on the organisation and administration of soil conservation and rivers control (Williams, 1964) noted the lack of attention to consumptive uses, and suggested that control of uses should lie with the catchment authorities.

Wild's comments (op. cit.) reflect the legal position at the time, and there was general agreement on many issues. Among these were recognition of the fragmentation of the law and administration of water matters, with both duplication and incompleteness in areal coverage as well as management aspects. For example, water pollution control was restricted to classified areas, and this was only control of pollution, not control of all water quality. Several Acts were considered in need of revision, because of obsolescence and complexity caused by amendments. It was generally felt that pollution control under the Health Act and Waters Pollution Act was simply not effective. A reorganisation of records of mining rights was also considered urgent. In all these matters, the lack of trained personnel, background knowledge, and adequate 'water technology' was stressed.

The Water and Soil Conservation Bill, as the consolidating Bill was named, was first presented on 9 September 1966. Although the Minister intended that it should be passed immediately, it was referred to the Lands and Agriculture Committee. This committee received submissions from 46 organisations, and after an extension of time, finally reported on the 6th September 1967. There were a large number of amendments (approximately 120) in the committee stages. Perhaps the most significant of these were the alteration

of the word licence to 'right' and incorporating appeals procedures to the Town and Country Planning Appeal Board (hereafter TCPAB or Appeal Board) rather than the national organisation created by the Act.

It is clear from the debates (New Zealand Parliamentary Debates, 1967 b) that this initial Bill was intended mainly to set up a national authority to prepare further major legislation, but this original purpose seemed to be lost during the committee stages. The Minister apologises (ibid, p 2857) for not consulting widely, in the face of criticism that "The Bill, as only the first step,... is going too far".

1.6 The Water and Soil Conservation Act, 1967

The Bill was passed, and the Act came into force, on 1 April 1968. The following summarises the principal provisions, and also outlines the contents of the subsequent amendments. Further details may be found in the next chapter, and in the reprinted Act which is enclosed as Appendix J. The numbers refer to the points shown on Figure 4.

This principal Act certainly set up an administrative structure. A National Water and Soil Conservation Authority (hereafter the Authority) was constituted with wide jurisdiction over water matters. A subsidiary Council, the Water Allocation Council (WAC) was also established. The existing Soil Conservation and Rivers Control Council (SCRCC) which dealt with the flood control and soil conservation matters under the 1941 Soil Conservation and Rivers Control Act (hereafter the 1941 Act); and the Pollution Advisory Council (the latter with some slight change in membership also became subsidiary councils. The Authority and its Councils together were called the National Water and Soil Conservation Organisation (after this point identified by NWASCO or the Organisation).

Provision was made for setting up of a maximum of 25 water regions which were to be existing catchment districts and areas. The existing Catchment Boards and Commissions and the Waikato Valley Authority, all primarily involved in the 'structural' water management under the 1941 Act, were to be Regional Water Boards (the abbreviation RWBs or the

Boards will be used after this). These Boards were to exercise all functions, rights, powers and duties delegated to them by the Authority or any Council and 'promote the protection of water supplies of local authorities and the conservation and most beneficial uses of natural water within the region'. Other functions, mostly under the direction of the Authority were included (Section 20) and the Boards were required to have 'due regard to recreational needs and the safeguarding of scenic and natural features, fisheries, and wildlife habitats' (3, 4, Figure 4). This latter requirement was further reinforced in the long title, which stated the Act was:

> An Act to promote a national policy in respect of natural water, and to make better provision for the conservation, allocation, use, and quality of natural water, and for promoting soil conservation and preventing damage by flood and erosion, and for promoting and controlling multiple uses of natural water and the drainage of land, and for ensuring that adequate account is taken of the needs of primary and secondary industry, water supplies of local authorities, fisheries, wildlife habitats, and all recreational uses of natural water.

This covers virtually all aspects of water use management as earlier defined, and also includes many other aspects of water resource management. It is notable that conservation is given emphasis as the first of the functions (5). The Act, as well as establishing the administration and setting out broad national policy, included a detailed and substantial change in control of water use. This vested 'the sole right to dam any river or stream, or to divert or take natural water or discharge natural water or waste into any natural water, or to use natural water' in the Crown. This almost entirely replaces the common law with statutory control (1), and the legal import of this has been discussed by Davis (1968) and Brookfield (1968).

A 'modified riparian' situation (United Nations, 1972) continues, in that the taking and use of water that is reasonably required for domestic purposes, and for the needs of animals, and firefighting is authorised without any action being required on the part of the user. Uses which lawfully

existed on 9 September 1966 (the day the Bill was first introduced) and had been used for three years prior to this, could be authorised provided notice of the use was given to the local Regional Water Board before 1 April 1969. For the new uses a procedure for application and granting of water rights by the Regional Water Boards was instituted. Thus all of the uses detailed above were subject to authorisation for a right. Provision was made for general authorities to be given in some situations, but a detailed procedure for processing water rights was included.

Procedures for advertisement of applicants, receipt of objections, hearing of applications and objections by Tribunals, and appeal procedures to the Town and Country Planning Appeal Board (as constituted under the Town and Country Planning Act 1953) were detailed. Boards were required to keep records of uses for public inspection, and conversely all users were required to supply information concerning their activities in relation to use of water. An offences section, with provision for relatively small fines was included; and importantly this Act was binding on the Crown.

A number of definitions were included, of which that for natural water is important: "Natural water means all forms of water, including fresh water, groundwater, artesian water, sea water, geothermal steam, water vapour, ice, and snow that are within the outer limits of the territorial sea of New Zealand....." (Section 2).

This inclusion of ground and artesian water also subjects uses from these sources to right requirements (7), although the definition goes on to exclude water used for water supply purpose of a public authority.

In 1968 Regulations were established to detail the requirements for notifications and applications. In the same year the first amendment to the Act allowed rights granted under other Acts, between 9 September 1966 and 1 December 1968 to be authorised, and mining privileges to continue as water rights. This had most impact on rural water uses in mining areas (8).

The 1969 Amendment extended the period for notification of existing uses until 1 April 1970, but also

included a section allowing transfer of water rights (9). Papers by McLeod (1970 b) and Howie (1971) review the situation at this time.

The first amendment in 1971 introduced a number of important aspects, and represents the first of the amendments to continue consolidating the law. As well as including a section on control of water in shortages (10) there was a general tightening of administration of the right process. This included altering the procedures for constituting Tribunals; allowing minor variation of rights to be dealt with by the Boards without advertising; introduced subsections on surrender, restriction and cessation of rights (11) and easements; and set up a provision to allow promulgation of by-laws on dams. Perhaps more importantly, particularly in the rural situation for some areas of the country, a whole section on mining rights in relation to water was included (12). This repealed sections of the Mining Act, and Public Works Act, although some provisions did not actually come into force until 1973.

A second amendment in the same year, continued this consolidating trend, and introduced all aspects of water quality control into the principal Act. Most of the provisions of the 1953 Waters Pollution Act, and the 1963 Regulations were incorporated, and these laws then repealed. The functions of the Water Allocation Council and the now renamed Water Pollution Control Council were combined under a new Water Resources Council (WRC). The system of classification of natural waters was retained, and the power to classify and reclassify was made a function of the WRC. The basis of classification was no longer 'public water use', but "a declaration of the minimum standards of quality at which natural water so classified shall be maintained in order to promote in the public interest, the conservation and best use of that water". The standards thus effectively became the classes, with temperature and bacterial criteria slightly amended. A new class, SE, was introduced, to be applied in special circumstances to allow ocean outfalls of raw, but broken down sewage. The issuing of permits ceased on 31 March 1972, all permits were deemed to be rights, and in

future the Boards were to exercise control by the issue of rights to discharge wastes. However, the Boards were required to seek the consent of the WRC before discharges could be granted in classified areas. Further definitions, particularly with regard to water quality matters, were also added.

A minor amendment was made in 1972, which although important in that it gave the Catchment Authorities Association representation on the National Authority, did not affect any uses directly and is not shown in Figure 4.

A number of matters were discussed as policy changes at this time, including the question of geothermal and underground water, rural water supply and irrigation. It was apparently decided to leave control of thermal waters under the Geothermal Energy Act, but a substantial review of irrigation policy was undertaken. (NWASC), 1971 a). This was discussed widely (Frengley, 1972) and although delayed by the change of government, was implemented in the 1973 amendment.

Groundwater control was also included in this amendment (14), and the 1953 Underground Waters Act repealed. The irrigation and also rural water supply questions were rationalised by placing the overview and financing (subsidy) provisions under the Authority, with the Ministry of Works and Development confirmed as major field agent (15).

This amendment also altered some sections with regard to classification, including: the actions that could be taken by the Boards in inheriting permits to discharge; provision for the WRC to cancel preliminary classifications; and transferred some standards from the schedules of classes to the body of the law (16). A major section of validating rights for the Tongariro power scheme was also added (17).

At this stage, amendments to the local Auckland Regional Authority Act, the passage of the Wellington Regional Water Board Act (1972) and the alteration of some catchment districts had completed coverage of New Zealand with Regional Water Boards.

The most recent amendment 1974 rectified an earlier omission, by extending water regions to the territorial

waters in the 'natural water' definition, the catchment districts previously had not extended beyond the shore (18).

1.7 Other Recent Enactments

A number of other laws have recently been enacted which have provisions relating to water use and these are also included in Figure 4.

The 1968 Litter Act includes provision for prosecution when solid wastes are placed in water (19), and the 1971 Marine Reserves Act makes discharge to such a reserve an offence (20). A substantial law, the 1974 Marine Pollution Act, has extensive controls over water quality and discharge in the marine situation, and remains outside of the 1967 Act because of its international nature (21).

One other influence has arisen not from law, but from Government policy. This is the establishment of a Commission for the Environment, and Environmental Impact Reporting Procedures, which took effect on 1 March 1974. Reporting of government actions and projects having an impact on the environment is required, and many of the water uses subject to rights also come within its scope. Although the co-ordination and timing of applications for rights, and impact reporting has not been established at this stage, this procedure will provide additional control over major water use projects.

The development of control has thus been very rapid since the 1967 Act, and although the flood control aspects are included in the National Authority functions, and controls are exerted over structural operations such as damming and diversions, the major thrust of this law has been towards water use control. The very speed of this development has caused problems, as will be shown later, and represents something of a legislative record of amendment. It does mean however, that substantial progress has been made in a short time, in establishing comprehensive management of water uses in New Zealand. As well as the addition of major management functions (for example, water quality and groundwater control) these amendments have clearly been 'mopping up' legislation.

CHAPTER 2

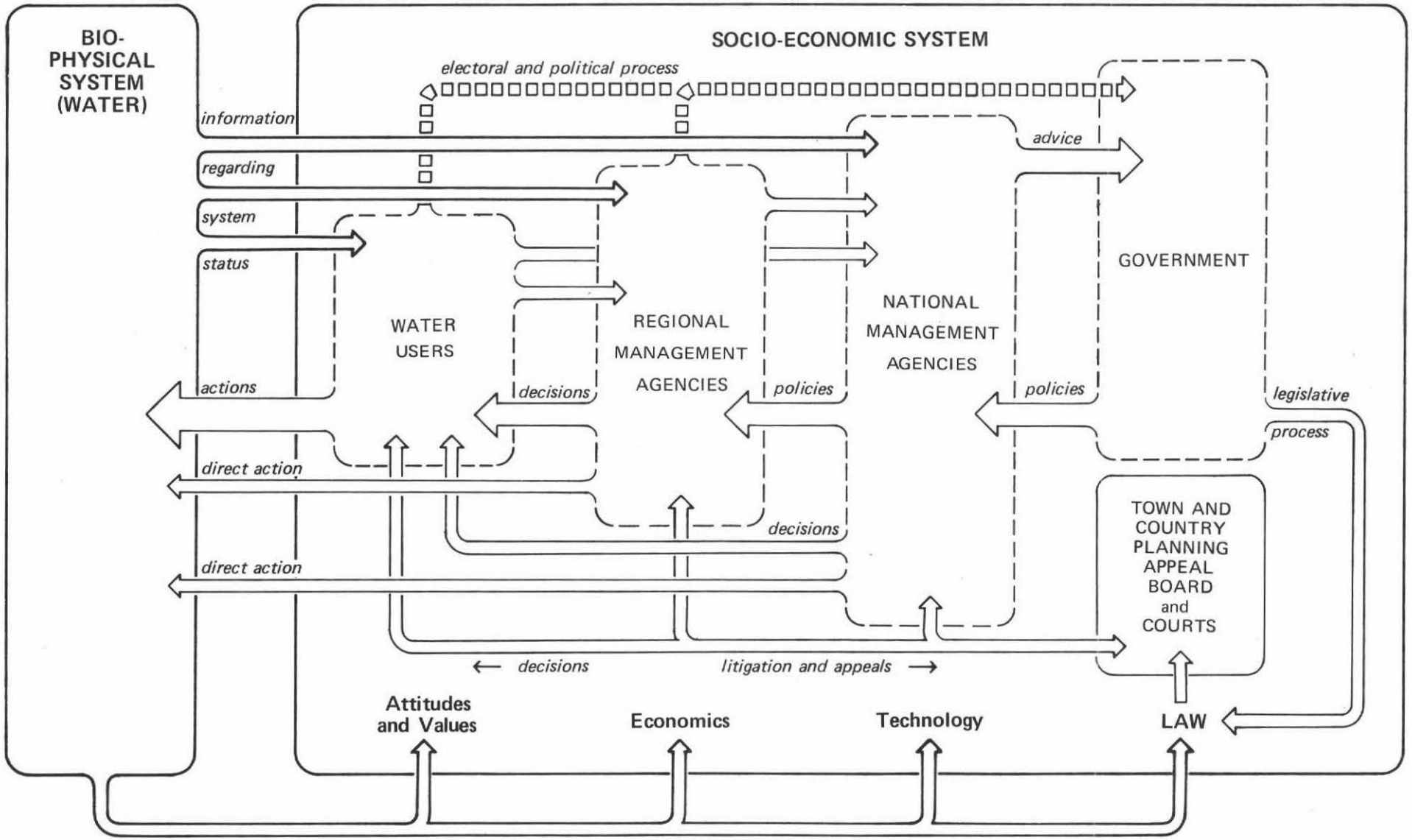
PRESENT MANAGEMENT

The present system of water use management thus involves all the aspects introduced by the 1967 Act and the amendments, the residue of other law, and influences from agencies such as the Commission for the Environment. The control exerted by the Water and Soil Conservation legislation is the major control over most of the uses discussed (Figure 4). Consideration will now be made of the management structures and functions created by this legislation.

The simple general model discussed earlier (Figure 3) can be expanded to show in more detail the agencies and linkages in the New Zealand situation. Figure 5 illustrates the hierarchy of the management agencies, and includes links to the judicial aspects of management. The water users and the management agencies are enclosed in broken lines to indicate that they are influenced by, and in turn affect the socio-economic variables. The judicial bloc is shown within a continuous line, indicating an isolation from the general socio-economic influences, although these are reflected in litigation and appeals and through the legislative process. Direct influence of the water users on both the regional and national agencies is shown, as is the feedback from the regional to the national agencies. The water user link to the government is both by the electoral process, and by direct political leverage; the latter is also available to the regional agencies, particularly the Regional Water Boards as local authorities.

2.1 Structures and Functions

The membership of the national agencies and a brief summary of their functions is indicated in Figure 6. The agencies which provide specialist services to the Organisation, the Commission for the Environment, and the two advisory councils, the Environmental Council and the Nature Conservation Council are also shown. The last three report direct to the Government; the Commission through its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PHYSICAL
SYSTEM
(WATER)
SOCIO-ECONOMIC SYSTEM
electoral and political process
information
regarding
system
status
actions
direct action
direct action
WATER
USERS
REGIONAL
MANAGEMENT
AGENCIES
NATIONAL
MANAGEMENT
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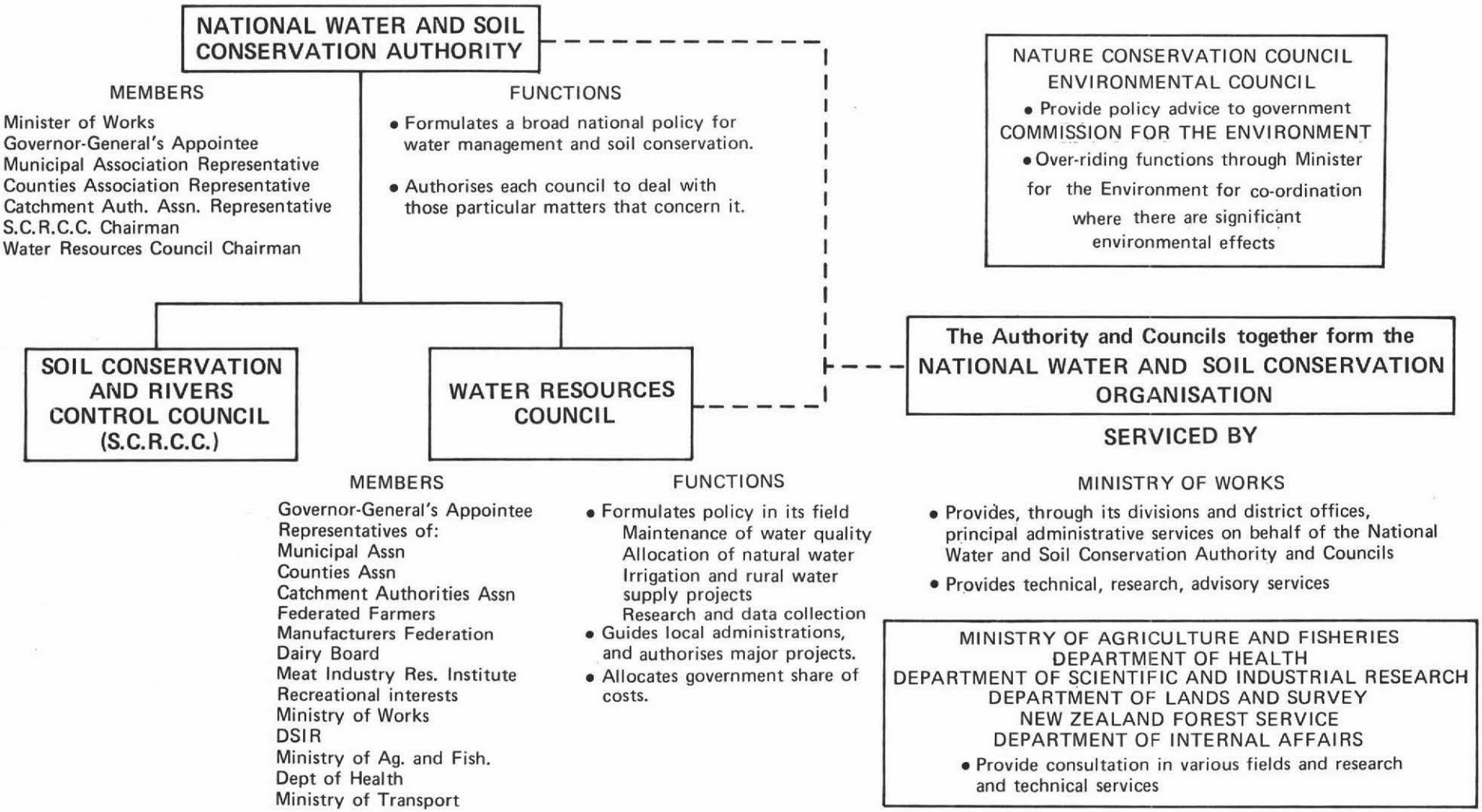

Figure 6

National water use management agencies — structures and functions

Minister, and the two Councils with general policy advice to Cabinet.

The Water Resources Council and the Authority have established a number of committees to deal with particular issues, and these are not shown in Figure 6. The committees have variable membership, depending on current problems, and consist of Council members and co-opted experts. Although the majority are serviced by the Ministry of Works and Development (hereafter MOWD), the Dairy Wastes Committee is serviced by the Ministry of Agriculture and Fisheries (hereafter MAF). As an indication of the areas covered a list of present committees and their activities in the year ending 31 March 1975 is included as Appendix C. The information is drawn from the National Authority Annual Report to Parliament (NWASC Authority, 1975).

A committee of the Authority or perhaps more correctly, of the Organisation, has also been established to review the legislation. Its activities for the last year also briefly outlined in this Appendix and its function is discussed in Chapter 10.

Figure 7 similarly outlines the membership and functions of the Regional Water Boards, the prime management agencies at the regional level, and also indicates the role of the MOWD and the territorial authorities.

These RWBs have far reaching control over many aspects of water use. The system of water rights provides considerable control over most operations involving water use, and allows substantial public input to the decision making process, including the right of appeal to an independent, semi-judicial authority. Control of water use in shortages, allocation of supply, control of quality, and control of structural aspects can be established under this system, and protection of recreational and wildlife interests is included. Control of mining privilege with respect to water; use of underground water and construction of wells and bores; and implementation of irrigation and rural water supply schemes is available to be exercised. The need for data collection, and the powers required for this, are recognised, as is the need for legal coercion by prosecution. Classification provides the national

REGIONAL WATER BOARDS

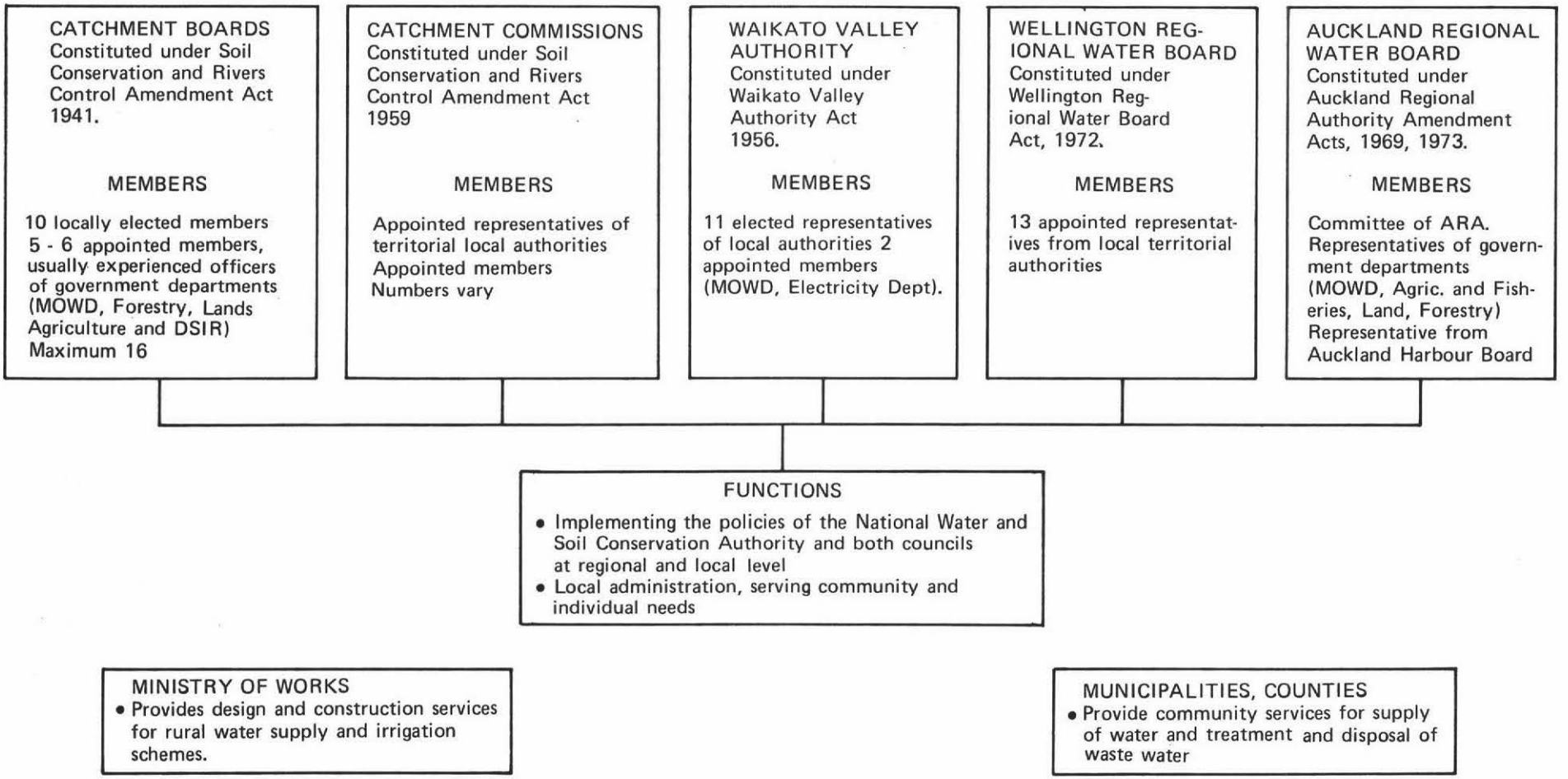

Figure 7

Regional water use management agencies — structures and functions

structure for water quality management which operates through the rights system. Full details of these provisions can be obtained from the reprinted Water and Soil Conservation Act which is included as Appendix J.

There have been very many rapid and substantial changes in these fields in a very short time. Every effort has been made to keep pace with these, and the following comments relate to the situation at the end of August, 1975.

The present status of the various management roles will inevitably be discussed in the following chapters on the problems of the system. However, some further explanation of the existing situation within some of these fields of management is required.

In particular, the water quality control system has been under considerable pressure, and a significant change has occurred quite recently. Following transfer of the classification system to the comprehensive law, the new Water Resources Council expressed its intention to classify the whole of the Country by 1975. A number of classifications had been completed (Appendix B) and others originally prepared under the 1963 Regulations were being processed. However, two of these (Porirua-Paraparaumu preliminary; Tauranga reclassification, preliminary) were appealed against and only one (Upper Manawatu, and remainder of the Manawatu region) appears to have been completed. Although the Council reported (NWASC Authority, 1973) that 39 areas had been classified, and only 12 remained to be done, all classifications under the new system - that is; not based predominantly on existing uses - were also appealed. In late 1974 the Council decided not to notify any more final classifications awaiting the outcome of these appeals, particularly those against the Southland classification. The Appeal Board decision was critical of both the philosophy and technical provisions of the classification, as well as questioning the status of some of the appellants. The decision allowed parts of the appeal and altered some

of the classes proposed[1]. A subsequent appeal by the Water Resources Council and some of the appellants resulted in Supreme Court decisions continuing much of the Appeal Board decision.[2, 3, 4].

As a result, the Southland and Bay of Islands classifications are to be reconsidered by the Appeal Board. The Water Resources Council has cancelled the majority (if not all) of the preliminary and final classifications promulgated under the 1971 Water and Soil Conservation Amendment Act (No. 2) (Appendix D). At this stage, the Water Resources Council has not made public any decision on future classifications.

Rural water supply schemes are being subsidised by NWASCO, and it was reported that in the year ended 31 March, 1974, nine schemes with total subsidy of $155,000 were approved. Irrigation schemes are now considered by an Officials' Committee in each MOWD district, and although the Ministry is the principal field agent, a number of government departments and other authorities are involved in the Officials' Committees. The allocation of finance has been delegated to the Water Resources Council who can now approve up to $500,000 in subsidy per scheme. (NWASC Authority, 1974). The question of financing of the Regional Water Boards, first raised in 1970 (NWASC Authority, 1971) has been discussed extensively and submissions were made to Government on this by the Authority. Increased finance has been made available to the Boards through a system of grants for Water Allocation Plans.

As a result of a report on water and soil conservation research (Dunford, 1973) changes have been made to the internal hierarchy of the principal servicing agency the Water and Soil Division of MOWD to the structure shown in

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1. All decisions on appeals both by the TCPAB and the Supreme Court, and other cases, will be indicated throughout by a superscript. Full citations of these appeals and cases are included in numerical order in the section of the Bibliography entitled Legal Decisions. For the several appeals to the TCPAB in the Southland case, only the one superscript (above) will be used, as the Appeal Board decisions appeared as a single two-part decision.

Figure 8. Following the appointment of a Director of the Research and Survey section, a substantially new policy on data collection has emerged, involving programming of 'operational surveys' through district committees made up of Water and Soil Division and RWB staff. The RWBs, their regions, and bases are shown in Figure 9.

A guide to agencies other than those operating under the 1967 Act involved in water use control has been prepared by the New Zealand Committee for Water Pollution Research whose listing is included as Appendix E. This Committee is intended to provide a coordinating group for particular research aspects related to water use. Fragmentation of responsibility is perhaps most evident in this field, and the range of bodies involved in research just on pollution aspects is indicated by the listing in DSIR (1973, p 551).

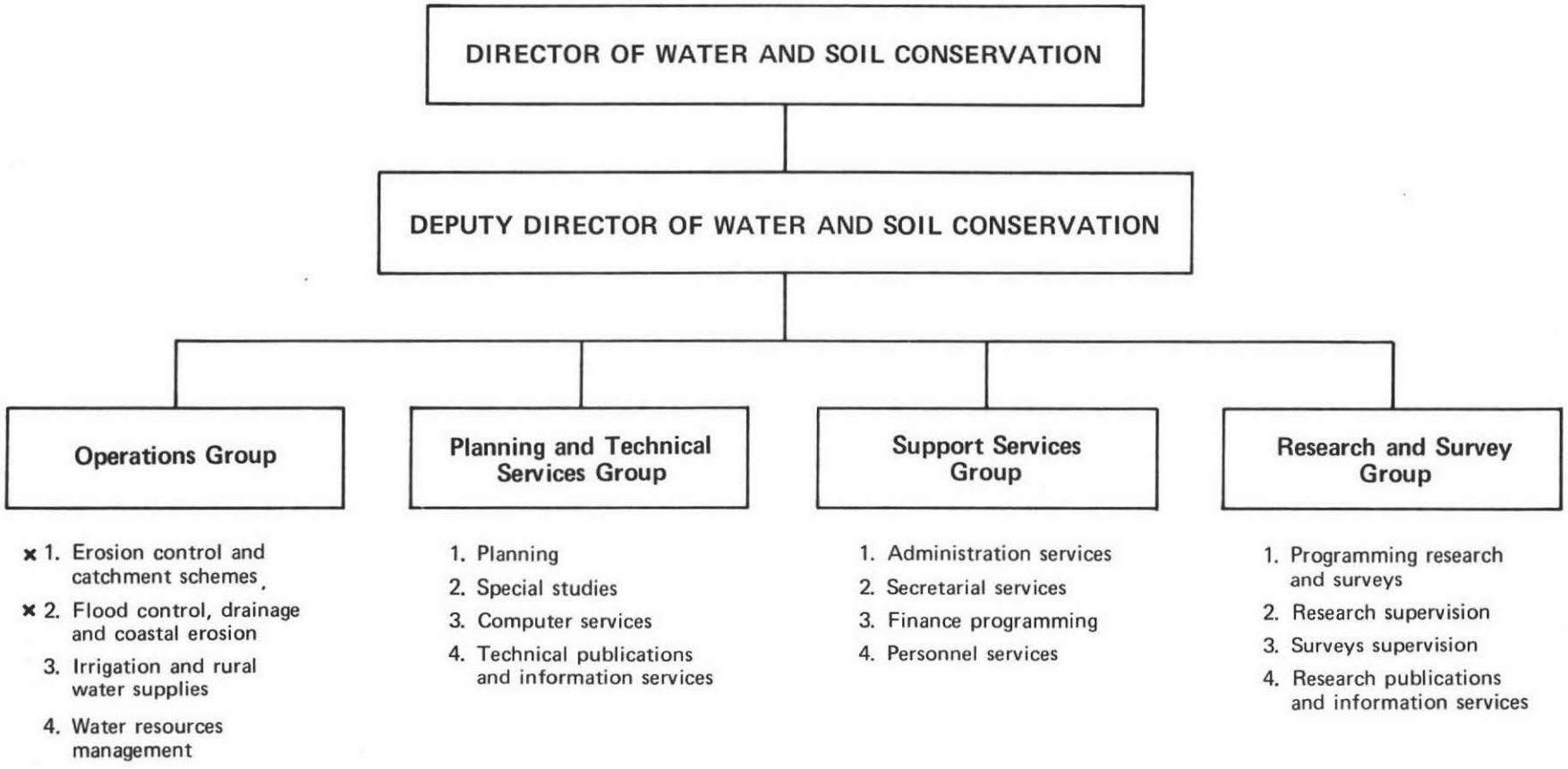
Whilst it might appear from the large number of statutes still involved in water use control that there continues to be a considerable degree of fragmentation, this is more apparent than real. It can be seen for example, from an analysis of the laws involved in pollution control (Appendix F - after Commission for the Environment, 1975), that many of the laws contain only passing mention of pollution, and do not contain detailed management structures in competition with or duplication of the 1967 Act.

2.2 Expansion of the Model

Although the major influences on the structural components of the system, and the linkages between them, have been shown in Figure 5, amplification of these connections is possible, Figures 10, 11, 12, 13 and 14 focus on each component separately and detail the inputs to and outputs from each.

The interaction of each of these blocs, except the juciciary, with the overall socio-economic milieu is assumed. The size of the arrows, both for inputs and outputs, are subjective assessments of the degree of importance of the influences.

These influences can affect different parts of the



× Not water use management

Figure 8

Organisation of Water and Soil Division, Ministry of Works and Development

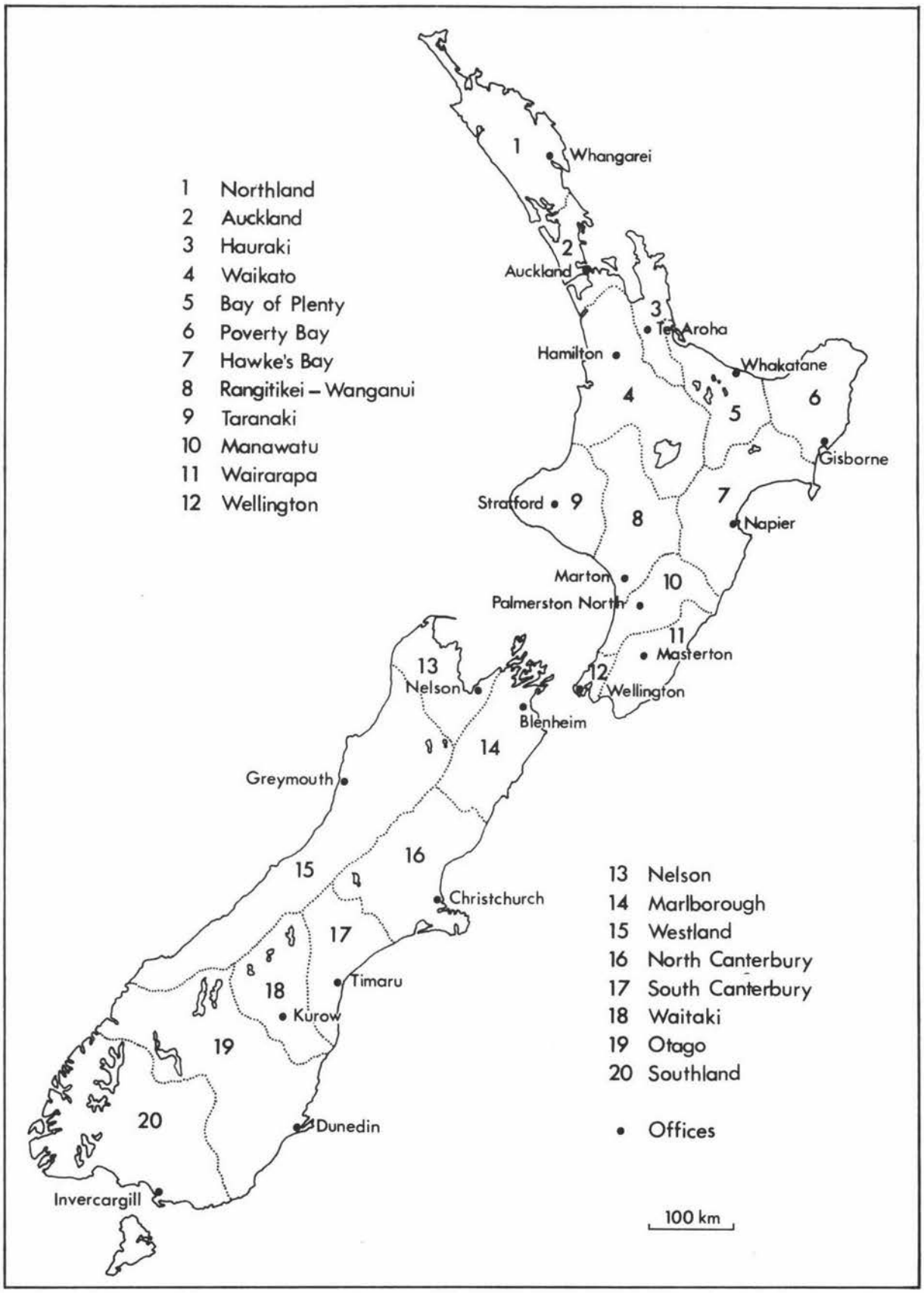
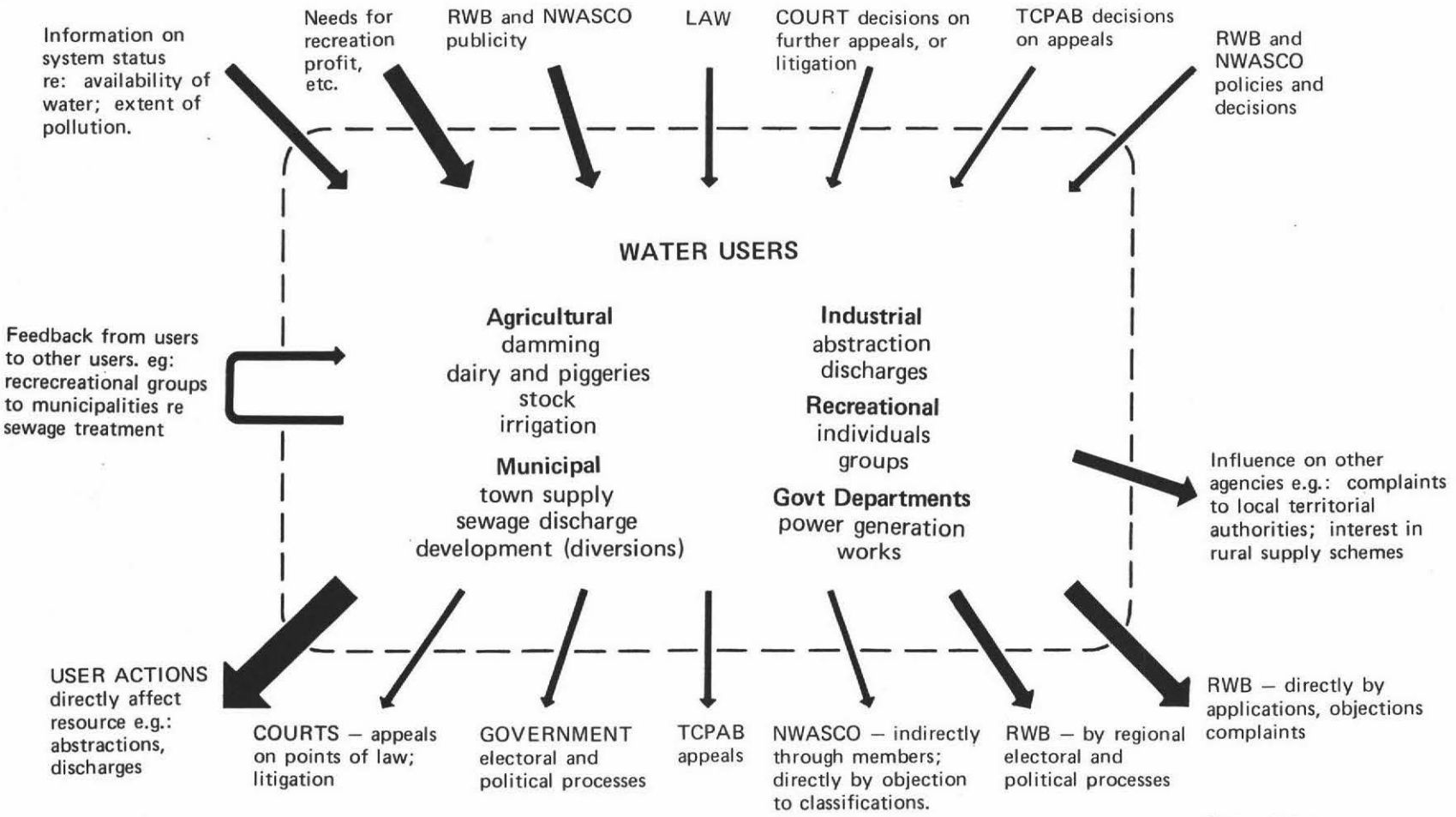


Figure 9

Regional Water Boards



Abbreviations

RWB Regional Water Board
NWASCO National Water and Soil Conservation Organisation
TCPAB Town and Country Planning Appeal Board

Figure 10
Inputs and outputs – water users

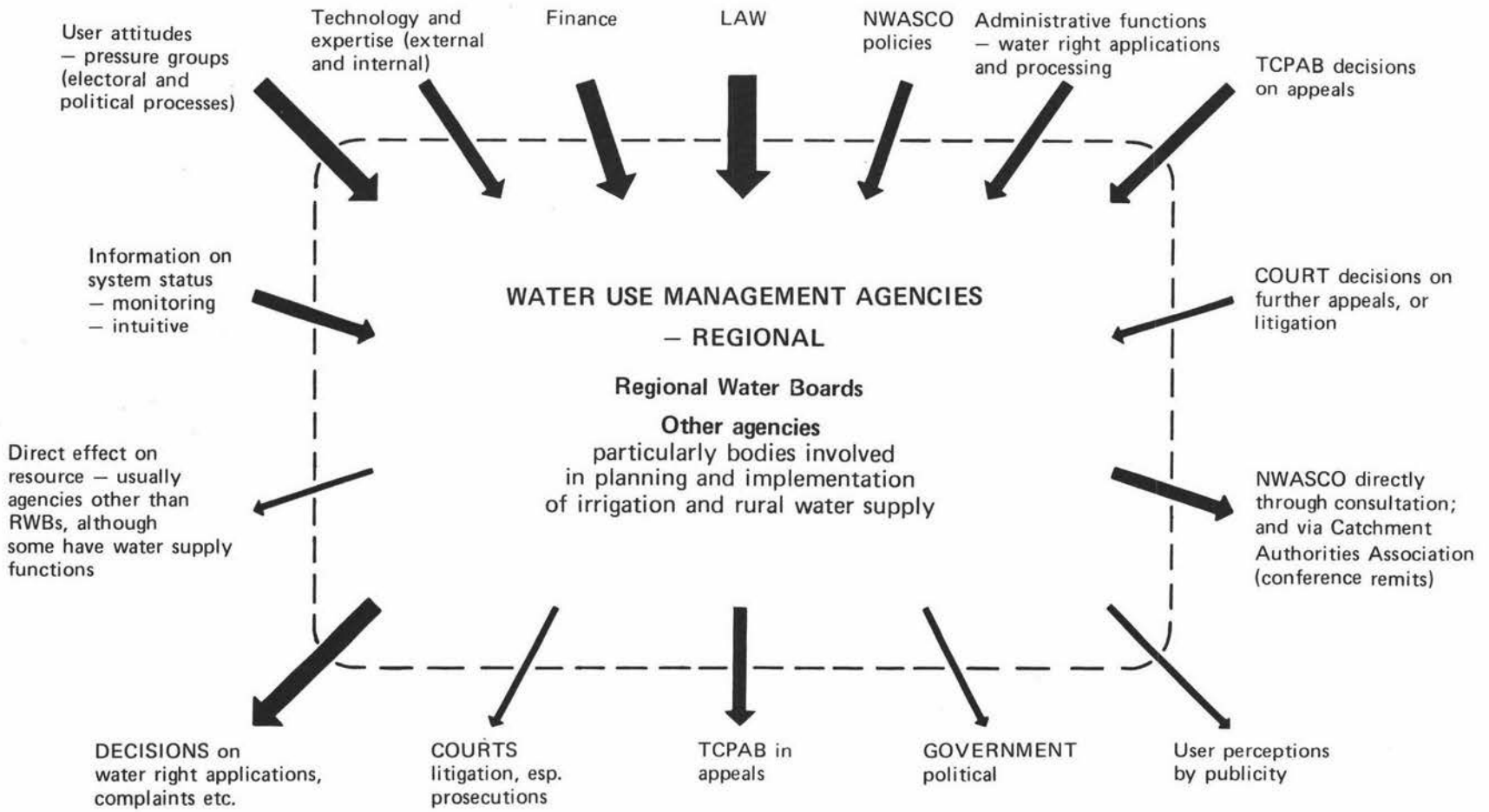


Figure 11

Inputs and outputs – regional water use management agencies

Abbreviations

NWASCO National Water and Soil Conservation Organisation

TCPAB Town and Country Planning Appeal Board

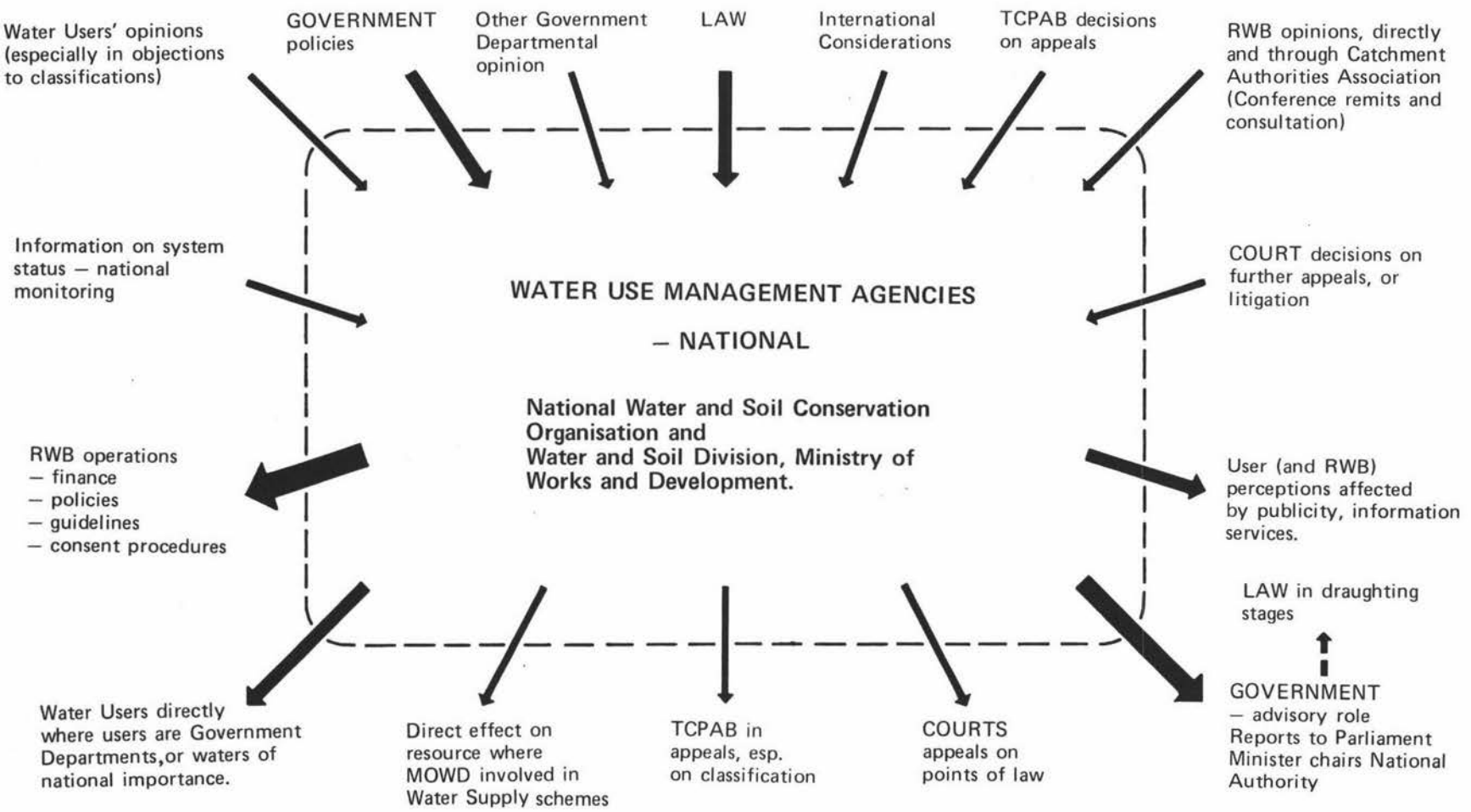


Figure 12

Inputs and outputs – national water use management agencies

Abbreviations

TCPAB Town and Country Planning Appeal Board

RWB Regional Water Board

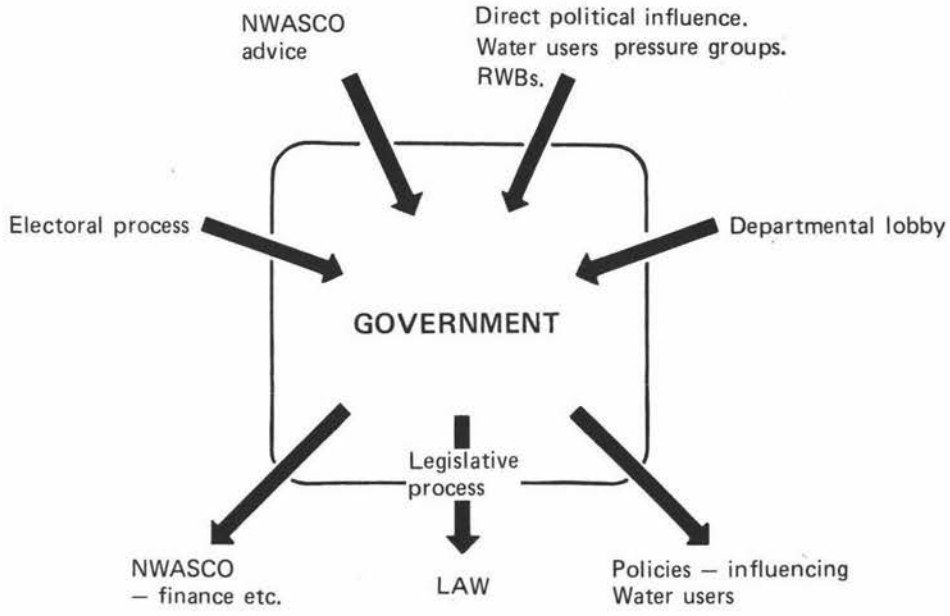


Figure 13
Government's role in water use management

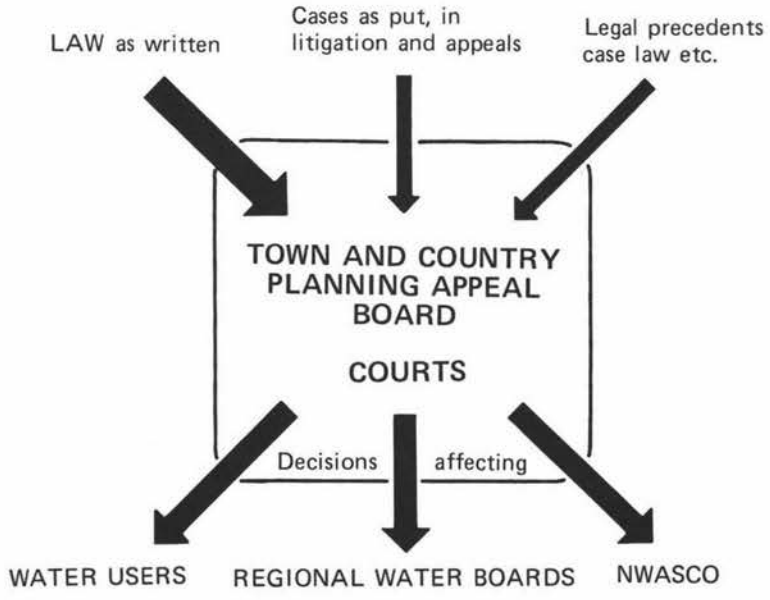


Figure 14
Judicial role in water use management

decision-making process within each structural component. It is not within the scope of this thesis to examine the effects of information and actions on the perception, evaluation and the search for alternatives, undertaken by the different groups. It is worth noting however that certain of these influences are directed mainly at one of these elements of the decision-making process. For example, publicity from the national agencies is aimed at increasing public and other agency perception of both nature of water use problems and the management system intended to cope with them.

An even more detailed approach to decision-making within the management agencies could be undertaken. O'Riordan (1971 b) proposes a simple model for this, involving an information base, a stage of canvassing of alternative strategies, followed by decision-making and finally comparison of the expected and actual outcomes. This evaluation of 'hindsight review' (Sewell, 1973) is closely linked to later search for alternative strategies, and subsequent decisions. The form in which information is presented to the manager is also discussed and it is suggested that this information can be modified by social guides, such as laws, policies, directives, standards and other pressures These pressures are often confused and contradictory statements by other agencies, professionals, citizens groups and individuals. The questions of values and attitudes, personalities, and role identification of the decision makers as well as the lack of feedback or evaluation are also raised by both O'Riordan and Sewell. Detailed examination of decision making at regional and national level in this way, will not be undertaken. However, where the influences or inputs to an agency have a major effect on one of these aspects of decision making, or a particular attribute of a decision maker substantially modifies any link, attention will be drawn to it.

The next part will discuss the problems of the present management framework, and will focus attention both on the internal structure of the components, the linkages between them, and the information flows across the interface.

PART II

PROBLEMS AND ISSUES OF

PRESENT MANAGEMENT

The present water use management regime is the source of increasing controversy, and as has been intimated, the classification procedure is one of the most vigorously debated environmental management topics in New Zealand today. Many of the problems and issues which are discussed here relate to the performance of the management agencies in the water use management role. Evaluation of the 'effectiveness' of control can only be made using defined economic or technical criteria, and because of the extreme difficulty of establishing such criteria for water use management, an appraisal of this type has not been undertaken. The attempt by Lello (1974) to produce a 'performance audit' for environmental planning, including water pollution control, is an example of the difficulties of evaluation by a discursive approach.

Minor indices of finance, staffing, and numbers of rights granted will be included, but it will be seen that none of these give a clear indication of the extent of control. The problems themselves, and the arguments about the various structures and procedures, will be used to indicate whether implementation is successful, in the opinion of the managers and their critics. Whether these opinions of success or failure are based on real changes in either the quality or quantity of the resource is another question. In fact it will be shown that information on the status of the biophysical system, in relation to the impact of water use, is generally insufficient to support either view.

As a general observation there is widespread acceptance that the New Zealand structure is as comprehensive in spirit or intention as any overseas example. There has, however, been an increasing expression of dissatisfaction with the implementation of that intention. This can be found at a variety of levels. Among water users, the recreational and environmental groups are vocal, voicing their attitudes by public statements and by objection and appeal in the water right and classification processes. The legal fraternity are concerned, and one group, the Environmental

Defence Society (hereafter EDS), has combined legal and environmental expertise in criticism of the system. Technical experts in universities and research institutions are making themselves heard, and more recently the Regional Water Boards have expressed concern with their role and status in the structure. The opinions expresses arise from many different viewpoints and are often directed at only restricted aspects of the overall water use management field, particularly the water quality control sector.

Three main areas of opinion can be identified. These correspond with the structural components of Figure 5, viz. the water users; the regional management agencies; and the national management agencies. A fourth can be described as specialist opinion, either legal or technical. Often, these opinions are channelled as 'expert' knowledge through water user interests, or are expressed through other agencies (Figure 6) such as Government Departments or the two advisory councils. In general these peripheral national agencies are the main providers of this specialist input. Also, this expert lobby is expressed in a general way without defined channels and in this is a reflection of the technology input from the socio-economic environment (Figures 3 and 5).

Where the municipalities are involved (Figure 7) as regional agencies, it is usually in the structural aspects of their role as water users either in abstraction for supply or discharge of wastes. Thus within the regional and national agency components the opinions of the major agencies, NWASCO and the RWBs will be stressed. The RWB role is particularly important. The Boards are sandwiched between the national agencies and the users. They are responsible for the regional management functions, with the administrative and technical load this entails, and must deal with the bulk of public participation in the system. This places them in a position in which they are theoretically best able to evaluate the problems and effectiveness of the overall structure. Also, at least until now, the Boards have in general been less vigorous than the other groups in expounding their views publicly. This is perhaps partly due to loyalty to the structure, but also due to preoccupation with the work

involved, the lack of a vehicle for effective coordinated comment, and in many cases only a recent realisation of the magnitude of the task ahead. Considerable emphasis has been placed on the facts and opinions of Board operation, and especially the opinions of the Boards themselves.

This Part will attempt to link these various viewpoints into an examination of the whole of the management framework, as the interface between the physical system (water) and the socio-economic system. The structures and the influences and processes linking the structures as shown in Figure 5, will be referred to and comments will be related to the further expanded input/output diagrams (Figures 10 to 14).

Sources of Information

The material used, both fact and opinion, has been drawn from a wide variety of sources, which can best be indicated within the three opinion areas already identified.

Information from the Water User/Specialist group has been drawn mainly from published material, including articles in journals, magazines, conference proceedings, etc. This provides 'expert' opinion, and attitudes of the more highly organised water users, although other attitudes can be gauged from cases presented to the Board. No attempt was made to canvass the agricultural sector, although some personal contact with farmers, especially in the Manawatu, will be alluded to. One interview was conducted with the Secretary of an influential Acclimatisation Society, and the annual reports of several other of these societies were consulted. Where general or overseas literature discusses similar or related situations, either in specific or general terms, some reference will be made to this also.

The National Authority and the Water Resources Council have a membership of the major water user groups, and theoretically at least, the policies of these bodies should reflect a consensus of water user opinion. A distinction must be made between the Organisation policy, and the opinions of the servicing agency, the Water and Soil Division of MOWD. The Organisation policy information has been drawn from the Annual Reports to Parliament, public

statements, circulars to the Regional Water Boards, and minutes of the Authority and Council meetings. Articles by members of the Organisation, and by technical advisers, are also referred to. It has proved difficult to separate policy from opinion in many instances, and the Organisation 'house journal', Soil and Water, contains many articles, both sourced and anonymous, which contain elements of both. The magazine is careful to note that the views expressed are not necessarily those of the Organisation or the Ministry. An interview was conducted with the Director (hereafter just Director) and Deputy-Director of Water and Soil Division, and some matters were discussed with another staff member.

As noted, it was considered that the Regional Water Boards could provide valuable information on the effectiveness of management, at least in their own regions. Circulation of a written questionnaire was considered, but rejected for a number of reasons. Dissatisfaction with a previous questionnaire (as circulated by Lello, 1974) and resistance to a further similar approach was expressed by staff of several Boards during initial enquiries. With only 20 Boards, sampling was considered to be untenable, as overall coverage was desired. As a considerable portion of the information required was matters of opinion rather than just fact, a uniform level of such opinion was desirable, as well as a more personal approach. Neither of these could be obtained by a written format.

As a result, all Regional Water Boards were visited between January and early August 1975, and discussions held with executive officers in all but one case. Again a separation of Board and staff opinion must be made clear. The opinions expressed were normally those of the officer interviewed, and although the officers were almost all chief engineers and executives of the Boards and thus closely associated with policy decisions, the opinions were not necessarily reflections of Board policy. It was also stressed early in the interviews that matters of opinion, particularly with questions on 'political' issues, would not be directly sourced either to the Board or the officer, and it is considered that the frankness with which these questions were answered justified this approach. In the

following Chapters, the expressions Board Officers, Board Staff and the Boards' are used interchangeably. Where the sources of opinions expressed are not otherwise referred to the information was derived from the interviews.

The information was obtained on the basis of an open-format, verbal questionnaire the framework of which is included as Appendix G. The interviews were conducted as open discussions, generally lasting 2 - 3 hours, although further time was often spent with other Board staff in obtaining factual information. It should be noted that there were on some occasions differences of both fact and opinion between staff members. A content analysis was performed on the information collected in this way, and where possible generally held opinions have been identified. However, many problems and attitudes have arisen through particular management problems in different regions, and these will also be discussed.

Further factual information has been obtained from the Boards' Annual Reports and Accounts, some indirectly through the National Authority Reports. Other policy reports and statements indicating management strategies were often made available by the Boards.

Nature and Organisation of Information

Water use management functions can be considered to divide logically into three broad categories of expertise and techniques, these being technical, administrative and legal.

1) Technical. These inputs are required to establish 'water resources intelligence' (Figure 2) or knowledge of both quantity and quality of the resource and the effects of uses on that resource. They include such skills as monitoring strateby and instrumentation, use of analytical tools both in the interpretative and chemical senses, and also knowledge of supply and treatment technology.

Technical information is the most sophisticated transfer across the interface between the biophysical and socio-economic systems (Figure 5). Other techniques, such as economic and

social analyses, could perhaps be included in this, but do not provide information on the biophysical system. In fact, these techniques are poorly developed in much of water use management in New Zealand, and socio-economic considerations appear mainly as assumptions in the second category.

2) Administration. This includes all organisational inputs, national and regional, including public involvement in the decision-making process, financing provisions, and the entire set of interrelationships between the components of the management structure.

3) Legal. This third aspect is closely linked to administration, but has a separate and distinct role of arbitration in the procedures. As mentioned in the introduction, the legislation is the direct determinant of most of the technical and legal arrangements.

The last two categories are the links between components within the socio-economic system, and all three aspects together make up the complex of structures and linkages as shown in the model (figure 5). Although certain parts of this complex can be identified as purely administrative or technical or legal, the management functions are an admixture of all three.

There is a tendency for issues in these categories to be considered in isolation, and criticisms of particular points are often in turn criticised for lack of appreciation of the broader context. As a corollary to the importance of the law, it appears to be forgotten in discussion of technical details that technical solutions can only obtain if an appropriate legal and administrative framework exists.

In the framework for information collection (Appendix G), the major clearly defined management functions or procedures were considered as a whole. The following Chapters examine these procedures separately, and then discuss the remaining issues under technical, administrative and legal headings.

CHAPTER 3
WATER RIGHTS

The water rights system, and the problems with it, are reviewed in this Chapter. Firstly, the changeover from common law to statutory rights will be discussed. Following this, the water right application process will be examined, generally in the order followed by the procedures in the law (Appendix J.).

3.1 Notifications of Existing Uses

It was considered at the time the comprehensive law was in preparation that the change from common law to statutory rights should be the final step in setting up the management framework, after the organisation had developed and more was known of the resource. In fact, the very first operation required of the Regional Water Boards was the receipt of notifications of existing use. One Board executive reports a bad start to this process, with a farmer appearing at the Board offices with a nationally-circulated notification form before the Board knew anything of its responsibilities under the new 1967 Act.

The variation with which this procedure was handled by the Boards is evidenced in Table I. After initial circulation of a nationally prepared notification form many Boards developed their own forms, often expanding on the requirements of the 1968 Regulations, and began publicity campaigns throughout their regions. Assistance was often obtained from water user groups, particularly Federated Farmers and the dairy industry, but as the table indicates there was a great deal of variation in the numbers of notifications received, even after the 1969 Amendment extended the notification period. The absolute numbers do not however represent a true indication of the efforts of the Boards as the third column, Table I, indicates. These figures are estimates, made by Board staff during the interviews, of the percentage of all uses lawfully existing at that time, which were notified to the Board. It can be seen that although a large number of notifications were made, for example, to

Table I

Notifications of Existing Uses Received by RWBs and Districts and Subsequent Action

Regional Water Boards and Districts *	Notices of Existing Uses Received		Percentage of existing uses notified	Immediate Action Taken	Legality Investigated	Subsequent Action	Notes
	Authority Report 31st March 1970	Total No's received-estimates from questionnaire					
Auckland	799 *	Less than 500	No estimate	Unknown	Unknown	None	
Bay of Plenty	1,800	Approx 3,000	Greater than 90	Filed	No	None	
Hauraki	1,144	1,200	50	Filed	No	None	
Hawke's Bay	500	Approx 300	10	Filed	No	Reviewed in one area	Concentrating on Heretaunga Plains
Manawatu	2,500	3,731	40-50	Acknowledged filed on computer	No	Checked against new applications and inspections	General review of all uses and rights begun by area inspection
Marlborough	181	196	No estimate	Acknowledged, checked. Some application for rights required	Some	Many reapplied or withdrawn	Inspection, particularly of discharges
Nelson	700	Approx 500	70-75	Checked some uses not accepted	Some	Most major uses reapplied	
North Canterbury	953	Approx 1,000	90	Checked some reapplication required	Yes	Major uses reapplied	
Northland	1,719	Approx 200	20	Checked some reapplication	Some	Filed compared with new applications	
Otago	2,208	Several thousand	No estimate	Some checked	Some		Much difficulty with mining privileges
Poverty Bay	319	381	80-90	Filed	No	½ reviewed by inspector-new rights required	Area inspections on wastes Other uses also checked
Rangitikei-Wanganui	2,130 +	Approx 1,100	50	Filed not acknowledged	No	Checked against new application	+ not Wanganui Catchment at this stage
South Canterbury	298	Approx 400	95	Not accepted reapplication in virtually all cases	Yes	All new granted rights	All uses requiring rights under control
Southland	65	Several hundred	40	Filed	No	Some checked with new applications	
Taranaki	1,638 *	Approx 800	50	A few acknowledged	No	Waste discharges not accepted	
Waikato	721	Several hundred	No estimate	Filed	No	Some new rights not reviewed	
Wairarapa	444	Approx 500	No estimate	Filed	No	None	
Waitaki	134	200	95	Filed	No	Some checking with new application	
Wellington	170 *	300-350	No estimate	Unknown	Unknown		
Westland	551	Approx 800	5	Most accepted	Some	Some checking with new applications	

* These Regions were not covered by RWBs at this stage, and notifications were received by MOWD District Offices for the Water Allocation Council

the Northland Board, they represented only 20 percent of the total number which should have been notified. This contrasts markedly with the numbers shown for, say, Waitaki, whose 134 notifications represented 95 percent of those that should have been received.

There appears to be a pattern of low returns (50 percent or less) in relatively water abundant regions (Manawatu, Northland, Rangitikei, Southland, Taranaki, Westland); with high returns in regions with water shortages, (Nelson, North Canterbury, South Canterbury, Waitaki). However, figures for Hawkes Bay, Bay of Plenty and Poverty Bay do not seem to conform to this, and for several key regions no estimates were made by the Boards. It does seem logical that in water short regions, user interest in water management would be high and greater compliance with control measures could be expected.

The figures for the water right applications received in the next three years (Tables II, III and IV) tend to confirm this, with many applications (or at least large numbers in relation to the number of notifications) in the areas suggested as water short. Also in other known drought-prone areas for which estimates are not available (Otago, Marlborough) the same applies. The early high rate of return was not sustained in the Bay of Plenty, which perhaps reflects a greater efficiency in distribution of notification forms, probably aided by the local authorities in the Commission structure. Hawkes Bay's low estimate of return is confirmed by the numbers of applications subsequently received, and is due to a great deal of attention being focussed on the water-short Heretaunga Plains. In Northland, the relatively large number of applications received by 31 March 1970, and 31 March 1972 (Tables II and IV) may result again from the Commission structure, but also from early activity in reviewing notifications particularly in the KeriKeri basin. Poverty Bay's continued high level of application receipts (Tables II, III and IV) may reflect early inspectorial activity, and also lack of available water for intensifying horticultural use in the Waipaoa Valley.

Thus although the trend is disguised by differing efforts of Boards in soliciting notifications, reflected in the total

Table II
Notices of Existing Water Uses and Applications for Water Rights Received, etc., as at 31 March 1970

District	Notices of Existing Uses Received	Applications for Water Rights			
		Received	Granted	Declined	Under Action
×Auckland	799	23	16	..	7
Bay of Plenty	1,800	27	21	..	6
Hauraki	1,144	18	6	..	12
Hawke's Bay	500	456	346	..	110
Manawatu	2,500	60	52	3	5
Marlborough	181	120	120	..	..
Nelson	700	357	267	..	90
North Canterbury ..	953	553	410	..	143
Northland	1,719	273	124	..	149
Otago	2,208	415	152	..	263
Poverty Bay	319	174	92	2	80
Rangitikei	2,130	50	21	1	28
South Canterbury ..	298	530	490	..	40
Southland	65	83	46	..	37
×Taranaki	1,638	20	9	..	11
Waikato	721	22	22	..	..
Wairarapa	444	50	18	..	32
Waitaki	134	60	24	..	36
×Wellington	170	32	12	..	20
Westland	551	28	6	4	18

Table III
Applications for Water Rights Received, etc., During 12 Months Ended 31 March 1971

District	Under Action as at 31 March 1970	Received	Granted	Declined	Not Proceeded with	Under Action
×Auckland	7	29	28	..	2	6
Bay of Plenty ..	6	35	23	..	6	12
×Hamilton ..	..	9	9	..	..	..
Hauraki	12	23	23	2	5	5
Hawke's Bay ..	110	366	362	9	100	5
Manawatu ..	5	61	41	1	..	24
Marlborough ..	..	142	141	..	..	1
Nelson	90	82	142	..	1	29
North Canterbury ..	143	313	299	20	3	134
Northland ..	19	34	40	..	2	11
Otago	263	124	178	..	2	207
Poverty Bay ..	80	129	59	3	5	142
Rangitikei ..	19	23	25	..	4	13
South Canterbury ..	40	146	176	5	..	5
Southland ..	37	26	25	..	23	15
Taranaki	11	41	35	..	..	17
Waikato	..	41	39	..	..	2
Wairarapa ..	32	51	39	..	..	44
Waitaki	36	24	40	..	5	15
×Wanganui ..	..	20	17	2	..	1
×Wellington ..	20	18	34	1	..	3
Westland	18	28	36	..	1	9
	948	1,765	1,811	43	159	700

× Returns from MOWD districts in areas without RWBs. Rights issued by the Water Allocation Council.

Table IV

Applications for Water Rights Received, etc., During 12 Months Ended 31 March 1972

District	Under Action as at 31 March 1971	Received	Granted	Declined	Not Proceeded with	Under Action
×Auckland ..	6	60	60	1	..	5
Bay of Plenty ..	12	35	31	..	10	6
×Hamilton ..	..	10	10	..	..	..
Hauraki	5	13	12	..	1	5
Hawke's Bay ..	5	244	227	11	..	11
Manawatu ..	24	32	46	..	3	7
Marlborough ..	1	26	22	..	2	3
Nelson	29	48	60	..	..	17
North Canterbury ..	134	206	164	..	4	172
Northland ..	11	187	76	8	6	108
Otago	207	167	46	10	25	293
Poverty Bay ..	142	92	96	1	3	134
Rangitikei ..	13	45	45	..	..	13
South Canterbury ..	5	113	105	3	..	10
Southland ..	15	12	17	..	..	10
Taranaki	17	36	38	1	1	13
Waikato	2	45	45	..	..	2
Wairarapa ..	44	35	30	1	3	45
Waitaki	15	35	32	2	5	11
×Wanganui ..	1	3	4	..	..	..
×Wellington ..	3	36	38	..	..	1
Westland	9	123	11	..	1	120
	700	1,603	1,215	38	64	986

Includes Crown water rights.+

× Returns from MOWD districts in areas without RWBs. Rights issued by the Water Allocation Council. (Total to 31 March 1972, 303)

\+ Total to this date, 141.

numbers received, the proportion of uses represented by these notifications appears to correlate well with the abundance of water in the regions. It is significant that in the South Canterbury region, whose farmers had originally approached the Minister of Works requesting tighter water use controls, the proportion of uses notified was very high (95 percent), even though the number was quite low.

Many Boards expressed dissatisfaction with the sudden deluge of work this process created, and considered they had very little time to prepare themselves even clerically for this. The notification forms, both those produced by the Organisation and by the Boards themselves are now considered to have been very poorly prepared, and even more poorly completed by the water users.

The procedures followed by the Boards once the notification period expired also varied a great deal. Most Boards acknowledge or receipted the notifications, although in many areas it is conceded that these receipts were not regarded as valuable by the users and promptly discarded. The question of who was to decide the lawfulness of any particular use was debated vigorously within the whole organisation at the time, and Boards generally followed their own solicitors' varied opinions despite a WAC circular (NWASCO, 1969 a). Some Boards made decisions on the legality of the use, and requested right applications (Table I). South Canterbury in particular, rejected virtually all the notifications and requested applications for rights. Other Boards considered that they did not have discretionary powers and simply recorded the notifications as received. It has recently been judged in the Supreme Court, however, that the Boards did have limited judicial powers in this regard[5].

Several Boards who spent considerable time encouraging notification, now feel that this was a wasted effort. The Manawatu Board reports that in reviewing their 3,700 notifications, over half were not required. These were for stock and domestic uses and dams not obstructing streams, and were received because these uses were not excluded on the notification forms prepared in accordance with the Regulations. Of the remainder, over half of these have proved unacceptable

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* These Regions were not covered by RWBs at this stage, and notifications were received by MOWD District Offices for the Water Allocation Council

because of incorrect completion, regardless of the legality of use. The subsequent action taken by the Boards is also summarised in Table I. In many cases the notified rights have not been reviewed, or even checked against new right applications.

The notifications do not have a fixed term and in fact provide neither an index of present use, nor a clear record of legal (authorised) notified uses.

3.2 Application for Rights

Within the requirements of the law the Regional Water Boards have developed a variety of approaches to processing water right applications. These are often at variance with national guidelines from the Organisation. Some of this variation is only in detail of procedure, but in other cases amounts to an automomous regional policy.

Most Boards consider applications for damming, diversion, discharge, or taking; at least one Board has a 'use' option as well. Approaches to the 'diversion' use vary - some Boards also require take and discharge applications, others feel 'divert' covers both of these although consider it implies no reduction in flow. Five Boards do not require rights for taking for farm dairy uses, despite an early national decision that these were required, and other Boards have issued general authorities for these and other farm abstractions. While none of the Boards require rights for 'reasonable' stock and domestic uses, rural water supply schemes and withdrawals for high intensity stock-fattening systems are in some areas subject to rights, as are town supply abstractions. Some Boards have detailed policies on damming, including by-laws often linked with engineering and soil conservation requirements. A significant ommission, pointed out by several officers, was the lack of definition of a river or stream, despite the clearly stated requirement for rights to "dam any river or stream". An early WAC circular discussed the legal definitions (NWASCO, 1970 a) but they remain outside the law, perhaps in a conscious attempt to allow flexibility.

A recent WRC circular on water right requirements for

herbicide discharges (NWASCO, 1975 b) has been ignored by the majority of Boards, and is regarded as administratively and politically unworkable. A similar national policy circular (NWASCO, 1974 a) on subdivisional water rights has been accepted in some areas and rejected in others.

Strategies for inducing or demanding users to apply for existing illegal or new uses also vary widely. Only one Board considers all uses in the region are covered by rights, and that new uses are automatically applied for; most Boards are either simply accepting applications as they come, or requiring application in restricted priority areas where competition exists, often for only one use category. Only a very few Boards have adopted a full inspection program to obtain a comprehensive coverage of uses by rights.

A few Boards have encountered some problem with the question of who should apply for the right. This problem has been discussed in the United Nations review of water legislation (1972), as an important detail, although most of the Boards apparently have not considered the matter, or found it any problem, and have simply accepted the applicant regardless of status. One Board, with high intensity farming uses over most of its catchment district reports difficulty in deciding whether owners or first or second order occupiers (lessees, or sharemilkers) should hold the right. It was pointed out that although 'any person' may apply for a right and it is desirable that the holder should be the user, rapid turnover of the actual users creates an administrative problem in transfers. Furthermore, these changes often result in changed conditions of use. This will be discussed in more detail when dealing with the transfer provisions.

It appears that within the general national policy, as expressed by the law, varied regional policies have developed. While some regional variation is needed and is to be expected (Gillies, 1969) the problems of contradictory regional policies have also been noted (Burton, 1970). Certainly, a water user may face quite different policies in different regions.

Processing Applications

Processing of water right applications is however relatively standardised. Although dislike of the amount of paper work involved was expressed by all Boards, similar systems of form letters etc. have evolved. Applications are advertised regularly, frequencies varying from once a week to once a month, depending on numbers received. A recent WRC circular (NWASCO, 1974 b) stressed the need for full and explicit advertisements, and drew attention to the requirements of the 1968 Regulations. Under these regulations the Boards can require applicants to notify other parties likely to be affected. This power was not known to many of the Boards, and it was commented that if the Board did know of others affected it should take this into account in decision-making whether formal objection was made or not. Several Boards have a system of notifying other agencies (Acclimatisation Societies, Drainage Boards, Government Departments and other local authorities) when applications relevant to their functions were received.

Statutory declarations accompanying applications have been dispensed with by many Boards, although some still require them, believing that formality in the process is desirable.

Fees

Fees for applications vary from $4 to $75. although the majority are about $20. The Regulations allow a fee of $4, but as the reasonable costs of the application can be placed as the Board may direct and the Board may require a deposit against expenses or costs (Section 24 (2)), most Boards increased the amount. The legality of this action was confirmed by a Supreme Court decision[6] in 1973, and fees have risen steadily since then. Some Boards maintained the low fee in the hope of encouraging applications, but in the absence of alternative financing are now attempting to cover costs of processing with this fees. Some resistance to high fees was reported, particularly from farming applicants.

Inspections

Only a few Boards appeared to have a policy of inspecting

all applications before decisions are made, and although contentious applications are inspected in some regions, often the rights are reported on by staff without field checks. This 'blind' granting of rights was 'justified' by some of the Boards by drawing attention to the effort and cost involved in full inspections. Other Boards felt that inspection is an essential part of the process, and by fuller explanation and a personal approach reduces user resistance to control and accusations that the process is 'just red tape'.

Presentation to the Board

The form in which the right applications are presented to the Boards also varies. In many cases full reports by staff accompany each application. In others virtual lists of applications are approved by the Boards. Several Boards separate contentious and non-contentious applications. Generally, the applications are considered by committees of the Boards whose recommendations are usually confirmed without question by the full Board. These committees vary in number from 6 members to the full Board, and sometimes have additional non-voting members co-opted on to them. One Board operates a small standing Tribunal, which considers all rights, whether objections are received or not. Generally, the committees are serviced by the executive officers, and in some cases no other staff are allowed contact with the elected members. In others, technical staff are involved in reporting directly to the Board on the applications.

Objections and Tribunals

Where objections are received, many of the Boards arrange informal discussions between the parties, and attempt to avoid tribunals which are considered time-consuming. Increasingly, however, Tribunals are being constituted, sometimes consisting simply of Board Members,but often with outside 'expert' membership. Most Boards hold only 2 or 3 Tribunal hearings a year, and only a very small proportion of these are taken to appeal. Servicing of these Tribunals is normally by administrative staff of the Boards, and technical staff are often called on

to make statements or give evidence to the Tribunal. Where the Tribunals consist solely of Board members, there is a tendency for the recommendations of Board staff to be followed rather slavishly.

Several comments were made regarding the standard of objections. Environmental interest groups in particular were criticised for well-meaning but poorly prepared cases. It was felt that too many objections were based on the advertisements alone, without reference to the more detailed information in the application available at the Board offices. Some of the Acclimatisation Societies especially, have developed a habit of objecting to virtually every application, a technique which Board staff considered frivolous.

Terms and Conditions

Most of the Boards follow national guidelines (NWASCO, 1969 b) as to the terms for different uses. There is only now a recognition by the Boards of the need for all uses from one source to expire concurrently, despite early awareness of this by the WAC (NWASCO, 1970 b). This will be discussed later under allocation planning, but several Boards are in difficulties with uncoordinated expiry times where competition for supply is high. The need for some system of 'renewals' was felt by many Boards, because of the work load involved in processing non-contentious rights, but it was agreed that where conflicts exist, reapplication and readvertisement is necessary. All expressed concern that the authorised notified uses had no fixed term, and that unless the users agreed to voluntarily surrender these, allocation programs would be difficult.

One Board has ignored the policies on terms and continues issuing rights for a term 'at the pleasure of the Board'. This policy was begun some time ago after advice from the Board's solicitor, and although many criticisms have been made of this system, no legal challenge has been made. The Board believes that this enables simple, non-contentious rights to continue unchanged, while in problem areas appropriate action can be taken, particularly if allocation problems arise. It was

pointed out that any cancellation is appealable, and that there was no intention to impose it as wilfully as the phrase may suggest.

Variations

In general, variations of rights are being processed although in most cases readvertisement is required. One observation was made that the section allowing the Board to dispense with the need for public notification of any such application did not seem consistent with other provisions, as the Board could not know if the use would not 'injuriously' affect others.

Decision

Many Boards short circuit the actual granting of rights, as this cannot strictly be done until after all objections and appeals have been determined, i.e. after the appeal period has expired (Section 26 (4)). Particularly with rights against which no objections are lodged, even if conditions are imposed, right documents are given to the applicants soon after the Board decision. In many cases this is done consciously in an effort to shorten a lengthy statutory process, as the Boards are particularly conscious of the users' attitude to any further delay. Several officers commented that it appears that the Organisation staff do not appreciate the length of time involved.

The requirement for the decision to be publicly notified has also been criticised as an unnecessary operation, and has been the subject of a remit at a recent Catchment Authorities Conference.

Filing

An aspect of the water rights process which involves both the notified uses and the granted rights is that of filing of the rights. Quite apart from the legal requirement that "Each Board shall keep conveniently available for public inspection and information detailed and properly indexed records of all rights granted on application or otherwise lawfully authorised under this Act", it would seem that a

simple system of recording and filing of rights would be essential. This point was stressed during the initial establishment of the consolidating water law.

However, it is clear from observations made when visiting the Boards that 'shoebox' systems of filing prevail. A computer system of water right filing has been in operation since 1970, and much was made of this at its introduction (NWASC Authority, 1971). Only a few Boards use the system fully for both recording and retrieval, the remainder regarding it as a nuisance. Only one Board thought that filing on computer was an obligation to establish national records; some use the system half-heartedly as a remote record. Many comments were made regarding the time and effort and expertise required to use the system, and several Boards have lost staff who had originally been trained to operate the program. Boards who had attempted retrieval found the process slow and error-prone. The format of the information accepted was criticised by many officers. For example, they found operating in cubic metres per second for flow rates troublesome and an inappropriate unit for the majority of uses (many uses appearing at 10^{-3} cubic metres per second). The lack of differentiation between physical address (location) and postal address was also commented on.

Alternative systems to fit in with existing filing systems have been developed in many Boards. In very many cases these are operated by staff seconded to this work at an early stage. There is a good deal of clumsy cross-referencing involved, and retrieval of information is often difficult, to the extent that in one case a new clerk had been unable to unravel the system he inherited. The computer numbering system has often been adopted, but several other numbers (for example, sequence of application) may be applied to the one right. Several officers considered that prime retrieval should be on <u>name</u> (i.e. alphabetically) as this was the prime need in any inspection or servicing system. Catchment or area based retrieval is regarded as the next most important basis of indexing.

It was generally agreed that the principle of a computer based system was excellent, enabling retrieval of information

in many different ways, but that the present system needed considerable revision. It was commented that the system was obviously set up before the Boards' filing needs were known, and very little notice was taken of Boards' opinions then or since. One Board which had used the system extensively for notified uses regretted having done so, as the resulting cross-referencing and filing system had proved unworkable.

Generally, although clear provision is made in the legislation for inspection of the right records by the public - a situation very different from that in Britain until recently (Tinker, 1972) - this information is not 'conveniently available', nor in many cases, 'properly indexed'. However, all the Boards are willing to allow inspection of the records, although several report refusing written requests for copies of the rights.

In this situation, any use of the right details on the computer to provide national information must be suspect. However, at least one attempt has been made using these data, to derive figures for national demand for irrigation (Hamilton, 1972).

Transfers

Few Boards have yet come to grips with problems of transfer of water rights. Although one water-short Board considers that all transfers are notified, the majority concede that notices of changes in ownership or occupation are only rarely received. There appears to be a direct correlation again with the value placed on the water use - where uses are essential to maintain particularly agricultural production, transfers are received.

The question of who holds the right, and the relationship between water user and land owner appears to need examination. There is a strong case for a system to link transfer of water rights to transfer of land titles, and appears to be little difficulty in attaching this to the present land transfer procedures. Again, this was considered by the Interdepartmental committee on water (Ministry of Works, 1965) with a suggestion that the rights should be

associated with land titles, but does not appear to have been discussed in detail since, either by the Boards or the Organisation. The fact that many Boards' right documents are simply typed and duplicated forms does not add to their impression of worth. Some Boards have had more impressive documents prepared, in the hope that this will increase their value.

Control

Restrictions on the exercise of rights in the public interest or during water shortages have been used only rarely, by a few Boards. Several Boards in water-short areas have, however, been involved in developing allocation plans. This concept has now been embraced by the Organisation, and money has been granted to the Boards for this purpose. In South Canterbury and North Canterbury regions particularly, this approach has been followed, and formal plans are being drawn up. The Authority's Annual Report (NWASC Authority, 1975) comments that plans are known to be advanced stage in the Taieri, Opihi, Rakaia, Waiau, Waimea Plains and the Takepau Plains. A guide to allocation planning has been produced by the Water Resources Council (NWASCO, 1975). Several Boards commented that it is one of the most useful guidelines ever produced by the Council. This appears to contain procedures similar to those adopted in the Canterbury regions, although apparently the guide was developed independently (G.B. McBride, pers.comm.).

3.3 General Authorities

A considerable number of general authorisations of different uses have been issued by the Boards throughout the country. Again there is great variation in aspects covered. Some of these have been issued after national consultations, the first of these being for stormwater discharges in municipalities. General authorisation was given in 1970 after a confused period in which 'dispensation from notification' was allowed. The general authorities, issued by most Boards, covered existing unpolluted discharges from stormwater systems, with subsequent new discharges to be

applied for in the normal way. In practice, this formal arrangement is not followed in detail. Increasing attention is being focussed on discharges from new subdivisions where silt contamination is common, and some Boards operate informal continuing 'notification' systems with municipalities. A more recent nationally supported general authority was for water taken for aerial spraying purposes. Boards have issued many other such general authorisations; for farm uses (including farm dairy uses); for discharges from unpolluted title drainage systems; in areas not classified, short term authorities for discharge of farm wastes; and for taking of water for road construction and other maintenance works etc. Some Boards believe that these actions are unnecessary, and commit the Board to a particular approach on matters of detail, before enough is known of problems that may arise.

3.4 Crown Rights

One apparent inconsistency in the law, which has been pointed out by at least one commentator (NZ Environment, 1972), is the section dealing with the procedure for applications for rights by the Crown. For Crown uses, the relevant Minister must apply to the Minister of Works, who refers the application to the Authority. This application is then reported on by the appropriate Regional Water Board. This alternative procedure, with no advertisement or calling for objections, has been considered odd in an Act which binds the Crown. It is presumably based on the belief that Crown uses are 'more beneficial' than private uses, and therefore should need to be subject to the same scrutiny Public notification of the authority decision is however required and appeals can be lodged. Faced with the possibility of an increasing number of appeals, and perhaps recognising the contradiction here, the Authority has recently directed the Boards (NWASCO, 1975 d) to publicly notify Crown rights, call for submissions, and incorporate these in their reports to the Authority. At a recent Authority meeting (5 August) a proposal that applicant departments pay costs to the Boards was discussed.

3.5 Granted Rights

It was hoped that information could be collected during the visits to the Board which would enable a detailed analysis of the number of rights processed in each year since the establishment of the system. It rapidly became obvious however, that this data was not readily available in this form at the Boards, and in most cases could only be obtained after considerable effort by Board staff. It was considered that this could not be justified, and in view of the varied policies of the Boards, it is unlikely that figures would have been a reliable index of the extent of control exerted. Some information on total number of rights received, granted, and declined was obtained. For 1969, 1970, 1971 (years ending 31st March in the following year) these data were obtained from the Authority's annual report to Parliament (Table II, III and IV), and have been discussed, in part, earlier. For the following years the data were obtained during the Board interviews, or annual reports when they were readily available, and the estimates of the total number of rights granted to March 1975 were also made during discussions at the Boards (Table V).

The figures are too sparse to draw any conclusions, and only by comparison with the numbers of notifications received and the estimated proportions of uses these represent, can any impression of the coverage of uses by rights be gained. Few Boards would hazard a guess as to the number of uses still outstanding, although some considered that the majority of major uses were subject to rights. Only one Board was confident of total coverage. It must be stressed that these figures are generally estimates and include all categories of use, but not necessarily every type of use within that category. Again, the numbers do not represent any index of actual control as continuing control or follow up of rights is the exception rather than the rule.

It does appear, based on the attitudes of the staff interviewed rather than any hard data, that the only real control and continuing management of water users and uses, is being achieved in regions which do have periods of

Table V

Water Right Applications Received etc. 1972 - 1975

Regional Water Boards	To 31st March 1973			to 31st March 1974			To 31st March 1975			1975 (to month shown)			Total No. Rights Granted to March 1975
	R	G	D	R	G	D	R	G	D	R	G	Under Action	
Auckland													337
Bay of Plenty													208
Hauraki*				44 3C	28		57 3C	34		341 October			Approx 200
Hawke's Bay													Approx 1500
Manawatu*	126	104		145	135		122						
Marlborough		24			103			69		58 July		30	589
Nelson													Approx 1200
North Canterbury+		233		376	350		242 205R	293					Approx 2000
Northland	81												Approx 700
Otago													—
Poverty Bay*		30			45			202					945
Rangitikei-Wanganui*	63	54		81	71		120	112		86 June	32	50	328
South Canterbury													Approx 900
Southland				49	24								Approx 300
Taranaki	37	24	3	58	54	2	81	73	9	25 June			252
Waikato													Approx 300
Wairarapa													Approx 300
Waitaki					7								165
Wellington				100 7C	97		42 5C	41	1				395
Westland													—
CROWN				110	108	2	100+		1				
WRC Consent					27			19					

R received
G granted
D declined

* Calendar years
C Crown right

\+ to September
R renewals

extreme shortage of water. This seems to apply to control of all water use categories.

The water right procedures are the major links between the water users and the regional agencies (Figure 5, 10 and 11). It seems that there is by no means full interchange between these two components, in all regions. Even where the administration is coping with the system, it does not necessarily mean that the regional agencies are controlling the users. In some areas it would seem that lack of follow up and checking, results in user actions being little modified by the conditions on the right, or even unaffected by the lack of a legal basis of use.

The Board's management of rights was raised in the interview with the Director and Deputy Director. It was commented that whereas management was 'very effective' in some areas, in others it had not even been attempted. In some cases it was recognised that there is difficulty with specific needs (e.g. in mining areas). The Director considered there was a tendency for the law to be criticised to mask the Board's own deficiencies. He commented that on the question of the lawfulness of notified uses, the Boards "did not do their homework", and failed to provide existing users with assurances of the continued legality of their uses. A general belief was expressed, that the law is not being fully used, and that it is "better than the practice" at present.

CHAPTER 4
WATER QUALITY

Of all the water use management issues, the control of water quality has proved to be the major link between the water users and the management agencies. The contact between users and the regional agencies (RWBs) is through right applications for discharges, but there is also a direct input to the national agency through the process of classification. This aspect has been the major source of involvement of the judicial bodies, through appeals to the TCPAB on classification and discharge right conditions, and subsequent further appeals on points of law.

Discussion of water quality has focussed attention on the technical inputs, particularly the extent and validity of information on the status of the biophysical system. (That is, the connections between the physical and socio-economic systems across the interface - Figure 5).

Scrutiny of the water quality procedures has stimulated criticism of many more general aspects of organisation, but the debate specifically on water quality and its control continues. The following can only be a summary of the situation and criticisms to date. As the previous outlines of the development of the system and the present situation have shown, this is a very controversial issue.

Following the decision by the Appeal Board on the Southland cases, the Water Resources Council decided to appeal to the Supreme Court and not to consider any further final classifications, although five preliminary classifications (Auckland, Bay of Plenty, Hauraki, North Canterbury, and Otago) were considered in 1974. (NWASC Authority, 1975). These generated further conflict, particularly in North Canterbury and Auckland where over 2,000 objections were lodged (according to Bellamy, 1975 b).

In the face of this mounting opposition a flurry of supporting articles appeared in the NWASCO house magazine, Soil and Water (no fewer than seven articles in the one issue, December 1974). One of these (Howie, 1974) has

been described by Bellamy (1975 b) as a last minute attempt at public relations. This last article provides a summary of the situation prior to the Supreme Court decision on the appeals. [2, 3, 4] This decision basically supported the Appeal Board findings, particularly the observation that the Water Resources Council's policy on classification was inconsistent with the Act. This has led to the present uncertain situation. The National Authority minutes (5 August) note that the WRC is reviewing policy, but the Director is reported as "doubt[ing] that urgent amending legislation is required", and that the Organisation is "awaiting findings of the legislation review committee".

Bellamy (1975 b) comments: "It is evident already that a sizeable cross-section of informed persons do not regard the management of New Zealand's water resources by the Water Resources Council as constituting 'a bold and imaginative approach' (Cowie, 1974), but rather to be a process in urgent need of revision" (p 5).

The following outlines many of the criticisms of the classification philosophy, classes and standards.

4.1 Classification Philosophy

It has been stated that the Pollution Advisory Council and its technical advisers were well aware of overseas quality control systems and their problems, and they consulted widely before adopting the philosophy expressed in the 1963 Regulations (N.W. Collins pers. comm.). The 'multiple use' approach adopted did seem to be accepted in the engineering community, although criticism of the attitude that dispersion and dilution of effluents is a 'beneficial' use of receiving waters soon began to be voiced by developing environmental interests. Knox (1970) considered the Councils approach outdated, and suggested a credo which among other things states "Users of water do not have an inherent right to pollute". A corollary to the philosophy of waste transport as one of the major valid uses of water, was the Council's policy of persuasion rather than prosecution. This was described by Scott (1972) as a "wildly optimistic vision" showing a "remarkable ignorance of

overseas experience".

The Water and Soil Conservation Amendment Act (No. 2), 1971, altered the strict use basis of classification as already discussed, and some raising of classes followed in a few classifications (for example, the Tararua Range Upper catchments were upgraded from D to C class in the Manawatu region classification 1973). Commentators maintained that too much emphasis was still given to present and future waste discharge, and submissions to the legislation review committee expressed these feelings. The Environmental Defence Society's submissions (EDS, 1974) point out that the change of emphasis (to public interest and best use) does not yet appear in official thinking on the subject. Knox, in an appendix to this submission comments that "elsewhere there is a clear trend away from the policy of controlled degradation" and from the premise that dispersion and dilution of effluents is a 'beneficial' use of receiving waters. The opposing concept that the class of water should reflect existing water quality is held by many groups and led to the appeals against the Southland classification. This has also found favour with the Regional Water Boards. The North Canterbury Board, for example, in submissions on preliminary classification pressed for class A (no discharges) for the high quality waters of the Southern Alps. The Auckland Regional Authority in its case against the Auckland preliminary classification produced very fundamental objections, which are included as Appendix G. The WRC attitude was reaffirmed as late as December, 1974 (Cowie, 1974) after this atmosphere of divergent opinion had led to the Southland Appeals[1]. The crux of the Appeal Board decision on the legal basis of classification is found in the following passage (Pages A 1364 - A1365. Emphasis added).

> 11. Sec. 26H says expressly that a classification is a declaration of the minimum standards of quality at which the waters being classified shall be maintained in order to achieve the object mentioned ...[beneficial use].
>
> Therefore in our opinion it is not sufficient to say simply that: "Classification is aimed at pollution control". If pollution be defined as "the use of natural water by mankind to carry away and dispose of waste", then one of the results of the classification of particular waters will

be a better control of the pollution of those waters and possible the reduction or termination of pollution thereof. The use of natural water to carry away and dispose of waste is recognised by the Act, but it is only one of the uses so recognised.

12. Clearly, in the context of the Act as a whole, the classification of water is:

(a) an aid to the preservation of those waters in good condition so that the waters may be used to the best advantage; and
(b) a guide to the suitability of waters for particular purposes and functions (including, but extending beyond, their use and capacity for carrying away and disposing of waste).

A classification is essentially a declaration of a minimum desired water quality. That desired quality may be the actual present quality of the water being classified, or it may be a higher or lower quality. If it is a higher quality, it must be a quality which is achievable by the control or abatement of pollution and/or by the regulation of the activites carried on upon the land in the catchments contributing to the volume of the water being classified. (For it seems that in fixing on a minimum desired water quality, some regard must be had to such existing and prospective activities).

13. A classification will be of particular interest to those responsible for preparing and implementing water pollution control programs, because one of the principal functions of such a program is the control and abatement of water discharges, present and future, in order that aesthetic, environmental and public health requirements shall be maintained and in order that waters are protected for multiple use. But a classification will be of interest to many other sections of the community as well.

14. In our opinion the process of classification called for by the Act requires first an inquiry into the existing quality of the water being classified.

If the existing quality of the water is found to be high, then the classification should reflect that existing quality, unless it is demonstrated that in the public interest there should be the freedom to lower the quality in the future in order that the water may be put to the best advantage, while still maintaining it in good condition. If the existing quality of the water is found to be low, then an enquiry should be had into the cause of the low quality. If the cause is found to be "pollution" and the public interest requires that the quality of the water should be raised in order that the best use may be made of it, then the classification should ideally reflect such higher desirable quality as is achievable through the abatement or reduction of "pollution", but realistically it may have to reflect such quality as may be expedient in the foreseeable future through such pollution control

measures as are practicable.

Having outlined what it considered to be the proper basis for classification, the Board decided that the principal inadequacy in the criteria adopted by the Water Resources Council was that they permitted the classification as Class D or Class SC or SD large bodies of water where general uses of the water predominated. Such an approach, said the Board, implied that it was permissible in the future to reduce the actual quality of those waters to the minimum standards specified by the classification, even though the present actual quality of those waters might qualify them for a higher classification. The Board found that the criteria adopted permitted a classification to be given without any prior examination of whether there was likely to be any necessity to lower the actual quality of those waters in the future.

The Board concluded that the criteria adopted by the Water Resources Council were rooted in the Waters Pollution Act 1953 and the Waters Pollution Regulations 1963 and that the Water Resources Council had not fully appreciated the changes in the law affected by the 1971 (No. 2) Amendment. The Board also noted: (paragraph 29, Page A1370).

> At the same time we must record our concern that in respect of one important facet of water quality, viz., the level of dissolved oxygen, the classification will indicate less than the minimum which we have found should be maintained in certain important and extensive stretches of water. Fortunately the Regional Water Board will be able to impose conditions upon the grant of rights to discharge waste into those waters which should have the effect of maintaining the desirable higher minimum in those waters. But (to use a moderate adjective) it <u>is unsatisfactory to have a public document indicate one standard and to expect a public body to apply another</u>.

On the basis of this, the appeal of the Southland Skindivers Club was allowed, and the SD areas were raised to SB.

The subsequent appeal to the Supreme Court on the basis of classification is summarised in the decision[2] as follows:

The Water Resources Council describes the Board's classifications as being based on existing water quality and contends that this approach is wrong. Incidentally, the Council says, existing water quality fluctuates and is difficult to determine. The approach favoured by the Council is expressed as being a classification based on best multiple use based on the best use of the waters concerned. In the view of the Council, a classification based on existing water quality is both wrong in principle and contrary to the intent of the Act. It is argued that the need for new and increasing waste discharges would tend to bring about reclassification by way of downgrading. An unfavourable analogy is drawn with specified departures under the Town Planning Act; in contrast the Council claims that under its own approach any reclassification would tend to be upwards. As seen by the Council, classification attempts to resolve the conflicts of waste disposal and public use by setting out areas where waste can be discharged with economical treatment and areas where public uses demand that good water quality be maintained. The basic principles are not seen as having changed when the Regulations were replaced by the 1971 statutory provisions.

As both approaches involve considering existing and likely future uses, it might be thought that the same result could be achieved by either. But the practical difference was well brought out by counsel for the Water Resources Council in his reply. He said that there are basically only three uses of water - for water supply, for contact recreation, for waste discharge. While that is no doubt something of an over-simplification, I accept that it is certainly not a distortion. In substance Mr Davison said that waters where public uses of the first two kinds require to be catered for and protected should be placed in one of the higher calsses, such as B or SB, which might limit the range of practicable uses; and that classes D and SD should be treated as residual general classes, appropriate for waters in which a wide range of uses may prove to be permissible, so that Regional Water Boards may keep their options open as to what uses will be permitted there. An applicant for a right to discharge waste might then naturally consider applying in D and SD areas. But, it was submitted, as the classifications prescribe only minimum standards, the Regional Boards would be able to impose higher standards on individual applicants; and in considering what requirements to insist on, the Boards should take into account such matters as the practicability and cost of methods of effluent treatment available from time to time. The point was also stressed that the minimum standards for classes D and SD do not represent poor quality water : it is or should be of good general quality and unsatisfactory only for certain specialised uses. (p 29 - 30).

The judgement concluded that neither the approach taken by the Council nor by the Appeal Board was expressly authorised by the Act. On a broad view of the Act it was concluded:

> The Act contemplates that existing water quality will be one of the matters considered in making a classification, and if enough information is not already to hand investigation will be needed to find it out. But the Act also contemplates investigations and consideration of present and likely future waste discharges and present and likely future uses of water. All these matters are relevant in making a classification. How detailed any investigation should be is very much a matter for discretion.

The Court also supported the Appeal Board view that a classification should not be lower than existing water quality "save for good reason"; and that a classification should set higher standards than those existing if they are reasonably needed and reasonably attainable.

Regarding the use of D classes as a general or residual classification, the Court recognised the "administrative attraction" of this approach but held it did not comply with the Act for four reasons:

1) Nothing in the Act justifies the case of a residual or "omnibus" classes and/or "special" classes. Similar considerations (including existing water quality) should apply to all classes. This approach was authorised by the old regulations not by the new Act.

2) When existing water quality is likely to be lowered the onus is on the applicant or water board to justify - in the public interest - such a reduction in quality. Thus a D classification which keeps a water board's options open really places an onus on those who seek to maintain existing quality or some higher standard (as regards water right conditions). This was not the intention of the Act.

3) The Act aims to promote a "national policy" - to consign large sections of the waters in the various regions to classes which may be lower than the existing quality, leaving the regional water boards to decide in individual cases to what extent, if at all, standards

above the minima will be aimed at, "Would be the antithesis of a national policy".

4) The criteria adopted by the W.R.C. would apparently permit a classification to be given without prior examination of whether there is likely to be any necessity to permit the lowering of the actual water quality.

Questions of status to appeal were raised in these appeals, and will be discussed later, but it is clear that the present basis of classification is legally incorrect. It is interesting to note that the law appears to reflect the attitudes and philosophies of the critics, far more closely than those of the implementing agency (the WRC). This is somewhat ironic as many of the Council members and advisers were responsible for these provisions in the law.

A wide range of opinion was expressed by the Boards in questioning them on classification philosophy. However, all Boards considered that the existing water quality should be more fully considered in defining the classes. Many felt that testing was required to establish existing quality before classification and all regretted the lack of background information. All consider that discharge to water is to some extent a valid use, although dischargers should be encouraged to not discharge is possible. It was commented that insisting on zero discharge was 'unrealistic' when the effects of diffuse sources, such as agricultural runoff, were unknown. It is clear from these discussions, and much of the literature, that those closely concerned with control find it very difficult to separate the philosophy behind classification, from the classes themselves, and the standards attached to these classes. Obviously they are closely interlinked, but part of this confusion probably results from the change from the clear 'use' classes of the Regulations to the generalised basis of the 1971 (2) Amendment, where the classes are in fact the standards.

Several Board officers considered that the system was a 'good start', but deplored the lack of continuing effort in reviewing it. Two of the Boards expressed the view that

they agreed with much of the criticism of classification, but in this criticism too little attention had been focussed on how the system was to be applied. One very important observation made by two of the Chief Engineers, was that the major problem with the present system was that it was difficult to understand. They both considered that in a procedure inviting public attention and objection, the first and foremost requirement, is that the system should be clearly understood by all parties. Obviously, this is not the case with classification as presently formulated.

The question of problems with the classification process, and in particular the import of the 'Cooke decision', was raised with the Director. He described this as "piddly" and of limited effect, and commented that classification is only a small part of the overall management operation. The controversey was described as a "storm in a teacup" dealing with fine points, and indicated that the Water Resources Council had at worst followed a wrong legal interpretation. He was critical of those who had "activated the judiciary" and considered the actions of pressure groups to be an over-use of the law.

4.2 Classification Classes

Discussion of the classes and standards is closely linked with the more philosophical debate, as the previous section will have indicated. Dissatisfaction with both the number and the scope of the classes is widespread. In support of the classes Cowie (1974) maintains that "the classes are few in number but precise in purpose, and each class has flexible quality requirements". He adds "the greater the number of classes in a classification, the less flexibility there is in water quality and the more rigid the application of standards" (p 9). What exactly the "precise purposes" of the classes are, is not discussed, and this attitude conflicts with the Appeal Board observation in the Southland decision that "the classes available under the Act are rigid and offer few alternatives. At least for the circumstances presented ... they are inadequate". (p A1370).

The Nature Conservation Council (Figure 6) is critical of the classes (NCC,1975 a) and supports the use of the present Class A in high country watersheds. (NCC 1975 b). It is reported the Ministry of Agriculture and Fisheries will continue to express its dissatisfaction with the current classification (Soil and Water, June 1974 a). All the Boards were critical of the classes for some reason, either in the freshwater or marine situation. Although flexibility is felt to be desirable the present system is seen to have aspects which are too flexible, and others which are far too rigid.

Two discussion papers on classification were submitted at the 1975 Catchment Authorities Association Conference (Soil and Water, June 1975 a) which discussed both purpose and policies of classification, and the need for a code of water quality standards. It was emphasised that classification is only the first step, and that little thought had been given to the subsequent program of systematic checking and testing.

One of the Board Engineers has proposed an alternative classification process involving a large number of multiple use classes (15 in all) to which standards are attached (Revington, 1975). Although sprinkled with expressions such as 'realistic' and 'reasonable' and leaving the enforcement procedures by way of water rights very much in the Boards' hands, these suggestions provide one example of an alternative strategy and are more constructive than other published criticisms. Reflecting the earlier comments on the need for simple, clearly understood classes EDS (1974 p 12) points out:

> It would be advantageous and less confusing if the water quality classes were recorded so that classes A, B and C referred to classes of water whose quality could be assessed in alphabetical sequence
> viz. A or SA high quality
> B or SB lower quality
> C or SC lowest quality.

4.3 Classification - Standards

There has been adverse specialist comment on the limited number of parameters applied as standards in the classes, the

meaningfulness of those parameters, (especially the bacteriological) and the actual values of the parameters that are used. Much of this remains unpublished but exists as a general air of dissatisfaction in scientific circles particularly.

Temperature

Examining the major parameters briefly, temperature has received relatively little attention, although the Huntly Power Station Hearing[7] did highlight problems of measurement and mixing of waste heat discharges. Scott (1974) comments that the possible rise to 27°C permitted under the Act would provide no safety margin for a temperature sensitive salmonid fishery.

Acidity and Alkalinity

Acidity and alkalinity have also not been widely discussed, although some Boards report levels much above the allowed ranges in heavily weeded rivers, and wonder when pH changes caused by weed infestation ceased to be 'due to natural causes'.

Toxic Substances

The loose requirements for toxic substances have been commented on by Knox (EDS, 1974) who adds "surely enough is known of the toxic properties of many compounds such that their maximum permissable concentrations can be defined". The need for a schedule of allowable concentrations of toxic materials and guidelines as to possible sources of these in industry, was expressed by one Board. The specification that "there shall be no destruction of natural acquatic life by reason of a concentration of toxic substances" has also been criticised by Scott, who notes the exclusion of inert particulate solids. He comments that the "provision is unrealistic but if it is to be included it should not ascribe damage to any one class of pollutants". (p 3).

Biological

Many Boards expressed interest in biological parameters, particularly as baseline indicators in relatively 'clean' areas, and felt that they are more useful than chemical indicators at present. Six Boards have employed biologists, and several have had consultant assistance. In one case this

has taken the form of contract 'ecological monitoring' (Bay of Plenty Catchment Commission 1974 a, 1974 b, 1975); in others advisory services from Universities have been obtained (for example, Fowles, 1972). Although the Boards are generally aware of the expertise required in this owrk, it is known that in one instance a biotic index has been prepared by engineering staff. Biologists employed by the Boards have stressed the need for keys to enable identification, and commented on the amount of effort required to establish just what 'natural acquatic life' is in any particular river or lake system. It is significant that virtually all the work on biological parameters (apart from microbiological) has occurred in an academic context (Hirsch, 1958; Cameron, 1970; Winterbourn et al., 1971; Gibbs and Penny, 1973; Scott, 1973; Marshall, 1974). Some early work by Hogan and Wilkinson (1959) and Williams (1959) on the Avon and Heathcote Rivers in Canterbury was management oriented.

Colour and Clarity

The requirements for colour and clarity, whilst accepted as important for 'visual' and recreational uses (Scott, 1974), has been criticised by the Regional Water Boards as unmeasurable. The question of conspicuous extent is regarded by EDS (1974) as one of the phrases "so imprecise as to be virtually unenforceable in a Court prosecution".

Dissolved Oxygen

The dissolves oxygen criterion has also been discussed by Scott (1974) who comments that this provision has given serious concern to administrators of freshwater fisheries. It is known that many Acclimatisation Societies feel that the levels allowed will be detrimental to fish populations. Cowie (1974) however dismisses these remarks with "such statements are not only incorrect, but are mischevious attempts to mislead public understanding" (p 9).

Bacteria

Of all the parameters the bacteriological has excited the most criticism. As early as 1960, before the 1963 Regulations were promulgated, in discussion of Cowie (1959) Rowntree (1960) observed: "some of the [proposed] standards are so idealistic as to be quite incapable of being supported

if they were seriously questioned. It is to be hoped that the Council (PAC) will reconsider, in particular, its bacterial requirements" (p 175). Subsequent papers (Vidal and Collins, 1970; Berquist and Bellamy, 1973; and Loutit, 1974) have expressed doubts over: the meaningfulness of using coliform organisms as indicators of faecal (human) contamination; the absolute values which should be used if this parameter is to remain; and the variation due to different analytical techniques. EDS (1974 p 12) comments:

> Another example of poor drafting of the schedules is provided by the many references to coliform bacteria. Reference to standard literature on bacteriology will indicate that this term does not describe what the schedule is intended to define. Furthermore, the levels are based on not fewer than 5 samples taken over not more than a 30 day period. In view of the known diurnal and seasonal variation in faecal coliform counts there will be wide differences in the median levels obtained depending on when the sampling is obtained.

Carrie (1973) explains how the present standards were arrived at, and comments in Soil and Water (December 1973) on the attitudes of microbiologists. He identifies three levels of criticism. Firstly, there should be no bacteriological standards at all, because neither Boards nor Board staffs understand bacteriology. Secondly, that the present standards are not restrictive enough; and thirdly, the majority view, that the present standards are completely meaningless.

In an unpublished paper circulated to the Boards, Gunn (1973) discusses the basis of coliform standards and concludes:

> The relevance of coliform standards is based on the possibility of contracting disease in spite of the demonstrated low risks. The international variation in standards for bathing waters is indicative, not of variation in risk to health, but of policies adopted for making aesthetic evaluations of these waters.
>
> New Zealand coliform requirements for environmental waters are recent, and have yet to be widely tested against local, regional and national data on background levels in polluted and unpolluted waters. Until convincing evidence is obtained to suggest either higher or lower limits, or alternative criteria such as salmonella (sic), these limits must stand. (p ii).

Because of this debate, the majority of Boards are wary of the coliform standards, and many have accepted the critical view. At the same time several Boards are conducting limited sampling programs for coliforms, and several report background levels in unpolluted rivers well above the present limits. One Board has made firm public statements regarding the suitability of beaches in its region for contact recreation. This debate remains unresolved and although submissions have been made to the law review committee, and attention is focussed on these criteria, early change seems unlikely.

Nutrients

The nutrient 'class' imposed by the 1971 (2) Amendment, Class X, required that

> Discharges into the waters shall have not less than 80 percent of the total phosphate content as phosphorous, or such lesser percentage as the Water Resources Council may specify in respect of any particular discharge, removed by such method of treatment as the Water Resources Council approves.

'Total phosphate content as phosphorus' was regarded as completely meaningless in terms of phosphate chemistry (J.K. Syers, pers. comm.), and it was immediately pointed out that the use of a percent reduction was not technically feasible and inappropriate with varying concentrations in effluents. This was apparently intended to express present technological limits for nutrient removal in domestic sewage, but has since been removed. It is now included in the body of the law as "by adding the symbol X to the classification the Council may indicate that the area of water in respect of which the symbol is added is sensitive to enrichment" (Section 26 (C) 5). Exactly what control is then exerted is not mentioned. There is a belief in some quarters that nutrient levels are more significant in the New Zealand situation than the usual organic or physical criteria, and that the lack of nutrient oriented receiving water standards is a serious ommission and will lead to a great deal of unimportant information being collected.

Suspended Solids, Grease and Oil

The requirement for suspended solids, grease and oil is that any discharge is to be "substantially free" from these.

This again has been criticised as too subjective and imprecise. While this is clearly flexible, the Boards pointed out the variation in expert opinion on this topic, and one Board reported an impasse over consent procedures on this issue. The relationship (or lack of it) between suspended solids and the colour and clarity criterion was also mentioned.

This criterion was highlighted by a Tribunal on shingle plant discharges to the Hutt River (Wellington Regional Water Board, 1973). Some Boards felt that again guidelines should be made available by the Organisation, and that they should not have to refer to particular cases such as this.

Mixing Zones

The application of all these standards is required after 'reasonable mixing' and again there has been pressure for the definition of this concept, and of mixing zones. Knox and EDS (EDS, 1974) ask if it is a distance, or degree of dilution, or based on some other criterion. This has been highlighted in the appeal on the Huntly Power Station water rights for waste heat discharges[7]. The Appeal Board commented as follows:

> The appellants argued that if we uphold the grant of the rights we should direct that the rights should define a specific "mixing zone" within which the temperature differential between the heated discharge and the river water must be reduced to no more than $3^{o}C$. Having considered the evidence and submissions on this question we find that it is impossible to predict the mixing phenomena with any degree of accuracy. Both mathematical analysis and physical modelling have their limitations, and the actual situation contains a number of highly variable factors.
>
> The Act intends that the quality of the receiving waters is to be maintained within the classified standard "after allowing for reasonable mixing of the discharge with the receiving waters". We apprehend that the Act therefore allows that a certain area or volume of the receiving waters will never be maintained at the classified standard, That area or volume can be conveniently called the "mixing zone". It is clear to us from the evidence that the area or volume of the mixing zone will fluctuate according to fluctuations in the respective

> volumes of the discharge and of the receiving waters and will be affected by hydraulic and other conditions.
>
> Also we hold that it is the intention of the Act that mixing shall occur as quickly as possible, in order that the intention of maintaining the classified standard is not frustrated. But what is a reasonable mixing zone will be a question of fact and degree in each particular case.
>
> The argument that there should be a specific maximum mixing zone has its attractions. But having considered the evidence and submissions we hold that it would be unwise to specify such in advance, at least in this case.

Similarly, the question of mixing zones in the marine situation has been raised, particularly in relation to class boundaries. This point has arisen in the Southland classification where the area around an SE discharge has been upgraded to SB. Knox (1974) expresses this in the estuarine situation:

> In one area known to me we have an estuary divided down the middle with an S.C. classification on one side and an S.E. on the other. Class D rivers open into each half of the estuary and the estuary itself opens on to a stretch of coastal sea classified as S.A. How such a hotch-potch could conform to the classification imposed I do not know. (p 1).

The relationship between standards and sampling has been raised by the Boards. When, for example, are the oxygen standards to be considered? The normal diurnal pattern of dissolved oxygen in streams results in a <u>low</u> in the early hours of the morning. Presumably the standards are to be maintained at <u>all</u> times, apart from in the mixing zone. The Boards and to a lesser extent EDS (1974) have shown concern with low flow conditions. Particularly in establishing conditions on rights, it is important to know at what <u>flow</u> these standards are to be maintained in the river. Are <u>extreme</u> low flows to be considered? The suggestion by the Organisation's technical advisers is that a 4 percent low flow is used (viz. 96 percent of the time that flow is equalled or exceeded). This means if based on average daily flows that on approximately 15 days per year the standards can be contravened - a situation for which the Boards find no statutory justification at all.

In all this discussion there appears to be two basic

attitudes. The first supports greater precision or rigidity of requirements, the second desires continued and even expanded flexibility. These two approaches are often suggested by the commentator, for different parameters. Of those wishing for greater flexibility, and the Boards on the whole are among these, there is a belief that nationally defined guidelines and procedures must accompany flexible standards. A point raised repeatedly by the Boards was that, above all, any parameter used as a standard must be able to be measured, preferably by simple techniques available to the Boards.

4.4 Receiving Water Standards v. Effluent Standards

The standards as outlined are predominantly standards applicable to the receiving water, and the question of effluent standards has been raised. There appears to be a basic acceptance of the principle of control through receiving water standards, rather than direct regulatory control of effluents. The Boards in particular see receiving water standards as appropriate for the New Zealand situation. An early contrast between these approaches was made by Cowie (1959) and there has been increasing discussion of the, particularly from the Department of Civil Engineering, University of Auckland. A number of papers from this department cover similar ground (Gunn and O'Grady, 1972; Auckland Harbour Board 1972; Wither, 1974) and the present author discussed these systems in New Zealand (Walker, 1975).

Gunn and O'Grady (1972) perhaps summarise the basis for this acceptance:

> The usage of effluent or receiving water standards as the primary emphasis in approaching water quality control varies from country to country. In the U.K. and Europe where perhaps pollution control (i.e. reduction in existing pollution) is the major effort in water quality management, effluent standards have been the primary tool in achieving the required objectives. In the United States and New Zealand where pollution prevention (i.e. the maintaining of existing acceptable standards of water quality) is the main aim in water management, receiving water standards are regulated with effluent control being complementary. (p 8).

The need for complementary effluent standards has been expressed by the Boards, and as Gunn and O'Grady observe:

> Receiving water standards and effluent standards are not alternatives - they are complementary to each other and maintenance of receiving water quality can only be achieved by regulating quality discharges. Any system of water classification will therefore be complemented by regulatory control of effluents. (p 7).

Bellamy (1974) similarly states:

> The advantages and disadvantages of these two approaches have been debated endlessly, but in recent years it has become increasingly accepted that both these approaches need to be employed if water quality is to be controlled adequately ... However, under the ... Act, heavy reliance has been placed on the control of the quality of receiving waters to certain minimum standards. Direct effluent control as a means of controlling pollution has been accorded only minor mention in the statute.

The minor 'mentions' are presumably the suspended solids grease and oil parameters (Standard h in 1971 No. 2 Amendment Schedules) and the disintegrated waste requirement for Class SE. Their rather odd position in the schedules of receiving water standards was apparently recognised and the 1973 Amendment removed them to the body of the Act (Section 21 (3A) c, d). The standards of Class A are also a curious mixture of the two: "The waters shall in all respects be maintained in their natural state, and no waste shall be permitted to enter them".

The basically receiving water standard system in New Zealand, does not provide a complementary set of effluent standards in the statute. The imposition of control is up to the Regional Water Boards by setting conditions on discharge rights. Many of the Boards feel that their work would be considerably easier if such statutory support was available. As Wither (1974) points out, the standards imply that full secondary treatment is required in the fresh water classes, but he comments that the Boards have the problem of exerting this implication with little legal support.

4.5 The Regional Water Board Role - in Theory

At present then, quality control is to be exerted using

receiving water standards. It would seem logical to expect that the law would contain provisions explaining how the standards are to be applied, and it does detail the Board's function to some extent in Section 21 (3A).

> In granting any right under this section to discharge natural water or waste into any natural water that has been classified, the Board shall ... impose such terms and conditions as may be necessary to ensure that -
> (a) After allowing for reasonable mixing of the discharge with the receiving water, the quality of the receiving water does not as a result of the discharge fall below the standards specified in the classification of that water:
> (b) The combined effect of the discharge being authorised and of all existing discharges and authorised discharges into the receiving water will not result in any failure to maintain the standards of quality specified in the classification of the receiving water.

There is also reference to the Boards' operations in Section 26 (Investigations of Water Quality). However, it is worth noting that Section 20 of the 1967 Act, Functions, Powers, etc. of Regional Water Boards, even after amendment does not detail direct responsibility for water quality measurement and control to the Boards but (subsection 4 (g)) requires that the Board shall from time to time obtain and apply the directions of the Water Resources Council in respect of natural water within the region , and in respect of classification and quality control of all natural water within the region. The direct responsibility appears to lie with the Authority (and its Councils) which under Section 14.4 (n), are required to carry out surveys and investigations for the purpose of ascertaining the causes, nature and extent of the deterioration of the quality of natural water.

Even if Section 21 (3A) is considered to establish the principles on which the Boards are to operate, it relates only to the areas already classified. This lack of provision for unclassified areas was based on the Water Resources Council's expressed intention to complete classification of all waters by 1975.

The Appeal Board has clarified the situation with the following finding[8]:

> We apprehend that the Act requires that ... positive conditions shall be imposed upon the right appealed against, to ensure the objects of the provisions of S.21 (3A) as it now stands; and that it is not a sufficient compliance with the Act to impose a condition ... that
>
> "The Regional Water Board may review the conditions of this right if at any time the exercising of this right causes the quality of the receiving water to fall below the classified standards".

It is also clear from circulars and correspondence from (and training courses run by) the National Authority, that the intention remains that the conditions on rights are to be defined in terms of effluent standards, or waste loads Furthermore, these are to be directly related to the rivers' natural purification or assimilative capacity, within the limits of the defined receiving water standards. This has been reiterated in a very recent circular to the Regional Water Boards (NWASCO 1975 e) which states:

> It has become apparent that some Regional Water Boards have been granting rights to discharge waste subject to conditions which simply require the discharger to maintain certain receiving water standards taken directly from the schedules to the Water and Soil Conservation Act.
>
> This practice does not provide adequate definition of the right or the conditions under which it may be exercised. It delegates the responsibility of the Regional Water Board for the maintenance of the receiving water quality, to the discharger who has neither the power nor the information necessary for this task. It does not effectively provide for the maintenance of the receiving water quality particularly when other activities, such as other waste discharges, or land wash, or river conditions complicate the situation.

The decision of the Appeal Board[8] as above is quoted, the circular continues:

> It is necessary to explicitly specify, in a right to discharge waste, the quality and quantity of the effluent. These values will depend on the source of the waste, its proposed treatment, the proximity of other discharges, the quality of the receiving water, and the other provisions of S.21 (3A).
>
> An analysis of these various factors, the assimilating capacity of the receiving water and the reasonable mixing conditions must be made by the

> Board in order to arrive at the necessary efluent standards for each discharge. These effluent standards are then imposed as conditions to the right. Use of the classification schedules in the legislation as conditions on a right is not sufficient and long-term problems are likely for the Board in carrying out its statutory function for the maintenance of receiving water quality standards and ensuring adequate compliance with the water right by dischargers ..... In general, therefore, explicit effluent standards must be set on all rights to discharge waste. This ensures the responsibility of the discharger for controlling his discharge is clear. It also ensures the responsibility of the regional water Board for the maintenance of receiving water standards is not abrogated.

Thus, at both legal, and national policy level, at least for classified areas, statements as to what the Boards should do in applying the standards, have been made. It is a good deal less clear, especially from a technical point of view, just how the Boards are to put this into practice and to undertake the "analysis of various factors ... in order to arrive at the necessary effluent standards for each discharge".

Several Boards expressed concern at the lack of assistance from the National Authority with this implementation role. One Board Engineer considers that the Organisation members and staff have no understanding of the Board's role at all, and pay little attention to the effort required after classification. He took strong exception to statements such as "now that the system of water classification has been amended and consolidated, the high quality of water in New Zealand will be secure" (Soil and Water, March 1973) and, following announcement of two classifications, "Dischargers will know to what degree they must purify their effluents, developers will be guided in their selection of industrial sites ..." (Soil and Water, June 1974 b, p 45). The engineer's reply to the editor on the first comment was never published.

4.6 The Regional Water Board Role - in Practice

Ten of the Boards considered water quality and pollution control to be the major water use management problem in their region. In some of these regions a number of quality problems are recognised; in others the Boards are preoccupied with one major control issue. Nationally, a very wide spectrum of quality

related management problems is covered.

The Boards' interests can be summarised as follows. Northland is concerned with coastal subdivisions and resort sewage problems, as well as off-farm wastes; Hauraki's interest is natural quality variations in lower tidal river reaches, in relation to abstractions. Bay of Plenty has eutrophication problems in the inland lakes, and quality interests in the densely populated coastal margins. Waikato, Manawatu and Southland are involved with major point-source discharges, and high intensity dairy farming, although Waikato also has lakes and hydro-electric impoundments to cope with. Taranaki, Rangitikei-Wanganui, Poverty Bay and Westland are generally concerned with farm wastes, although all these areas also have a few major discrete discharges.

Major discharges

Only the Boards with major inland industrial and municipal discharges saw their role in quality control as surveying to establish allowable waste loads. The remaining Boards, both those mentioned and the rest who did not recognise quality control as first priority, saw monitoring as the necessary approach. Several accepted that repetition of receiving water standards was not morally or legally correct, but with present capabilities and problems, considered they could do little else. In a number of cases the concept of nonitoring sampling programs to establish quality conditions and characterising the effect of wastes, was apparently not understood.

Thus, although some Boards are attempting to apply the principles outlined in the circular quoted (NWASCO,1975 c) many are producing conditions in other ways. It has been contended that Section 21.3A does not specify any mechanism or system by which terms and conditions are to be established, and it is argued that the definition of conditions can be done in any way which ensures the discharge does not reduce the quality of the receiving water below the standards specified in the classification. Discharge rights are being granted, particularly in unclassified areas, with conditions established by either -

1) repetition of the receiving water standards as a condition or discharge; or

2) the use of what may be called administrative conditions i.e. non-technical conditions such as 'wash-water only to be discharged'; or

3) the use of some relatively arbitrary effluent standard such as the 20 ppm BOD (Biochemcial oxygen demand - a parameter of organic waste concentration) 30 ppm SS (suspended solids) recommended by the Royal Commission on Sewage Disposal in Britain.

In some cases Boards are requiring monitoring of the effluent or even of the receiving water, by the discharger. Others undertake monitoring programs themselves, although this is not widespread. In other areas, it appears that the Boards are simply not attempting to put pressure on the dischargers by allowing existing rights or permits without conditions to continue unaltered, and as a consequence, the discharges continue unimproved.

Within the terms of the circular some Boards are apparently "abrogating their responsibilities", although a number of Boards considered that lack of facilities, staff, finance and national assistance had limited their effectiveness. One Board reported that in submitting programs for grant money under the Water Allocation Plan Scheme, quality investigation programs were excluded from the grant received in favour of quantity projects.

Two Boards were however satisfied with the technical assistance they had obtained from the national bodies, and in particular mentioned assistance with rights for offshore discharges. Several Boards were dissatisfied with the requirements for conditions to be applied to 'oxidation' ponds, especially when imposed by consent procedures. One officer considered the following paragraphs from NWASCO circular (NWASCO,1975 e) to be completely contradictory with the rest and also to be admission of the worthlessness of bacteriological standards.

> Some variation to this approach of using explicit effluent standards is sometimes necessary, particularly where oxidation ponds are used for treatment or where bacteriological quality is important. However, more repetition of the receiving water standards even in these cases is not adequate. In the case of oxidation ponds the principle controls over the quality of the effluent are in the influent load to the ponds and the loading rate within the ponds, plus the layout of the ponds. Accurate specification, in a meaningful way, of the effluent from oxidation ponds is not yet available although examination of this aspect is underway.
>
> Ensuring satisfactory bacteriological quality in an effluent should also rely on the specification of the treatment of the waste rather than on an effluent standard. This is because of the many problems associated with the testing for and interpretation of results of bacteriological examination. They are useful for evaluation but are of doubtful enforcement value. (p 2).

One Board has made strong representations to the WRC in seeking consent for an oxidation pond discharge, considering that the imposed requirements for stating influent load and design parameters were opposed to both the philosophy and letter of the Law. This is in part supported by the TCPAB in the hearing of an application by Rangiora Borough Council[9] which observed that there is nothing in the Act to empower a Regional Water Board to require that before waste is discharged it should be treated by a particular method, or even that it should be treated at all.

Two Boards were extremely critical of the delay in obtaining consent from the WRC for discharge rights in classified areas, and at least one Board simply ignores the requirement. One Board reported a five month delay in receiving a reply after submission of an application, and that reply was only a suggestion by Council staff before submission of the right to Council.

It has been stated that local authorities and industries are making a considerable effort to improve the quality of effluent discharges, and steady progress is being made towards the ideal situation where dischargers do not lower the quality of the receiving water (Spooner quoted in Soil and Water, June 1975 b). There appears to be little evidence available to support this contention. Many of the Boards do report improve-

ments in local authority discharges particularly, since 1970, but many also admit that this may not be directly due to their efforts. In some cases Boards do consider that their efforts and the pressures of water rights (or lack of them) has had an effect. In contrast, one Board recognises that its own inability to produce valid effluent standards has tended to delay implementation of proposals. This Board also considers that use of short term rights is simply a continuation of the proven ineffective temporary permit system. It has only reluctantly granted rights when insufficient information is available to prepare conditions which are based on knowledge of the receiving waters.

An earlier article in Soil and Water (December 1974) suggested improvements in water quality in the Lower Waimakariri, an interesting observation when considering Kirk's comment (1970) that the pollution there had become more serious over the sixteen years of the Pollution Advisory Council's existence. There appears to be no concrete scientific evidence to indicate either a reduction or an improvement in receiving water quality or the quality of discharges, although frequent statements are made supporting both suppositions. Visual evidence cannot, of course, be dismissed but it seems likely that increasing awareness of quality problems accounts for some of the negative comment. It is probably that this same awareness has resulted in pressures on local authorities and industry to improve their effluents.

Farm Wastes

The approaches adopted by the Boards in controlling farm waste discharges have varied. It is worth noting that the Boards have historically had closer links to the rural community than to the urban, both by representation and in the original Catchment Board role and it is not surprising that many Boards have concentrated on rural waste problems. This probably also reflects public attitude in interest in wastes in many areas, and the greater recognition of the Boards' role by complainants in the rural areas.

It would be impossible to discuss all the policies, but a number of common strategies and problems have been encountered.

General authorisations, often short term, have been granted for farm wastes in some regions. Several Boards have undertaken inspection of farm dairy sheds and piggeries throughout their regions, or in restricted areas, and many report a high level of cooperation from the farmers. Three Boards report very satisfactory progress in installation of treatment systems, although these Boards generally have only restricted areas of this type of farming.

Problems have been experienced with lack of advisory services, and many of the Boards have, perhaps inevitably, become involved in the advisory role. In some areas assistance has been obtained from the Farm Machinery Section of the Ministry of Agriculture and Fisheries for design of treatment plants; in others, Boards have relied on commercial firms. Several Boards have run field days in association with these groups. Delays in supply of equipment are reported, and have restricted progress. The Boards have found that the advisory booklets prepared by NWASCO are useful.

Several Boards felt that the emphasis on spray irrigation as a disposal technique was not appropriate to some areas. Manawatu cited problems in sand country with wear of machinery, and Poverty Bay has inadequate power reticulation in several areas. The use of oxidation or anaerobic/aerobic pond systems has increased in several regions. Some Boards are actively promoting these although problems with definition of right conditions have been experienced. Detailed effluent standards are not regarded as appropriate as a management indicator for the farmer, and often both specifications of size and operation of facilities have been added to the right.

Proposals first mooted some years ago to involve the Ministry of Agriculture and Fisheries in the inspection and control of dairy shed wastes were not regarded by the Boards as workable. They generally felt that any separation of the control function would be a backward step, and that initial inspection was only a part of the process. The recent Milk Production and Supply Regulations, 1973, stress the control under the 1967 Act, by directing that disposal must conform to its requirements. One officer pointed to the Dairy Instructorate's poor record in the past, commenting that

in some cases these same advisers probably originally suggested the siting of offending dairy sheds near streams to facilitate disposal. A discussion of this proposal appeared again in the National Authority Minutes of 5 August 1975, indicating the work would be undertaken by the Ministry if funds and extra staff were made available. The Boards would resist a diversion of funds in this way, and it was commented that if any financing of this work is done, the money should go to the Boards.

The Boards were sensitive to the accusation that a multiplicity of inspections by a variety of agencies are occurring. The Boards felt their inspectorial role to be justifiable in that water use functions other than control of waste disposal are covered in inspection. In some cases, soil conservation and engineering purposes are served as well in farm inspections or visits.

Reports on the disposal of effluents both from farm and industrial dairy operations are assembled by the dairy wastes committee of the WRC each year. The latest available figures, for the year ending 31 December 1973, indicated that of the 21,000 farm dairies 55 percent had satisfactory methods. Of the satisfactory methods 26 percent were by discharge to waste land, 11 percent spray irrigation, 8 percent using a pumping system, 7 percent to ponds or lagoons, and 3 percent were disposing wastes by tanker (Soil and Water, September 1974 b).

There has, however, been criticism of the way in which these data are compiled. They are prepared by the farm dairy instructors, as part of their annual reports, and the form used is considered misleading (F.W. Phillips pers.comm.). In these reports a subjective judgement must be made as to how 'satisfactory' the disposal is. It has been pointed out that the disposal requirements of the dairy regulations (distance from shed, predominantly) are very different from those of the Water and Soil Conservation Act, and that interpretation in terms of the dairy regulations is often the criterion. Even where the receiving water quality is recognised as the basis for 'satisfaction'

the estimate is often made without full investigation of disposal systems or local drains etc.

Only the Taranaki Board reported prosecutions of farm dischargers, although a number indicated that they were reaching this point. The successful conviction of seven dairy farmers in Taranaki (up to 31 March 1975) was achieved after the farmers had ignored repeated warnings. It is significant that this Board, a Commission with at present one staff member, has been able to set this precedent only with a high level of assistance from constituent local authorities. In this case, both inspections and subsequent paper work have been done by the local authorities, and this represents a devotion of manpower and time that no other Board can manage.

4.7 Quality Data Collection

The previous sections have dealt with the problems of the management procedures, which are the links between users and agencies within the socio-economic system (Figure 5), and touched on the control exerted on the users to modify their actions and impact on the water resource. The classification process and particularly the standards can be seen to provide an artificial and apparently arbitrary set of constraints on the quality of the biophysical system. That is, these do not represent direct controls on users, but set limits to the resource available for 'use' by dischargers. This framework is in turn theoretically used by the RWBs to exert control, but (as the controversy has shown) reflects the national agencies' concept of the quality of the resource, only. In theory the standards have been derived from observation of the resource itself, although that is doubted by many of their critics. O'Riordan (1971 b) observes that standards and the technical criteria on which they are based, are often derived from a curious mixture of faith, intuition, experience, and technical knowledge. This would appear to be true in New Zealand.

In this section attention will be focussed on the

flows of information on quality which cross the interface (Figure 5). Both the reliability and amount of this information will be discussed.

There is an extreme paucity of background data throughout New Zealand for all the parameters mentioned, and all the Boards bewailed this fact. It was commented that any improvement in the last few years could not be gauged, except where outstanding visual changes had occurred, because data on background levels were not available for comparison Although some testing was undertaken by the PAC in areas first classified, and in the preceding ten years, these data are apparently unavailable. One Board reported that quality reports known to exist for one area have not been obtained, despite several requests. The Boards also emphasised that low flow information was also non-existent in critical areas, because of previous concentration on high flows for flood control work. Despite early recognition of this lack (Campbell, 1964; Ministry of Works, 1965; Gillies, 1969) investigation of water quality was accorded low priority by the Organisation. Dunford (1973) notes the very low level of research effort in this field, and although the needs, particularly of the RWBs were outlined in a report to the Water Resources Council in 1973, this is late recognition indeed. The Appeal Board has recognised the shortage of information, and consequently has been hampered in its decisions in a number of appeals. [1, 7, 9, 10]

Present Investigations

Limited water quality investigations have been undertaken on the Waikato River, by the Ministry of Works, and a number of other projects have been established by other agencies especially Government Departments. Again, these have concentrated on the Waikato System (Reay, 1973; Timperley, 1975). The MOWD Waikato investigation has been boosted, with a technical committee for 'The Waikato River Resources Study' set up, and information is appearing from this work (Nielsen, 1972 ; Rutherford, 1974).

Auckland Regional Authority has undertaken a comprehensive study of the Waitemata Harbour, and DSIR has a

program in Lake Taupo.

As the Boards have become aware of their responsibilities under the 1971 (No. 2) amendment, limited testing programs have been established. The ecological monitoring commissioned by the Bay of Penty Board has been mentioned but most of the other programs are unsophisticated and of limited extent. They are directed at a variety of problems, depending on the policies and priorities of the Boards, as indicated.

Facilities

All the Boards agreed that the Organisation had been slow in recognition of the need for water quality data collection, and several were very critical of this situation. The need for trained staff, laboratories and problem oriented research was stressed in the 1970 Physical Environment Conference recommendations (McMahon, no date). Despite promisory comments by Gillespie (1972) little appears to have been achieved, and the Boards feel very much on their own in these technical matters. The Boards generally still have inappropriately trained staff. Several in-service training courses have been run for Board staff at Cawthron Institute and the Waste Water Treatment Plant Operators' School in Trentham. These have covered water sampling, analytical and preservation techniques, but despite this many Board staff appear to have over-confident and simplistic views of quality and testing.

The Boards are using a variety of facilities for their testing. Auckland has the sophisticated services of the ARA laboratory at its disposal, and Waikato operates through the Ministry of Works facilities. Several Boards use commercial services. Four Boards of the twenty have their own small laboratories, and three more are in the planning stages. Other Boards have some limited capability, usually restricted to dissolved oxygen (D.O.) testing. The national scheme for D.O. testing was regarded by the Boards as a step in the right direction, but many regarded the Organisation arrangement with Cawthron Institute for other analyses to be unworkable. Only the two Boards nearest the Institute (Nelson and Marlborough) considered they could use the service.

The remaining Boards found the circular regarding this arrangement confusing, and in absence of information on suitable containers, storage, preservation and transport, have not made use of it.

Standardisation of Techniques

This present situation raises the whole question of standardisation of procedures. The need for nationally defined guidelines and procedures in sampling, analysis and interpretation has been expressed by a number of authors (Cowie, 1964; Boyt et al, 1972; Dunford, 1973; Walker, 1973). The importance of standard analytical services was stressed by the Interdepartmental Committee on Water (Ministry of Works, 1965). Problems with variability in analytical methods and results between laboratories has been demonstrated in the Chem-Aqua program (Kingsford and Stevenson, 1973). Although standard techniques are available for analyses, there are often several methods for each parameter, and some national consistency is essential. Apart from the D.O. Scheme there have been no standard methods defined for the organisation to follow, although some attempts at coordination have been made by distribution of a booklet on standard methods by another division of the Ministry of Works and Development (MOWD, 1974).

As well as standardisation of analytical procedures, the writer has stressed the need for guidelines for sampling programs (Walker, 1973; 1975) to enable collection of meaningful data and to increase efficiency of inherently expensive surveys.

The in-service training courses run by the Organisation have tended only to repeat principles or simplified methods or have referred to obsolete 'classical' technical papers, and have not provided the Boards with operational techniques. Only early published work for New Zealand (Johannesson, 1958; Annabell, 1961) and recent unpublished exercises such as Boyt (no date) and 'textbook' background knowledge are available for the Boards to develop much needed techniques.

At present the national agencies have apparently made no effort to evaluate and recommend electronic instruments, with the result that five Boards have already purchased a variety

of instruments and further types and makes are being considered by other Boards. The technical advisers appear to favour wet chemical methods despite overwhelming overseas experience with and support for instrumentation, and strong recommendations from within New Zealand (Salmon, 1973; Walker, 1973).

The Manawatu Board, after two years successful experience with a hand-held field D.O. meter, has now purchased recording instruments to enable monitoring of diurnal patterns without expensive night sampling surveys. Several Boards considered that national standardisation of instruments was essential, for servicing as well as consistency, and felt that the role of the instrument depot in Christchurch should be extended to the purchase and maintenance of quality equipment. Several reported difficulty with attracting suppliers' attention, and thought the buying power of the Organisation would save a lot of effort on their part.

It is to be hoped that the work in the Waikato will stress the complexity and sophistication of techniques required to adequately establish quality conditions, and draw the Water Resources Council's attention to this whole area of monitoring strategy and technology (Gorden and Gorden, 1972).

The only research that has been undertaken in this field by the national agency is evaluation of computer simulation techniques. The use of simulation in water quality modelling has been described by McBride (1973). Several Board Officers regard this as an academic exercise completely unuseable as a tool in the present management context. The program developed is described in the NWASCO Manual (Volume II as being for "use by catchment authorities and other agencies". However, among other limitations and assumptions of the model it is noted that the nature of the sources and sinks of the D.O. and BOD must be understood before the programs are applied. Only one Board in New Zealand is seriously attempting to establish DO/BOD relationships, and it appears frivolous to develop such sophisticated techniques when other simple procedural guidelines are required.

Another modelling exercise also by McBride (1972) of flow patterns associated with the discharge of sewage or waste heat via sea outfalls, is seen by several Boards to

add considerably to the understanding of these situations. The Estuarine Research Unit of Canterbury University has recently received support from the Organisation, and consequently Boards can make use of its specialist knowledge.

Little attention appears to be paid by the Boards in setting conditions on rights, to accounting for possible variations of waste load. Only one Board considered that understanding of the character of the waste, both in quantity and quality, was important. The difficulty of characterising wastes and assuming anything about flow rates or quality has been clearly demonstrated in Marshall's work on dairy factories (1975).

Apart from the need for national consistency, it is beyond the Board's capabilities at present to develop the necessary management procedures and tools, although because of urgent regional need several Boards are attempting to establish these in the absence of national assistance. It is ironic that it is the failure of the Organisation to provide this technical back-up that is the major factor in precluding the effective application of the principles the Organisation is itself propounding.

However, a number of Boards among those that do not consider water quality to be major priority in the region, are not particularly concerned about this issue. This attitude was epitomised by the opinion offered by the Director who considered that management could be achieved at the local level with a "fundamental approach" and without too much detail or "ultimate refinement". No answer was obtained when it was asked just what constituted this "fundamental approach".

4.8 Other Water Quality Considerations

There is increasing attention being paid to effluents other than those from 'conventional' point sources. The problem of leachate from rubbish dumps of the 'sanitary land fill' type is now recognised in several regions, and potential contamination of ground water by these dumps is causing concern. This has been noted particularly in the Heretaunga Plains underground water system by Grant (no date).

One study on tip leachates has been published (Hutchinson and Taylor, 1973) in which the tips did not affect the receiving water to any great extent. Future control measures against discharges from tips have perhaps been weakened by a recent decision in the Magistrates Court[11]. This held that the defendant (the local body controlling the tip) was not discharging within the meaning of the word in the 1967 Act, and that some positive act of the controlling body must be proved - mere tolerance or non interference is not sufficient.

The potential of diffuse sources to lower water quality is also being recognised. O'Connor (1968) first discussed the role of runoff from agricultural (particularly pastoral) systems in influencing water quality, and White covered similar ground in 1973. The whole field of eutrophication and the role of nutrients in excessive and deleterious fertilisation of receiving waters is receiving considerable attention. Fish (1969) considered agricultural development, particularly topdressing with phosphorous fertilisers, to be the most important cause of the eutrophication of several lakes. Gilchrist and Gillingham (1970), discussed nutrient runoff in field plots, but more recent work by Soil Bureau indicates that losses of phosphorous in surface runoff may have little relationship to the quantities entering the receiving water (White, 1973). Elliott (1971) provides a more balanced view of the role of topdressing in eutrophication, and Ryden and Syers (1973) comment:

> The extent to which soil and fertiliser P. [phosphorous] are major causative factors in the eutrophication of water supplies in New Zealand is difficult to determine because of the lack of adequate information. Losses of P from agricultural watersheds have not been evaluated with any degree of reliability (p 491).

Metson (1971) provides a general and lightweight review of information on the soil factor in eutrophication, but it is only more recent research which is orientated towards solutions of management problems. Two specific problems which have been discussed are the weed infestations in the Waikato system (Chapman, 1970) and the possible source of the nitrate contamination of shallow groundwaters, also in

the Waikato (Baber and Wilson, 1972). The N.Z. Fertilizer Manufacturers' Association has been active in stimulating discussion of eutrophication, and as well as including this topic in conferences, it has recently promoted a press forum on this issue (N.Z. Fertilizer Manufacturers' Association, 1972).

The research effort directed to the nutrient question and the number of agencies involved can be gauged by the listing of projects in the proceedings of the Pollution Research Conference (DSIR, 1973).

The Rotorua lakes have created intense interest, and a Cabinet Sub-committee has been formed to discuss the problems. A recent report by Swedish consultants has highlighted sewage disposal problems. A MOWD program monitoring nutrient inputs has been established, and an interdepartmental committee formed (NWASC Authority, 1975).

Current research is being undertaken at Massey University under the aegis of the Organisation, on nutrient relationships resulting from irrigation of farm dairy wastes, and also in a 'clean water' irrigation system. Results from this research are now being published (Macgregor et al, 1975; Yeates and Stout, 1975). Interest is also being expressed in the contribution of nutrients made by stormwater and industrial discharges. Preliminary sampling indicates that loads from these sources may be much greater than originally thought (Syers, 1974).

Although the level of investigation required in this area is beyond the RWBs' capabilities at present, the Boards do maintain a high interest in this issue. This results from their soil conservation role as Catchment Boards, in which they are closely involved in agricultural development work. The Bay of Plenty Board has an obvious interest in the Rotorua Lakes situation, and the Valley Authority also has enrichment problems in the Waikato catchment. The South Island Boards are interested in the high country lakes, and investigations are being commenced on the coastal dune lakes of the North Island west coast.

There has been little attention focussed on management in the marine situation either under the 1967 Act, or the

Marine Pollution Act, although some action is taken periodically by Harbour Boards where ship discharges are involved. Classification in the marine situation, and advisory services on sea outfalls have been mentioned, and some relatively small monitoring programs by a number of Boards (Northland, Hawkes Bay, Nelson, Marlborough and North Canterbury) are under way. Published information is scarce, but some baseline observations have been made in the vicinity of proposed thermal power stations (Stanton 1973; Ridgway, 1973). A substantial program has been reported for the Avon-Heathcote Estuary, Canterbury (Knox and Kilner, 1973). Several Boards are also concerned with estuarine or river mouth situations (Bay of Plenty, Manawatu, Rangitikei-Wanganui, North Canterbury).

There has been some discussion of toxic compounds, and Reay (1973) and Axtman (1974) have commented on arsenic and mercury levels respectively in the Waikato System.

The issue of water quality and shellfish farming in northern coastal waters is topical in several areas, and has been the basis for appeal proceedings. This will be briefly discussed in the later section on fisheries.

4.9 Activity of Other Agencies

As indicated earlier, particularly by the examination of other laws involved in water pollution control (Appendix F), other agencies are still involved in quality management. Limited as the earlier control was, activity under these statutes has in most cases reduced still further.

Local authorities do not appear to have pursued their water quality role, except under the Litter Act, although they have been involved as water users, and in the 'structural' aspects of waste treatment. Government Departments are generally either involved through research, or in advisory capacities at national level. The Ministry of Agriculture and Fisheries as mentioned earlier has been involved in advisory services directly at regional and local levels.

Some of the Acclimatisation Societies have maintained an active role in quality monitoring (often visual) and in

a few areas (notably Otago, Wellington and Hawkes Bay) have obtained prosecutions More often, these societies (and other advisory agencies such as the Nature Conservation Council) have diverted their attention to using the objection provisions of the 1967 Act. While some of the Boards have been annoyed by automatic and poorly researched objections by the Societies, in other cases the Boards report constructive and well-prepared cases. Consultation with the Societies or Government Departments with relevant interests (particularly Internal Affairs, Wildlife Division, and Fisheries Management Division of Ministry of Agriculture and Fisheries) is routine in a few regions, but generally at a low level. One Board reported that information on fisheries and their requirements for maintenance had not been provided by the appropriate authority despite several requests. In this situation, it was considered difficult to have 'due regard to the safe-guarding of fisheries' in any allocation plan.

Water quality management explores a wide range of the interactions within the socio-economic system (Figure 5), and most of the linkages between the components have been touched on. As with the water right procedures the relationship between the regional agencies and the water users does not appear to result in strong enforcement, although some success is evident in control of farm wastes. The linkages between the water users and the national agencies in the classification process can be seen to be strained, and have led to litigation. Perhaps the greatest weakness in water quality management, identified in both specialist and judicial opinions, is the lack of inform-ation on the resource. This is at the root of the majority of the philosophical and technical arguments surrounding classification, and has led to the variety of perceptions of the extent of water quality problems.

CHAPTER 5

SECONDARY MANAGEMENT ISSUES

5.1 Recreation, Fisheries, Aquatic Life, Wildlife

The 1967 Act gives considerable emphasis to these aspects of water use, both in the long title, and in detailing the functions of the Organisation and the Regional Water Boards. The guiding expressions are 'ensuring that adequate account is taken of the needs of' and the 'Board shall have due regard to'. Other than these statements of principle, there appears to be no other enabling framework for these uses.

In practice, it appears that the machinery for processing water rights, in particular the opportunity for objection, is providing the major control or opportunity for involvement in this field. In these uses, interests are often closely associated. Fresh water fisheries are managed to a great extent by Acclimatisation Societies, which are basically recreational interest groups, and these bodies also have a management role in other wildlife considerations. The other major inputs here are from the Fisheries Management Division of the Ministry of Agriculture and Fisheries, and Wildlife Division of Internal Affairs. The Nature Conservation Council also has a watching brief in this area.

Boards receive many objections to waste discharge applications from individual citizens and groups who use inland and coastal waters for contact recreation. Objections and appeals against classifications are often from recreational interests (Southland and Auckland for example) and at this level have considerable effect. This may increase following the Southland decision[2]. It appears also that the Boards do consider the recreational objections or submissions seriously. Several Boards have become involved in planning and even construction of river-side recreation amendities, usually as a part of structural flood control measures. A general discussion of these aspects including financing is presented by Wederell (1974). Two Boards reported regular willow clearing operations to improve access for fisherman and swimmers, and this may occur in other regions.

Wellington Regional Water Board has separate statutory recognition of recreational aspects. This is perhaps more oriented to land than water-based recreation, and is a by-product of the Boards water supply functions and extensive land ownership and management. The Manawatu Board has become the servicing and controlling agency of a Manawatu River Users Committee, comprising predominantly recreational groups. This developed in response to increasing conflict between swimmers, fisherman, power-boat and yachting interests, but was also in part due to the need to reduce bank erosion in the lower reaches of the river. This Board, and two others also reported concern with jet-boating activities in conflict with other recreational interests. Although general co-operation from jet boat enthusiasts was reported, a need for greater control over such boating activities was expressed, and the question of licensing of boats was raised. This link with boating activities and transport regulations was introduced in defining water uses in the Introduction. Boat based recreation has been implicated in other water use management problems, such as spread of weed species in the Waikato. Increasing attention is also being paid to the problems presented by marinas, especially in enclosed inland waters (Ministry of Works, 1972).

In the freshwater situation, the objection system has again been the main vehicle for safeguarding fisheries needs. Attention has been focussed on the need for fish screens and fish pass facilities, although previous power to require these was available under much earlier Fish Bypass Regulations (Fisheries Act 1908). The maintenance requirements for fisheries are being investigated in a number of South Island rivers. Some published information is available both on biological (Gibbs, 1971; Fowles, 1972; and Graynoth, 1974) and economic aspects of recreational fishing (Graynoth, 1972). It is generally felt by the Boards that lack of information makes balancing of these requirements against other demands, very difficult.

In the marine situation, water quality problems have been emphasised in shellfish areas, where both marine farming and public shellfish harvesting for consumption are

widespread. It is well known that a high level of purity is required to avoid concentration of potentially pathogenic micro-organisms by filtering molluscs such as oysters, pipis, cockles and mussels. This has resulted in intense public interest particularly where farming is being encouraged. There has been a lack of coordinated management since the early stages of pollution control. At this time the Marine Department was promoting farming without considering the relationship with classification, which was also under their control as servicing agency to the PAC. As a result, the appeal provisions have been used by interested parties both in the Bay of Plenty[8] and the Bay of Islands. The latter case was further appealed to the Supreme Court[12]. The measures that should be taken to achieve water quality desirable for marine farming were argued extensively before the Appeal Board in the latter case.

Wildlife interests seem to be mainly concerned with maintenance of wetland habitats, for breeding and maintenance of bird populations. Again the water right process appears to provide the major link between conservation and development interests, although a number of Boards have a parallel concern with the effects of excessive drainage on downstream and flood flow regimes.

It does not appear, however, that the provisions of the 1967 Act have affected the rate of development of wetland areas, or resolved the competition between local drainage benefits and longer term regional conservation and recreational interests. This aspect is attracting more interest as a recent set of guidelines prepared by NWASCO (1975 f) indicate.

5.2 Irrigation

A full analysis of the irrigation policy at present followed is beyond the scope of this thesis. The following is a brief description of the evolution of the policy, its present application, and some of the attitudes expressed by the RWBs.

In 1968 the National Water & Soil Conservation Authority requested the then Water Allocation Council to study and report on means of increasing the overall availability of

water for agriculture and to advise it on establishing a national policy for irrigation.

In 1969 the Water Allocation Council reported back that a committee of the Council should be established to look into the adequacy of the present irrigation policy and its administration, and to recommend changes it considered necessary or desirable.

This proposition was approved by the Authority and subsequently a committee of five members was established.

In 1971 the committee's report was published (NWASCO, 1971). It contained a number of recommendations, the most important of which were as follows:

1) Irrigation schemes be made a responsibility of the National Water and Soil Conservation Authority.

2) County Councils be encouraged, and catchment authorities be permitted in specific cases to promote, construct, and operate schemes and to take over existing Government schemes.

3) Future schemes warranting Government support be assisted by subsidy and not by grants.

4) Older schemes be examined and those requiring upgrading be treated as new schemes.

5) On-farm development be included in overall scheme planning and be eligible for subsidy.

6) In principle, all schemes be required to pay working expenses and show an acceptable return on capital.

This received a mixed reception, but was generally favoured (Soil and Water, Sept./Dec 1972). A change in Government in 1972, led to the establishment of a Parliamentary Investigating Committee, and the new policy was not released until mid 1973. The recommendations of the WAC were generally followed, except for part 2 above, as the Ministry of Works was re-instated in its former role of major field agent. In addition local irrigation committees were to be set up, both to investigate new schemes, and appraise all existing schemes.

The present status of implementation can best be described by the summary in the NWASC Authority's Annual

Report (1975):

> Following the first full year of operation of the revised irrigation policy introduced in 1973, significant progress can be reported. Forty-nine proposals are under investigation by the Ministry of Works and Development. Decisions to proceed with these proposals will depend on the outcome of engineering and agricultural feasibility, economic, and water resource studies being carried out.
>
> Previously limited mainly to Otago and Canterbury, interest in irrigation spread throughout the country. The Water Resources Council gave approval in principle to six schemes including the Maniototo and Waiau Plains. These approvals enabled action to be taken to declare the irrigation districts and to conduct polls prior to financial approval being sought. Procedural statements were released on the initiation of irrigation schemes and development of on-farm subsidised works. A third paper on off-farm development is being prepared (p 10).

There is clearly a high level of commitment to this capital development as indicated by the available subsidies mentioned earlier, and the level of expenditure shown later in the section on finance. As would be expected at this scale of development, there is considerable debate in specific areas where schemes are being prepared, and in several cases impact reports will be required. This level of government involvement in irrigation takes this aspect of management into Stages 4 and 5 of Craine's analysis (Figure 2) and as such, into an area of 'effectiveness' which can only be judged at a national level against alternative investment decisions. As Frengley (1972) pointed out, the committee report did not comply with its first term of reference, in that it did not "assess the relative merits of irrigation as compared to other investment opportunities in agriculture" (p 2). He observes however, that this could only be done with a considerable amount of research, and the present Government policy indicates its commitment to irrigation without such analysis.

Several Boards considered the reinstatement of the Ministry of Works and Development as the major agent was a retrograde step, and that the promotion of schemes should have been delegated to the Boards. It appears, however, that the scale of the projects would be beyond many of the Boards'

capabilities both in terms of staff numbers and expertise. The Officials' Committees which have been established, and of which the Boards are usually members, encompass a wide range of expertise (especially in economic evaluation) perhaps more suited to the scale of operation.

Several Boards reported that they were not concerned with large scale flood irrigation schemes, but were primarily concerned with individual on-farm systems of spray irrigation. These smaller systems too, are receiving financial assistance by way of loans, and recent policy changes give a guide to farmers on procedure and requirements for subsidised development.

The National Authority Annual Report 1974 noted a necessary increase in staff for implementation of this policy, and several Boards commented on the fact that staff numbers at MOWD district level are increasing, while the Boards are struggling both with lack of finance and shortage of staff.

In terms of the model, the present irrigation procedures are the major direct link between the agencies and the physical system, both at national (policy, finance, and overseeing) and regional level (MOWD in servicing Officials' Committees, and providing technical and construction facilities). Again, there is a potential direct link between the ultimate water users and the national agency, in the preparation and presentation scheme proposals, which is not exclusively the role of the Officials' Committees.

5.3 Rural Water Supply

A similar pattern of support for rural water supply schemes has developed. Distribution of subsidies became the responsibility of the National Authority on 1 April 1972, and was soon delegated to the WRC. Interest in this increased rapidly, with 9 schemes subsidised to the extent of $155,000 in 1973/74, and a further 11 schemes in 1974/75. The policy was reviewed in mid 1974, culminating in a decision to increase the subsidy from $1 to $2 for off-farm works, to $1 for $1 for both on-farm and off-farm works.

This also represents a high level of government involvement, although this is mainly financial, with the promotion

and construction normally undertaken by Counties. Several of the Boards considered that this function should also have been delegated to the regions, both to simplify right procedures and to enable coordination of drainage and water supply schemes. There does not however, appear to be any restriction on Boards taking an active role in promoting schemes, although again financial problems may preclude Board involvement. Some Boards have been involved in promotion of schemes although generally these have been small, and represent more an extension of soil conservation farm plan operations than major supply scheme planning. In at least one case the Farm Advisory section of the MAF has investigated the feasibility of a supply scheme (N.Z. Farm Advisory Service, 1969).

Water users may have direct contact with the national agencies in proposing schemes, but often the user group is represented by a local territorial authority (usually a county). In this situation, in terms of the model (Figure 5), the county can be considered as a regional agency (Figure 7), and has the direct influence or physical intervention in the bio-physical system. In this case, the county is in turn influenced by the ultimate users. From the extent of interest in these schemes, it is apparent that this procedure is well used. This also follows the trend noted by the United Nations (1972) and Craine (1969) of increasing government involvement in supply functions. The UN also points out that there tends to be greater acceptance of intermediate supply authorities after introduction of third phase consolidating legislation. This is appearing in New Zealand.

5.4 Underground Water

Groundwater was mentioned only within the definition of natural water in the principal Act (1967), but this did make groundwater use subject to the same administrative regime as surface water. In the regions where consideration of the lawfulness of the notices of existing use was made, use from underground sources was often the only use recognised as legal. Subsequent granting of rights was very

much a 'blind' operation by the Regional Water Boards, as virtually nothing was known of groundwater supplies.

Underground Water Authorities had been set up in several areas under the Underground Water Act, 1953. Only two, in the Hutt Valley and the Heretaunga Plains, had made much progress in either control or investigation of the resource. Most of the investigation had been undertaken by the N.Z. Geological Survey, DSIR, and both investigation techniques and more recent published papers have been based on experience and information from this agency. Recently, more information has been produced for the Canterbury Plains groundwater (Mandel, 1974; Hunt and Wilson, 1974), the Hutt Valley system (Donaldson, 1974), and the Heretaunga Plains acquifer (Grant, no date). All these papers provide data of importance for management of the resource.

The study in the Heretaunga Plains has been directly related to allocation problems in the area, and is now supported by the Organisation, as well as the RWB. Hawke's Bay is not the only Board to have been involved in groundwater investigations, although this Board took over the Underground Water Authority in the area at an early stage. The Manawatu Board produced a report on the Manawatu water resources (Manawatu Catchment Board, 1970) with considerable emphasis on groundwater, and Dalmer (1971) indicated close relationships between surface and groundwater in North Canterbury. Brown (1972) studied the resources of the Wairau Plains in close cooperation with the Marlborough Board, and many other Boards have begun groundwater investigations. Manawatu recently sponsored a staff engineer to attend a post-graduate groundwater hydrology course in Jerusalem Israel, and other Boards have allocated water allocation plan grant money to groundwater problems.

The 1973 Amendment to the Water and Soil Conservation Act gave the Boards power to make by-laws controlling the sinking of bores. Although only Marlborough has enacted by-laws, a number of other Boards are preparing them. The Boards were again concerned at the lack of provision for financing. The Amendment in fact contains the express provision that no charge can be levied by any by-law. They

consider that this involves more work with again no financial support.

Wellington Regional Water Board has extensive responsibilities and powers under its own Act (including ability to charge) for the Hutt Valley ground water system. This reflects the control previously exerted by the Underground Water Authority in that area. Even with just three sets of by-laws to compare, differences are evident. For example, the Heretaunga Plains by-laws require a permit for drilling or altering a bore to be obtained any held by the driller; in Marlborough the permit is held by the owners of the bore. These divergences reinforce the need for model by-laws to be prepared by the Organisation.

One Board engineer considered that the exclusion of bores sunk in search for petroleum products from the by-laws is a serious omission. This attitude has arisen from major problems in that region with rogue bores resulting from unsatisfactory sealing of shot holes used in seismic surveys for petroleum investigation. Several Board officers commented on the complete lack of provision for control of groundwater <u>quality</u> prior to the 1973 Amendment, and the relatively poor provisions possible under the by-laws.

A recent Appeal Board Hearing[13] raised an important legal question regarding discharge to groundwater. The point arose in hearing of an application to irrigate timber mill effluent, and the Board's part decision states:

> The Company is proposing to irrigate effluent water from its mill on to the ground whence some of this water will percolate into the underground water. There is no doubt that the company will thereby discharge effluent water in that it will release the effluent water from its control. Also there is no doubt that the underground water is "natural water" within the definition of that term contained in the Water Act. The question is whether the Company will thereby discharge the effluent water <u>into natural water</u>. (p A.2884)

The distinction between discharges requiring rights (Section 21) and discharges under the offences Section (Section 34) is noted, and the provisions of the bylaws contrasted with the Act itself. The Appeal Board notes:

> The statutory intention appears to be that direct discharges into natural water are to be regulated by rights granted under Section 21 (3) ... and that discharges of anything on to the ground which may percolate into underground water are to be regulated by by-laws (p A. 2885).

The Appeal Board recognised the general applicability of this issue, and proposed to state a case for the opinion of the Supreme Court. If a right to discharge is found to be required, it seems that all methods of land disposal of wastes will also require a right. This may even extend to 'clean' water irrigation, and could result in a further heavy administrative burden for the Boards.

Generally the Boards showed considerable awareness of groundwater problems in their areas, but again considered they lack background information and finance for effective investigation and management. Many Boards were particularly concerned about the expense and expertise required to adequately establish groundwater resources, and felt that the Organisation recognition of this situation had been delayed. One Board reported problems with obtaining instruments for continuous monitoring of wells, particularly those that at some times provide artesian water (i.e. pressure wells or wells with piezometric surface above ground level) and at other times require pumping. This same Board reported a particular user attitude in this situation. Although ample water is available from these bores, many users are reluctant to install pumps or storage facilities to maintain supply over the relatively short periods of lack of flow, and proffer strongly 'riparian' opinions when this is suggested.

Underground water represents simply a subset of the overall water resource, and as such fits directly into the management scheme (Figure 5). Again, the technical information is lacking, and the right process status is similar. The by-law arrangement does, however, involve the regional agency much more closely in controlling user actions in the structural sense, as the technology of groundwater abstraction can be directly dictated. Also, investigation normally involves the agency in sinking bores and test pumping, thus directly influencing the resource, although this is normally only in the investigation phase.

CHAPTER 6

TECHNICAL PROBLEMS

The problem of collection of information on water quality has been covered, and this Chapter will deal predominantly with the collection of water quantity data, for surface waters. This represents the other major block of technical information about the biophysical system, required to establish viable water use management. As for water quality data, this is obtained by monitoring programs mounted by both the regional and national agencies. Water Users also perceive water quantity, although this is usually in a more intuitive and qualitative manner.

Waste treatment and water supply technology have already been distinguished as water-as-entity management. As such they will not be considered in this section, although knowledge of this field clearly modifies the user actions and consequent impact on the resource. It would also appear that this technology should be understood by the agencies before imposing non-structural or regulatory measures.

6.1 Quantity Data Collection

There was early recognition that detailed information on water availability was essential for operation of a comprehensive water law, and this was widely discussed during preparation of the 1967 Act. Campbell (1964) stressed the lack of 'technical preparedness' of the then Ministry of Works, and discusses strategies for data collection and storage.

Presumably in response to this, there was rapid development of a hydrological section within the relatively newly created Water and Soil Division of the MOW. This work was given added impetus by New Zealand's involvement in the International Hydrological Decade (IHD). A rapid expansion of a research program involving a network of representative and experimental basins followed, and in 1968 the Annual Report of the Water and Soil Division (MOW, 1968) reported decentralising of the hydrological effort. Although this

report recognised the "need to supply vital information to RWBs", there was an increasing tendency to concentrate on research projects. One Board cited a case where a Hydrological Survey group at district level concentrated on a representative basin to the complete exclusion of flow gauging in a part of the district very important to the Board. The Boards do admit that the hydrological observation procedures developed over this period provide an important management tool.

Several Boards established their own hydrological survey teams, often staffed by MOW trained technicians, and it is interesting to speculate whether this movement to the Boards accounted for the Division's reported loss of 40 percent of its professional staff in one year (ibid). The Boards' own data collection was supported by 'hydrological grants' of $4,000 per Board per year from the national Organisation purse. These were first made available in 1968. This was said to have made a "clearer distinction between national and local investigation", and was in recognition of the importance of investigations in granting of water rights (Soil Conservation and Rivers Control Council, 1969).

Although a number of reports were prepared by the Boards (Northland Catchment Commission, 1968; Manawatu Catchment Board, 1970; Dalmer, 1971), the need for more detailed data, particularly on low flows, began to be felt. The Boards generally either wanted to develop their own data collection facilities, or obtain more information from the Hydrological Survey parties. They were concerned to see considerable sums spent on what they considered esoteric research. This applied particularly to the Boards who were reaching the top of their rating capacity, and felt the RWB functions to be a burden.

Dunford (1973) crystallised much of this feeling in his report on research, and as well as commenting on the Board criticism of the research program and lack of applied work, noted a deficiency in the reporting of research results to the managers. He also emphasised the continuing role of Hydrological Survey in data collection, and in discussing the research at the time, made a careful

distinction between research, investigations and surveys.

The situation was, and still is, by no means uniform throughout the country. The Boards with hydrological teams of their own have in some areas overshadowed the Ministry of Works in this role. In other regions, the Boards have virtually no capability at all. The degree of cooperation between the survey parties and the Boards ranges from outright antagonism, to full cooperation with complementary programs established each year. Lack of coordination is however, the rule rather than the exception. Boards with investigation capability consider the Hydrological Instrument Depot in Christchurch to be important, and feel it should be expanded. Several Boards felt however that they receive older equipment 'cast-off' by the survey parties, and have as a result purchased equipment themselves. The computer system developed for storage and retrieval of hydrological data as described by Ibbitt (no date) was criticised by several Boards, because of slow turn-around times and the inability of the Boards to obtain the data they feel they need. While it was agreed that the system is relatively new, and some time for 'settling down' should be allowed, several Board officers contended that terminals would be required in the Board offices before full use could be made of the available programs. Also, at the time of the interviews, three Boards had sophisticated calculators and were doing their own analyses.

Much of the money made available to the Boards in Water Allocation Plan Grants ($200,000 total 1973/74; $355,000 total 1974/75) was used in investigation programs. Although most of the Boards have embraced the concept of water allocation planning, and were grateful for the added finance, several Boards questioned the basis of allocation. The cynical view was expressed, that the Boards most capable of financing their own investigations received the largest grants.

There has been growing appreciation that the Boards need to collect their own data for projects of regional significance, and for use in routine management. This was also recognised by Dunford (1973) and the accompanying need for standard techniques, monitoring and central servicing was

also noted. A draft data collection policy circulated in early 1975, for the first time indicated official recognition of this possible separation of data collection roles and indicated that this separation may even be required in instrumentation.

6.2 Operational Surveys

Following the appointment of a Director of Research and Surveys (Figure 8), and wide consultation with Boards and Districts, a new policy on data collection has been approved by the National Authority. This was not circulated to the Boards until late April 1975, and consequently only the Boards visited after this date were fully aware of the proposals. Operational surveys are designed to enhance as well as coordinate the survey work of the Boards and Water and Soil Division. These involve formation of district committees to establish projects for each MOWD district. Technical and presumably financial approval for these projects will then have to be sought from Head Office.

As financial allocations were already established for the 1975/76 financial year, and the policy is thus not in full operation, the effects of this programming are not known. While the Boards recognised this, and most considered that the system would have to run for a few years before the import of the policy became clear, several Boards expressed reservations about it. There is some fear that regional priorities will be swamped by national priorities, and that the present situation will be perpetuated under even tighter central control. It was felt that the scope of the policy extended to matters which were of too great detail to be considered by the central agency (Water and Soil Division, Head Office) and that this could develop into erosion rather than enhancement of regional operational surveys. A more optimistic view was taken by other Board Officers, who pointed out that any finance from this source would be additional to that presently available. Another saw this system as a method for producing well-organised standard project listings which could be used at national level as a lever to Treasury for greater financial appropriation.

As a consequence of the Dunford Report, and the appointment of the Director of Research and Surveys, there is a substantial reorganisation of research structure and programs in progress, which will involve devolution of the research effort to regional centres. The implications of this are wide, and there are indications from contracts already let that the research will be directed to management issues, and therefore hopefully provide some of the much needed technical background for decision making.

There does not seem to be any intention to extend the research function into other than technical areas, although data storage and water right recording do to some extent span both the technical and administrative categories. Whether reviews of existing technical/ administrative procedures will be undertaken is also unknown at this stage, but it is notable that this 'monitoring' of the implications and implementation of previous policy decisions has been apparently completely neglected by the Organisation, up till now.

As the title suggests, this Chapter has dealt with the information on the status of the system. Again, the general lack of data creates problems in management, and as with the quality issue there are distinctly different perceptions of the information that is available. There has been considerable distinction between the type information sought and obtained, (even if not required) by the regional agencies and national agencies.

CHAPTER 7

ADMINISTRATION AND LAW

Administration represents the linkages between the various components within the socio-economic system. In discussing the identifiable management processes such as water rights, water quality management, irrigation etc. the administrative aspects have been included. A number of purely 'administrative' points may however be identified, and this Chapter will deal with these. Purely legal issues will be discussed in the last section.

7.1 Structures

There is support for the way in which New Zealand water use management is organised, often from within the national framework (Howie, 1971; Soil and Water, September, 1974 a). Even those critical of a particular sector of management, concede that centralised control under a single authority represents a major strength (Bellamy, 1975 b). There has been, however, severe criticism of the constitution of the Authority and its Councils. (Bellamy, 1975 b) continues: "it is unfortunate that such a complex administrative structure has been permitted to evolve, and there is no obvious reason why management of the nation's water and soil resources should require the attention of three Councils comprising over 30 members" (p 5).

The Ombudsman, Sir Guy Powles, commented on this structure as early as 1970, when he pointed out the devious path by which some of the members of the Authority and Councils were elected. Although there was some rationalisation of the Councils soon after this, his general observation is still valid. The example used was the appointment of the Municipal Association representative:

Stage I The electors elect their Municipal Council.
Stage II The Municipal Council appoints its representatives to the Municipal Association.
Stage III The Municipal Association elects its executive.
Stage IV The Executive nominates a panel of three to the Minister.
Stage V The Minister appoints one of these three.

> Thus those two persons who are supposed to represent the citizen on the National Water and Soil Conservation Authority are four stages removed from election by democratic process. (p 470).

Similar views have since been expressed by Kember (1972), and McCaskill (1973). Knox (1970) also commented on the lack of expertise of these members. EDS (1974) in submissions to the law review committee maintained that major users and dischargers of water are more heavily represented than the individual citizen or public interest groups, and considered the two-tier central administrative structure to be unwieldy. The committee has apparently agreed with these comments and is reported to have recommended a two-level hierachy, with a single national authority and regional administration only. (Soil and Water, September 1974 c).

There is also known to be some dissatisfaction with the Authority and Council membership among Government Departments, and the Minister for the Environment for one has sought representation on the Water Resources Council.

EDS also considers that the membership of Regional Water Boards does not adequately reflect the general public interest and the rights of individual citizens. In contradiction to this, the Society suggests that "in view of the technical nature of much of the work encluntered, the public interest would be better served by an increase in the number of appointed members representing public interest groups" (p 6). As well as this rather elitist attitude, there have been other attempts to have recreational-user representatives appointed to the Boards. In November 1973, the Authority declined a request for this by the Council of South Island Acclimatisation Societies, on the grounds that "recreational interests are already well catered for. There is already a recreational-users representative on the WRC; recreational groups could always put up candidates as local body elections; and that if this request was met, there would be a number of other groups having an equal claim to representation".

The present distinction between both the title and the

functions of the Catchment Board and the Regional Water Board is regarded as confusing by water users, and the Boards themselves. In water use matters, the name Regional Water Board should be used. In practice, the term Catchment Board is used, and even the TCPAB has reverted to this in a number of appeals, both in the title [5, 9, 10] and the text[13]. The law review committee is known to have recommended that functions under both the Acts (1941 and 1967) be performed by the one body with a single name.

In the writer's own experience, the Boards operate very democratically with direct and frequent contact between constituents and elected members, especially in the rural districts. While it could be maintained that the elected Board members are poorly equipped to discuss the detailed technical policy matters arising from the Regional Board functions, the nominated members from government departments do provide substantial specialist knowledge. Failure in Board appreciation of technical issues is probably due to staff inadequacies, or staff inability to communicate with the Board, rather than lack of expertise on the Board itself. Several Boards do call in expert opinion at committee level, and allow these specialists full speaking rights.

In many areas Board members are elected unopposed, which can be considered either a reflection of the ineffectiveness of the Boards and lack of interest by the public, or a vote of confidence in the present members. In areas where problems have focussed attention on the Boards, however, seats have been hotly contested and public interest and specialist group candidates have been elected. Both Wellington RWB and Auckland Regional Authority have members appointed and although this represents a one stage remove from the electorate, there has not been much complaint of this, yet.

The Commissions have been criticised for remoteness from the electorate, vested interest attitudes, and parochialism on the part of their members (Pemberton, 1974). There is an interesting divergence of opinion among the catchment authorities regarding the worth of the Commissions. The Board staff considered the Commissions ineffective, and it was maintained that the Commissions' poor record in

management was sufficient evidence of this. Certainly, one Commission has been deliberately kept as small as possible, with only one staff member. In another, vested local authority interest has blunted the Commissions' effectiveness in regulating local authority waste discharges. Some advantages of the Commission structure were suggested by one Commission executive, who maintained that parochial voting was not evident, and that there was a considerable improvement in communications with local bodies. He also maintained that the calibre of the appointed members, often Mayors or Deputy-Mayors, is much higher than that of the usual elected Board Members.

The existence of several of the Boards under empowering statutes other than the 1967 Act (Figure 7) is regarded as anomalous by Bellamy (1975 b), and the need for consistent structure and representation has been supported by the Law Review Committee.

The question of Tribunal membership has already been discussed.

There is considerable variation in the degree of delegation of responsibilities to Board staff, particularly with Catchment Board operations, although the extent to which Regional Water Board functions may be further delegated is prescribed by the law. Williams (1964) considered that Boards should "let details of administration go" and concentrate on policy issues. Although many of the officers interviewed felt that the increasingly technical nature of RWB operations required delegation, there was a strong belief that the present situation was a good balance between democracy and 'technocracy'. None of these men indicated that they would prefer to operate in a 'technical directorate', although it was commented that the high cost and delays involved in servicing the democracy of the Boards could perhaps no longer be afforded.

7.2 Staffing

The lack of suitably trained and experienced staff was recognised as early as 1964 by Campbell and stressed in the

Physical Environment Conference 1970. Early difficulties in retaining hydrological personnel in the MOWD have been mentioned, and although the situation appears to have eased in the national organisation, there still is an acute shortage of staff at the regional level.

Berquist and Bellamy noted in 1973 that a "full-time staff of only eight members of the Water and Soil Division of the Ministry of Works report their findings to three bodies consisting of no less than thirty appointed members". (p 6). There has been a determined recruiting effort by the Organisation in the Universities, and study awards have been made available. One Board officer took strong exception to a recent advertisement in national newspapers for staff for Water and Soil Division, which offered work in overseeing Regional Water Board operations, to new graduates or professionals, and added "no experience necessary". (Emphasis added).

It was also observed that virtually none of the top level staff in the Water and Soil Division have worked in catchment authorities, and certainly none have had experience in Regional Water Board operations except in servicing the Water Allocation Council. Although there is an increasing movement of staff between the Boards and the Division, usually as short term secondment (NWASC Authority, 1975), the Boards consider this situation has led to a fundamental lack of appreciation of the pressures and problems at regional level. There have been accusations that the Organisation, and the RWBs are serviced exclusively by engineering professionals, who bring with them a particular set of attitudes not necessarily suited to the expanded water use management role. While this cannot be regarded as entirely true, there is a preponderance of engineering based expertise in top-line positions. The recent reorganisation of the staff structure of Water and Soil Division (Figure 8) is regarded as a good move away from distinctions of discipline to that of function (NWASCO, 1973). Several Board officers commented that the resulting new sections are in fact proving more difficult to deal with than the old.

There is a widespread feeling among Board staff that the Organisation servicing staff, despite their relatively small

numbers, exert an undue influence on the Authority and the Councils. This touches on the delicate subject of the relationships within the structure, but a recent extract from the WRC minutes appears to reinforce this opinion. The minutes of the June WRC meeting note that a council member "expressed the opinion that there was a continuing need for council members to be au fait with classification and water right procedures, and suggested that time be put aside for a refresher talk from the director's staff".

It must be considered alarming that a member of the Council responsible for advocating national policy and overseeing the legal and procedural aspects of management, is not fully conversant with the two major management procedures, and is sufficiently dependent on staff to require a "refresher talk".

In the July minutes of the Authority, the Catchment Authorities' Association representative was reported as expressing concern that the National Authority has oversight of staff movements in catchment authorities, but no control over staff in the Water and Soil Division which actually services it. This is a further anomaly in a situation whcih has annoyed the Boards for some time. Because the Boards have generally been dependent on grants from the national purse for financing RWB functions, the National Authority has naturally assumed an overseeing function. This has extended in most regions to the Boards requiring approval of the Authority before appointing new staff. The elected Boards have in some cases felt this to be an erosion of their autonomy, although in one case a Board has apparently accepted this staffing overview even though no administrative grant was obtained. This problem is closely linked to financing difficulties, and will be further discussed in the next section. In this climate, some of the Boards are irritated by the recent expansion of District staff of the Water and Soil Division, although the need for more staff to undertake the irrigation development role is recognised. Prior to this it was felt the District staff were searching for things to do, while <u>not</u> servicing the Boards. Suggestions were made that an 'empire-building'

philosophy exists in many Districts. In particular, the Board officers could not see what role the District Water and Soil Officers (DWASOs) played.

The Regional Water Board staffing problem has been recognised by a number of commentators (Knox,1970; E.D.S., 1974; Bellamy,1975; Walker,1975; Williams,1975). Lello (1974), from replies to a questionnaire circulated to North Island Boards, estimates that the whole North Island may depend on about 40 men for 'front line' water management. From the interviews with the Boards, estimates have been prepared of the total manpower involved in Regional Water Board work. These are expressed as man-years per year for each Board throughout New Zealand, under three classes - Professional, Subprofessional, and Administrative - in Table VI. 'Professional' includes executives and graduates; subprofessional, those with technician training or technical backgrounds, usually including hydrological staff. Administration includes the clerical aspects of water right processing which are often performed by technical staff. Only a proportion of hydrological effort has been included, usually that associated with low flow gauging.

Precise allocation of time proved difficult. As several officers pointed out, changes in emphasis are frequent, and particular projects or right applications may require full-time concentration for a period. In several Boards increases in staff were intended, and as the interviews were staged over 6 months, some changes will have occurred. However, the figures should provide a reasonable estimate of manpower, for the middle of 1975. Allowing for some increase in staff numbers since Lello's questionnaire was circulated, the combined figures for technical staff (Professional and subprofessional) agree well with his estimate.

There is considerable variation in the staff organisation in the Boards. In three Boards at the time of interviewing, substantial reorganisation of the structures had recently occurred or was in progress, resulting in appointment of a Chief Executive. In other Boards, the historical

Table VI

Regional Water Board Staff 1975

(man-years/year)

	Professional	Subprofessional	Administrative
Northland	$2\frac{1}{2}$	$1\frac{1}{2}$	1
Auckland	2	$2\frac{1}{2}$	2
Hauraki	2	$1\frac{1}{2}$	1
Waikato	$3\frac{1}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$
Poverty Bay	$1\frac{1}{2}$	1	1
Bay of Plenty	$1\frac{3}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$
Hawkes Bay	$1\frac{1}{2}$	$1\frac{1}{4}$	1
Taranaki	0	0	$\frac{3}{4}$
Rangitikei-Wanganui	3	$3\frac{1}{2}$	1
Manawatu	$2\frac{3}{4}$	3	$1\frac{1}{2}$
Wairarapa	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$
Wellington	4	0	$1\frac{1}{4}$
NORTH ISLAND (Sub Total)	$24\frac{3}{4}$	$18\frac{1}{2}$	$12\frac{1}{4}$
Nelson	$3\frac{1}{2}$	$1\frac{1}{2}$	1
Marlborough	$\frac{1}{2}$	1	$\frac{1}{2}$
North Canterbury	3	4	$2\frac{1}{2}$
South Canterbury	$\frac{1}{2}$	3	2
Westland	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{2}$
Waitaki	$\frac{1}{4}$	0	$\frac{1}{2}$
Otago	2	2	$1\frac{1}{2}$
Southland	1	2	1
SOUTH ISLAND (Sub Total)	11	$14\frac{1}{4}$	9
NEW ZEALAND TOTAL	$35\frac{3}{4}$	$32\frac{3}{4}$	$21\frac{1}{4}$

separation of Engineering, Soil Conservation and Administration continues. In most Boards the water use management functions remain under engineering control, and there was no indication in any Board that a fourth distinct section was developing. Several executives stressed the need for an integrated or multidisciplinary approach, although in some cases this appeared to be a rationale for continuation of the present hierarchy and rather uncoordinated approaches. Several Boards reported difficulty in obtaining 'suitable' staff, particularly where the Board offices are in remote or unattractive towns. The difficulty of deciding just what staff are required for this work was often raised.

A considerable variety of disciplines are employed, including biologists, geologists, geographers, agricultural engineers and scientists, and health inspectors, although generally the Chief Engineers are in the executive positions.

7.3 Finance

A major problem, and one that is at the root of many of the other difficulties, is finance. The lack of funds, particularly at the regional level, has long been recognised within the organisation, and more recently by the critics (Bellamy, 1975 b). The principal Act contained no provision for financing of the water use management functions, and the subsequent mopping-up amendments which have also added considerable responsibilities have not introduced any system of funding.

The Regional Water Boards protested at this situation at the outset but under the direction of the Authority, used money obtained by rating for administrative purposes under the 1941 Soil Conservation and Rivers Control Act. In the case of Commissions, administrative levies were made against the local authorities. Even in 1968, however, a number of the Boards with low rating potential (i.e. low capital values in their regions) were at the maximum rate allowed under this law. They were thus forced to obtain supplementary administration finance as a grant from the Authority (at that stage, through the Soil Conservation and Rivers Control Council).

Increasing costs of administration, especially with the added burden of Regional Water Board functions, resulted in many more Boards rating at maximum, and seeking administration grants. This situation escalated, and as well as the dissatisfaction with controls over staffing, limiting of these grants and detailed examination of Board estimates by the Authority caused resentment. This perhaps peaked in 1973 when Brown (1973) reports a large number of remits on financing at the Catchment Authorities' Association Conference. He quotes the Otago Board as threatening to refuse to take up their grant of $10,000 as they had asked for some $30,000, and that "such a figure ... was essential if [the] board was to satisfactorily play its part in administering the 1967 Act".

Several Boards deliberately reduced or delayed increase in expenditure during this time to avoid grants. Until recently only the North Canterbury Board was substantially below the maximum rate, due to very high capital value in the region. The recent government valuation has eased the situation, and many Boards have reduced their rates.

The legality of using finance obtained under the 1941 Act for RWB purposes has, however, been challenged by local authorities in the Bay of Plenty. A declaratory judgement has been sought, and the National Authority August minutes reported that this has been heard, but the decision reserved.

National Expenditure

What of national expenditure over this period? A certain amount of information has been obtained from the annual reports to Parliament by the National Authority and the Ministry of Works. Unfortunately, as noted for the data on water rights granted, the format of these reports is not consistent, and several changes in financial details have occurred. It is also impossible to separate water use management expenditure from overall expenditure on water resources, including flood control, drainage, and irrigation scheme operation. Table VII shows the development of the Ministry of Works and Development expenditure from 1969 to 1973, with the water resource management figures highlighted. A gradual increase in the proportion

Class of Work	1969–70		1970–71		1971–72		1972–73		1973–74		Change in percentage over the 5 years
	$	Percent	$	Percent	$	Percent	$	Percent	$	Percent	
Highways and roads, including all expenditure of the National Roads Board	79,876,604	34.61	87,799,240	35.09	90,461,873	34.64	107,112,325	35.15	100,221,703	33.63	−0.98
Electric power development (construction)	48,415,868	20.98	52,092,518	20.82	53,744,371	20.58	66,711,494	21.90	58,731,763	19.70	−1.28
Housing construction	15,710,142	6.81	13,302,128	5.32	10,984,146	4.20	12,926,305	4.24	20,709,926	6.95	+0.14
Administration, plant, workshops, stores, laboratories	9,356,711	4.05	10,635,287	4.25	13,184,979	5.05	16,568,331	5.44	20,772,389	6.97	+2.92
Miscellaneous	28,590,017	12.39	27,540,081	11.01	30,024,017	11.49	19,667,817	6.45	26,598,756	8.92	−3.47
Public buildings, including maintenance	21,525,981	9.33	25,093,315	10.03	28,621,628	10.96	39,913,148	13.10	24,569,021	8.24	−1.09
Defence	6,343,113	2.75	6,387,019	2.55	5,195,202	1.99	6,231,601	2.05	7,463,165	2.50	−0.25
Education buildings, including maintenance	11,225,849	4.86	14,127,129	5.65	15,002,534	5.74	16,287,105	5.35	18,093,117	6.07	+1.21
Soil conservation and rivers control, including maintenance	7,035,853	3.05	7,256,956	2.90	7,617,014	2.92	10,217,875	3.35	10,928,310	3.67	+0.62
Railways construction and improvement to open lines	1,801,703	0.78	4,845,938	1.93	4,796,907	1.84	7,117,901	2.34	7,932,607	2.67	+1.89
Irrigation, water supply, and drainage, including maintenance	912,407	0.39	1,128,912	0.45	1,553,016	0.59	1,907,731	0.63	2,035,443	0.68	+0.29
	230,794,248	100.00	250,208,523	100.00	261,185,687	100.00	304,661,633	100.00	298,056,200	100.00	
Percentage of MWD appropriation for water resource management		3.44		3.35		3.51		3.98		4.35	+0.91

Table VII

Ministry of Works and Development Expenditure 1969–1973

After Ministry of Works and Development statement to the House of Representatives for the year ended 31st March 1974. Appendix to the Journals of the House of Representatives 1974, D1 (p.49).

of the MOWD vote devoted to water resources can be seen, but although this represents some diversion of funds to this field, it does not indicate a substantial commitment to increased responsibilities.

The National Authority reports also include details of its expenditure, and these are shown in Tables VIII and IX. Table VIII shows only a gradual increase in expenditure up to 1972, and in this last year the amount shown was $417,000 over appropriation. A somewhat clearer indication of the expenditure on water use management can be obtained from Table IX, but it is notable that following substantial over-expenditure in 1972/1973, in both 1973/1974 and 1974/1975 the appropriation was considerably underspent. This is attributed to short supply of materials and late implementation of works programs. In 1974 the Water Allocation Plan grants were first made available, late in the financial year, and it is apparent that this was an attempt to erode a substantial credit. It seems surprising that there was not more effort made to distribute these funds to the Board.

A steady increase is shown in the appropriations over the last three years, although the Authority had noted in an earlier annual report:

> Funds allocated by government for soil conservation, flood control, and land drainage have increased from $5.3 million in 1965, to $7.2 million in 1970. When allowance is made for increases brought about by the recent addition to this vote of items formerly charged to other votes, the net average annual increase in the allocation is only slightly in excess of increases in costs. (Soil and Water March/June 1971, p 7).

Regional Water Board Finance

The problems of lack of administration finance for Boards was first raised in 1970 (NWASC Authority, 1971) and was clearly recognised in the following year, when grants totalling $500,000 were made (NWASC Authority, 1972). With apparent awareness by the politicians (Colman 1973) and strong feeling expressed at the 1973 Catchment Authorities' Conference a full review of the situation was undertaken by the Authority. The earlier and continuing hydrological grants ($4,000 per Board), were some small assistance in investigation, as were the later WAP grants. The judgement[6] regarding deposits by

Type of Expenditure	Financial Year				
	1967–68	1968–69	1969–70	1970–71	1971–72
	$	$	$	$	$
Drainage work	89,413	113,075	171,299	153,926	164,715
Experimental and demonstration work	8,595	10,061	10,355	10,090	18,149
Fees and expenses of council	14,946	18,005	25,937	26,753	35,957
Foreshore protection work	..	..	(c) 21,893	(c) 8,064	(c) 15,632
Information and educational work	15,043	17,972	37,847	42,136	56,382
Initial expenses of catchment boards and commissions	..	..	..	5,000	..
Investigations and surveys, including hydrological data, installation or recording apparatus, collection, etc.	539,461	574,948	746,623	894,917	934,801
Loans, etc., to catchment boards and other local authorities	167,938	194,837	197,996	311,116	520,443
Restoration of flood damage	316,077	330,116	120,729	571,350	554,200
River control work	3,619,056	3,428,752	3,487,581	3,115,979	3,175,023
River control and drainage (maintenance)	337,595	322,242	377,565	465,595	458,115
Soil conservation works	512,901	447,874	535,077	589,245	587,616
Soil conservation reserves	(b) 239,851	(b) 245,036	(b) 258,135	(b) 271,285	(b) 274,722
Tussock Grasslands and Mountain Lands Institute	37,000	37,900	41,000	65,300	86,000
Waikato Valley Authority	(a) 1,239,839	(a) 923,575	(a) 1,003,816	(a) 726,200	(a) 735,259
Totals	7,137,715	6,664,396	7,035,853	7,256,956	7,617,014

(a) Included in vote "Expenditure" but not under council's control.
(b) Soil conservation reserves previously administered by the Department of Agriculture.
(c) Previously administered under another subdivision of the Vote.

Table VIII

National Authority Expenditure, 1 April 1967 to 31 March 1972

Source: NWASC Authority Report to the House of Representatives for the year ended 31 March 1972. Appendix to the Journals of the House of Representatives 1972, D1A (p.39).

Table IX

National Water and Soil Conservation Authority Expenditure

for years ending 31 March 1973, 1974, 1975

Source: NWASC Authority Report to the

House of Representatives

Appendix to the Journals of the House of Representatives.

1973 D2, 1974 D2, 1975 D1A.

Year ending 31 March	Type of Expenditure	Expended $000	Appropriated $000	Difference $000
1973		12,126	10,985	1,141 Overspent
1974	Administration and general	2,258		
	Investigations and construction of irrigation schemes	1,362		
	Maintenance and operation of irrigation schemes	673		
	River control and drainage works	5.900		
	Water resources investigations and surveys	1.278		
	Soil conservation works and reserves	1,493		
		12.964	13,780	816 Underspent
1975	Administration and general	2,483	3,160	
	Investigations and construction if irrigation schemes	1,631	1,480	
	Maintenance and operation if irrigation schemes	835	900	
	River control and drainage works	4,420	5,385	
	Catchment control works	2,616	1,575	
	Soil conservation works and reserves	1,138	1,185	
	Surveys	1,315	990	
	Research	1,045	1,375	
		15,483	16,050	567 Underspent

objectors also enabled Boards to cover some of the administrative cost in processing water rights.

In early 1974, the Public Expenditure Committee of the House of Representatives recommended that consideration be given to making a charge for water use, and that Boards should be required to recover, from the applicant, at least full administrative costs involved in issuing water rights. In view of widespread ill-feeling aroused by the application of the deposit provisions the Authority considered (May 1974) that the Act should be amended to delete reference to deposits by objectors before dealing with applications.

Further submissions to the law review committee, particularly from Boards, resulted in this committee recommending to the Authority that the maximum administrative rate be raised. They also suggested that fees be charged for water taken and discharges made into water, as well as for water right applications. The present situation is best described by a quotation from the Authority's Annual Report (1975, p 6).

> Government approved of amendments being drafted - To the Water and Soil Conservation Act 1967 to waive the payment of deposits by objectors to water right applications and to impose a charge for the taking and discharge of water.
>
> To the Soil Conservation and Rivers Control Act 1941 to increase from 0.03472 cent in the dollar to 0.05 cent in the dollar, the maximum administration rate a catchment authority may levy, and to charge costs of surveys and investigations directly to the schemes and works to which they relate.

This legislation was not introduced to Parliament in the 1975 session, and will clearly not now be passed until at least the next sitting. It seems that the Authority is awaiting the declaratory judgement as to whether RWB administrative finance can be drawn under the 1941 Act, before finally establishing any charging provision.

None of the Boards reported being consulted as to how such a charge should be applied, or collected. While several expressed dissatisfaction at this others did not expect to be approached.

Thus, despite some likely extra finance for investigations through the operational survey policy, the Boards will still

have to rely on their own limited resources and the disliked administration grants, for at least another year.

The question of financing was raised with the Director, who agreed that no new source of finance had been made available to meet the inevitable costs of the RWB work. He commented that this had no doubt been inhibiting, but that it had been difficult to justify access to further rates, at the regional level. Because of this, funding had been made available nationally, on the principle that the taxpayer is generally less discriminating than the ratepayer, as to where moneys are expended. He considered, however, that the lack of money had been used by Boards as an excuse. He pointed out that surveys and investigations could be financed by administration revenue, but that several Boards had not used the Government funding (i.e. administration grants) available.

It has proved very difficult to establish the Regional Water Boards' expenditure on water use management. The Boards' annual accounts are still very much oriented to Catchment Board finances, and even the readily identifiable Water Board functions, such as water right processing, are rarely separated from other expenses. Some of the RWB activities are financed from administration accounts, and investigation programs are often included in engineering or hydrological sections. For this reason accurate data regarding costs for each Board could not be assembled. Table X is an attempt to indicate levels of expenditure for the Boards in 1974 and 1975, derived from information obtained in the interviews and from annual accounts. The categories include the Water Allocation Plan grants ; but not the hydrological grants; a proportion of hydrological (flow recording) effort, estimated during the discussions; and where costs were not distinguished, a fraction of the administrative outgoings. In all cases these estimates will be conservative.

Although the majority of Boards considered finance to have been the major limitation on expansion of activities in the water use management field, several officers felt

TABLE X

Regional Water Board Expenditure

Years ending 31 March, 1974 and 1975

Expenditure Categories $000	Number of Boards	
	1974	1975
less than 10	5	3
10 - 15	1	3
15 - 20	4	1
20 - 30	2	5
30 - 40	4	2
40 - 50	1	4
more than 50		2
Total number of Boards	17	20

that the delay was not altogether a bad thing, and had enabled steady progress rather than early misdirected effort. This slow implementation has been regarded considerably less favourably by the critics, although recent commentators (Lello, 1974; Williams, 1975; and Bellamy, 1975 b) have considered this to be a lack of national rather than regional political commitment. Bellamy also implicates the public, and hopes that the current public interest in environmental protection will be reflected in larger budgets for the water boards.

Brown (1975) in reviewing the 1975 Catchment Authorities' conference, implies that national political inertia is at the root of financing problems. He points out the two year delay since the recommendations of the public expenditure committee of the House, and concludes "undoubtedly,

though, it is the catchment authorities which must bear the brunt of any lack of commitment" (p 13).

7.4 Interrelationships

Structures and membership, staffing, and finance are basically structural aspects of administration, and clearly have a major effect on the way in which decisions are made, or problems perceived. The connections between the agencies and other components of the water use management framework (Figure 5, and 10 to 14) are also very important in determining the effectiveness of control, however that is measured. The following sections examine the interrelationships between the water users, regional agencies (RWBs), national agencies, and the judicial bodies, noting particularly the extent of communication between them.

Water Users/Regional Water Boards

Much of the contact between the users and the Boards is formalised in the law, through the application and objection procedures and the requirement for Board records to be open to public inspection. In general, the relationship between the Boards and parties to water right applications are good, and the Board officers reported that often the Tribunals act as arbitrators in longstanding conflicts between water users. The applicants and objectors both have the right to make submissions on the membership of Special Tribunals although there has been some criticism of the fact that the applicant has the prerogative to require a special Tribunal. The relatively small number of appeals since 1968 is perhaps an indication of user satisfaction with the Board decisions.

Also, the Board meetings are public meetings and at least one Board has opened committee proceedings to the public, although public attendance is generally very low.

There was early criticism of the RWBs by certain specialist water user groups, (usually regarded as 'pressure groups'), although this appears to have lessened as they have become involved in hearings and discussions. This perhaps indicates a realisation of the complexity of the issues which have to be resolved, or recognition that much of the lack of

progress by the Boards is a result of factors outside the Boards' control. In some cases where 'pressure group' candidates have been elected to the Boards, their initial idealism has been shaken by the problems faced.

The involvement of Acclimatisation Societies has already been discussed, and in some areas, close cooperation and mutual recognition of problems have developed. The relationships between Boards and the farming community are variable both between and within regions and depending on the particular problems farmers' attitudes vary from apathy, to intense interest. Board officers in water-abundant regions reported a resistance to the right requirements. Even in these areas, however, it was felt the principles of the Act are accepted - it is the machinery which creates problems.

The recent extension of the Ombudsman's jurisdiction to local authorities by the 1975 Ombudsmen Act, has added a further level of protection for the public, in dealing with the Regional Water Boards.

The degree of cooperation between local authorities and Boards also varies. In some regions there is antagonism between both elected members and staff, in others a general lack of cooperation. Again there are differences between the Commissions, the Boards, and the other independently established water authorities in their attitudes and contact with territorial authorities. The activities of the Boards in control of sewage discharges has often fomented problems.

Control of crown users remains with the Authority, and its not known to what extent any real control is exerted, particularly with the staffing situation. In one case, a Board has been delegated authority to control a Crown water right (Fancourt, 1974), and several Board officers felt that all rights should be subject to Board control, except where the waters were designated of 'national importance'.

Many Boards have found industrial users more cooperative than the local authorities, and in only a few instances was overt resistance reported. Several Boards reported responses by industrial and agricultural dischargers which amounted to 'Well, what do you want us to do!'. This attitude highlighted lack of advisory expertise or services

and placed Boards in the potentially difficult position of acting as both judge and advocate.

Although Bellamy (1975 b) obviously considers that public interest in water use management is still high, one Board officer felt that the peak of user acceptance of controls has passed. He believed that the extended period for notification of uses; the piecemeal activity of the Board since then; and the length of time elapsed without adequate follow-up since the enactment of the law; had led to apathy and some resistance, particularly on the part of the farming community.

Some Boards have been involved in publicity and extension activities. These have included visits to schools and other interested organisations, and support of Conservation Week activities. This still tends, however, to concentrate on flood control and soil conservation matters.

An important point raised by the Director was that because of the provisions for public involvement the Act had attracted public participation and conflict. As with the Town and Country Planning Act 1953 (under review at present) the provisions for objection and appeal have focussed attention on all aspects of the legislation.

Water Users/National Organisation

The remoteness of the 'public' user representation of the Organisation from the electoral process has already been discussed under structure. Powles (1970); Kember (1972), and EDS (1974) also point out the high level of representation of commercial users whose activities tend to conflict with 'public' uses.

The law review committee has attracted a considerable number of critical specialist submissions particularly related to water quality, and both Pemberton (1974) and Bellamy (1975 b) point to a tendency of the national agencies to ignore these expert views.

The classification process provides the major statutory link other than representation between the water users and the Authority and Councils, and the widespread dissatisfaction with both the philosophy and the technical provisions of this

procedure has been indicated previously. The whole issue of classification must be regarded as a major failure in public relations on the part of the Organisation, both in communicating the policy to the public, and in taking notice of the opinions put forward. The self-righteousness exhibited by Cowie (1974) does nothing to ease the situation. Bellamy summarises the 'opposition' view as follows:

> It now appears most unlikely that the management of New Zealand's water resources by the system of classifications carried out by the Water Resources Council can survive either the recent decisions of the Town & Country Planning Appeal Board, or the political effects of the existing widespread dissatisfaction with the programme. It is now quite widely accepted, at least in circles outside the Water Resources Council and the Ministry of Works and Development, that the present system not only is fundamentally ill-conceived, but is also unworkable in its present form.
>
> To say this is not to question the sincerity of the individuals involved in the design or implementation of the water classification scheme, but to recognise that sooner or later unpalatable facts must be faced. Last minute attempts at public relations (Howie, 1974) are unlikely to salvage what has already been demonstrated to be beyond repair. (Bellamy, 1975 b, p 6).

It is difficult to establish just how sensitive either the Organisation or the servicing agency are to public or water user opinion. Despite the 'remoteness' of representation there must be some appreciation of user attitudes and problems by the nominated members, although this may be offset by the influential career bureaucrats on the Authority and Councils. The Authority decision to introduce measures precluding deposit charges against objectors does reflect a recognition of opinion, but this may be due in part to the championing of this cause by the Nature Conservation Council. National agencies outside the Organisation do appear to act as links between users, especially specialist interest groups, and the Organisation. These include the Nature Conservation Council, the Environmental Council, and more recently the Commission for the Environment whose submissions to the Law review committee of the Authority are known to have mirrored much 'outside' opinion. Government Departments (Figure 6) also act both in an advisory capacity and as water users in their own right, and

are represented at Council level.

Professional societies of a number of disciplines also are involved both in direct submissions, and in organising conferences which become forums for discussion of water use management. The Microbiological, Hydrological, Ecological, and the Engineering Societies are particularly influential, and this last group has been closely involved since the consolidation of the law began. The NZIE also has a number of committees, and sub-groups, which have substantial representation from the technical staff involved in servicing the Organisation.

The Directors attitude towards 'pressure groups' is, however, harsh. In commenting on the role of pressure groups, without specifying any particular group, he considered that there had been an "over-exploitation of the law" in a negative way, which had tended to "undermine public confidence" in the system. Some of the opinion was "professional humbug", and there was an element of career seeking in public statements made. The Director, the Deputy Director, and another member of the technical staff all considered the criticisms to be part of "a game" - this expression was repeated several times during the discussions.

Considerable effort has been made in publicity by the Organisation, and the Director quoted a current expenditure of $60,000 a year. A number of publications have been prepared, and several films promoted. One of these 'The Water Cycle' received a number of awards and has been widely distributed. Supply of information to schools through the Department of Education was reported (NWASC Authority 1975) and the Water and Soil Division's information service undertakes school visits. The Organisation's quarterly magazine Soil and Water continues to be the biggest single public relations effort. Although this is widely circulated, and presumably reaches the public, many of the Boards consider it to be a 'house journal' for the Organisation and not sufficient in itself as a publicity measure. Until June 1975, the magazine published 'supportive' articles almost exclusively, and this last issue is the first to have published viewpoints opposing Organisation policy apart from legal decisions. This apparent change in editorial

policy was heralded with an editorial entitled "The Challenge of Good Communications", and coincides with an increase in the rate of publication to six issues a year. The crux of the communication and public relations issue was outlined in this editorial

> The prime reason for stepping-up production is to increase the flow of public information on soil conservation and water management matters between the public, catchment authorities/regional water boards, and the National Water & Soil Conservation Organisation, and so attempt to generate greater discussion and create better understanding.
>
> The problems facing New Zealand's water and soil resources are increasing and getting more complex. Management techniques are becoming more sophisticated. The public is expecting 'better things'.
>
> Good communications are therefore vital.
>
> It was perhaps appropriate that one of the discussion topics at this year's annual conference of catchment authorities/regional water boards was communications, albeit communications between them and the national organisation. The discussion did, however, reveal wider implications and highlight the need for continually looking at improving the way we all interact.
>
> Catchment authorities are the local agents of the national organisation and are therefore at the brunt of public reaction. If communications to them from Wellington are not good, then communications from them to the public cannot be good. Also, if communications from the National Water and Soil Conservation Organisation to the public are poor, then catchment authorities will, in many cases, 'carry the can'. (Soil and Water, June 1975 c, p 3).

Regional Water Boards/National Organisation

That there are problems in communication between the Boards and the Organisation can be inferred from the earlier comments on staffing and finance. It was the discussion on communications at the 1975 Catchment Authorities' Association Conference which brought this into the open, and prompted the above editorial. There has been a growing feeling that the opinions and problems of the Boards have not been taken into account, in the water use management field. The discussion paper on communication (Marlborough Catchment Board, 1975, p 4) noted:

> As a group our total involvement and experience in the practical application of the Water and Soil Conservation Act by far outweighs that of the Water Resources Council. Yet this Council makes little use of the

> expertise and experience of Regional Water Authorities, but prefers to issue procedures and policy based upon its own thinking and experience in dealing with a limited section of the community.

The relatively late inclusion of a catchment authorities' representative on the National Authority was noted by one Board officer, and although the Councils have included Board representatives since establishment, there are no Board appointees on significant subcommittees (e.g. the Water Quality subcommittee , which is considering applied research). Many Board officers feel that they are not adequately consulted, even though there are combined meetings with Organisation staff. Dunford (1973) noted that meetings have "too often ... been carried on in an atmosphere of confrontation, not consultation" (p 63). It was clear from comments made during the interviews that there are considerable conflicts of personality which often preclude rational discussion.

Much of this feeling of lack of recognition of views stems from the Boards' own lack of appreciation of just how little autonomy they have under the 1967 Act. Apart from the right granting procedures, obviously a central aspect of the control structure, the Boards as Regional Water Boards are heavily subservient to the Organisation, and have very much less independence than as Catchment Boards. This does not appear to be fully appreciated by the Authority and WRC either. Policy pronouncements from both bodies are couched in a diversity of language which does little to clarify the Boards' position. For example, apart from recent guidelines on wetlands and regional planning and development (NWASCO 1975 a, 1975 f) which are just guidelines, policies are communicated to the Boards and the Districts by circulars. Although these appear to be 'directives' which are to be applied (Section 20 (5) g), they are variously described as guidelines, policies or recommendations. Circular 74/17 on water rights and subdivision required to the Boards to notify the Council when they "adopt ... the recommendations" (NWASCO 1974 a).

In practice, many Boards simply ignore these edicts, and staff frequently prepare reports on the contents of the

circulars suggesting variations in application. This again appears to result in the direct opposite of a uniform national policy.

One Board reported an incident it regarded as indicative of a lack of faith in Regional Water Board operation and unjustified confidence in its own staff on the part of the Organisation. At a Dairy Factory Managers' Conference, the member of the Water Resources Council for the Dairy Industry, was said to have commented in a written paper that Regional Water Board staff were liable to be motivated by their own personal opinions, and that the industry should seek advice from the central agency. This point was further elaborated in the presentation of the paper, and the Board felt that this comment from the top of the structure did nothing to assist Boards in controlling one of the major polluting industries in NZ.

Much of the antipathy between Boards and the national organisation occurs at staff level. The majority of Board officers felt that Board work is very much 'overchecked' at national level and there are substantial delays as a result. Although it is accepted that there must be national oversight of the use of national moneys (subsidies, grants etc), the officers are resentful that surveillance in detail is done by staff far less experienced than themselves, without familiarity with local conditions, or even previous experience at regional level. The alternative view to this is that some degree of separation from local issues must occur if national priorities are to be established.

Board staff reported cases where national staff showed a complete lack of appreciation of the Board operation, apparently expecting Board executives to alter Board decisions. This is perhaps a reflection of a different relationship between Boards and staff and the WRC and its staff, but leads to the feeling that information is 'filtered out' by the Council's technical advisers, before submission to the Council.

Several Board staff also noted a disturbing tendency of the Water and Soil Division to think of itself as NWASCO, and pointed to the positioning of the abbreviation 'NWASCO'

and the Ministry of Works symbol on a number of publications.

When the question of differing attitudes between the national and the regional agencies was raised with the Boards, there was a general consensus that this was inevitable and occurred in all local authority/department contact. Most of the officers felt resigned to such differences, and tended to avoid conflict. In one case it was commented "there's no point in fighting, we're half taken over now!". In other regions the officers tended to rail against the situation, and expected confrontation, although one executive felt that continued opposition was necessary even though this made the situation worse. Only in a few cases were conciliatory attitudes expressed. Classification proved to be a bone of contention, which has more than any other management issue polarised attitudes. In several areas Boards had publicly opposed preliminary classifications, after earlier submissions had not been accepted by the Council.

The Boards visited after the Catchment Authorities' Conference in April 1975 and the discussion there of the communication issue, indicated a mixed reception to the debate. Many felt the communication 'paper' was overstated (a view shared by the Director) and the situation was not as bad as it indicated. There was general agreement that there should be better communication within the organisation, particularly on technical aspects of Regional Water Board work. Several considered that the Organisation-run courses were very good opportunities for exchange of information.

Generally, Board officers felt that more communication and exchange of information could mean diversion of effort from actual application of techniques, and be time-consuming and non-productive.

There appears to be an overall pattern which explains many of the communication, finance and staffing problems. This can be considered to begin in early application of the 1941 Act, with most of the implementation at the regional level, and a gradual development of a national overseeing structure and staff. These national staff were drawn from the regional agencies (catchment Boards) and were acutely aware of the problems and operations at that level. More

recently these people have been replaced by staff without regional experience, and a centrally-oriented national bureaucracy established without replacement of the previously effective 'old-boy network'. In the water use management field, the national structure, both policy bodies and staff, developed rapidly before the work had started regionally. This means that a system has been established without knowledge of the management problems or what techniques and procedures are appropriate to deal with them. The classification process, the technically undefined Board role in applying quality controls, and the computer water rights recording system can be regarded as prime examples of this situation.

The variability of contact and coordination between the Boards and the MOWD Districts has been indicated in discussing data collection, and the role of the DWASOs. In most regions the District Commissioners of Works (DCWs) are non-elective members of the Boards, and communication at policy level at least is good. Many Board officers offerred the opinion that the DCWs provide much needed expertise in Regional Water Board decision-making.

Most of this discussion has revolved around communication between the Organisation and the individual Boards. The role of the Catchment Authorities' Association must be considered. McCaskill (1973) maintains that the Association played a large part in the discussions of the proposals for the comprehensive legislation regarding water, and had been prepared for many years for the eventual taking over of responsibility for the control of pollution and of the allocation of water. Although the Association no doubt made submissions on the Bill to the Lands and Agriculture Committee, there is little evidence to support this assertion. In fact, all the Boards without exception considered that the Association had been weak in pressing Board views. It has only been the Local Government Act 1974 and the prospects of regional reorganisation eliminating the Boards that has sparked life into it, and it was not until the 1974 Annual Conference of the association that a permanent

secretariat was approved.

The Association has played a part in establishing salary scales, but has primarily been concerned with the annual conference. These conferences have been rather curious, stilted affairs, and it is only recently that Board executive staff have had more than an advisory role in debates, and been allowed speaking rights. Brown (1975) comments that the 1973 conference, and conferences for quite a few years prior to that, had shown the Association to be very isolated and secure, almost smug. He also observes that the 1975 conference did not complete its change of character, and that there was still a feeling of "timidity in taking the final step" to "aggressive and positive action" (p 12). In the writer's experience, and from the discussions with Boards before the 1975 conference, there appears to be each year an expectation (at least among Board executive staff) of a vigorous, productive conference, but this expectation is never fulfilled. One Board officer considered that rapid and lengthy replies to contentious discussion topics by Organisation representatives and servicing staff had effectively defused this year's conference.

The Boards hope that the permanent secretariat will strengthen the Association, and result in more effective presentation of the Boards' views. Again a cynical view was expressed in one instance, fearing that the secretariat could become a puppet for the Organisation, and simply another vehicle for disseminating the national agencies' views to the Boards, rather than the converse.

Users and Agencies/Judicial Bodies

The judicial bodies provide the structure for arbitration of conflicts between the water users and the agencies. In this role these bodies are governed by the law, legal precedents, and the cases presented, and are to a large extent disassociated from the general socio-economic influences (Figure 5 and 14).

The initial stage involves the Town and Country Planning Appeal Board (TCPAB) in hearing appeals on classification and on Board decisions in water right applications. The Appeal

Board decisions can be further appealed to the Supreme Court, on points of law, and there is a further stage of appeal to the Court of Appeal. Apart from this appeal structure, the Agencies also have power to prosecute, and decisions of the Magistrate's Court can be appealed in the usual way.

One aspect of the appeal procedure has been substantially tested already. This is the question of status to appeal, or locus standi. Although this is basically a legal issue, it will be discussed here as it determines the standing of water users and water user groups to seek alteration in agency decisions.

Most attention has been focussed on standing to appeal against classifications, and the issue was raised in the appeals against the Southland Classification[1, 2, 3, 4] and the final classification in the Bay of Islands[12]. In the Southland cases the TCPAB ruled that the Ministry of Agriculture and Fisheries, the Fiordland National Park Board, and the Southland Catchment Board did not have status, and similarly for the Bay of Islands, rejected standing for the Northland Catchment Commission. The discussion revolved around legal interpretation of the expressions 'body', 'person' as applied to the apellants, and in the subsequent appeals to the Supreme Court, the judgement noted the variety of language in the Act and found it impossible to discern any clear pattern explaining all the differences.

In the judgement on the MAF appeal in Southland[3] the Supreme Court overruled the prior decision of the Appeal Board and held that the Ministry of Agriculture and Fisheries was entitled to appeal against a final classification. In reaching this decision the judge rejected the WRC contention that differences between the WRC and the MAF should be settled administratively by stating: "representations at an administrative level might be a totally inadequate remedy for the MAF which has only one of the 14 members comprising the Council" (p 4). Evidence was given for the MAF that there had been little consultation by the WRC before the classifications were notified (in both Southland and

Northland).

Both the Southland Catchment Board and the National Park Board were also held to have legal standing to appeal[4], and the judge commented that "it would verge on the absurd if the Park Board had no right of appeal" (p 2). Similarly for the Bay of Islands Classification the status of the Commission was accepted[14], and standing of other appellants confirmed.[12]

Thus a relatively wide view of legal status has been established which allows the public, user groups, and agencies with some statutory management function relating to water or resource management, to appeal.

The Act allows a wide range of people and groups to object to right applications. Boards appear to have been liberal in hearing objections, and several reported that the Tribunals have incorporated late objections and other evidence in their considerations, under their powers to require other evidence (Section 24 (6). The Act also allows a wide range of evidence to be considered once appeal proceedings have been instituted (Section 25. 3). The question of status to bring such an appeal has not been tested as thoroughly as for classification, although the appeal regarding the Huntly power station discharge[7] did raise this point. It was held that the Environmental Defence Society did not have standing to object under Section 23 (5) because it was not a "person which or who claims to be detrimentally affected by the decision of the Authority". Nevertheless the scientific evidence and submissions of the Society were received, and to a considerable extent acted upon, of the Appeal Board because other objectors who did have standing adopted the evidence and submissions of the Society.

The very wide grounds of objection available to any person were also noted in the Supreme Court in the case of Atihau-Whanganui Incorporation v Rangitikei-Wanganui Regional Water Board[15], and in the Southland Skindivers Club judgement[2]. In spite of this, EDS has strongly recommended to the law review committee that the requirements for status under this section be liberalised.

There has been little enforcement of the law by prosecution of offenders. Although the National Authority reported at the abolition of the Water Pollution Control Council (WPCC) (NWASC Authority 1972) that the "Council successfully took a number of prosecutions for offences relating to unauthorised discharges of wastes into classified water" (p 12), the Council's enforcement record over its 8 years of existence was poor indeed. There were also a number of unsuccessful prosecutions, and the apparently routine renewal of Temporary Permits for persistent offenders was apparently used in preference to litigation. These permits came to be regarded in many quarters as 'licences to pollute'.

Apart from the recent prosecution of dairy farmers in Taranaki, there has been little enforcement by the Boards, although there have been minor convictions (with minimal fines) in some areas on 'administrative' grounds - i.e. on the basis of no right being held for a use. Many of the Boards indicated that they do not consider prosecution appropriate at this stage, and are operating on a basis of education and cooperation. This view has recently been reported in Soil and Water March 1975 a, p 11).

> Dr W.R. Holmes, who is in his second term of office as chairman of the North Canterbury Catchment Board, believes that catchment authorities should seek cooperation rather than act like policemen with batons in trying to enforce the water standards set down by the Water Resources Council.
>
> He supported his view by saying "the real exercise is how firmly do you press to keep in place sic (pace?) with public demands for higher water standards that may be unrealistic".
>
> Even though the North Canterbury Catchment Board has powers of prosecution, in most areas Dr Holmes does not see the implementation of the standards as a 'penalty situation'.
>
> "While it is perfectly easy to blame discharges for the state of the waters, the public climate of the 1920's might have actively encouraged these activities.
>
> "Public acquiescence accepted these industries in the first place and now the public has to show some tolerance".

Other commentators are not convinced that this appraoch is desirable. Powles (1970) questioned whether enforcement

had not been lost sight of in the development of a forest of coordination, and Williams (1975) has more forcibly stated:

> It seems to me that vigorous enforcement of the law is called for especially in the case of persistent offenders. The only prosecutions in recent time, to my knowledge, have been initiated by private individuals or private organisation. But since the responsibility for administration and enforcement is placed squarely on the Regional Water Boards, I believe that they should accept first-line responsibility for enforcement (p 21).

Other interactions

Water use management issues do not appear to have become a national electoral issue to any extent, although all such management is heavily political. Some projects with closely related water use or water quality issues have attracted national as well as regional attention (for example, the raising of Lake Manapouri and the siting of the aluminium smelter at Bluff, the Clutha hydro-electric development etc).

Water user groups particularly 'specialist' groups appear to have considerable political influence, outside these electoral considerations, and the response of the Director may reflect this. Certainly such groups can be a significant force at the regional level, and several have been active in electoral process in the recent local body election. The Boards themselves can and do use national politicians over local or regional issues, and one Board officer caustically observed that only a 'ministerial' had any effect on the Water and Soil Division head office.

In fact, it is difficult to establish the relationship between the government and the national agencies, both authority and councils, and servicing staff. The Deputy-Director commented that the procedure for preparation of Bills was poorly understood by those outside the system. It appears that there has been considerable departmental influence in the detail of the 1967 Act and Amendments (Figure 5 and 12). To establish to what extent consultation between departments

occurs would require the comments of a seasoned observer of bureaucracy, but it does appear that the department in this case (the Water and Soil Division of the MOWD) is prey to both inter and intra-departmental lobby. That conflicts do occur is evidenced by the following observation by the Depty-Director (N.W. Collins). He stated that "the Water and Soil Division is embarassed by the activities of the Commission for the Environment" and added "the funds being used to support the Commission would be better employed elsewhere - for example, in the Water and Soil Division".

7.5 Law

Many legal aspects have been considered in the preceding chapters, and only a few general observations remain to be made. There have been a large number of amendments, mostly of 'mopping or washing up' character, although some have continued the consolidation of the law. The result is a very complex and confused body of legislation, interpretation of which is difficult. All but two of the Boards reported problems with interpretation and thus implementation of many of the provisions, depending on particular problems in the region. Several felt that national guidelines as to interpretation were needed. Many Boards have sought their own solicitor's opinions, and found them at variance with those of the national organisation.

Many commentators have noted the legal problems (McCaskill, 1973; Lello, 1974; EDS, 1974; Williams, 1975) and both the TCPAB and Supreme Court decisions have highlighted the variety of language and thus interpretation possible. In the group of decisions on the Southland classification, the judge variously observed that the Act suffered from prolixity; was full of tautology; and that definitions overlapped. In the judgement on the Water Resources Council's appeal[2] he commented on the "lengthy Long Title" of the Act, and observed that "something can be found in it, and was, to support almost any argument" (p 2).

The Act suffers from many of the problems outlined for technological legislation by Hitchcock (1972), and fails in the primary requirement of being readily understood. Hitchcock observes that rapid change can lead to confusion, and make it difficult even for experts to comprehend the law. It appears in this case that simply bad law draughting may also be a significant factor. Despite this confusion, some clarification of legal issues has occurred, and the question of appeal status has been outlined above. A recent dissertation by Holm (1975) examines in some detail the question of locus standi in both this law and other statute and common law. As well as the decisions cited earlier, a number of other minor issues relating particularly to water rights have been discussed in appeals and Supreme Court cases, although these will not be discussed here. Whether the law review committee presently examining the law can produce further consolidating legislation incorporating such clarification as has occurred, and avoid the ambiguities and contradictions apparent in the present statute, remains to be seen.

All the preceding discussion of the problems evident in implementation of the law, and in interpreting the law itself, reinforces the observation made in the Introduction, that the law is the major determinant of the management structures and functions. The general lack of recognition of this in the academic context by many of the disciplines involved in water use management appears to be parallelled in the 'real world' situation. A Board officer observed that once a system is established in law, clarification must be left to legal processes, unless the law is altered. It appears from the responses to the Appeal Board decisions, that this has only recently been fully realised by the Organisation. It can be seen that there is a wide range or problems inherent in the management regime. Some of these are not very significant, others are basic issues which must be resolved before management of the resource and the users of the resource can fulfill either the spirit of the law or the expectations of many of the users. In terms of the model, most of the problems arise as expected in the linkages between the components within the socio-economic system,

and the transfer and translation of information on the biophysical system status. A resume of the problems and issues raised, and identification of the most important of them, will be made in Chapter 10, after consideration of overseas experience in water use management.

CHAPTER 8

REGIONALISM AND PLANNING

The involvement of water (and soil) management agencies in the two issues of regionalism and planning has recently been brought to the fore, largely because of the 1967 Act and their water use management role. Geography has long been closely associated with the study of these two subjects, and their importance in the future of water use management in New Zealand again indicates the validity of considering current resource management problems in a geographical framework.

8.1 Water Regions

A discussion of the concept of regions is not germaine to this thesis, although a theoretical analysis such as that provided by Grigg (1967) is valuable background to any regional considerations. Neither will the development of regional concepts in New Zealand be traced. It will be obvious from earlier chapters that the role of the regional agencies is very important in the management structure created by the 1967 Act, and a good deal of attention has been paid to their structures and functions. The diversity of problems faced by the RWBs, and the way in which their operations have been determined by these problems has been alluded to. It appears these problems have a definite spatial component. In discussing the Boards' performance in the early application of the 1967 Act, and their subsequent administration of existing uses and water right applications, there appeared to be a pattern determined by relative water-abundance in the region. Similarly the Board's approach to water quality control apparently relates to the existing quality situation and problems. These regional characteristics and the actual extent of the water regions appear to have a considerable impact on regional management policies and operations.

The water use management functions were imposed on already established regional agencies, the Catchment Boards, whose districts became water regions. Although there was not complete coverage of the country by the Catchment Boards or the other authorities (Figure 7) in 1967, this has now been achieved. Eighteen of these water regions are catchment based, and thus are simple physical regions which apart from very minor boundary irregularities contain complete river basins. Of these eighteen, two Boards (Waitaki Catchment Commission and Waikato Valley Authority) have single basin regions; the remainder consist of a number of catchments, although they are often centred on one or two major rivers. The remaining two regions are the urban 'regions' of Auckland and Wellington, for which RWBs have only recently been established. The regions here are clearly 'community of interest' based although in both cases the boundaries have been extended to complete catchments.

This system of hydrologically sound regions is frequently regarded as a major strength of the New Zealand water use management system. In the early discussions of the consolidating legislation, the existing catchment authority regional base was automatically assumed to be appropriate for water use control. There has been considerable emphasis in overseas literature on the importance of regions being catchment based, and this has of course been echoed in New Zealand. Hellinga (1960) in examining local administration of water control in a number of European countries considered taking the river basin as the unit area to be of "vast importance" (p 19), and Fesler (1964) maintained that the basin concept introduces a new kind of functional 'whole' into organisation thinking. Kneese and Bower (1968) believe that regional agencies should have basin wide jurisdiction. Bormann and Likens (1969) see the watershed as a logical ecosystem, O'Riordan and More (1969) have stressed the basin's role as a system, and Haggett (1972) identified watersheds as nested regions and regional ecosystems (p 248). In examining a model water use act for the state of Florida, U.S.A., Maloney (1970) held that

each management district must be a hydrologically sound unit, and county lines and other political boundaries should be ignored. Powell (1972 b) considers the river basin to offer a spatial unit which transcends any partial view focussing on rivers, lakes etc., and to be a "comprehensive natural unit which is also a highly valuable spatial framework for all types of data collection on the behaviour of water and water bodies" (p 93). Pereira (1973) in considering land use and water resources, comments that for water affairs there must be some reference to main catchment area boundaries. He also notes the drastic reorganisation required in countries with long civic histories and little previous need to be concerned with water matters. In New Zealand a regional approach has also been regarded as essential (McMahon, no date, p 237), and there has been some recent discussion of watersheds as a basis for establishing regional boundaries (Ackley, 1975).

In much of this discussion, the importance of a hydrological unit as a management district is simply assumed, and there has been surprisingly little critical examination of this premise. There have however, been some recent suggestions that the catchment may not be the most appropriate management unit, and Powell (1972 b) balances his earlier comments in favour of the basin concept with the following (p 93):

> There has been a tendency to exaggerate the value of the basin, as if it were some type of all-embracing unit which is a gift from the gods; a ready-made guide for enlightened planners. Three obvious complaints can be raised against this tendency.
>
> (1) To translate plans into reality is always a difficult process, involving communication and cooperation between the many different parties involved. In this context, the river basin is a most difficult concept for the residents of such an area to comprehend and at any given moment there may be a number of contrary forces working against the emergence of any 'regional thinking' which could help so much in planning strategy - agricultural-industrial competition, antipathy between urban and rural residents, lack of contact between upstream and downstream residents. All of these issues may precede the unified basin concept in the thinking of water users.

> (2) In real situations it may be more pertinent for water management planning to select areal units which reflect use patterns rather than the natural system itself .... Where urban concentrations heavily dominate the socio-political-economic situation, they may also dominate the water use pattern and there is a very reasonable argument to be made for urban-based spatial units which reflect this dominance.
>
> (3) Although the river basin has already proven its utility in European countries, elsewhere it may be unsuitable purely because of its greater size.

Although the third criticism is not valid for New Zealand, the first two are very real. There have been other suggestions that social groupings are appropraite for water management. For example Smith (1964) has discussed the role of the 'public district' in management, and raises an important aspect often neglected in consideration of basin-wide control - that is, underground water. Although the hydrological links between surface and groundwater cannot be ignored, there is often a different attitude expressed by users towards groundwater uses which is not sensitive to regional considerations. There has been, however, some discussion of the link between physical and social regions, and their interdependence (Grigg, 1967) and Smith (1969) has looked at the drainage basin as an historical basis for human activity.

The question now arises as to whether the present regions established originally for flood control and soil conservation purposes (water-as-entity-management) are appropriate for the predominantly social water use management role. This can be stated in another way. Do the technical advantages of hydrological sound and apparently functional regions outweigh the problems created by regions which do not reflect water use problems or represent regions based on a 'community of interest'? With reference to Figure 5, this is asking whether the regional management agency can operate effectively in its regional jurisdiction over a subsystem of the biophysical system, if the water user bloc does not have a parallel scale of interest or orientation.

It appears in many of the regions in New Zealand,

problems do arise because of this, and the proposals for regional reorganisation are emphasising this issue. The central North Island provides a prime example, with a socio-economic community of interest which areally includes the headwaters of many catchments, based around Lake Taupo, part of the Waikato River system. The present water region includes just the Taupo basin, and the agency is based in Hamilton. In the Manawatu region, largely due to the antecedent Manawatu River, the upper catchments are separated from the lower by the Tararua and Ruahine Ranges. The orientation of the communities in the upper catchments is towards the Hawke's Bay or Wairarapa districts rather than the Manawatu itself. In some regions this separation of physical and social regions is manifest in remoteness of Board offices from certain areas (Westland is particularly troubled by this) although district sub-offices have eased the situation in some regions.

Most Boards report small areas within their regions where interest and cooperation by users is high, and often local committees develop to control and oversee uses. These invariably have an economic productive base, and represent small scale social groupings. It could be considered that the 'success' of the Taranaki Catchment Commission in controlling farm waste discharges, as measured by the prosecutions, has relied on an established managerial community of interest provided by the Counties.

A further related problem with the present situation is the lack of homogeneity within regions, and diversity between the regions. It is often assumed that catchments are homogeneous, but in terms of water use management this is not so, and a number of New Zealand rivers traverse a range of water use demands and problems. The situation is compounded where the regions contain a number of catchments, as the majority in fact do. The variation between the regions, and the consequent effect on Board policies has been shown, and has been recognised as a potential problem since the consolidated legislation was first in preparation (Ministry of Works, 1965). This situation with Boards facing many dissimilar problems has led to much of the fragmentation of policy and dissatis-

faction with the national servicing expressed by the Boards.

Thus it appears that the present regions may not be particularly suitable for water use management. However, it is generally regarded as desirable to integrate the use management role and the structural resource management function embodied in the catchment authorities. For the flood control management role particularly the technical needs are accepted as overriding the social. It is worth noting that the ad-hoc catchment authority structure and regional catchment districts were only established after the failure of most existing socio-economic administrations (the territorial authorities) to undertake this management role (Bush, 1975). Although water use management up till now has been primarily administrative, the increasing awareness of the totality of water resource management confirms the need to link these roles at regional level. Consideration of schemes to retain flood peaks for water supply as well as flood control, is an example of this trend. The developing interest in land and water use planning also stresses the invisibility of these functions.

The above discussion highlights the fact that there was little emphasis on the nature of the management problems, or the appropriateness of the existing regions at the time the comprehensive legislation was prepared.

8.2 Regional Land Use Planning

The Boards in their original role as catchment authorities, have long been involved in land use planning in the high country, and concerned with land use in relation to flood control and drainage work in lowland areas. However, it has only been in recent years that the Boards' lack of contribution to the formal planning process under the 1953 Town and Country Planning Act has come under scrutiny. This is due in part to increased pressure of development, but also because of the Board's wider functions under the 1967 Act.

Much of the Boards' interest stems from the 1941 Act, and the informal input to planning has been mostly involved with minimising flood or erosion hazards. Again there is

a diversity of problems. For example, the Nelson Board is concerned with forestry development, and Gisborne is closely involved in the East Coast project. Increasingly Boards have found themselves involved in land use problems with water right proceedings, and the two 'new' urban Boards, Auckland and Wellington, are particularly concerned with water rights relating to urban development. Some Boards report an indirect involvement in land use decisions even before right proceedings have begun, with industry 'shopping around' for sites where water is available for either taking or discharging into.

This expansion of the planning role of the RWBs has been strongly supported by the national agencies. Several Board officers offered the opinion that this has been an enlightened approach which has encouraged them to take their role more seriously. The Authority pushed for a full involvement of water and soil agencies in regional planning in submissions to the Town and Country Planning Act Review Committee in 1973, and a number of guidelines have been produced which directly relate to land use and land development problems. The latest of these (NWASCO, 1975 a) is regarded by some Boards as unworkable unless the Boards have a greater statutory role, but generally these are Boards that are in conflict with their constituent local authorities.

There have been a number of recent conferences which have dealt in part with the link between water and land use. Again the NZIE have played a significant role and part of their 1973 Conference was a symposium entitled Water in the Development of a Region. The papers by Norton and Roberts are particularly significant. A similar symposium in 1974 discussed regional management of sea coasts and lake shores and Howard's paper (1974) outlined the Orgnaisation policy and involvement in coastal development.

The interrelationship between the 1967 Water and Soil Conservation Act and the 1953 Town and Country Planning Act has been emphasised by a recent TCPAB hearing and subsequent Supreme Court decision on appeal of a right application by the King Country Electric Power Board[15]. The Appeal Board initially held that the 1967 Act does not

provide for the resolution of conflicting priorities between land use and water use. The subsequent judgement and the Appeal Board reversal of its previous decision indicates that the 1967 Act can be used for this purpose.

A recent TCPAB Practice Note has further reinforced the connection. This suggests that where a development proposal requires a consent under both Acts, applications should be made at the same time. In such cases, the Appeal Boards as a general practice will not hear an appeal lodged under one Act until the result of the application under the other Act is known. If appeals follow under both Acts, they will be dealt with together. This last approach has already been followed with recent appeals[13].

There have also been a number of recent articles discussing the Boards' and 1967 Acts involvement in regional planning (Pemberton, 1974; Town, 1974; Bellamy, 1975 a). At the 1975 Catchment Authorities Conference the remits and addresses from delegates repeatedly referred to the contribution that catchment authorities could, and must make towards town and country planning and land development plans (NZ Local Government, July 1975).

8.3 Local Government Reorganisation

The rapid increase of interest in regionalism and regional planning shown by the Boards and the Organisation is due almost entirely to the proposals for reorganisation of local government under the recent 1974 Local Government Act. These proposals, which threaten the very existence of the Boards, as ad-hoc local bodies, have resulted in a far greater sense of unity between the Boards. The Organisation has supported the Boards, and encouraged a positive stance, to the extent that there has been greater cohesion and consultation on this issue than on any previous issue. The reasons for this activity are clearly indicated in the following report of an address by the present Minister of Local Government, Henry May.

> Mr May recalled that the Parliamentary Local Bills Committee which carried out an enquiry into the structure

of local government in 1959-60 "came down very strongly against government by ad hoc authorities".

On the one hand, the committee said, ad hoc authorities were "a natural consequence of the lack of proper reorganisation and co-ordination of the territorial structure" and, on the other, "tended to further complicate and weaken the whole structure of local government". Mr May then commented: "We can expect to see the gradual disappearnace of most of the ad hoc authorities and the absorption of their responsibilities by either territorial authorities where appropriate or by regional bodies where they can only be administered at that level.

"I would be the first to accept that many of these ad hoc bodies have done a wonderful job. But the ad hoc authority, no matter how efficient it might be, is a diversion of effort and, as the 1960 committee said, a confusing factor which contributes to that apathy towards local affairs which is such a disquietening factor in our local scene.

"But that is not the whole story by any means. Far too many ad hoc authorities tend to become unduly subservient to central bodies, there is little coordination between those of different types, there are too many examples of overlapping jurisdiction and too much unco-ordinated competition for financial and other resources. And they are not all efficient by any means.

"Under the provisions of the Act the function of those ad hoc authorities which are limited geographically and could be absorbed in the territorial structure will in general be absorbed by territorial authorities. Those which have a regional impact will become the responsibility of the new regional bodies - regional councils or united councils.

"The regional councils and united councils will be bodies under which all functions of a regional nature will be coordinated under single administrations. That is their whole purpose - coordinated administration of regional functions. (NZ Local Government, September 1975 a p 19).

In the face of these proposals, which incidentally are regarded by some planners as disguised centralist, not regionalist, moves, (Bagnall, 1975) the Association has presented a remarkably united front. Supported by the Organisation, (A.W. Gibson, pers. comm.) a policy statement in favour of integration with regional councils has been adopted. Because of the representation and administrative proposals for United Councils (a type of commission structure, with staffing and services by one of the constituent territorial authorities) the Association is strongly opposed to these councils and is adamant that if necessary the authorities

should remain outside them and continue to function as special purpose regional authorities.

There has been some criticism of this early declaration of policy by C.N. Mackenzie, the Counties Association representative on the Authority, because of the uncertainty at the present time as to what form or forms the regional bodies would take. He is reported to have said that the declaration was premature and that "quite a number of elected members are having second thoughts about it". This presumably means elected Board members (NZ Local Government, September 1975 b, p 23). From the interviews with Board officers, the majority of Boards do support the Association stand, although the Commissions in particular are not as opposed to United Councils.

Apart from the questions of representation, there was particular concern by some Boards that the boundaries of the present water regions would be altered, based on the perhaps uncritical belief that the catchment based regions provide the best management district. This varied between the Boards. Some have areas which are likely to remain intact, others consider loss of small catchments or even parts of major catchments would be of little concern. In contrast, other Boards such as Rangitikei-Wanganui and Waikato (whose regions include part of the central North Island are mentioned earlier) and Manawatu are worried that substantial and important parts of the catchments may be separated under a regional council structure. Both these Boards and the Director, felt that although the provisions in the Local Government Act for outdistricts could be invoked in these situations, management could be overstretched if these outdistricts are too large. The question of financing of the water and soil activities in the regional council was raised by several Boards, but the ramifications of this problem are too many to be discussed here.

Some of the Boards, and to some extent the Association, are pressing for the Boards to operate as bulk water supply and sewage treatment agencies. They point to both the Wellington Board and overseas, particularly British, regional structures

in support of this. This reflects a growing interest in involving the agency further in the implementation role (Stages 4 and 5. Figure 2).

It is not known whether or not the Local Government Commission presently hearing submissions from affected local authorities is considering such functional issues. Even if it is, it is uncertain what weighting will be given these functions in determining the regional body and boundaries. If the Commission's attitudes are similar to or influenced by the planners present at the NZ Planning Institute's Autumn Seminar at Massey University, May 1975, the Boards and ad hoc local bodies will be given little consideration at all.

Some further discussion of the implications of reorganisation follows in considering prospects for the future. Once the Commission's intentions are known there must be rapid alteration or development of management procedures to operate efficiently in the new regional framework. Lello (1974) points this out in stressing that "the creation of effective management systems for regions will have to be considered well in advance of legislation if a new act establishing regional councils is to be implemented effectively".

PART III

NEW ZEALAND MANAGEMENT

IN PERSPECTIVE

CHAPTER 9

OVERSEAS COMPARISONS

Part II has dealt with problems and issues of present water use management. Any evaluation or judgement which was implied in discussing the issues, arose from considering the performance of the system in implementing its own stated goals or intentions. This introverted view of the success of the organisational and functional aspects of control is inherent in many of the opinions reported, in that the comments are often based on an expectation of how the established regime should operate. A number of the views, particularly those held outside the overall organisation created by the 1967 Act, have a broader base and reflect 'public' or specialist concepts of appropriate management agencies and operation.

Frequently, these commentators have drawn attention to overseas experience, and it is pertinent to now consider the New Zealand pattern in this context. In this way, those problems which are international rather than just peculiar to New Zealand can be identified, and the success or failure of the New Zealand system to cope with these issues also indicated. This comparison will be used to highlight the strengths and weaknesses of the framework, (Figures 3 and 5 should again be referred to) and will follow a similar pattern to Part II.

Before examining water use management in this regard it must be pointed out that the integration at both regional and national level of both water use management and other aspects of water resource management, is a major strength of the New Zealand system. Much of the overseas management is conducted by single purpose authorities, and although certain functions (such as the structural or implementation aspects of water use management) remain largely outside the major agencies in New Zealand, the pattern here is very much closer to a multipurpose approach. Obviously this is viewed only within water resource management, but as has been

shown there is increasing involvement of the water agencies in broader resource management decisions. Because the present management is primarily regulatory or administrative, apart from the irrigation and rural water supply functions, this is more a potential strength. It is only now that the essential linkages between these management functions at the operational level are being recognised.

9.1 Water Rights

The water rights system can best be discussed with reference to the United Nations comparison of legal regimes for the abstraction and use of water (1972). In this, riparian, prior appropriation and administrative dispositions of water, are described and it is clear that the NZ rights are a form of the last type. Distinction is made between different forms of authorisation in this disposition and the two major forms are described as follows:

> In administrative law 'permits' are distinguished from 'concessions' since it is generally accepted that the former are precarious and revocable and create obligations only for persons in receipt thereof, whereas concessions are for a fixed period or perpetual create reciprocal obligations, and their revocation is governed by law. Consequently, the procedure for obtaining them is different, since a concession has a certain condition of stability which a permit lacks. (United Nations, 1972, p 18).

It would seem that NZ rights are concessions rather than permits in this definition. It is interesting to note that authorisations, as well as being called permits or concessions, are variously named licences, consents, or grants, and the word right is used only in a general sense, rarely as the actual name of the authorisation. It may be recalled that the change of the name from 'licence' to 'right' was one of the alterations in the committee stages of the original Bill. Several Board officers commented that this term is inappropriate when the 'sole right' to water use is in fact vested in the Crown (Section 21). In particular, it was felt that there should be no such thing as a right to discharge.

The allowance of 'reasonable use' without obligation for domestic stock and firefighting is comparable to modified riparian concepts continued in other basically administrative overseas regimes, although provision in this dispensation for small gardens has not been made in New Zealand. It is noted that this priority accorded to domestic use extends to municipal and community water supply in most jurisdictions. Many Boards in NZ are requiring rights for town supply, and this avoids the 'accidental' high priority accorded to industrial use in urban areas because it comes under the umbrella of municipal supply. The fact that supply of water for domestic and municipal use remains in the hands of local government is not unusual, either.

The question of who holds the right and can use the water is often clearly stated in other law, and the NZ system appears to be lacking in this regard. In particular, the link between land and the water concession is often strict, with the concession given for a particular piece of land and attached to it. In some countries, permits or concessions are given to ultimate users, and not supply agencies or the purveyors of water. This is in contrast to the NZ procedure for irrigation and rural water supply rights, where the rights are granted to the suppliers.

The NZ system for application for rights is very democratic in comparison with many overseas examples, as is the extent of public access to a 'register of uses'. Similarly the protection of water users is high, with the Tribunal and appeal procedures. The NZ system also provided good protection of pre-existing uses. The UN comparison found the way in which existing uses are catered for in the change to new regimes, critical for the future success of control.

The NZ system covers most of the administration issues raised, such as duration of right; transfer (although without the land/user link clarified the practical application of this is difficult, as discussed earlier); provision for loss or forfeiture for non-compliance; and the question of easements. In contrast with many oversees systems the priorities for uses are not clearly spelled

out in NZ, but as the UN notes, where "public interest is made the main or the sole criterion for priority, the water administration is left with more discretion. "(United Nations, 1972, p 85).

In regard to the basis for allocation of supply, and the quantity allowed for users, United Nations comments:

> The quantity of water that the user may receive depends ultimately upon his needs and upon the availability of water; it can virtually be defined as a function of those two factors. In practice; however, matching needs and availability of water so as to achieve an acceptable balance and an acceptable share for all users has proved far from simple and has resulted in a number of varied formulae in which custom and even happenstance have played an important role (ibid, p 172)

The formulae listed include: unlimited; 'beneficial' use; share of supply; per unit of land; and crops grown; several of these are being applied in NZ, particularly the last three, although here the amount is expressed quantitatively based on calculations from available supply or requirements. It seems that the NZ flexibility is in fact an advantage in this situation.

The UN analysis includes a large section on payment for water, and it appears that the NZ regime is virtually alone in providing no system of charging for use. The question of payment in relation to supply authorities is raised in some detail, although this again is rather divorced from the NZ consolidating law, except for irrigation relationships between suppliers and the administrative agencies are noted. User groups in NZ do not appear to have the same level of representation on the agencies, but this is probably due to the strength of the water user associations in other countries. In arid or semi-arid climates particularly user organisations are very active.

Much of the analysis in the United Nations text relates to abstractive uses only, and the New Zealand system appears much broader in scope than much of the law discussed. Many of the general trends observed by the UN have been repeated here, although the increased role of the government in construction is more recent than that reported in many

countries.

9.2 Water Quality

There has been considerable emphasis on water quality management in overseas literature. Authors such as Craine (1969) and Gibson (1971) maintain that water quality should be the integrator of water resource management. This perhaps indicates that quality considerations have often been the poor cousins of other control issues. Almost the reverse is true in New Zealand. Water pollution control had a substantial background before inclusion in the comprehensive legislation, albeit an ineffective one, and to a large extent was simply transferred to the water use agencies. Although Cowie's 1959 paper indicates a thorough background in many of the issues in control, there was apparently no review of the procedures undertaken in 1971 before transfer. This was apparently in the hope that the problems could be cured simply by a shift in administration.

Certainly there was none of the analysis of staffing needs, administration or financing; or overall economic analysis regarded as important by Klassen (1962) and WHO (1966), despite the observations by Knox (1970) and the 1970 Physical Environment Conference (McMahon, no date). Although considerations of the most effective control systems were available at this time (Kneese and Bower, 1968; Dales, 1968), the earlier regulation by stream or receiving water standards was not reviewed (or if reviewed, obviously not implemented). O'Riordan (1971 b) sees receiving water standards as an inefficient mechanism for promoting optimum quality, and less common and effective than effluent standards. He reports the latter to be "relatively simple to administer, monitor and enforce" (p 74). Effluent standards are not regarded as highly by other writers, however, and Key (1969) indicates a more away from effluent to river standards in Britain, where effluent standards developed and have traditionally been applied. O'Riordan notes, however, that stream standards may be necessary to safeguard public health and welfare, and provide the focus around which to assess broad public

preferences for certain levels of water quality.

Subsidy systems, which theoretically encourage waste treatment are also discussed, but generally are discounted in favour of effluent charges. Subsidies are available in New Zealand for municipal waste treatment. In combination with water supply subsidies these total approximately $7.5 million per year (Thorn, 1975). These are available under different legislation, and obviously do not offer any incentive to industrial dischargers.

O'Riordan (1971 b) reviews the support for effluent charging in some detail, and there have been other case studies indicating its effectiveness (Millar et al, 1971). Further discussion of this issue is not necessary, other than to point out that in all the criticism of the New Zealand procedures there has been no suggestion that economic disincentives should be imposed.

New Zealand is not unique in attempting enforcement by regulation via standards. Both Kneese and Bower (1968) and O'Riordan (1971 b) observe that this is the most common method of pollution control, because it is administratively more practicable than either of the two alternative approaches (subsidy and charge) and because it is politically and socially more acceptable to polluters (industries and public). Certainly the debate in NZ on classification and the standards has not seriously questioned the basis of regulation by standards.

The predominance of control by standards has led to a wealth of literature discussing standards and criteria. Apart from detailed coverages for particular areas such as that by McKee and Wolf (1963), almost all 'texts' include a section on appropriate parameters (For example, Klein, 1966). The debate on flexibility v. rigidity of standards is also vigorous overseas. White (1969) favours ambiguity as well, considering that this allows a high degree of administrative discretion in applying a program, and flexibility to change in time and place as needs, perception and technology change. He cites (p 61) Wolman (1950) as stating:

> Almost every situation on almost every body of water in this country is a problem in itself. As a rule, the solution to such problems is not assisted materially by referring to a convenient handbook. The solution lies in most instances in the considered balancing of technical and financial conveniences and equities, out of which the perennial compromises of judgments ensue. In more instances than one, any criterion, in law or in rule, which stands in the way of these compromises is unfortunate. They lead either to unwise and unwarranted expenditures or to acrimonious debate and delay in correctives. Administrative judgment and decision are the results of intelligent diagnostic techniques, bargaining, availability of the dollar, and adaptability to the local scene. They are not and never have been the result of legislative fiat, even when this is re-inforced by formulas of pseudo-mathematical character.

While this could be considered an apology for normative decision making, it is relevant to New Zealand and does illustrate the need for flexibility. While there is criticism of the flexible standards in NZ, the rigid standards (particularly bacteriological) are also under fire. The fact that rigid bacterial parameters have largely been discarded in Britain (Dr A.L. Downing ex-Director of the Water Pollution Research Laboratory, Stevenage, England in discussion at Biotechnology Conference Massey University, May 1975) tends to support flexibility.

There appears to be two possible conflicting views of the NZ system. Either the present standards result from the Organisation being unwilling or unable to change them in the light of overseas experience; or the Organisation advisers have, in enlightened anticipation of overseas trends, developed flexible standards which are simply not understood or accepted by sectors of the scientific community because they have not been developed in the usual 'trial and error' manner

Whichever of these alternatives proves to be correct, it is in the next phase of control that the present system is notably lacking. McLoughlin (1972) observes that setting of standards cannot be divorced from the problem of enforcement, and yet as the earlier discussion of the RWB role in control has indicated, the application of the receiving water standards is poorly prescribed. Southgate (1969) considers that "scientific management of the water economy

requires that river authorities should be able to predict what the effect of discharging a given effluent in a specific receiving water will be" (p 15). Thomann (1972) regards water quality systems analysis as essential to avoid the lack of rational under-pinning of decision making that has existed in the past. Before sophisticated modelling such as Thomann excellently reviews can be applied.

These have not been readily available from published sources, and Kittrell and West (1967) deplored the lack of standard procedures at the basic water quality survey planning stage. However, as early as 1962, Petrik laid down guidelines for such surveys and there have been papers published recently (Montgomery and Hart, 1974; Oxley and Wallis, 1974). Sophisticated interpretative and predictive techniques are detailed in Thomann's text, but he notes the importance of close liaison with field sampling and data analysis activities.

Downing (1971) describes the shortcomings of predictive methods however, and Greenberg et al (1974) conclude for North eastern New Jersey, U.S.A., that the reporting, recording and storage of water quality and effluent data is 'spotty', and forms an inadequate foundation on which to base control solutions. Also, papers such as Elvins (1974) indicate a relative lack of sophistication in monitoring programs. The last two papers indicate that monitoring strategy is not necessarily efficiently applied overseas, and it has been commented that even with considerable advances, really accurate prediction will never be possible (Water Research Association, 1964).

In this field, and in monitoring technology there appears to have been no attempt to transplant or translate overseas experience to New Zealand. This technology is closely linked to strategy, and ranges from simple quality analysis, to biological indices, and instrumentation. Millar et al (1971) discuss these techniques and an exhaustive collection of papers on biological aspects is found in Cairns and Dickson (1973). There is considerable emphasis on instrumentation overseas, and the use of remote automatic monitoring equipment is commonplace. Instrumentation is also

discussed in standard texts (Klein, 1966) and authors such as McDermott et al (1969); Briggs (1972), Drake (1972), and Phillips and Mack (1975) discuss both needs and the range of equipment available. The belief held by the Organisation technical advisory that such instrumentation is 'unreliable' is a failure to keep up with overseas evidence and progress to third-generation equipment. O'Riordan (1971 b) has discussed the application of games theory to control of pollution, and there already seems to be a process of bargaining between the Boards and the dischargers occurring in New Zealand.

> Game theory involves common interest, uncertainty of each other's actions in any given situation, and tremendous dependence upon precedent. The process of bargaining to resolve conflict means that both sides must give ground to gain ground. This whole procedure is clothed in ritual, opening with threats (bombastic statements) by the pollution-control agency, followed by a period of withdrawal when behind the scenes bargaining takes place, and ending in some form of compromise, either as to the amount or timing of pollution- control measures or both. The emphasis is upon incrementalism (major institutional changes do not occur rapidly), ritual, and continuing negotiation to achieve what is desriable rather than optimal by searching for common ground amongst all interested parties. In some instances the recognition of the need for cooperation and the establishment of a common purpose is a notable achievement .... This entire process centres around some focal point, be it air or water quality standards for specific kinds of emission, or individual effluent controls, since bargaining cannot take place in the abstract or across a wide range of issues. (ibid, p 78)

Although objectors are involved in the bargaining process here, and the threats from the agencies and inertia by the polluters are not as marked, this pattern is appearing. In some regions this has developed because the management role of the Boards is undefined and the relation between discharges and standards cannot be set.

The recognition of other water quality problems lags behind overseas knowledge, but this is partly because these problems have arisen only recently. Awareness of diffuse sources is however relatively recent worldwide (Kettel and Day, 1974) despite the fact that nutrient and eutrophication

problems have been recognised for some time (Sawyer, 1968). The international problems of toxic wastes are again infrequent here, due to the predominance of organic wastes from primary processing. Pesticide issues are similarly of lesser importance. Detergent problems have largely been avoided, except in wool scouring effluents, due to early consultation by the national agencies with importers. Both this industry's cooperation in changing to 'soft' detergents, and the widespread use of soap powders has averted many of the possible difficulties. Thus despite, or perhaps because, of fewer problems of water quality, the New Zealand system of control does not appear to be the most effective of the systems in use overseas. There appears to be a mistaken belief that because of the generally lower levels of pollution, water quality can be controlled with a lower level of technical expertise and technological application. The need for flexibility in control at higher levels of quality, with aesthetics and therefore public perception as the major and variable criterion, is recognised. The resulting need for perhaps greater sophistication in monitoring strategy and technology, is not.

9.3 Irrigation and Rural Water Supply

The heavy involvement of the national organisation in these essentially regional operations in New Zealand, differs from the overseas pattern. This may simply be a reflection of New Zealand's small size and primary production orientation. The literature on irrigation has not been researched, but it appears from the United Nations summary (1972) of law that the procedures here are uncommon, and efficient.

9.4 Underground Water

Groundwater is being recognised as the largest potential source of new water-supply, with reserves greater than all surface freshwater taken together (ibid). A lag in subjecting groundwater use to the third phase consolidating legislation and the attached permit systems is recognised. New Zealand

appears to have had advanced and relatively early control of groundwater under the 1953 Underground Water Act, although as this was not generally applied and the control was theoretical rather than actual. The fact that groundwater was subjected to rights to the imposition of the statutory right regime in 1967, again appears to be advanced. The inclusion of further controls over groundwater has also been rapid in comparison with overseas systems.

The greater dependence of the rural community on underground sources internationally (ibid) is again paralleled here, although there has long been use of groundwater for industry and municipal purpose where high basic purity has offset the cost of abstraction. The use of groundwater for preference, rather than need is again common in New Zealand, and the high level of 'riparian' attitudes is also noted. Hutchins (1964) in discussing groundwater legislation in the U.S.A. comments that opposition to legal restriction on well drilling or individual pumping has effectively blocked enactment of proposed legislation in many jurisdictions.

Complexity of definition has been avoided by the New Zealand system, and the bylaw provisions contain virtually all of the control issues outlined for other administrations. Although the application of the bylaws is only beginning, it appears that the New Zealand controls are as sophisticated as any, although again the financing question is neglected. Greater controls and knowledge of the resource exist in arid regions, particularly the Middle East, but management here is well advanced for a 'humid' country.

9.5 Other Technical Aspects

Under the impetus of the I.H.D., the hydrological observation techniques and programs have achieved a high level of development in New Zealand, although not to the pitch of many arid countries or where high demand for urban supplies has required very detailed knowledge. The separation and relatively small scale of structural aspects of water supply has resulted in different orientation to that overseas. Many of the data collection techniques are, however, translated from international

experience. The problems in NZ are perhaps organisational rather than technical, a situation that exists in many other countries.

The coordination of techniques for collection of data on water quality and quantity into a coherent information system is only just beginning here, although this too is only a relatively recent innovation overseas. Whether this can be done on a national basis, and still cater for regional needs remains to be seen. It is doubtful that overseas development in information systems can be directly transferred to NZ. Communications-Control networks such as those proposed by Kneese and Bower (1968) are closely associated with structural and operational measures, and as such are not directly applicable to the New Zealand situation. It is to be hoped that the monitoring instrumentation and strategies associated with such systems will be considered in coordinating data collection, here, although on previous performance this seems unlikely. The computer based hydrological data storage and analysis mentioned earlier is a beginning, but the system must extend into broader operational approaches to the problem, and not become simply a systems engineering exercise.

The development of applied research in water use management has lagged behind most other developed countries perhaps due to lack of recognition of the issues, or even a real lack of problems at a level recognised by public and politicians. Agencies such as the Environmental Protection Agency in the U.S.A., and the Water Pollution Research Laboratories, Stevenage, in Britain, have directed considerable effort to problem-solving research, and developing management techniques. The belated orientation of research to operational problems and decision-making needs is not just a New Zeland problem, however, as Jeffers (1973) indicates, and the following quote applies to researchers world-wide.

> My conclusion is that the new frontier does not lie in research per se but in the joining of research to the decision-making process, so that the result of research is not a document or a paper to a learned society, but an actual contribution to the decision that is ultimately made, couched in terms that the

> decision-maker can understand and which leave him in no doubt as to the consequences of alternative decisions. As scientists, it is our job to forge the multi-disciplinary teams which will be needed to tackle real problems and to see that these teams are equipped both mentally and physically to undertake tasks of sufficient magnitude to make a positive contribution to the continuing crisis of resource management. As managers, it is our job to see that priority is given to those tasks which are likely to have the greatest impact upon the decisions that have to be made, rather than to aspects which scratch our intellectual itches. (ibid, p 26)

9.6 Organisation and Administration

Apart from the fortunate integration of water use management with other structural aspects, the New Zealand administration is relatively simple and coordinated compared with many overseas examples (United Nations, 1972; Soil and Water September, 1974). There is not the usual multiplicity of agencies dealing with different areas, or aspects. There are fewer agencies in the hierarchy also, although despite this the structure is still criticised for complexity at least at national level. The agencies have many of the attributes considered necessary by Klassen (1962) and Caldwell (1966) for effective operation.

Finance

Lack of funding is not peculiar to New Zealand. J.L. Sax, cited by Williams (1975), has described the typical political response to environmental issues as "noble sounding mandates and small budgets", and Millar et al (1971) noted the constant and repeated underfunding of agencies devoted to anti-pollution activities. The complete lack of extra finance for the greatly expanded functions of the regional agencies appears to be an original twist to the general trend. The distribution and limitation of funds through a central bureaucracy is, however, not unusual. Generally, the economic implications of water use management are considered overseas, and the New Zealand failure in this respect is notable. Apart from analysis of the economics of irrigation of wastes in relation to gains of productivity and replacement of fertiliser by Phillips (1971), there has

been little consideration even in the academic context, of the social costs and 'external diseconomies' of waste discharge. Certainly no connection has been made to effluent charging or other economic measures, and lack of prosecutions makes the economic disincentives of fines rather illusory. It appears where industry has improved the quality of its effluents it has been more as an act of social conscience than as a result of economic pressures.

Public Involvement

The whole basis of environmental and water resource management and the public, political and bureaucratic inputs to management systems has been discussed from a number of different viewpoints in the literature. Marshall (1964) in viewing economic and political aspects of water resources planning finds 'rational choice' of alternatives in administration of water is highly unlikely. Haefele (1972) identifies problems in both the technical and political analysis of what society wants. Edmunds and Letey (1973) review all the social choice mechanisms available, finding them all wanting for environmental issues. In discussing water development in the U.S.A., Goldman (1973) finds it encouraging that agencies involved in water planning are attempting to incorporate public values and attitudes into the decision-making process. He notes that conservation opinions usually appear only adversary proceedings after decisions are made, and maintains that a basic change must occur in the philosophy of decision makers; that is, involving the public rather than excluding them, and the elimination of the attitude that public involvement will only be asking for unnecessary trouble and delay. Sewell (1973) summarises the whole issue as follows:

> Ideally, goals should be formulated through extensive, rational discussion between the various groups involved in decision-making, as well as with those who are likely to be affected by the decisions. Generally, however, it seems that goals evolve not from logical debate but from an admixture of historical precedent, political opportunism, and assumptions about public attitudes .... Usually there is little or no attempt to discover what the public wants or would like to have. Politicians and their technical advisors, it seems, tend

> to rely mainly on their own judgements as to the latter rather than canvassing public opinion in a systematic way .... A possible consequence may be that decision-makers will misperceive the goals which the public expects them to pursue. (p 37).

The present controversy over classification is a clear example of this general situation.

There is allowance in the New Zealand regime for substantial public input, and these statutory mechanisms appear to be enlightened recognition of the necessity to incorporate public values in decision making. The right of public inspection of records is simply stated and broadly based. In Britain, for example, public access to information has been very restricted - for discharges this was partly based on the possible problems of 'industrial espionage' of new processes - although this secrecy has been substantially eliminated in the recent Control of Pollution Act, 1974. (McLoughlin, 1975).

Goldman (1973) reports observations of frustration, cynicism and disillusionment with many institutions by the public, stemming from a lack of real involvement in the decision-making process, and a sense of helplessness regarding ability to have any impact on the decision making process. Wandesforde-Smith (1973) comments that resource management agencies at all levels of government in the U.S.A., appear to have reached a point at which their behaviour and performance are unacceptable to a substantial, vocal and growing segment of the American public. Bolle (1973) notes a breakdown in the normal democratic process through which the public need is translated into law by legislature, and in turn carried out by administrative agencies. He points to confrontation, conflict, and lawsuits as expressions of dissatisfaction. The whole question of public administration and bureaucracy, and the public access to decision-making and decision makers is being raised.

Maass et al (1962) recognised that problems with bureaucracy are inherent in water management, and Marshall (1964, 1965) has considered the influence of bureaucratic attitudes and organisational loyalty on decision making. Reich (1970), O'Riordan (1971 b), and Edmunds and Letey

(1973) have also analysed bureaucratic responses and resource managers' attitudes. Tinker (1972) has facetiously summarised the British responses as 'Nanny knows best'. Frauenglass (1973) notes that after generations of being taken on faith the professional resource manager is at first incredulous when public scrutiny questions decisions, and if issues are forced, agencies may literally go into shock. The Water Resources Council response to the Southland decision appears to approach this stage.

Wandesforde-Smith (1973) observes that it was the administrative leaders who took resource management to the status of a public function in the first place. He notes that it is scarcely surprising that they find the 'new' public conservation interest and criticism "unpalatable". This situation is paralleled in New Zealand, particularly with water pollution control.

The reactions by Cowie (1974) and the Director to pressure group activity and specialist opinion are hardly encouraging as far as agency accomodation of public opinion is concerned. From the above discussion, however, these are perhaps normal and inevitable.

Law

The role of the law has been described by Maass et al (1962) and although discussing the U.S. system the following is generally applicable to democratic systems:

> With respect to popular control over the administrative process, it has always been a premise of constitutional democratic government that bureaucracy suffers from inherent tendencies toward parochialism and toward aggrandizement of power by officials that destroys responsibility. Thus bureaucracy must be constantly subjected to informed criticism. The chief executive, the courts, professional standards, and direct relations between the community and the bureaus of government, while necessary, are not sufficient for this purpose. The chief executive, as an elected representative of the people, can subject the bureaucracy to popular control, but the supervision he provides has limitations. It can be exercised only by his top political aides in the executive, and "they are continually being pushed into becoming mere captives of their department by their own lack of information and expertise and by the department's quiet persistence,

> quiet obstruction, and command of facts .... The protection provided by the courts is likely to be largely negative and after the fact. Professional standards, although important in ensuring responsible conduct of public affairs, are no substitute for popular oversight. And since direct relations between a government bureau and the public develop almost inevitably into those between the bureau and a special public (the agency's clientele), it is difficult to ensure popular control by this means. In short, legislative oversight, as an essential supplement to the forms mentioned, guarantees the capacity of the people to call the bureaucracy to account. (ibid, p 578).

In New Zealand litigation has become the most important means of public access to the decision process of the agencies both national and regional. The public rights in law, particularly the issue of locus standii, appear to be more liberal than usual overseas (Sax, 1970) although as Holm (1975) observes there is still the conservative element designed as protection against the 'vexatious litigant'.

White (1973) raises a point regarding legislative changes. He notes that when values change rapidly the planner may be caught with his earlier judgements, while the legislators may be quick to sense the shift, and find it easier to readjust their positions. This refers to planning and implementation and as such is not directly applicable in New Zealand, but there is a parallel in the present classification debate. Here the planners (the national agency and its advisers) were following their interpretation of the law, and have been found by the judicial bodies to be incorrect in this. As the agency and the advisers originally prepared the law, it seems that the Appeal Board and Supreme Court may be interpreting the law in relation to the current public opinion, which the agency does not, or believes it cannot, take into account. If this is so, the interpretation of the intended or even actual provisions of the law can be modified by public attitudes and values, and the judicial bodies are not as divorced from the socio-economic milieu as earlier discussions have indicated (Figures 5 and 14).

Regionalism

Although reservations were noted for the whole catchment basis of the present water regions, international opinion would consider this to be a strength of the New Zealand management structure. Several western countries have made considerable efforts to establish regions based on watersheds, and broken up existing territorial boundaries to do so. It is ironic therefore that the New Zealand regional structure may be lost in the impending reorganisation of local government. The issue of decentralisation of control, as distinct from regionalism, has been discussed as well. The general relationship between central government and local districts in European countries is outlined in Hellinga (1960) who notes that in most countries there is strict supervision of the finances and administration of the districts. In some cases the districts can be regarded as subsidiaries of central government. He observes (p 33):

> It requires great tact on the part of the central government to stimulate local districts in their activity on the one hand and on the other to restrain them from adopting a passive attitude because the drastic action on the part of a higher authority has rendered them local subsidiaries of the central government.

Klassen (1962) accepts the need of nation-wide uniform laws and regulations so that one area cannot offer more in the way of freedom from pollution control requirements than another, but believes in responsibility resting with the smallest governmental unit able to handle the necessary public services satisfactorily and economically.

Ross (1973) finds local agencies tend to be self-seeking and have insufficient expertise, and considers national agencies less influenced by local issues, capable of attracting greater technical talent, and to have the necessary overall view of problems. He notes, however, that both levels are prey to lack of finance, and often fail to keep up with current knowledge. He also observes that resource agencies frequently simply react to crises, and seldom seek to anticipate problems. While this is not true for either the national or regional agencies in NZ, the Boards do tend

to operate on a hand to mouth basis. Williams (1964) observed that the Boards "lack long range ideas". This can be blamed on lack of espertise and the burden of administration, both of which are in part due to lack of finance. Broady (1968) comments:

> Even where senior officials do not give in to discouragement they are frequently oppressed by the sheer weight of detailed administration work which leaves little time for, if it does not completely inhibit, the breadth of thinking and the vision which are particularly called for in a period of rapid social change. (ibid, p 45)

Communication failures within organisations are also recognised overseas, and the separation of the Boards and the Organisation here does not appear to result in exceptional breakdowns. As well as discussing bureaucratic behaviour, Reich (1970) points out that top-decision makers receive mainly interpretations of interpretations, and that the briefing received at that level may be three or more steps removed from the facts.

A number of the points raised here have been commented on previously for New Zealand. The heavy financial control, and resulting passivity of some Boards; a tendency for variation in regulations between regions; and lack of expertise at Board level, are all international problems.

The need for regional or local involvement of control agencies in supply and treatment has been stressed in Britain (Ministry of Housing and Local Government, 1970) and is assumed in other general texts (Kneese and Bower, 1968). This appears to be a natural consequence of high demand for the resource. The present lack of this in New Zealand may also alter with local government reorganisation. The essential links between land and water uses are also emphasised (ibid; Periera, 1973), and McLoughlin (1972) has commented that for control of water quality agencies must know of intended development. He describes for Britain a situation very similar to that in New Zealand with no statutory links in the formal planning process, and only non-uniform, informal coordination between agencies.

CHAPTER 10

CONCLUSIONS AND PROSPECTS FOR THE FUTURE

10.1 Conclusions

Many of the problems and issues in water use management in New Zealand are experienced by many other countries, and are not necessarily restricted just to water use management. Problems with public participation, and reactionary and tardy bureaucratic response appear to be the norm in all resource management issues.

In certain aspects the present New Zealand regime fares better than present overseas systems. The structure and the interconnections within the structure are relatively simple, and public access at many stages of decision-making is well provided for in the law. The judicial bodies are involved at a relatively early stage, and appear to be more sensitive to regional management issues than the national agencies. The right procedures are detailed, and the groundwater, rural water supply and irrigation provisions are comprehensive. The latter has a high level of political and financial commitment. The recognition of the close links between land and water use, and the need for formal planning attachment of the two is occurring relatively early in comparison to overseas examples. In other issues, such as lack of applied research, and a low level of overall political commitment, New Zealand is no worse off then elsewhere.

The New Zealand system has not coped with a number of other problems, and there has apparently been a failure to learn from overseas experience. In many instances these issues override the good or simply indifferent aspects above, and the problems often appear magnified, perhaps due to the relatively small scale of operation.

The lack of finance is an immediate and all-pervading issue which has influenced implementation at all levels and of all aspects. The bureaucratic response, particularly from the national agencies, appears as bad as in other countries, although this may be one of the issues which is

particularly magnified by the high level of power in the hands of the bureaucrats. A closely related issue is the failure of the organisation to recognise technological and strategic experience overseas, and to transfer it to or translate it for application to New Zealand problems.

The paramount issue which does not appear as any particular management problem, although it is the background to all of them, is the failure of the whole regime to adequately set objectives and achieve them. The goals or principles are stated in a variety of different ways in the Act, and are best expressed in the long title (see Appendix J), but as Millar et al (1971) commented the management "falls short of the noble intentions". Bellamy (1975 b) has recognised the lack of long term objectives to guide the management of New Zealand's water resources in the water quality area, but a similar situation exists for virtually all use aspects. There appears to be in fact, a deterioration of achievement in progressing through the various levels or elements in the generalised decision-making process. A general goal has been set; objectives have not. Standards have been defined and for quality have been made the objectives as well, but these are widely regarded as inapplicable.

Until recently, there had been no hindsight review of any aspect of the system. This lack of monitoring, in the general as well as the technical sense, at all stages of the administrative and legislative process, has resulted in an eight year old system which already requires substantial overhaul.

Why has this come about? The problem can be traced to the initial stages of the law, during the committee stages in the House. The bill which became the principal Act was intended to be a statement of philosophy and to establish an administrative structure. The agencies established were then to consider what management strategies and procedures were appropriate, and to prepare a further, very much larger, comprehensive Act. In particular, control measures were to be the last thing implemented. Despite the logic of this

approach, and an assumption by the Interdepartmental Committee on water that this pattern would be followed on water that this pattern would be followed (Ministry of Works, 1965), control procedures were included. The reasons for this will probably never be established, but no doubt an admixture such as Sewell (op.cit.) describes plus a high level of government departmental input were the cause. Comments by Maass et al (1962), Kneese and Bower (1968) and Thomann (1972), however, indicate this too early introduction of control regimes is the rule rather than exception. Although the motivation of those promulgating the legislation cannot be questioned, the result is often as in this case, inhibiting rather than progressive.

The question also arises, as to whether the whole country was ready for such far-reaching changes in water administration. The variation in the degree of implementation would suggest it was not, and it is notable that the major progress appears to have been made in South Canterbury (the area whose farmers originally approached the Minister), and other allied water-short areas. It is a moot point whether coherent nationally applicable legislation would have developed if the first law had been established as planned. This may have given users in water-abundant regions time to accept a nationally defined regime. It appears that the regional diversity in water use management problems, as evidenced by the variable regional policies which have developed, may prelude the effective application of a national framework. Hellinga (1960) describes, for European countries, systems of regulations adapted to to regions within the countries. It seems that a system of such regulations or bylaws may be appropriate for the NZ regions.

This background, and the rapid changes introduced by the amendments, result in an overall impression of a system of considerable breadth, but lacking depth in many respects. Where issues are dealt with in detail,

this stems from theory, and does not represent the depth that can only develop from understanding of the management problems. Attempts to improve this have been made at policy or guideline level only, and as such have had little impact on the legal or operational fabric.

The theoretical framework has not been used as a basis for hypothesis testing per se in this study but a number of issues are made explicit by the model (Figure 5) and have been used as premises in evaluation. These have been examined in discussing the problems of the present management regime. The model identifies the flow of information from the biophysical system to the components of the socio-economic system; the linkages between these components; the hierarchy of the management agencies; and further interrogation relates the structures to the management problems (i.e. relates form to function).

As anticipated, many of the linkages have proved to be weak. The available information on the biophysical system status is virtually non-existent for some aspects of management. Connections between users and agencies are often tenuous. The present regions (and procedures) are not necessarily the most appropriate for effective management, and there continues to be lack of preparation for expanded duties.

Although the model details only the water use management subsystem, the close association of this with all water resource management has been mentioned. The increasing involvement of the water use management agencies in land use decisions, represents a link to overall resource management, and emphasises the nesting of water use management within the entire management and planning field. This expansion into land use and planning when the water use management procedures are not operating efficiently, epitomises the pattern of increasing breadth of function, rather than depth.

The role of the higher echelons (the national agencies and the Government) in monitoring the performance of the management regime is implicit in the model. The hindsight

review that has occurred, however, has been stimulated by the judicial bodies, not the national agency or the Government.

This study is intended to provide a complementary review from a different perspective.

10.2 Prospects for the Future

As demands for water for all uses increase, the greater becomes the need for management of water use. Many of the Boards see Regional Water Board functions overtaking the more traditional catchment authority role, and several felt that this had already occurred, at least at a public interest level. Obviously changes are occurring continually, both with shifts in public attitudes and values, and in response to many other influences. As indicated, a number of the management issues are under scrutiny at present, and in particular problems with financing may be resolved in the near future.

The future of the classification process remains in coubt. A very recent WRC circular to the RWBs (NWASCO 1975 g) states:

> Bearing this [the Supreme Court judgement] in mind the Council must now alter its approach to the control of water quality. To do this it has set up a special committee of Water Resources Council members to review the basis that should be adopted for the control of water quality and to report progress to the Council at not more than three monthly intervals.
>
> In the meantime the Council will continue to prepare classifications in areas where conflicts of water use are apparent as this procedure would appear to fit the new principles of classification.....
>
> In making its decision to confine its efforts to classifying only in problem areas, as an interim measure, the Council noted that the current problems had arisen mostly over argument about water that is remote and unthreatened by pollution, eg the coastal water off Fiordland, the water in the high country of the South Island and the waters of the Hauraki Gulf, to name a few.
>
> If pollution control is to be an aim of classification, then classifications should perhaps be confined to those areas subject to, or threatened by, pollution. This in in contrast to the Council's present policy of classifying all the surface water in the country but, in any event, if existing water

quality is to play such an important role then resources will dictate that specific problem areas should be concentrated on.

It should therefore be noted that the Council's programme of classification has been severely curtailed and until firm proposals for the future control of water quality are established the above-mentioned restricted type of classifying will continue.

With the cancellation of classifications the specified minimum water quality necessary for the protection of public uses of the water is removed. Boards can no longer rely on the minimum standards for determining the minimum conditions on a water right. Instead Boards may fix on water rights such terms as they may specify. No other statutory constraints exist and the particular conditions will depend on the merits of each case.

There are two major areas, however, which are likely to have profound effects on the future of water use management in New Zealand. These are the intended legislation review, and local government reorganisation.

Legislation Review

The proposal to review the water and soil legislation was first noted in the Authority annual report for 1973/1974 (NWASC Authority, 1974). The Authority reported being instructed to review the Acts (the 1967 Act, and the 1941 Soil Conservation and Rivers Control Act), with a view to updating amending and consolidating the existing legislation into one act. A committee was set up soon after this, and submissions invited. There has been criticism of the constitution of this committee by EDS (1975 p 89).

Of the 12 members of the committee, four are present or former members of the staff of the Water and Soil Division of the Ministry of Works and Development, six are present or former engineers or officers of catchment boards, and one is a former waterworks engineer. Only one is a solicitor.

There is no member representing the Town and Country Planning Appeal Board, the statutory appeal authority under the Act: nor are the disciplines of the biological sciences, planning or law adequately represented.

If a serious attempt is to be made to review the Water and Soil Conservation Act, there is a clear need to enlarge the membership of the review committee to include a sufficiently wide range of skills and experience to permit a fundamental and searching reappraisal of the aims and intentions of the Act to be made.

This was countered by the Director who stated: (Soil and Water, March 1975 b, p 23)

> of the 11-man committee two are qualified solicitors, and three have established careers in planning or biological science. The suggestion that the three disciplines of law, planning, and science are inadequately represented, is without foundation.

In fact, it is generally considered that in establishing this Committee, the Organisation has included many personnel outside its normal range of consultation, and that the presence on the committee of present and recently retired RWB executives is a major advance. The present chairman N.W. Collins, the Deputy-Director, sees the law review committee's function as creation or absorption of ideas, which are submitted to the Authority through the Councils, and in turn are advised to the Minister. Eventually, after consideration by the Minister and his colleagues, instructions will be issued to prepare a bill, which then follows the usual legislative procedure.

At the time of interview, he felt that a new law was still a "long way away", despite earlier hopes that the first reading of the Bill would be possible by September 1975 Soil and Water, September 1974 c). If change in classification procedure is, as the Director stated, to await the review, rapid change is unlikely. Collins also sees the review as a continuation in the process of consolidating the law, and aimed at clarification, simplification, and amendment as well as consolidation.

Reference has been made both to submissions to and recommendations of this committee, andit appears that there is wide consultation and acceptance of opinions outside the organisation. Several Board officers felt, however, that the committee was under pressure to complete the review, and that this could result in another unsatisfactory law. The Director indicated that the further consolidated law would be in force before the local government reorganisation, and did not consider that there would be conflicting provisions. Similar views were expressed by several Boards, although others felt that there would have to be careful consideration of the relation between the two laws, especially of financing provisions.

There appears to be two levels of approach possible for a nationally applied law. The law must either be extremely detailed, and thus account for the regional variation or complexity, or it must include clear statements of objectives and be sufficiently flexible to allow variable regional application. The present law lies somewhere between these two, and this ambivalence must be avoided if the public updated law is to be workable.

The Authority's orientation in the past has been to expansion of role, rather than consolidation. It is to be hoped that the law review committee, assisted by the operational experience of its members will not be pressured into broadening the water and soil management functions without substantially reviewing the present regime.

Local Government Reorganisation

As discussed earlier, reorganisation will vitally affect the operations and structure of the Regional Water Boards. The variety of problems likely to arise have been outlined, and the more active stance of the Catchment Authorities' Association has also been noted. The Local Government Commission Schemes are now awaited with some trepidation, at least in some regions. A Soil and Water editorial (1975 c) discusses the situation, following a recent Commission proposal:

> One of the early scheme proposals issued by the Local Government Commission appears to have more than justified [the catchment authorities' and Organisation's] concern. The Local Government Commission has proposed a central North Island region that would cut across four catchment authority/regional water board boundaries. Such a situation would effectively negate efforts to have soil conservation and water management activities incorporated as an integral part of effective regional planning and development.
> .....
> The central region proposal might be acceptable to many agencies responsible for a wide range of activities; the basis of this acceptance would be the principle of 'community of interest'. However, it could never be acceptable to local water and soil agencies whose regional structure, possibly the most logical, most developed, and most successful example in NZ is based on the principle of the 'whole catchment'. .....

> Previous schemes proposed under the 1974 Local Government Act have fitted in with the 'whole catchment' principle. Is it possible that the 'community of interest' principle could overshadow the other?.....
>
> The current proposals, though, go much further, and it seems that the commission must resolve two points. Firstly, should water and soil matters be an important integral part of regional planning and development? Secondly, can the well-tested (and proven?) 'whole catchment' principle be so thoroughly discarded, as evidenced by the proposed central North Island scheme? (p 3 & 4).

The provisional scheme recently released for Northland, however, accepts the 'whole catchment' principle, and places water and soil functions firmly in a Regional Council. The committee structure is also defined.

> Subject to section 73(2) of the Local Government Act 1974 the functions of the Northland Catchment Commission and Regional Water Board shall be transferred to the said council which, except as hereinafter provided, shall have all the rights, powers, duties, and obligations which as at the date of transfer of the said functions were conferred or imposed upon the Northland Catchment Commission and Regional Water Board by the Soil Conservation and Rivers Control Act 1941, the Water and Soil Conservation Act 1967, or any other enactment.
>
> The said council shall establish and maintain a committee to be known as "the Water and Soil Conservation Committee" (or by such other name as the said council may decide) and subject to section 60 of the Local Government Act 1974 may delegate to that committee such powers and duties as the said council thinks fit;
>
> The committee shall be appointed by the said council at its first meeting following the date of assumption of the functions of the Northland Catchment Commission and Regional Water Board and thereafter at its first meeting following each succeeding triennial general elelction and shall include the following members:
>
> (i) Such number of members of the said council as the said council may decide;
>
> (ii) If the said council so decides such other person or persons who, because of experience or by virtue of office, can, in the opinion of the said council, facilitate the work of the committee;
>
> (iii) One person appointed by the Minister of Works and Development;
>
> (iv) One person appointed by the Minister of Lands;
>
> (v) One person appointed by the Minister of Forests;

(vi) One person appointed by the Minister of Agriculture and Fisheries;

The need for rural emphasis to continue in membership of this committee is emphasised in the Explanatory Statement (Appendix I). In this, the National Authority's, and Catchment Associations submissions are summarised, and the Commission's favourable reactions to these expressed. It seems that the Commission accepts the water and soil functions as central to the regional concept, and will give these functions considerable weight in future schemes.

There does appear to be one ommission, again the question of control over the territorial sea. The proposed regions boundaries are mean high water mark, and although the Boards functions are absorbed, it is not clear whether the recently confirmed Board jurisdiction over coastal waters is included. No doubt this will be clarified or rectified in the objection phase, and the final scheme proposal.

Even if regional councils are established, there is much speculation as to the manner of integration of the Boards' functions into the new structure. Problems with finance are anticipated, unless the water and soil functions are still independently financed. The establishment of the water and soil agency as a committee of the council is confirmed by the Northland proposal, and many will be relieved to note the inclusion of the government departmental nominees. There is a fear that as the Regional Council members will not be elected just for their water and soil interests - and in fact, they are unlikely to be there on that basis - that there will be a loss of genuine interest by the decision makers. In particular, it is thought that there will be a preponderance of urban politicians on the Councils, simply by proportional representation, and this remoteness of contact with the rural scene and dominance by townspeople, will interfere with water and soil management functions. This has been forcibly expressed by the National Party spokesman on local Government, D.A. Highet. (NZ Parliamentary Debates, 1975). One Board officer considered this would be an

initial weakening, but strength in other areas such as planning would compensate. Again, this fear must be somewhat allayed by the Northland Proposal.

The future of the Board staff was of obvious interest to the officers interviewed, and mixed feelings were evident. Some felt the already established Board structures would give Board staff an early advantage; others saw substantial reorganisation with administrative or managerial expertise in the top-line positions, and thus a lowering of their own position. Several were philosophical about this, and felt it necessary for the 'greater good', and balanced against it the prospect of much wider employment opportunities.

The outdistrict provision was considered likely to bring financial and organisational difficulties, and one officer also wondered how the MOWD District based operational survey policy would operate with strong regional agencies.

A change of Government could also substantially alter the pattern of regional reorganisation, just as the proposal to delegate irrigation promotion to the regions was reversed by the previous change of administration.

If no alteration occurs, and the regional reorganisation does prove to be a disguised centralist move as Bagnall (1975) maintains, the prospect of absorption of the regional function by the national bureaucracy must be considered. Certainly the Labour government's irrigation policy is centralist in that the financing and implementation is strongly under central control. The Boards are naturally strong opponents of this, and feel that departmental take-over would destroy the close rapport established with the public at the regional level.

Hellinga (1960) points out that major difficulties can arise with management of local issues by central government, particularly with the necessarily lengthy times for decision making through the hierarchy. The Director maintained that this was unlikely, nor was the formation of a Super-Ministry, (such as the Department of the Environment in Britain) being sought by the Water and Soil Division of the MOWD, although other central agencies

were actively promoting it.

Whatever the outcome of reorganisation, there will definitely need to be a review of operational policy to cater for the changed structures, boundaries, and expanded functions. It is to be hoped that the rather poor record of the Organisation in supporting regional operations will be improved.

In conclusion, it can be seen that water use management in New Zealand has developed very rapidly. Although there are many problems, above all a failure to adequately translate general goals into specific objectives and provide the machinery to achieve these, a threshold of realisation of the issues has been reached by the agencies, if not the public. If this recognition stimulates effective action, it should be possible in this small country for the management organisations to work towards the general goal for management of water stated in the present law That is "to ensure that this national asset is available to meet as many demands as possible and is used to the best advantage of both the country and the region in which it exists in the course of nature".

APPENDIX A
Classification Classes and Standards
1963 Waters Pollution Regulations
Source: World Health Organisation, 1967.

I. Inland waters

Class	*Characteristics*	*Requirements for pollution prevention*
A	Water - supply waters in a controlled catchment area	Entry of sewage, industrial wastes or other polluting discharges prohibited
B	Water - supply waters in an uncontrolled catchment area-	Water temperature must not be raised above 75° F, or if natural temperature exceeds 70° F, must not be raised by more than 5° F; acidity or alkalinity must be kept within pH range 6.0 to 8.5; water must not be unpalatable, or contain toxic substances to an extent rendering it unsafe for human or farm animal consumption, nor show any conspicuous change in its natural colour; oxygen content must not be reduced to less than 6 ppm; coliform bacteria content must not consistently exceed 5000 per 100 ml; all discharges must be substantially free from suspended solids, grease and oil
C	Waters to which the public have ready access and used regularly for bathing	As for Class B, except that water must not contain substances toxic or harmful to humans, nor contain such substances to such an extent as to be unsafe for consumption by farm animals, and the figure for the coliform bacteria content is 1000 per 100 ml
D	Inland waters in classified areas not included in any of the foregoing classes	As for Class B, except that the reference to toxic substances rendering the water unsafe for human consumption is deleted, the minimum oxygen content is 5 ppm, and the reference to coliform bacteria is deleted

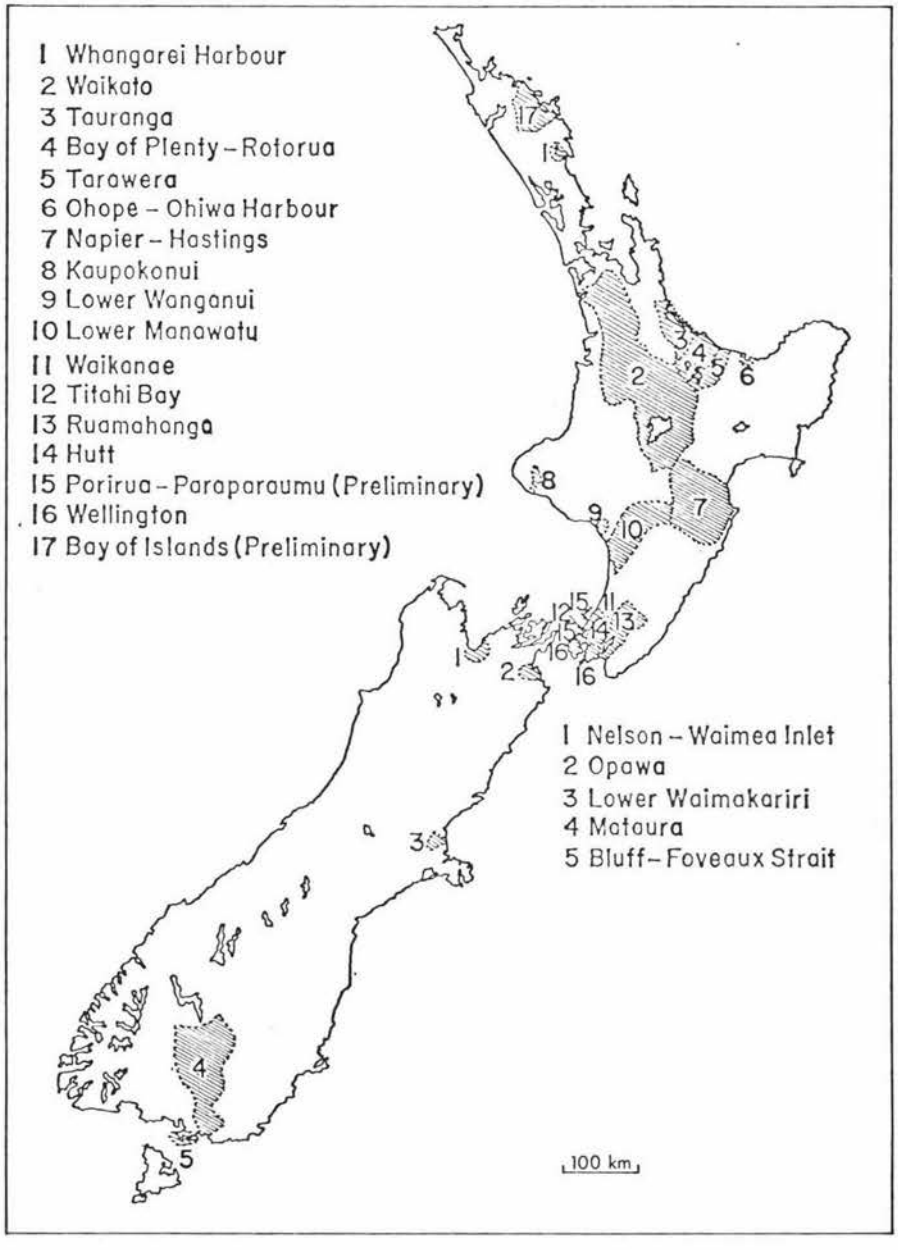
II. Coastal waters

Class	*Characteristics*	*Requirements for pollution prevention*
SA	Waters from which edible shellfish are regularly taken for human consumption	No destruction of normal aquatic life by reason of a concentration of toxic substances, a change in the pH-value, or a rise in temperature; no fouling of fishing grounds; coliform bacteria content must not consistently exceed 50 per 100 ml; natural colour of water must not be conspicuously affected, water must not give off an offensive smell; all discharges must be substantially free from suspended solids, grease and oil
SB	Waters to which the public have ready access and used regularly for bathing	As for Class SA, with the addition that substances toxic or harmful to humans are prohibited, and the maximum coliform bacteria content is 1000 per 100 ml
SC	Coastal waters to which the requirements listed apply	As for Class SA, with the addition that the water temperature must not be raised above 80° F and the pH value must be in the range 6 to 9, while the reference to coliform bacteria is deleted
SD	Coastal waters to which the requirements listed apply	As for Class SA, but the references to coliform bacteria and to the colour and smell of the water are deleted

APPENDIX B

Classifications and Permits Granted under Waters Pollution Regulations

Source: NWASC Authority Reports to the House of Representatives. Appendix to the Journals of the House of Representatives 1971, 1972.



Applications for Permits to Discharge Wastes During Year Ended 31 March 1971

Classification	Full Permits Issued	Temporary Permits Issued	Permits Cancelled
Whangarei Harbour	2	6	..
Waikato River	15	28	19
Tauranga Harbour	2	8	..
Rotorua	7	30	2
Tarawera River	..	1	..
Ohope/Ohiwa Harbour	..	7	..
Lower Manawatu River	5	9	1
Lower Wanganui River	1	3	..
Kaupokonui River	1	6	20
Hawke's Bay	..	29	3
Ruamahanga River	3	14	4
Waikanae River	..	1	..
Titahi Bay	..	2	..
Hutt River	1	4	7
Waimea Estuary	1	11	2
Opawa River	..	11	2
Lower Waimakariri River	..	3	..
Mataura River	1	22	..
Bluff Harbour/Foveaux Strait	1	..	..
	40	195	60

Applications for Permits to Discharge Wastes During Year Ended 31 March 1972

Classification	Full Permits Issued	Temporary Permits Issued	Permits Cancelled	Total
North Island				
Bay of Islands	Preliminary classification			
Whangarei	2	2	..	4
Waikato	94	373	33	500
Tauranga	2	8	..	10
Rotorua	2	15	4	21
Tarawera	..	3	..	3
Ohiwa	..	..	..	..
Hawke's Bay	1	30	3	34
Kaupokonui	..	14	33	47
Wanganui	..	2	..	2
Manawatu	..	7	1	8
Ruamahunga	1	7	7	15
Hutt	31	22	11	64
Waikanae	..	..	..	..
Titahi Bay	..	1	..	1
Wellington	Final classification subject to appeals.			
Porirua-Paraparaumu ..	Preliminary classification.			
	133	484	92	709
South Island				
Waimea Estuary	..	13	1	14
Opawa	..	4	2	6
Waimakariri	..	3	10	13
Mataura	1	29	..	30
Foveaux Strait	4	..	..	4
	5	49	13	67
North Island	133	484	92	709
South Island	5	49	13	67
Total	138	533	105	776

APPENDIX C

Committees of the Organisation and their Activities in 1974

Source: NWASC Authority Annual Report to the House of Representatives, for year ended 31st March 1975.
Appendix to the Journals of the House of Representatives, 1975, DIA

Water Resources Council Committees

Dairy Wastes: This committee continued to report frequently to the Water Resources Council.

Meat Wastes: This committee was reconstituted in November 1974 with new terms of reference and membership. The committee made a tour of three freezing works in February 1975.

Piggery Wastes: This committee continued to meet and considered research programmes on the development of a bio-gas system and on the disposal of pig-farm effluents.

Synthetic Detergents: This committee did not meet during the year but continued in existence to oversee the progress by manufacturers in converting products to comply with the bio-degradibility standard sought by the committee.

Irrigation and Rural Water Supply: This committee met regularly and made recommendations to the Water Resources Council on irrigation and rural water-supply proposals. The committee also considered policy statements for the initiation of irrigation schemes and on-farm development procedures. The committee visited Nelson, Marlborough and Canterbury and compiled a national priority list for irrigation and development. It investigated in detail the new policy for rural water supply schemes.

Water Quality Research: This committee continued to meet in November 1974 reported to the Water Resources Council on the research needs and priorities in water quality.

Special Committee on Meat Wastes Treatment: The Water Resources Council established this committee to investigate and assess the Ecotech system in connection with treatment of meat wastes.

Lake Rotorua Interdepartmental Committee: This committee was formed in February 1975 to co-ordinate and supervise further research and investigations at Lake Rotorua, with initial emphasis in rural areas, and to report to the Bay Of Plenty Regional Water Board and the Water Resources Council.

National Authority Committee
Legislation Review: This committee held its inaugural meeting in April 1974 and relayed its recommendations for revision and consolidation of water and soil legislation to the Authority throughout the year.

APPENDIX D

WATER RESOURCES COUNCIL
CANCELLATION OF CLASSIFICATIONS

NOTICE IS HEREBY GIVEN pursuant to Section 261A of the Water and Soil Conservation Act 1967 that the Water Resources Council has cancelled the following final and preliminary classifications and reclassifications of New Zealand's natural waters with effect from 14th August, 1975.

FINAL CLASSIFICATIONS:
Porirua — Paraparaumu — Publicly notified on 28th October, 1972.

FINAL RECLASSIFICATIONS:
Tauranga Harbour — Publicly notified on 16th March, 1974.

PRELIMINARY CLASSIFICATIONS:
Auckland — publicly notified on 6th July, 1974.
Hauraki — publicly notified on 8th June, 1974.
Bay of Plenty — publicly notified on 29th March, 1975.
Wellington — publicly notified on 8th December, 1973.
North Canterbury — publicly notified on 13th April, 1974.
Otago — publicly notified on 22nd February, 1975.

A. R. CROASDALE,
Secretary,
Water Resources Council.
18th August, 1975.

2244

Source: 'The Press' Christchurch, 18 August 1975.

APPENDIX E

Guide to Water and Soil Conservation Administration in New Zealand - Principal Agencies Concerned with Administration

Source: NZ Committee for Water Pollution Research Newsletter No. 2 - August 1973

AGENCY	Principal officers concerned with NW & SCO Administration	Main functions in respect to NW & SCO	Groups, formal & Informal, for co-ordination of activities in specific technical fields
Minister of the Environment		Over-riding functions for co-ordination, where there are significant environmental effects.	(Note: bodies listed below are mainly formal continuing bodies; others exist, and there is scope for joint action with professional bodies as warranted)
National Agencies			
Ministry of Works: Water & Soil Divn.	Director Asst. Director (Research) Chief Engineer Chief Soil Conservator Chief Scientific Hydrologist	General responsibility for administration of the Water and Soil Conservation Act.	M.O.W. Working Group on Water Quality.
Civil Engineering Division	Chief Civil Engineer Chief Public Health Engineer	Engineering advisory service on waste treatment and plant performance. Special investigations into treatment processes.	

AGENCY	Principal officers concerned with NW & SCO Administration	Main functions in respect to NW & SCO	Groups, formal & informal, for co-ordination of activities in specific technical fields
Department of Health:			
Public Health Divn.	Asst. Director, Environmental Health Branch	Represented on Water Resources Council. Provision of field services to Water & Soil Divn. for classification of natural waters as well as to Regional Water Boards as an interim service pending the handing of this work to such Boards.	
D.S. & I.R. :			
Chemistry Divn. Ecology Divn. Geological Survey Inst. of Nuclear Sciences Oceanographic Institute Soil Bureau	Divisional Directors	Research and consultation in various fields	Officials Committee on Eutrophication Research Associations : Meat Ind. Research Institute Dairy Research Institute Wool Research Institute
Department of Agriculture:	Director-General	Consultation in various fields	
N.Z. Forest Service:	Director-General	Consultation in various fields	
Catchment Authorities Assn. :	President & Secretary	Representation of Authorities' joint views	Catchment Authorities Assn Executive Engineering and other technical or administrative staff groups

AGENCY	Principal officers concerned with NW & SCO Administration	Main functions in respect to NW & SCO	Groups, formal & Informal, for co-ordination of activities in specific technical fields
Municipal Assn :	As above	As above	As above
Counties Assn :	As above	As above	As above
Local Agencies :			
Regional Water Boards (generally, Catchment Authorities)	Generally - Chief Engineer Chief Soil Conservator Secretary	Administration within a district of all statutory provisions	Informal associations of chief executives of authorities
Municipalities and Counties		Co-operation with administrative activities of catchment authorities who may delegate certain responsibilities	A.R.A. Research Advisory Sub-committee

APPENDIX F

Laws Controlling Water Pollution 1975

After: Commission for the Environment, 1975

Legislation	Administering Department	Licensing or Registration	Offences and Penalties	Appeal or objection Provisions
Continental Shelf Act 1964	Foreign Affairs	✓	✓	
Counties Act 1956	Internal Affairs		✓	
Fisheries Act 1908	Agriculture and Fisheries		✓	
Harbours Act 1950	Transport		✓	
Health Act 1956	Health		✓	
Marine Pollution Act 1974	Transport	✓	✓	
Marine Reserves Act 1971	Agriculture and Fisheries		✓	
Municipal Corporations Act 1954	Internal Affairs		✓	
Police Offences Act 1927	Justice		✓	
Water & Soil Conservation Act 1967	Works & Development	✓	✓	✓
Whaling Industry Act 1935	Agriculture and Fisheries		✓	
Wildlife Act 1953	Internal Affairs		✓	

Summaries of Relevant Acts

Continental Shelf Act, 1964

This Act makes provision for the control of the exploration and exploitation of the mineral, living and non-living resources of the continental shelf (which is defined as the seabed and subsoil of areas adjacent to the outside the territorial limits and generally (but not always) less than 200 metres below the sea's surface). Regulations may control water pollution which is harmful to the living resources of the sea and natural resources of the continental shelf (which in this case includes areas inside the territorial limit). Such control is effected by ensuring that steps are taken, prior to or during exploitation, to prevent water pollution (eg. establishing safety zones around installations, with appropriate measures, applying in the zones). A fine of up to $1,000 may be imposed.

Counties Act, 1956

This Act deals broadly with the constitution of County Councils and the general administration of County Boroughs and County Towns (which will in the future be subject to reorganisation under the Local Government Act 1974). With regard to water pollution. This Act regulates the discharge by Councils of silt, refuse and other wastes into harbours, and provides penalties for the pollution of waterworks and watercourses. Section 311 lists a number of cases likely to cause a nuisance or be dangerous to public health, several of these relating to water pollution (with a maximum penalty of $40 and up to $10 for each day the offence continues.) The Counties Amendment Act 1961 provides for councils to make by-laws for the prevention of pollution of water races, as well as providing a general prohibition on such pollution.

Penalty: A fine of up to $200, and up to $20 for each day an offence continues. Also, a person may be ordered to reimburse the costs of the council in repairing any damage done. For a breach of by-laws, a fine of up to $100 and up to $10/day for a continuing offence.

Administered by County Town Committees, County Borough Councils and County Councils as well as Department of Internal Affairs.

Fisheries Act, 1908

This Act deals with the licensing and regulation of sea and fresh water fishing. A 1970 amendment to the Act provides for regulations to be made prohibiting the pollution of any rivers, streams or waters, where it may be harmful to fish. Penalty: A fine of up to $2,000, and up to $20 for each day the offence continues.

Harbours Act, 1950

This Act provides for the setting up of Harbour Boards, which are given wide powers regarding harbour administration, including the power to make by-laws prohibiting polluting discharges from tanks, vessels, etc, into harbours (Section 232(36)).

Offences provided by the Act include depositing rubbish of various sorts into or onto harbours, tidal waters, navigable lakes or rivers, sea below low-water mark, and tidal land, if this affects navigation or creates a nuisance on tidal lands (Section 242). It is also an offence to pollute any harbour with sawdust, sawmill refuse or flasmill refuse. Penalty for a breach of a by-law, a fine of up to $100, plus up to $10 for each day an offence continues (and a Board may obtain an injunction to restrain further continuance of the offence). The general penalty for an offence is a fine of up to $200, and in the cases cited above an offender may also be required to pay the expense of removal of offending substances.

Health Act, 1956

This Act is the main stature concerned with public health, and has a number of provisions relating to water pollution. Local authorities are required to provide sanitary works, which includes sewerage works and water-works. Section 29 defines a number of nuisance offences, including permitting or causing pools, watercourses, gutters etc., to be offensive or likely to be injurous to health, and the placing, constructing or maintaining of water supply sources in a condition liable to contamination.

It is an offence to pollute directly or indirectly water supplies or watercourses in such a way as to make the water dangerous to health, or offensive, or unfit for domestic use. Such watercourses and water supplies are the responsibility of the local territorial authorities, which may be required by the Medical Officer of Health to cease supply if the water is so polluted as to be dangerous to health.

Section 64 authorises local authorities to make by-laws for the general maintenance of public helath, and in relation to water pollution, for :

- regulating drainage and the collection and disposal of sewage, and describing conditions to be observed in the construction of septic tanks, sanitary appliances, etc.
- the protection of any water supply

Section 117 provides for regulations to be made to give effect to the provisions of the Act, and in particular for :

- preventing the pollution of the waters of any harbour with offensive matter from any ship
- preventing the pollution, so as to be injurious to health, of any river, stream, watercourse or lake, whether used as a source of water supply or not.

Penalties: A fine of up to $200 for offences relating to the pollution of water supplies. For a breach of by-laws, a fine of up to $100, plus up to $10/day for a continuing offence.

Marine Reserves Act, 1971

This Act provides for the establishment and management of marine reserves. It is an offence to discharge without authorisation any toxic or polluting substance injurious to plant or animal life in a marine reserve. Penalty: Imprisonment for a term of up to 3 months and/or a fine of up to $500, plus up to $10 for every day the offence continues. In addition, an offencer is liable for monetary damages for the value of damage to the reserve or its marine life.

Municipal Corporations Act, 1954

This Act deals broadly with the constitution of cities, boroughs and town districts (now subject to the Local Government Act 1974). It is an offence for any Council to drain sewage, refuse or wastes into a harbour without the prior permission of the relevant Harbour Board. Further, it is an offence to connect a private drain to a public drain or watercourse without Council authorisation. It is an offence to bathe in or discharge any waste or polluting substance into Council waterworks.

Section 293 lists a number of cases likely to cause a nuisance or be dangerous to public health, several of these relating to water pollution. Penalty: A fine up to $200, and up to $20 for each day an offence continues. In addition, an offender may also be required to reimburse the council for the cost of rectifying any damage done.

Police Offences Act, 1923

This deals with a wide range of illegal activities. It provides penalties for polluting rivers, streams or other water with dead animal carcases or other offensive matter. Penalty: A fine of up to $50. Where the water involved is used for human consumption, the penalty is a fine of up to $500 and/or imprisonment for a term of up to 3 months.

Whaling Industry Act, 1935

This Act was passed to give effect to an International Convention for the Regulation of Whaling, and other related purposes. It is an offence to allow water pollution arising from discharges of noxious matter from slaughtered whales, whale ships or processing factories within

territorial water. A fine of up to $100 may be imposed.

Wildlife Act, 1953

This Act primarily deals with the protection and control of wildlife and game. The Act provides for regulations to be made imposing conditions by proclamation prohibiting water pollution in specified wildlife sanctuaries. A 1972 amendment widened that power to include the making of regulations to control any water pollution injurious to wildlife or wildlife food or habitats. Penalty: A fine of up to $2,000, and in the case of a continuing offence, up to $20 for each day the offence continues.

APPENDIX G

Regional Water Board Questionnaire

The following was conducted as an open discussion, with the points and questions raised as prompts.

1. Introduction Initial discussion of basis of thesis, and definition of topic in relation to Regional Water Board functions.
2. What has been the major difficulty in operating the 1967 Act and Amendments? Depending on response moved to:
3. Procedures

   How does RWB Function. Board Committees.

   Who Services the Board.

   Trubunals: Number per year; Composition;

   Who services them

   Appeals: Numbers.

   Rights Notices of Existing Use

   How many received

   How many expired/renewed/covered by granted rights.

   What proportion of uses existing at that time.

   How much effort - publicity etc.

   Granted Rights

   Fee.

   Advertising - how often

   Processing procedures/farms etc.

   Numbers Granted (in later interviews rough totals only requested)

   Terms and Conditions

   Inspections

   Renewals

   Transfers

   Filing - Computer/Board System

   Strategies

   Stock Use

   Large stock schemes (Rural water supply)

   High intensity stock schemes.

   Cowshed/Piggery Uses

Dams

Herbicides

4. Water Quality

State of Classification

Is quality control a major issue

What aspects are important

How do your operate on discharges

i) Major Industry

ii) Sewage - Oxidation ponds?

iii) Farm wastes - advice Dairy Division of MAF help?

Do you see setting effluent standards as a major function?

How important will sampling and testing be.

Facilities Laboratory - wervices

Cawthron

Role of Instrumentation

Classification Opinion

Should there be more emphasis on existing quality)

Do you think the Organisation has been slow with advice, guidelines etc.

5. Water Quantity

Investigation Have you a hydrological team MOWD assistance, in hydrology?

Equipment

Has ther been a change of emphasis?

e.g. to low flows.

Water Allocation Planning What stage?

Operational Surveys Are you aware of new policy. Will it be good or bad. Any fear of loss of regional priorities.

6. Underground Water

Level of investigation/knowledge By-laws.

7. Irrigation and Rural Water Supply

Involvement/Success of Present Policy.

8. Recreation, Fisheries etc.

9. Administration

Structure Organisation/Board/Commissions

Staffing Difficulties
Numbers/Jobs/Designations
Qualifications
Time spent
Staff organisation

Finance Where from?
How much?
Administrative Grant?
WAP grants how much, for what?
Enough?

Relationships

WASCO Good or Bad
Is help forthcoming
Finance
Are regional problems appreciated.
Organisation v. Water and Soil Division

MOWD Districts Hydrological Survey
DWASO

Other Local Bodies

Pressure Groups

Acclimatisation Societies

Catchment Authorities Association

Internal Future - proportion of work

10. Land Use Involved in decisions?

11. Regional Reorganisation
What's likely in region
How will Board operate
Does the Catchment district (Water region) have to remain intact? Why?
What will happen to staff?
Would you rather operate as a technical directorate?

12. Future Prospects
What of new financing proposals.
Law review committee.

APPENDIX H

Objections to Auckland Preliminary Water Classification - ARA

Source: Auckland Regional Authority, August 1974

Part I : Basic Objections

The Authority objects to:

1. The lack of any explanatory material or stated policy regarding:

(i) the reasoning on which the classification is founded and the information which it is based. In the absence of any statement of the information or reasoning on which the classification is based, there is no way of discovering the manner or extent to which the classification represents the public interest. Nor is it possible to assess the weight that should be attributed to the classification in various circumstances. For example when pressures arise for changes to accommodate changing community needs, it will not be possible to ascertain whether these new demands should be accommodated, or whether the classification protects some other unstated interest that should prevail.

(ii) the role of the classification in the process of water resource planning and management. The role of the classification in water quality management is not clear. There is a great danger that classification will become the sole test of acceptability of any proposal affecting water resources - but a proposal whilst not infringing the classification, may still conflict with community needs and values in other respects especially whilst the classification is a statement of minimum quality. For example a water resource may be of relatively low water quality but still greatly valued as a wildlife habitat or a feature of scientific interest. A proposal affecting it may not infringe the classification but may be unacceptable because it would be to the detriment of those other qualities which are valued by the community. If to protect such situations the Regional Water Board is forced as a general rule to adopt standards higher than the classification then the value of the classification is

reduced and its provisions will be subject to abuse.

(iii) the relationship of the classification to community needs and values. The categories used to classify the region's water resources bear no clear relationship to the ways in which the regional community values that resource. The classification categories are limited in number, and arbitrary in the parameters of water quality that they establish.

Different parts of the waters of the region may be used and valued in a wide variety of ways - as water for human consumption or for industrial use; as a recreational feature, to look at from a distance or appreciate the clarity of at close quarters; as a recreation feature to swim in, sail over, dive under; as a habitat of fish, fowl and plant; as a resource constantly renewed by tides and ocean currents which can dilute and carry away liquid wastes.

The need to plan and manage the water resources of the region stem from wide ranging needs and values such as these, and if the waters are to be classified it should be interms that bear a perceivable relationship to these needs and values.

2. The preliminary classification as a statement of <u>minimum</u> water quality which represents neither existing water quality, desired future condition nor (in some cases) an achievable future condition.

As a statement of minimum quality the classification appears to be neither a statement of existing water quality, nor is it a statement of goals toward the achievement of which water resource management should be directed. It is possible that existing water resources within the region could be substantially degraded whilst meeting the classification.

There is a substantial amount of knowledge and information within the region and within the Authority in particular, into which the Water Resources Council is welcome to enquire, which could be applied to refinement and improvement of water resource planning in the Auckland region. The Authority would be happy to co-

operate with, and assist the Council in applying this knowlege and in the preparation of a revised classification.

As Regards the Remedy Sought by the Authority:

At the hearing of submissions the bases of the Authority's objections will be explained more fully and an outline given regarding alternative ways in which classification could be carried out. The Authority's presentation in support of its request that the preliminary classification be deferred will also develop the following arguments:-

1. That water resource planning and management should be a problem solving and goal oriented task. The basic approach should be one of seeking to maintain or improve water quality except where a case for degrading existing quality can be demonstrated to be in the public interest.

2. That for a classification to be effectively and efficiently administered, it must be supported by:-

(i) An explanation of the philosophy underlying the planning and management of water resources.

(ii) A release of the information on which the classification is based and an explanation of the reasons for the way in which each locality is classified.

(iii) A statement of the way in which the classification will be applied, including advice as to the circumstances in which local variations to the classification will be initiated and the term that may elapse before the classification is reviewed.

3. That the classification should be a dual one - firstly describing existing water quality, and secondly indicating the desired water quality towards the maintenance or achievement of which management will be directed.

4. That in designing the classification there should be adequate opportunities for the public at large, interested groups and public bodies to contribute information and to state their views as to what represents the public interest regarding future quality and use of water resources.

5. That the mode of classification should be flexible and that this might be achieved by providing for varying combinations of water quality parameters to be applied in different localities depending on the nature of water quality problems and the range of present and potential uses.

APPENDIX I

Northland Region - Provisional Scheme

Source: Local Government Commission, 1975

EXPLANATORY STATEMENT

6.3 Water and Soil Conservation

In considering the relationship of water and soil management to regional government, the Commission has studied certain statements by the two national authorities most closely concerned - the National Water and Soil Conservation Authority and the New Zealand Catchment Authorities' Association.

The National Water and Soil Conservation Organisation "firmly supports moves towards the efficient consolidated local government for which the Local Government Act 1974 makes provision". The Organisation has stated further that fully effective regional government - which must avoid all fragmented or conflicting development and ensure efficient use of resources - must have water and soil management as an integral part of its functions.

The New Zealand Catchment Authorities' Association-

(a) Agrees in principle with the broad concept of regional government because of the improvements it should achieve both in the co-ordination and in the efficiency of regional functions;

(b) Favours the establishment of regional councils because they would provide for representation on an elective basis, and for independent regional bodies. Further to that point, the Association has expressed the belief that the maintenance of an independent stance in regional matters, free from direct influences either from territorial authorities or from central government, is essential for the effective functioning of regional government in general and of catchment work in particular.

In expressing the above views, the Catchment Authorit-

ies' Association has made it clear that they are subject to -

(i) The preservation of the "whole catchment" principle for the management and control of water and soil resources - this leading to the view that administrative regions should be chosen so as to take full advantage of the regional organisations already provided by catchment authorities;

(ii) The preservation within the regional council of a forum for the exchange of ideas between central and local government. In this regard the Association has observed that present Government appointees to catchment authorities make available a breadth of knowledge and administrative ability, give invaluable service to those authorities, and at the same time form an essential link between central and local government. This consideration has led the Association to state its belief that in any regional council there should be a special-function committee for water and soil conservation, and that this committee should include representatives of the central government agencies most concerned with the operation of water and soil legislation. The Association has further stated that this special-function committee must have direct access to the National Water and Soil Conservation Authority and its Council.

The Commission notes the constructive views expressed by the National Water and Soil Conservation Organisation and by the Catchment Authorities' Association, which endorse the Commission's opinion that water and soil management should be a function of regional government.

The Commission is satisfied also that the function of water and soil management should be exercised by a regional council, and that regional boundaries should be determined with due regard to the location of watersheds. The Commission notes, however, that in parts of New Zealand the location of regional boundaries in conformity with catchment authority boundaries may be deemed inappropriate.

In this event "out-districts" for water and soil management can readily be established pursuant to the provisions of section 100 of the Act.....

The Catchment Commission has expressed a strong preference for the establishment of an elected regional council in Northland. As such a council is now proposed, and as the Catchment Commission is already functioning e efficiently as a regional body, it is logical to expect it to function no less efficiently as an arm of regional government - and indeed to be strengthened and complemented in that action by its intimate association with the regional planning operations of the regional council.

The Commission has provided for a specially structured committee to be established, including appointees of the Ministry of Works and Development, N.Z. Forest Service, Lands and Survey Department and the Agriculture and Fisheries Department. This would continue the representation those State Departments at present have on the Northland Catchment Commission. It has been the Commission's experience from meeting with catchment authorities that they accept and indeed value such representation, both for the expertise the individual members are able to contribute and for the means of liaison thus provided with related State agencies. At the same time, the scheme allows the regional council wide discretion in the appointment of other persons - either members or non-members of the council itself - to the committee. It would be reasonable to expect that, in order to preserve adequate rural participation in the control and management of matters concerning soil conservation, river control, flood prevention and drainage work, the selection of members would take due regard of the rural sector.

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