

EVOLUTION OF THE INSTITUTIONAL STRUCTURE OF
SCOTTISH WATER MANAGEMENT, 1929 - 1977.

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This thesis was composed by me and is based
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ABSTRACT

This thesis presents an account of the evolution of laws, policies and the administrative agencies concerned with water management in Scotland since the 1930s. A heavy emphasis on matters of water supply and water quality reflects the approach to water resources adopted in Scotland although matters of land drainage, fisheries and further aspects of water management are briefly considered to highlight the contrast between conditions in Scotland and those in England and Wales. The study is mainly based on literary sources of an official nature but also draws on the writings of contemporary water managers and others.

An interpretation is offered under three main headings, viz.: the allocation of functions within and between agencies; the criteria used to define administrative areas; and factors influencing the nature and pace of change. The externalities of securing water supplies in Scotland have not engendered a holistic approach to the management of river basins, in marked contrast to experience South of the Border.

Differences between the types of authority which were first allocated tasks of water management are shown to have lain at the root of many of the problems and institutional responses considered. A steady growth in the influence of central government is traced and the emergence of the Scottish Development Department in 1962 identified as a key factor in explaining recent changes in institutional structure. Central government's role, however, is also seen to have been peculiarly constrained because of the unique constitutional position of the Scottish Office.

A desire to maximise the representation of existing institutionalised interest groups has consistently shaped the areal pattern of administrative agencies. An inappropriate pattern of agencies led to problems of water supply and of sewage treatment in a country where resources can truly be enumerated in terms of 'a measure of plenty' but where progress towards cleaner water has been slow. Wider social and economic goals, however, gave rise to the pattern that finally emerged.

Changes have occurred in an incremental and disjointed fashion. Differences over objectives, deficiencies in the availability of information and a shortage of skilled managers preconditioned a reliance on precedent and produced small increments of change for much of the period under consideration except when 'disjoints' occurred through the adoption of policies already established in England and Wales and through the addition of the Scottish Development Department to the scene.

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CHAPTER ONE

Introduction

The evolution of arrangements for the management of water resources in Scotland is a field of study more generally described by O'Riordan in the following terms: ¹

'One of the least touched upon, but possibly one of the most fundamental research needs in resource management is the analysis of how institutional arrangements are formed, and how they evolve in response to changing needs and the existence of internal and external stress'

Institutional changes have been made to meet mounting water problems in many parts of the world in recent years. Several commentators have followed developments in England and Wales with a view to experience there contributing to the nature of changes elsewhere, particularly in North America. Scottish experience, by contrast, has received relatively little attention. (See Chapter 2 below).

A general growth of public interest in environmental issues in the late 1960s and early 1970s found expression in geography through the appearance of several texts on resources management and conservation (Arvill 1967,² Burton and Kates 1965,³ Chisholm 1970,⁴ Chorley 1969,⁵ O'Riordan 1971⁶ and 1976).⁷ Different groups of geographers saw the challenge of problems of resource management in different ways: some (for example, Gregory 1974)⁸ saw scope for a drawing together of what had tended to become disparate strands of specialists within geography by focussing upon real practical problems; others saw a contribution stemming from the application of recently developed modelling techniques (for example, Birch 1974⁹ and Wilson 1974);¹⁰ whilst more generally and in the context of the professional standing of

geographers themselves, Coppock called for greater awareness of the challenges, and opportunities that arose through growing public concern with problems of traditional interest in 1974.¹¹ The necessary skills and concepts were available to contribute effectively to public policy and a changing role for geographical research was appropriate. There had been a lack of concern with management. Geographers had not generally sought to ask questions about the management of resources and had been concerned with statistical tendencies rather than with individual decisions. Historical geographers had paid more attention to decision-making than their colleagues studying the contemporary scene, an unfortunate development since:

"it is not impossible for a geographer to consider the use of resources without examining official policies and policy measures".¹²

The structure of this study

In this vein, this study is concerned with the evolution of policies with respect to the institutional arrangements for water management in Scotland. In this chapter the nature of institutional arrangements is explored further and several themes are identified for discussion later in the light of Scottish developments. This is followed by a brief review of previous work on water management in Great Britain and of some of the concepts of water resource studies considered important elsewhere. As a further preliminary to the evolution of Scottish institutions, Chapter 3 contains a brief description of water resources and the demands made upon them.

The following six chapters are devoted to water supply: Chapters 4 and 5 focus on the development of the institutional structure and policies at the national level since 1929, aspects of local administration are considered in Chapter 6, whilst Chapter 7 is a case study of difficulties encountered in arranging supplies for Ayrshire. Water resources planning in Scotland is considered in Chapter 8 with particular reference to the future supply of Central Scotland.

An attempt has been made to pass from a consideration of the whole to the parts and this is sustained in the following three chapters dealing with water quality. In Chapters 9 and 10 institutions and policies are discussed whilst local experience, particularly in the Forth Basin and the River Don in Aberdeenshire, is the subject of Chapter 11. The 'whole' in many parts of the world would include several other aspects of water management and the generation of hydro-electricity, fisheries, land drainage, flood control and the recreational use of reservoirs are the subject of Chapter 12. These have been less important in shaping the form of institutions and policies than in England and Wales.

It is to such comparisons that attention turns in Chapter 13 in the traditional comparative frame of geographical analysis. As mentioned above, the English regional water authorities have been seen as a model for the rest of the world, yet they have seen no mirror image in the neighbouring kingdom. The important thing about the Scots, it is often said, is that they are not English and the simple question: why does the Scottish transform mechanism differ from the English is posed by way of an introduction to the first part of

conclusions as to its nature.

Institutional Structures for Public Services

The importance of institutional arrangements in frustrating or realising the aspirations of society is increasingly being recognised and the study of organisations is a growing field of interest generally so that several texts are now available dealing with aspects of public administration in the United Kingdom. (For example, Baker 1972;¹³ Brown 1972;¹⁴ Castles, Murray and Potter, 1971;¹⁵ Dansie, 1973;¹⁶ Salaman and Thompson, 1973;¹⁷ Self, 1972;¹⁸ Smith, 1976;¹⁹ Stanyer, 1977;²⁰ Stanyer and Smith, 1976).²¹

Much of the theory of organisations is concerned with questions of goals, control and leadership or job satisfaction, employee productivity and participation, clearly reflecting its origins in American business studies. Water management is, by and large, the responsibility of public authorities and there are important contrasts between these and private concerns, the origin of many contributions to the literature. As a general rule, the equivalent of demand for public services is determined by statute as well as the qualities of the things demanded; public bodies are expected to pursue aims determined by people other than themselves; and public services are generally provided with due regard to the principle of equality of treatment to all comers.

Only the very smallest states do not find it necessary to adopt extensive decentralised machinery of government and this added to

national insistence on minimum standards and uniformity in the provision of services over the whole country on the one hand, and a need to manage the level of public expenditure both at central and local levels on the other, have given rise to a complicated relationship between central and local authorities. Control is exerted by the former over the latter in several ways: for example through the provision of grants or by regulation of the public sector borrowing requirement. Indeed, a formidable list of mechanisms exists: general statutory provisions; circulars; confirmatory and appellate functions; adjudicatory functions; inspection; default powers; audit; control over the appointment, dismissal, discipline, pay and conditions of service of some staff; and control over local Bills.²²

The potential for central control of local activity is clearly very great, but several authors have pointed out that the listing of mechanisms does not describe how a machine works. Although central government has a wide range of controls, in practice the relationship is one of complex interaction both administratively and politically. After drawing attention to the fact that too little is known about controls in practice and that the available evidence suggests that there is considerable variation in both central governments willingness to exert control and in local authorities' willingness to accept, Rhodes concludes: " 'Control' appears to be a completely inappropriate description of the relationship".²³ The changing relationship between central authority and local authorities forms a major theme in the study of the institutional arrangements for water management.

A further complicating factor when dealing with Scotland is that country's unique constitutional position. The distinctive institutions, in the executive, legislative and judicial branches of government, added to a host of social and cultural differences, amounts to a separate Scottish political system.²⁴ Mackintosh has suggested that while government on the area principle for Scotland has established closer connections between central and local government and increased the former's knowledge of local conditions, there are pressures preventing this connection and knowledge bearing full fruit in the development of special administrative procedures for application to Scotland only, not least those tending to produce conformity between the methods of Whitehall and St. Andrews House.²⁵ In Mackintosh's view neither would it be fair nor would it be possible within the British political system for civil servants to accept or exercise openly any discretion leading to differences in policy without reference to a body of elected representatives, and he was therefore an ardent proponent of some measure of devolution from Parliament to an elected Scottish Assembly. Thus, in the particular context of a study of Scotland, the configuration of central - local relations is complicated by the existence of uncertainty as to exactly where the centre is. In some ways it is in London but the centre is often not Parliament but the Scottish Office to which the implementation and review of long-standing policies has been devolved. One has therefore to contend not only with a complicated exchange of influence between the Scottish centre and local authorities but also a similar second stage of exchange between Edinburgh and London.

Institutional Arrangements for Water Management

The matter of central - local relations is, then, a theme of interest that can be discerned even before the particular requirements of managing water resources are considered. A very large literature concerning the latter has emerged over the last two decades, particularly from North American sources.

Mitchell has drawn together a collection of papers designed to examine the question: what is the impact of institutional arrangements upon actors (their perceptions, attitudes, motivations) and their behaviour (decision and policy making) in the water management process?²⁶ In this, his own paper is devoted to assessing differing perceptions as to what is meant by 'institutional arrangements'.²⁷ After reviewing the work of several commentators (particularly Craine,²⁸ White²⁹ and Ouellet),³⁰ he concludes that, since each author has evolved a framework of his own, comparison of the results of individual case studies is a task bordering on the fruitless, with difficulties in verifying findings, so that it is virtually impossible to create a body of substantiated theoretical or empirical knowledge. While it is not the intention of this work to contribute to the solution of this problem, the Scottish institutions can be better understood by referring to some of the concepts derived from experience elsewhere.

Cunha et al.,³¹ have examined the institutional structure and law of water management in fifteen countries, mainly in Europe but also including Canada, the USA, Japan and Australia, in an attempt to derive principles for a water resources management policy in

an empirical manner. They recognise that, in defining a water management policy, there is a series of institutional factors which to a certain extent, condition water management. The most important of these they see as the need to consider the river basin as the basic water resources management unit since the various kinds of water use at different points of a certain basin are generally interdependent. The implementation of a water management policy must also bear in mind overall development and especially consider the requirements of land use planning and the conditions imposed by de facto situations. It is necessary to plan the use of water resources, beginning by establishing the goals, taking into account the short- and long-term regional peculiarities and, by the same token, analysing the cost of the action required for attaining such goals. Needless to say, the planning process should embrace the hydrological cycle as a whole, including objectives concerning quality as well as quantities and tidal and underground as well as surface waters.

These principles, extend the range of relevant matters to the wider social and economic context of land use and regional planning and demand consideration of regional goals in these respects. Thus, in many parts of the world regional policies are seen as being inseparable from water resources management. Water developments are both conditioned by and condition wider social and economic goals so that it is not surprising that the politics of water development and use have received an increasing amount of attention.³² Because of their wider implications, water management decisions are seldom made by a single entity and therefore the principal task of institutional

design is to secure a distribution of resources among the groups involved and a set of rules governing their behaviour. In this context public representatives have a crucial role to play for in a democracy only they can legitimise such rules. Therefore, in addition to the physical characteristics of water resources, the general structure of government is an inescapable element. Institutional design must thus take into account certain features of political and organisational behaviour such as agency-clientele relationships, the perception of problems implicit in membership of a particular profession and the role of organised pressure groups.

Questions concerning who should be consulted when developments are being projected, and of how conflicts over proposed developments could be resolved or ameliorated at an earlier stage in the planning process, have been raised by a number of case studies set in England and Wales, but these themes largely reflect events in North America where the matter has generated a voluminous literature (for example, Pierce & Doerksen 1976)³³. In the United States the Federal Water Pollution Control Act as amended in 1972 "contains one of the strongest requirements for participatory democracy in the entire federal statute book"³⁴, and therefore this is an area which attracted considerable attention in recent years. In Britain, however, there has been little public participation in the control of water pollution and Byers has put this down to the present state of the law.³⁵

Administrative Areas

The derivation of suitable administrative areas is an important

supplementary question to matters concerning the allocation of functions between and within different levels of government, and between authorities and the public. The definition of administrative areas is not an academic task. Lipman has expressed the view:³⁶

"The academic student must beware, above all of sketching administrative utopias since it is generally only the administrator who knows what is administratively possible as distinct from that which appears theoretically desirable - a consideration of paramount in the field of politics which, as Bismarck observed, is the science of the possible.

Yet, if the academic student of administration cannot teach the administrator, he may attempt to save time. Decisions taken by the administrator must generally be based on a survey of past action and other relevant factors. The marshalling of this material is a task in which the student can help the administrator who may lack adequate time and perhaps sometimes training, to understand it thoroughly.

A study of the previous history of the subject can thus provide the evidence upon which decisions can be taken ..."

Notwithstanding the difficulties, two criteria for a qualitative evaluation of the suitability of areas for local administration appear appropriate: the extent to which it approximates to the social community it contains; and administrative areas should attempt the maximisation of efficiency and economy in the operation of services.

In addition, three general principles for the definition of areas may be identified: the application of a quantitative standard to achieve similar areas, similar population sizes or maximum numbers; administrative areas should coincide so far as possible with other types of area drawn through consideration of physiographic, industrial linkages and traditional groupings; and administrative areas should equate with the zone of influence of principal towns, paying special attention to transport and population movement.

More recently there has been a revival of interest on the part of geographers in administrative units for public services. For example, Massam has expressed the view:³⁷

"Location theory in economics and geography has primarily been concerned with industrial, commercial and residential decisions, but for a complete picture of human organisation we need to develop theories to explain public facilities locational decisions and this requires an understanding of the way organisations operate and decisions are made. Advances in this field will depend upon the judicious use of measurement procedures, the calibration of conceptions, systematic arrangements of the elements which relate to the provision of public services, and an improvement in the application of analytical procedures.

It is now widely recognised that if we understand the ways in which particular political structures come into being, and if we have an appreciation of the qualities of alternative structures, then we may be in a strong position to make valuable prescriptive statements."

Massam has subsequently outlined some of the techniques that might be used in the evaluation of the spatial qualities of administrative units³⁸ and Johnston has extended their use to systems of local government and electoral behaviour.³⁹ In this vein, Greenberg et al. have applied techniques of network analysis and matrix algebra to the water supply networks of the New York Metropolitan Region and found them useful in identifying stress points; but they admit their model is not universally applicable.⁴⁰

Enquiry is confined here, however, to the origins of present structures for water management, the evaluation of their performance merely being noted as a worthy area for future research. In the broader context of American political science, Fesler has identified four criteria for the spatial definition of administrative areas:⁴¹

1. The areal unit must be adjusted to the distribution of phenomena with which government must deal;

2. Concerning efficiency, a need for the specialisms of skilled officers sets limits on the optimum size of administrative units;
3. Fiscal resources must be adequate; and
4. Popular control should be encouraged.

These are clearly along the same lines as Lipman, but Fesler adds to the discussion through his humanistic view of the power hierarchy. He starts with the citizen and looks upwards through layers of government which minister to the citizen's needs, regulating freedom of action and demanding his financial support. He suggests the citizen requires efficiency of performance, effective democratic control, adequate methods of collaboration, an understandable system of hierarchy, and a changing system in which redundant and anachronistic units are removed.

The latter requirement is of particular concern here and on this he sees administrative adjustments occurring in either of two ways; by considering each function separately or by starting with the emphasis on the interrelationship of functions and the need for co-ordinated administration and area based popular control. Elements of both are apparent in the institutional history of water management in the U.K.

Areas for Water Management

Lipman points out that the need for water supply, land drainage, and the prevention of pollution to be managed on the basis of whole river basins was first argued in the 1860s.⁴² The main difficulty in adopting river basins as units of management lay with matching the

physical unit with existing political arrangements. The matter has generated much discussion on the part of political scientists in the United States, but little in the way of positive conclusions, apart from the definition of metropolitan, city-regions as the primary competing concept with river basins as 'decision arenas'.⁴³

The problem is clearly much simpler in the U.K. where there is at least a chance of fitting the square peg of water management into the round hole of local government. Details of Scotland and England and Wales, where the matter came to the fore at the time of local government reorganisation within the last decade and was resolved in a different manner in each country, are to be found below; for the moment it is concluded that three questions on the matter of areal units appear relevant.

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Lipman and Freeman agree that a fundamental factor in the definition of areal units is the balance of technical efficiency with democratic control, including in that context the nature of the communities served, their traditions and their feeling of community of interest. A second basic question is clearly the weighting which should most appropriately be given to physiographic factors; just how significantly unique are the characteristics of the drainage basin in particular situations? Lastly, and linking the previous two, there is the question of the inter-relation of different functions: can square pegs be made to fit round holes? Since the separation of water supply planning and general town and country planning in England and Wales, several authors have sought to investigate the change.⁴⁵

The Nature and Pace of Institutional Change

Having considered the allocation of responsibilities within and between various levels of government and the selection of an appropriate areal unit for the management of water resources, there remains the identification of factors in the nature and pace of change as institutional frameworks respond to new problems and changing social values.

The identification of causal factors in the nature and pace of institutional change is a research priority identified by many North American authors, including Sewell,⁴⁶ who has drawn attention to three challenges to contemporary water management leading to pressure for institutional reform. These are the increasing complexity of problems to be solved, the growing degree of competition for investment funds, and shifts in social goals and values. He sees these three challenges as having important implications for the planning and policy-making process and for the legal and administrative frameworks of water management.

Notwithstanding this, the nature and pace of change has not received a great deal of attention. There are, it is true, three major conceptualisations of how the process of change might be effected. These are the rationalist approach (as discussed, for example, by Banfield)⁴⁷, the incrementalist approach (Lindblom)^{48,49}, and a compromise between the two, 'mixed scanning' (Etzioni).⁵⁰

The rationalist has a clear view of the end point to which his

efforts are directed. He examines the full range of possibilities available to him and evaluates each according to which combination will satisfy his aim most efficiently and which is likeliest to have fewest unforeseen consequences. Simple in conception, the rationalist approach is almost impossible to follow in practice, as has been pointed out by several authors.

Lindblom lists the deficiencies of this conception most devastatingly. Amongst other things he points to difficulties over deciding what the most desirable end point is, especially if there are several different groups of interested parties. Next, even if the aims are agreed there is the difficulty of recognising what the problem is: why is the aim not being achieved? Then there is the problem of identifying the full range of possible solutions followed by the ability to analyse their implications: from where is the time, effort, skill and money for such costly analyses to come? How does one know whether or not a strategy will work?

Lindblom sees the minimisation of risk and information costs as the cornerstone of real practice with regard to the making of policy. If one repeats a precedent in a given situation the risk of meeting an unforeseen circumstance is greatly reduced. The further the strategy adopted strays from previous practice the more uncertainty there will be as to its outcome. The more uncertainty there is, the more difficult it will be to persuade other people both that the strategy will, in fact, work and that their interests will not be damaged to an unexpected extent. The closer the decision-maker keeps to well-tried practice, the less new information he requires to

predict whether or not the solution he has selected will work in the way he expects.

With such considerations in mind, Lindblom sees policy decisions occurring as increments of change, with decision-makers keeping close to established practice and considering only a few, familiar and well-tried potential solutions for the very good reasons that it is easier to do this in terms of time and effort and the risk of unforeseen consequences is reduced. Conflicts over likely effects are also minimised because more information is readily available as to the repercussions of the strategy. It is not expected that one change will solve a problem once and for all.

Lindblom, therefore, sees policy developing in a series of steps. Occasionally a disjoint occurs: that is, the continuity or sequence of steps is broken. This may happen because successful practice elsewhere is translated to a new context or when new interest groups come to dominate the decision-making arena so that values as to a good outcome change. Occasionally the over-ruling consideration will be that something new is required and that anything resembling previous practice just will not do.

Etzioni steers a middle course between the utopia of the rationalists and Lindblom's conservatism in the third approach of 'mixed scanning'. Scanning possible solutions is divided into two parts, with an initial stage of comprehensive rational search but at a highly generalised level so as to reduce the cost of information and minimise the difficulty of predicting consequences. No major

option is left uncovered. A broad course of action having been determined, it is then tested incrementally. If steps along the chosen lines do not appear to be working, that approach is dropped and another adopted.

These conceptions of the process of policy making are applicable to all forms of decisions. Of particular interest here is the matter of change in institutional structures including laws and organisations.

The evolution of arrangements for Scottish Water Management

Ideas as to the nature and pace of change, then, are added to those mentioned earlier concerning central-local relations and the selection of appropriate areal units of management, forming a frame of reference for the narrative of Scottish water management. The adoption of such themes follows Barr and Sewell's approach to water management in England and Wales.^{51,52} They represent a more detailed conception of what other authors have called 'the transform mechanism'. The nature of this 'black box' is the subject of this study, but before turning to the principal task, two further preliminary chapters follow, the first of which reviews existing work in the field of water resources management in Great Britain.

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CHAPTER TWO

Previous studies of water management in Great Britain

Existing works on water management are briefly reviewed in this chapter. Six themes pervade the literature on Great Britain: Scottish works, case studies of individual policies, case studies of conflict over the use of water resources, comment on British policies for the control of water pollution, the official literature and calls for more rational approaches to the allocation of resources, primarily by monetary means. Each of these is now addressed in turn, pausing only briefly to acknowledge the two general text books now available by Smith (1972)¹ and Porter (1978),² the former outlining the hydrological background to, and the development of, the contemporary water situation in Great Britain in 1972, whilst the latter brings the evolution of institutional arrangements in England and Wales up to date.

Studies of water management in Britain follow a general trend of growing interest in the late 1950s and early 1960s coming to fruition in the 1970s. Virtually all eyes have turned to the problems and institutional reforms of England and Wales where a good deal more official documentation has also been made available and problems have been much more complex and controversial than in Scotland where there is a much better ratio of resources to population (see below Chapter 3). Indeed, a mere handful of academic papers have appeared in recent years on developments in Scotland.

Smith (1977)³ has provided a brief overview of Scottish water resources whilst Cruikshank (1965)⁴ discussed the background and wider

context of the Loch Lomond scheme of water supply for the continued development of industrial employment in Central Scotland, and Hubbard has analysed the practice and principles underlying the Scottish river purification boards in their early years (Hubbard, 1968,⁵ 1969).⁶

Studies of policies applied in England and Wales

Throughout the 1950s central government attempted to rationalise the number of water supply undertakings in England and Wales. Gregory⁷ (1959) pointed to the fragmentation of administrative authority as a distinctive feature of English water management, following this with a case study of Lancashire in which the utility of rationalising the number of authorities was demonstrated (Gregory, 1962)⁸, whilst the detailed background of the formation of the Great Ouse Water Authority to promote a new scheme of water supply has been furnished by Rydz (1971).⁹

Gregory looked forward to the creation of river authorities which he saw as powerful factors in the future planning of water resources development and hence much of the landscape and economy of Britain. The need for more planning in the allocation of national and regional water resources had also been argued by Balchin, who in 1956, reviewed the conflicting uses to which the hydrological cycle was put and noted increasing pressure on water resources to the extent that:¹⁰

"the slightest interruption in the hydrological cycle is now rapidly reflected by diminished streams and diminished water supplies".

The Water Resources Act 1963 was brought forward to deal with

such increasing pressure, but it fell to a visiting American to analyse in detail the policy then adopted, particularly its potential contribution to American water management, saying: ¹¹

"The social sciences have the obligation to look beyond the problems of delineating technically desirable programmes for water resources development. They must probe the opportunities for and obstacles to the implementation of such programmes."

In this context Craine was particularly struck by the degree of public intervention and the number of interests that had apparently been drawn successfully into the regionally-based river authorities. Such a decentralised system seemed to him to give important administrative advantages, not least flexibility to meet different problems in a locally appropriate manner. He saw the 1963 Act as a giant step forward in England's response to contemporary water problems but foresaw difficulties in the river authorities' lack of powers over sewage treatment.

Similarly, it fell to another American academic to analyse the reasons for the failure of the 1963 Act and chronicle the manner in which the Water Act 1973 came to take its final form. Okun also clearly saw the English experience as a model for elsewhere: ¹²

"The reorganisation of water management in England and Wales, in providing a rational structure for water management generally and for water quality management particularly, cannot help but be a model for other countries throughout the world."

For such purposes he has probably provided the most complete account of the modern evolution of the English institutional structure in which he detects several highly desirable features, decentralised policy-making within hydrologically based units of administration independently financed.

Meanwhile, in the mid-1960s, river authorities were beginning their task of planning the rational use of water through the collection of information as to existing uses and potential resources and several authors sought to assist them in this task. Smith published an assessment of the water resources of Nidderdale and developing demands upon them in 1966¹³ and a similar survey of Tees-side followed in 1967. In this, the background to a proposal to develop a reservoir at Cow Green was given and Smith concluded that:¹⁴

"the unenviable decisions which would have to be made, balancing losses of amenity and recreation against the future industrial prosperity of Tees-side, may well mean that, in the long term, additional supplies will come from outside the valley."

It was becoming more and more apparent that a national strategy for water supplies was required: a conclusion fostered by the publication of a series of assessments by the Water Resources Board (see below). But the Cow Green reservoir was to become also, perhaps, the best known incidence of conflict between environmentalists and water authorities in England, largely through the publication and republication of a detailed account of objectors, objections and their fate by Gregory.¹⁵

Case studies of conflict over the use of water resources

In the late 1960s it almost seemed as if no new reservoir could be built anywhere in England and Wales without vigorous, time consuming and expensive opposition. This caught the attention of a Canadian, Bruce Mitchell, who, in addition to Cow Green, provided accounts of two other major cases of conflict, concerning the

Tryweryn scheme to transfer more Welsh water to Liverpool and the extension of supplies from the Lake District for Manchester¹⁶ (which has also been the subject of study by Dolbey).¹⁷ He also concluded that the spatial and temporal qualities of water supply and demand in England and Wales required a national policy if social benefits were to be optimised. But in the particular circumstances of the time in which he worked perhaps more important was the existence of conflicts within, as well as between, interest groups posing a dilemma for the existing institutional structure which seemed inadequate in several respects.

Water Quality

Thus far, mention has been made largely of literature concerning water supplies and water resources. There is a definite dearth of analytical comment on water quality, probably because of the statutory veil of secrecy built into the British code for controlling pollution which prohibits the publication of specific details. Tinker has drawn attention to this and extended some hope for the future, if and when the relevant section of the Control of Pollution Act 1974 becomes effective.¹⁸

The historical position suffers no such handicap; well before his time, Law provided an account of the origins and evolution of river management for the Aire and Calder in West Yorkshire in 1956.¹⁹ This is probably the best account available of the circumstances surrounding the Rivers (Prevention of Pollution) Act 1876. Law's thesis is also memorable for his emphasis on the inadequacies of

the system pertaining prior to 1945 in England and Wales (1946 in Scotland) whereby the allocation of water resources between conflicting interested parties was by Parliamentary committees of non-specialists on an ad hoc basis through private and local Bills. More recently, Smith followed Hubbard in selecting Scottish problems of pollution control for study,²⁰ applying modern concepts to the analysis of decisions made in the 19th century, and in a more modern context, Porter²¹ traced the history of pollution in several estuaries for the Royal Commission on Environmental Pollution whilst a team at the University of Newcastle have also been studying the Tees Estuary.²² The Pollution Research Unit of the University of Manchester has also published several studies on aspects of pollution generally and²³ McLoughlin has reviewed English law.²⁴ These apart, the literature on water quality in Britain stems largely from official sources and the professions involved amongst which Fish's contribution is outstanding.²⁵

The Official Literature

The Water Resources Act, 1963, both in formulation and implementation, generated a considerable official literature on water policies in England and Wales, as did its failings and the subsequent Act of 1973. A National Water Policy published in 1944²⁶ referred to both countries notwithstanding its roots in the English Central Advisory Water Committee's (CAWC) final report of 1943.²⁷ The CAWC reported again in 1962²⁸ in the aftermath of a drought in 1959 and laid down the foundations of the 1963 Act. Its Scottish equivalent, the Scottish Water Advisory Committee, considered similar matters between 1962 and 1966²⁹ but strictly confined its enquiries to water supplies.

Both advisory committees returned to the water services in the light of separate proposals for the reform of local government in 1971³⁰ and 1972³¹ respectively.

In England and Wales the Water Resources Board was established in 1963 and subsequently produced a series of highly informative reports, culminating with a survey of the water resources of England and Wales as a whole in 1973³², including a detailed statement of options for the future. The Scottish equivalent, albeit lacking specific proposals for future development, appeared in the same year.³³ National surveys of water quality have similarly appeared in tandem,^{34,35} though there is no Scottish equivalent to the detailed review of sewage disposal provided for England and Wales by the Jeger Committee.³⁶ In 1972 the Royal Commission on Environmental Pollution considered estuaries in the United Kingdom in its third report including the Clyde.³⁷ At the local level several River Authorities published accounts of the water resources of their area³⁸ and the Trent Research Project generated a series of reports evaluating different strategies which although specific to that basin have a wider significance for the methodology of water resources planning in the U.K.³⁹ The process of reorganisation in England and Wales in 1973 brought a review of economic and financial policies⁴⁰ and the creation of the National Water Council which took on the task of publishing a series of informative reports on the water industry. Outstanding examples of which are 'Paying for Water'⁴¹ and 'We didn't wait for the rain' in the aftermath of the English drought of 1976.⁴² Both this Council and the ten regional water authorities publish annual reports of which there are no equivalents in Scotland. This study seeks to rectify

insofar as possible in a single volume, the imbalance of information available on Scotland.

A more rational approach to the utilisation of water resources?

In earlier years water management was considered a branch of economic geography and it has often fallen to economists to make important contributions. Thus, in 1955, Sleeman drew attention to the extent to which per capita consumption varied around Great Britain and to a similar variation in water rates.⁴³ He felt that if the most efficient use was to be made of the country's water resources there was a need to pay more attention to the economics of water supply.

Rees published a survey of industrial demand for water in South-East England in 1969⁴⁴ adding empirical weight to the themes earlier expressed by Balchin, viz., that economic limits to supply did exist and that the pricing system for water failed to marry the actual allocation of resources with the optimum so that it was likely that too many resources were being expended to provide water services. In the light of several successive reports by the Water Resources Board Rees returned to similar themes on several occasions.⁴⁵

In particular, she has been to the fore in arguing that if domestic consumers were to pay for the amount of water they used they would be more careful as to how they used it, the rate of growth in demand would fall and the need for heavy expenditure on new capital works would decline, as has Herrington.⁴⁶ He has also repeatedly called

for a more rational approach to meeting demands for water: ⁴⁷

"It is ... desirable that the selection of new capital projects and other means of reconciling the future demands and supplies of the nation's water services be undertaken in a rational and dispassionate framework rather than on the basis of hunch, guesswork, rule of thumb or horse trading."

Hanke has recently reviewed American experience with metering ⁴⁸ and suggested that residential, in-house use responds little to price changes but outdoor water consumption seems significantly related to price throughout the humid and drier parts of the United States. The key issue, therefore, becomes: would a reduction in the use of water for car-washing and in gardens be sufficient to justify the universal installation of meters and ultimately lead to a reduced demand for water? It should be remembered also that the information obtainable from domestic metering might be of considerable value in improving the accuracy of forecasts of demand.

⁴⁹
Warford has reviewed the history of consideration given to domestic metering in England and Wales and the history of practice in Malvern which has also been the subject of study recently by Philips and Smith. ⁵⁰

⁵¹
Philips and Kershaw conclude that there is little evidence to suggest that any significant economies can be achieved through a reduction in consumption in a temperate climate after the introduction of universal metering. The cost per installation per annum at 1973/75 prices seemed to be of the order of £8.30, very nearly half the existing total charge for water in the areas examined. They also doubt whether the detailed information on consumption and the losses

in distribution systems revealed by the practice would justify its cost.

Smith found,⁵² at 1970/71 prices, that the long-run marginal costs of water would have to be between 60 and 80p per 1000 gallons before metering could be economically justified. Hanke points out, however, that at present the marginal costs of meeting additional demand are not known and so the controversy is still very much alive, particularly in the light of the growing cost of new projects, especially for the supply of South-East England.

The North American situation also provided the context for an increasing interest in charging for the discharge of effluents as a means both of internalising the external costs imposed by the disposal of water-borne waste and of optimising total costs. Effluent charges are also seen as a means of encouraging recycling and economy in the use of industrial process water. Kneese and Bower⁵³ have been to the fore in advocating this means of regulating the use of the environment.

In England, the theoretical argument has been put forward by Beckermann⁵⁴ whilst Atkins and Lowe⁵⁵ have studied pollution control costs in industry and concluded that increased costs would make firms reconsider their use of water and encourage changes in processes of production.

The impact of rising charges for the disposal of industrial water on consumption has been confirmed by the Central Water Planning

Unit which has noted that a stationary trend in consumption by industry and commerce between 1970 and 1974, between which times effluent charges became common in England Wales, turned to an accelerating decline after 1974 as many charges rose sharply and firms economised in their use of water.⁵⁶

A further impetus to the study of charging systems has come from membership of the European Economic Community and the possibility that policies in this regard may, one day, be harmonised throughout Europe. Johnson and Brown⁵⁷ have reviewed the pollution control policies of six European countries including France, the Netherlands, the German Federal Republic and England and Wales. They were unable to provide any suitable explanation why effluent charging systems exist in some countries and not in others. Mackintosh and Wilcox⁵⁸ have reviewed the implications of informal discussions that have taken place between the U.K. government and the Commission of the E.E.C. The U.K. is one of only three (with Ireland and Denmark) countries with no plans to introduce a system of charging for all discharges to a river. The authors feel that a charge providing an incentive to improve the quality of effluents discharged may prove a useful aid to the existing system of consents, especially where there are many discharges of a given pollutant into a stretch of river, i.e., where the basis of the charge might be relatively easy to determine. There is not sufficient information to indicate how common this is in the United Kingdom, but it is known that a great many of the discharges to rivers in England and Wales are the responsibility of the regional water authorities and there seems little point in these authorities levying a system of charges to influence their own

behaviour. (Of the E.E.C. member countries, only in England and Wales and in the Netherlands are the sewage treatment works in the charge of the same authority as is responsible for controlling pollution in rivers). Thus, it is clear that the implementation of the various ideas of a more rational allocation of resources following from cash incentives would have significant implications for institutional structure. It would not, however, make the business of water management any less political an activity; indeed, concern over the levels and distribution of charges would likely increase the calls for adequate representation of all interests on decision-making bodies.

Concluding comment

The degree to which water resources systems are composed of a series of complex and mutually interdependent internal relationships ⁵⁹ has been stressed by Beaumont so that in his view the normal approach of reasoning from the part to the whole is inapplicable; what is needed is a methodology involving reasoning from the whole to the part. He also quotes similar sentiments from Wiener in which an ⁶⁰ interaction of physical resources, demand for water, residual consequences of its use and socio-political factors is envisaged varying both temporally and spatially to provide the context of decision-making. Thus a study of Scottish water management is necessarily lengthy and all-embracing.

This being so, what follows is largely concerned with the historical evolution of Scottish institutions concerned with water: a lack of data precludes any quantitative

evaluation of the structure that has emerged. Undoubtedly it is in this direction, however, that further research effort should be directed. In the meantime, the following chapter contains a brief description of Scottish water resources and the demands made of them.

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CHAPTER 3Population and Resources

The context of problems of water management in Scotland is outlined in this chapter. As Smith has pointed out, Scotland possesses a water resource unequalled in Europe, although there are substantial regional variations in pressure of demand.¹ There is no absolute shortage of water anywhere in the country, whether for consumption or for use as a carrier and dilutant of effluents. Nevertheless, from time to time, significant difficulties have been encountered in manipulating spatial and temporal variations within the hydrological cycle into line with growing demands. Problems have not occurred because of any particular characteristics of demand nor have they arisen through the distribution of resources, but rather because of inadequacies in the structure of administration available to tackle difficulties.

The purpose of this chapter is merely to confirm a surfeit of resources over demand. A discussion of recent trends in demand is postponed until later (Chapter 8) and this chapter ends by drawing attention to the wide variation in the financial capability of different local authorities before the evolution of policies with respect to water management is discussed in succeeding chapters.

A ratio of population to resources, both for purposes of water supply and for the disposal of sewage effluents (to non-tidal waters), is outlined. Several difficulties frustrate the derivation of a simple yet accurate index of the potential of water resources, not

least a paucity of information concerning water normally flowing into the sea from each river basin and a lack of any specific detail as to the demands for water in specific localities.

Since the purpose of such an index is merely to give some confirmation of the undeniable excess of resources over demand and some indication of regional variations, an attempt has been made (Table 3.1) to derive a picture of the relative ease or difficulty of the task of water management in different parts of Scotland. It is based on information published by the Water Data Unit² concerning the mean gauged discharges of rivers in Scotland and on the Scottish Development Department's review of Scottish water supplies, 'Measure of Plenty'³ published in 1973.

Recording has been initiated only relatively recently in many places and in several cases gauges that can measure the flow from whole river catchments have not yet been installed. The records used in compiling Tables 3.1 and 3.2 are from the stations shown in Figure 3.1. Clearly the picture of resources is incomplete. Fortunately figures are available for the Forth and Clyde basins from Messrs. R.H.Cuthbertson and Associates as a result of their recent study of possible future sources of supply for Central Scotland (see Chapter 8).⁴ The limited coverage afforded by the records of gauging stations therefore underestimates resources, sometimes quite seriously; several important rivers, for example, the Ayrshire Doon, are not included at all. The use of *measured* data has the advantage of excluding water already drawn off for purposes of supply which reappears as effluent discharge, often in another basin after

Figure 3.1
Hydrological Information Used in the Calculations
of Population : Resource Ratios



use, notably the $4.92 \text{ m}^3/\text{s}$ transferred from the Upper Teith to the Clyde basin by means of the Loch Katrine and associated waterworks.⁵ The resource figures, therefore, refer to the present state of development and are of interest not as a precise assessment of potential but as a means of highlighting the relative pressures of demand upon them around the country, assuming that the errors associated with each estimate accumulate in a manner likely to make each regional estimate subject to the same margin of error.

Table 3.1 : Population - Water Resource Ratios for Scotland, 1971

<u>Water Board Area</u>	(1) <u>Resource</u> m.g.d.	(2) <u>Per Capita</u> <u>Demand</u> gals/hd/day	(3) <u>Resource</u> <u>Per Capita</u> gals/hd/day	(4) <u>Ratio</u> (3)/(2)
North East of Scotland	2,756	73.7	6,350	86.2
East of Scotland	2,914	70.8	6,793	95.9
Fife and Kinross	509	72.4	1,552	21.4
Mid-Scotland	844	139.9	2,646	18.9
South East of Scotland	1,623	70.6	1,901	26.9
South West of Scotland	1,547	95.0	10,995	115.9
Ayrshire	583	108.9	1,555	14.3
Lanarkshire	438	80.1	779	9.7
Lower Clyde	1,518	106.0	1,011	9.5

A ratio of population to resources has been calculated in Table 3.1 by taking the per capita consumption reported by SDD and comparing this with the quantity of water in the rivers of that region that appears to be available in an average year per capita. SDD's figures relate to 1971 and the areas of the then recently formed ad hoc regional water boards (see Chapter 5) and include the industrial use of water so that differences in the degree to which each area is industrialised are reflected within the per capita figure.

Of course, the ratios take no account of whether or not temporal variations in supply can be accommodated by means of storage and no account of water quality. Two points are apparent: first, there are two dimensions of potential water problems, the regions of Central Scotland clearly represent a much more difficult problem than the North East, East and South West of the country. Secondly, within the Central area one might expect the problem of the West-Central area to be, and to have been, most acute, particularly Ayrshire (see Chapter 7), and, in view of Glasgow's reliance on the Teith basin, in Renfrewshire. Some difficulty might also have been expected in Lanarkshire (Chapter 6). Of course, these broad conclusions do not preclude local difficulties.

Similar conclusions may be drawn from Table 3.2 which shows the result of an attempt to compare existing use of water for effluent disposal with available resources. In this case SDD's report on the quality of Scottish rivers, 'Towards Cleaner Water' published in 1976 is used as the source of information on the existing situation.⁶ For each river purification board area (as they were in 1973) the volume of effluent discharged daily to inland waters has been calculated in per capita terms. This is then compared with the volume of water, per capita, potentially available for their dilution and transfer seaward.

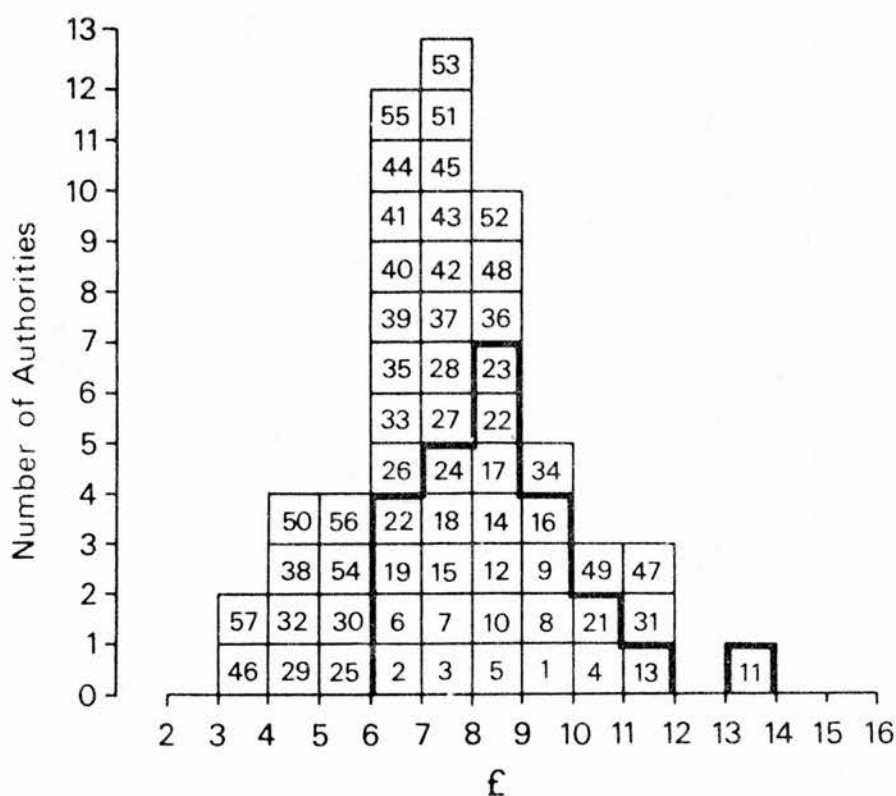
Table 3.2 : Effluent generated - Resource Ratios

<u>R.P.B. Areas</u>	(1) <u>Resource</u> m.g.d.	(2) <u>Effluent</u> gals/hd/day	(3) <u>Per Capita</u> <u>Resource</u> gals/hd/day	(4) <u>Ratio</u> $\frac{(3)}{(2)}$
Banff, Moray & Nairn	1,757	78.1	36,152	463
Dee & Don	999	62.5	18,772	300
Tay	3,267	75.9	43,796	577
Forth	1,000	70.6	5,935	84
Lothian	220	54.1	1,500	28
Tweed	1,404	113.1	18,715	166
Solway	1,547	73.3	23,363	319
Ayrshire	583	63.8	10,323	162
Clyde	1,956	84.7	1,872	22

Again the likely scale of waste disposal problems is seen to be radically different in Central Scotland as compared to areas to the North and South. As might have been expected, the nub of Scottish problems of pollution control appear to be and to have been found in the Clyde and Lothian areas (Chapters 10 and 11).

In both tables, however, the ratios of demand to remaining resources, even at their least favourable, are still substantial. Problems have arisen because of an inappropriate institutional structure. Figure 3.2 shows a wide variation in the financial capability of different local authorities around the country in 1934-35.⁷ Those authorities which were financially weak at this time are of special

Figure 3.2
 Rateable Value Per Head of Population ;
 Cities, Large Burghs and Counties, 1934 - 35

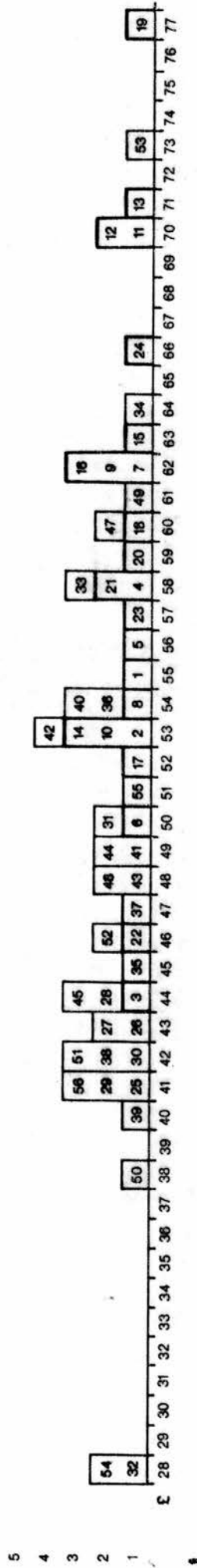


Key for Figures 3.2 and 3.3

1 Aberdeen	15 Hamilton	28 Ayrshire	42 Lanarkshire
2 Airdrie	16 Inverness	29 Banff	43 Midlothian
3 Arbroath	17 Kilmarnock	30 Berwickshire	44 Moray
4 Ayr	18 Kirkcaldy	31 Bute	45 Nairn
5 Clydebank	19 Motherwell & Wishaw	32 Caithness	46 Orkney
6 Coatbridge	20 Paisley	33 Clackmannan	47 Peebleshire
7 Dumbarton	21 Perth	34 Dunbarton	48 Perthshire
8 Dumfries	22 Port Glasgow	35 Dumfriesshire	49 Renfrewshire
9 Dundee	23 Rutherglen	36 East Lothian	50 Ross & Cromarty
10 Dunfermline	24 Stirling	37 Fife	51 Roxburghshire
11 Edinburgh	25 Aberdeenshire	38 Invernesshire	52 Selkirkshire
12 Falkirk	26 Angus	39 Kincardineshire	53 Stirlingshire
13 Glasgow	27 Argyll	40 Kinross	54 Sutherland
14 Greenock		41 Kircudbright	55 West Lothian
			56 Wigtownshire
			57 Zetland

interest for it is reasonable to suppose that they were least able to take appropriate action on the face of growing demand, and hence problems steadily mounted (Chapters 4 and 9). Especially worthy of note is the general tendency of the large burghs and cities having a better financial base than most counties. Further, the values plotted for the latter conceal a wide variation within each County between landward areas and small burghs. Figure 3.3 shows the same measure forty years later.⁸ Unfortunately the ravages of inflation obscure comparison to reveal the effect of changes in industrial structure and residential patterns. Therefore, Figures 3.4 and 3.5 are the same data transformed to 'Z scores' (measures of deviation from the mean in terms of standard deviations). It is clear that while the overall symmetry of the distribution of wealth amongst Scottish local authorities was retained over the period, there was a small but significant shift in the relative status of the large burghs, to their advantage relative to the mass of counties. It is this increasing divergence in the ability of authorities to get things done that underlies many of the administrative difficulties of Scottish water management, to which attention is now turned in following chapters.

Figure 3.3 Rateable Value per head of population 1973 / 74

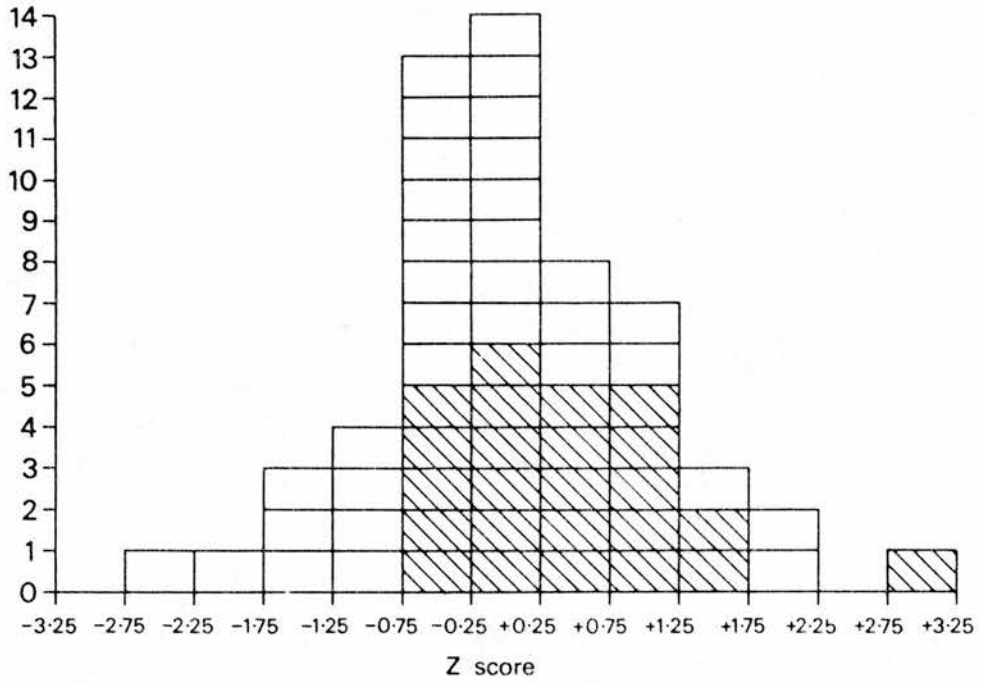


5
4
3
2
1
6

Figure 3.4

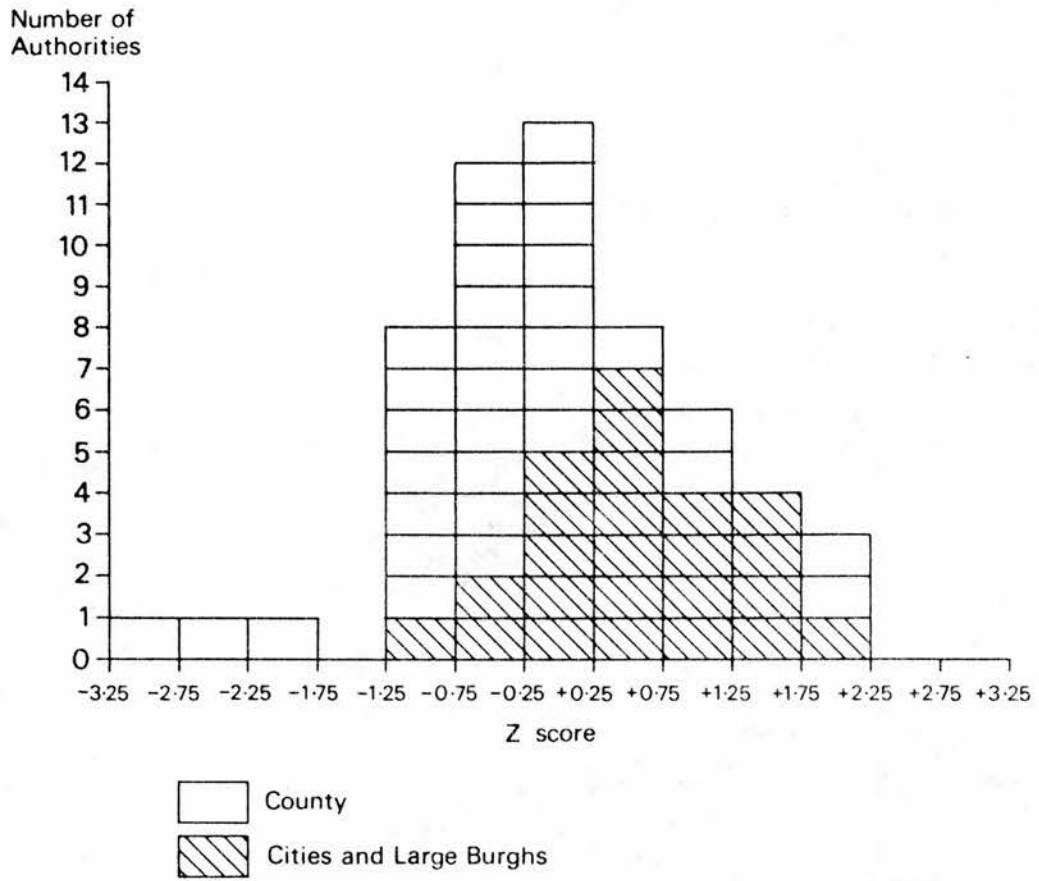
Relative Distribution of Rateable Value Per Capita 1933/34

Number of Authorities



County
City or Large Burgh

Figure 3.5
Relative Distribution of Rateable Value Per Capita 1973/74



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and see Pugh, N.J., Water Supply, in The Institution of Civil Engineers, Proceedings Symposium, Conservation of Water Resources in the United Kingdom, The Institution, 1962, pp.8-14, especially p.11 quoting the Under Secretary of State for Scotland addressing the British Waterworks Association in Edinburgh in 1960: 'Our problem in Scotland is not so much to find the water but to distribute it to places where it is required'.
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CHAPTER 4

The Department of Health for Scotland extends its influence over matters of water supply: 1929-59

It is easy to forget the extent to which central government has begun to take a detailed interest in many public services only in recent decades. Most of the original ideas of Scottish water policy have originated within the Scottish Office and therefore it is to the origins of the Department of Health for Scotland that attention is turned first.

National problems of water supply were recognised officially for the first time in 1933 by an independent investigative committee in response to a severe drought. Several shortcomings in the legal and administrative context of water management were laid bare in 1935 but action had to be postponed until the post-war years, largely because of a lack of precise information, but also because of a somewhat distant relationship between central and local authority. Significant changes in the law of water supply were made in 1944, 1946 and 1949 but the structure of local administration remained essentially unchanged. Using information and experience of co-ordination gained during the war years, officers of DHS worked quietly and extensively behind the scenes to foster the reconstruction of the 1950s and the extension of piped supplies to all, but by the 1960s pressures were mounting such that the long standing view of some that a fundamental administrative reorganisation was necessary, could no longer be ignored.

DHS, the Committee on Scottish Health Services and the drought of 1933

Matters of 'general sanitation', including water supply, drainage and river pollution, were regarded as primarily local concerns until the mid 1930s. The powers and duties of central government were limited and regulatory, so that when DHS replaced the Scottish Board of Health in 1929 it was technically independent of the Scottish Secretary of State; concerned solely with particular functions vested by individual Acts of Parliament on its predecessors.

This situation began to change in response to the drought of 1933 when it became apparent that in many areas the highly localised organisation of water supplies had not kept pace with an ever increasing demand for water. In January 1934 DHS called for reports from local authorities on the adequacy of their supplies during the previous year and found that of 787 supplies reported, 300 had proved inadequate.¹ A Committee reviewing the Scottish Health Services appointed a sub-committee to investigate further. They found that some of the areas worst affected had never had a proper supply, whilst others, even some large urban undertakings, were working on a very small margin of safety.² That might have been the end of the matter had it not also become apparent that the sub-committee had not been able to obtain exact information on the extent of deficiencies. The evidence as a whole left no doubt that the areas of deficiency were mostly rural and sufficiently numerous and important to constitute a serious problem, though a definitive picture was lacking.

It was clear that deficiencies were not due to any insufficiency of water resources. They were a result of the administrative and legal system under which these resources had been developed. Two inadequacies were particularly apparent; the historical growth of supply systems to the burghs independently of each other and of their environs and the historical legacy of a particular institutional form, 'special water supply districts' (SWDS), arranging and administering local supplies in the rural areas. The former had led to a good deal of wasteful duplication in the provision of supplies and exploitation of sources whilst the limited boundaries of the latter meant that many SWDs found it impossible, with available rating resources, to finance an adequate supply. The cost of providing water supplies could be significantly reduced if local authorities were to work in combination or co-operation and promote large-scale developments that made full use of available catchments.

3

All the professional associations consulted by the sub-committee agreed that new arrangements were necessary whereby the water resources of Scotland could be viewed as a whole and their allocation arranged according to need. If adequate water supplies were to be secured at minimum cost, local government boundaries would have to be transcended, at least for planning purposes. Hence, a complete review of the provision of water supplies would involve not only 'full and exact' knowledge of the existing position and of potential sources but also the consideration of many administrative and legal questions. The gathering of facts about sources of supply, areas that might be served and their needs was a matter for engineers and would take some time. A solution for the administrative and legal questions, statutory areas

of supply, administering authorities, water rating, water rights and so on, would not only depend on the technical facts but also on the willingness of the many interests involved to discuss the matter. Clearly, the clarification of such questions would be an even lengthier exercise.

Accordingly, the sub-committee recommended that whatever may be done by way of emergency measures as a result of the recent drought, it was urgently necessary to provide a more economical and more effective system of water distribution and that a technical survey of water resources and needs should be put in hand at once (emphasis added).

By way of immediate response DHS repeated the actions of earlier years in calling for reports generally and convening a conference of adjacent authorities in particular problem areas. A survey of water supplies by questionnaire of burghs and SWDs had been undertaken in 1931.⁴ The response had been good (with only two burghs and thirty-three SWSs - less than 10% - declining to reply). Two hundred and forty-seven supplies (of five hundred and thirty) seemed unsatisfactory in some respect and the authorities concerned were asked to consider submitting improvement schemes for the approval of the Unemployment Grants Committee. In 1932 a further survey of the supplies of 114 villages led to the conclusion that 33 were in need of immediate⁵ improvement.

Also in 1931 DHS had convened a conference of various water authorities in Dunbartonshire with a view to promoting the joint

supply of the whole country. The Burghs declined to participate in any such scheme, however, and the County Council necessarily began to consider the future supply of the landward area in isolation.⁶ A similar unsatisfactory fate befell the conference arranged the previous year of twelve water authorities in Banff-shire on the Moray Coast to tackle the problem of insufficient supply to meet the demands of summer visitors. The object of the exercise was again a joint scheme, but, notwithstanding the offer of a grant amounting to over 60% of the cost from the Unemployment Grants Committee, a majority of the authorities expressed no interest in the scheme and the proposal was abandoned.⁷

The survey by questionnaire that followed the drought of 1933 revealed areas where supplies had been adequate at source but had proved insufficient because of leaking pipes and fittings; in two areas the reservoirs themselves had been found to be leaking. But the basic problem was clearly a lack of co-operation between authorities and nowhere was this more obvious than in Fife where some of the authorities, particularly the Burgh of Kirkcaldy, had found themselves 2mgd short in 1933/34 whilst the contiguous water undertaking, operated by Fife County Council had simultaneously retained an estimated surplus of 2.9mgd. Here was a clear example of the many possibilities for co-operation to the public's advantage. DHS estimated that the reservoirs serving the County's Dunfermline district at Glendevon could supply 2.9mgd more than they did whilst those serving the landward Kirkcaldy district could add a further 3mgd. The County was planning to supply the Northern and Eastern districts from these sources already, so that mains would pass close

to the coastal burghs. The latter could be supplied easily by inter-connection. Indeed, the use of existing mains, laid by the burghs, would obviate some of the expense of the County's plans. Apparently undeterred by experience in Dumbartonshire DHS convened a conference of the Fife authorities to consider the pooling of supplies. By a small majority the conference decided to take no action.⁸ In the light of situations such as this it was hardly surprising that by 1935 DHS published the view that no local authority should have to provide a new supply when another had an ample supply which with the minimum of engineering difficulty could be made available and that no two neighbouring authorities should provide independent supplies without investigating the possibilities of co-operation in a joint supply. But DHS had no powers to enforce such co-operation.⁹

Early Legislation Increasing the Influence exercised by DHS

Two Acts of Parliament dealing with water supply were passed in 1934: the Water Supplies (Exceptional Shortage Orders) Act 1934 and the Rural Water Supplies Act 1934. Both were important precedents. The former empowered DHS to authorise the taking of supplies, albeit on a temporary and emergency basis, by Order. Hitherto the legal right to take water had always been allocated by Parliament and in the event of individual disputes ad hoc Parliamentary Committees had determined the pattern of allocation of water resources. Now it passed to professional administrators with a sound perspective on the issues involved. The Rural Water Supplies Act empowered DHS to make grants towards the expense of providing or improving the supply of rural areas. A total of 180 applications were received, the

estimated total cost of which would have been over a million pounds, thus indicating the degree of interest in such assistance. Some applications were rejected because the impact the proposed scheme would have on local rates was sufficiently small to bring into question the need for a grant whilst others fell because the additional rate levy required, even with a grant, would have been too heavy. Seventy schemes received a maximum grant of 25% of the cost whilst a further thirteen received somewhat less.¹⁰ The payment of a grant was conditional on DHS approval of the engineering details of the scheme and, in those cases where a SWD was the recipient, on the County Council contributing a sum equal to the grant from the general rate (as opposed to the SWD water rate). Some offers of grant were refused because of the latter condition. Most of the approved projects were local but a few regional schemes were set underway; in Dumbartonshire's Vale of Leven District, in Perthshire, in Easter Ross, in Kirkcudbrightshire and two in Dumfries-shire affecting two-thirds of the landward population. Progress was slow, however, with only 14 of the 83 in progress or about to begin by the end of the following year.¹¹

Reservations expressed on the Committee on Scottish Health Services recommendations of 1936

The final report of the full Committee on Scottish Health Services reiterated the conclusions of their sub-committee's report two years before: a technical survey of the water resources and supplies of Scotland should be undertaken at once and a comprehensive enquiry should then be held into the whole question of water supplies.¹²

Three members of the committee were not content to leave matters there. A note of reservation was published on their behalf. They took the view that water and drainage were the foundation of all sanitary measures and it appeared vital that they should be administered in areas large enough both in population and rateable value to secure the best results. This could be achieved only by the establishment of schemes large enough to secure the supervision of the skilled expert and necessarily requiring the appropriate population and rateable value. Their views are worthy of extensive quotation in the light of events many years later: ¹³

"Our colleagues are not prepared to recommend any recasting of local authority functions applicable to water and drainage so long as there exists the possibility of combination and co-operation. But to rely on co-operation is to ignore the lessons of history in local government. While powers of combination and co-operation have existed for many years and the need is, or should be, self-evident, it is only in a limited number of cases and for special reasons that these have been exercised. Pressure by the central department is possible and on occasion may be effective, but where, as in the provision of water, the whole country would require to be covered by a series of joint boards, the necessary coercion of a vast number of small authorities would throw an intolerable burden on the central department. To hand over to a government department powers which ought to have been exercised by the legislature is to render those powers largely ineffective."

In short, a system of regional water authorities should be implemented by means of special and specific legislation.

The full committee had recognised, ¹⁴

"The outstanding difficulty is that some of the town and county councils are unable out of their own resources to provide economically and efficiently for water supplies and drainage, hospitals, specialist medical and other services that in modern conditions, require large administrative units"

But they then added, ¹⁵

"To plan these services on a regional basis ... does not

necessarily involve departure from the present local government structure ... the existing organisation ... provides for creating larger areas, by co-operative action among the authorities to meet whatever need may arise ... The failure of local authorities to co-operate ..., we gather, is an aftermath of the reforms of 1929. The transfer of powers from small burghs has created fears in the minds of representatives of large burghs and has fostered jealousy between County and burgh. We are convinced that if the existing organisation of local government is to survive, these fears and jealousies must be overcome."

The committee did not think that DHS powers should be strengthened except where intervention was justified: when it could be demonstrated that separate action by the authorities involved increased expense and lower standards of services. They recommended that in such cases DHS should have the power to demand the production of plans for the provision of services on a joint basis, which, if after a public enquiry still appeared the most reasonable approach, should be enforced by Order.

Housing and Health

Ensuring the adequacy of domestic water supply was only one thrust in the public health movement. The homes of the Scottish people were the focus of growing and continuous concern particularly in respect of overcrowding. The census of 1931 revealed 15% of the population to be living more than three to a room with a further 35% more than two to a room. The proportion of the total population living in houses of one or two apartments was 42% and considerably higher in some towns: 55% of Glaswegians lived in houses with not more than two apartments.¹⁶ The position had improved since 1917 when the Commission on the Housing of the Industrial Population had identified the tenement as a

major drag on the health and vitality of the urban population. New styles of housing had been recommended to be constructed by local authorities for rent to the working classes. These recommendations formed the basis of the Housing and Town Planning Act 1919 and between then and 1941 over 300,000 new houses were built in Scotland, 70% of them by local authorities. Even so, it was estimated in 1938 that a further 300,000 were required.¹⁷

Water undertakings were not only engaged in providing extra water in line with modern sanitary facilities, standard in such houses, but also engaged in coping with a redistribution of the population as people moved from the crowded areas of the urban cores to estates of considerably lower density on their fringes. In this context it is not surprising that the Scottish Housing Advisory Committee, reporting in 1937, also called for a more rational development of water resources on a regional basis.

Unemployment and Industrial Development

Housing and health were not the only wider problems with a bearing on the provision of water in the 1930s. Heavy unemployment prevailed throughout the United Kingdom and the depths of economic recession brought unemployment rates of 60% in Wishaw and 54% in Clydebank. In the early years of the decade the Government commissioned studies of some of the worst hit areas, where unemployment stood at 40% or more, and four such areas were designated under the Special Areas (Development and Improvement) Act 1934, one of them being Clydeside and North Lanarkshire (although the City of Glasgow

in between was excluded). A Commissioner was appointed to exercise powers of assistance. These were limited: he was not allowed to assist private industry directly or duplicate other government schemes of grant-aid, so that the major areas of public works, housing and roads, were excluded.¹⁸ In the first year the Scottish Commissioner spent 90% of his money on sewerage and in his last pre-war report recorded assistance towards 18 water supply schemes,¹⁹ costing approximately £500,000, even though from 1937 the main contribution of the commissioner lay in attempting to alter the location and structure of industry by the promotion of industrial estates.

The water schemes were largely concerned with urgent improvements on grounds of public health but evidence had,²⁰

"come to hand ... connected with water supply which cannot be overlooked" ... "an adequate reserve of water in a particular place at a particular time may be the determining factor in negotiations for attracting new industrial developments. It is therefore important that the possible future requirements of industry should be borne in mind when estimating what supply should be provided."

A case where an important industrial development had actually been lost to an area through the inadequacy of water supplies had occurred in North Ayrshire. The Commissioner had therefore asked a firm of consultant engineers to survey and report on the position in that area and the report was then being considered in consultation with DHS.

DHS produces policies

The DHS, then, faced a number of problems with very little in its tool kit in its early years. The water supply systems of many areas were inadequate as revealed by the experience of drought. Domestic

demand for water was growing (to 40 gallons per head per day in 1934²¹ as compared with between 15 and 25 forty years earlier), and would continue to grow at a rapid rate as the working class dwellings of urban Scotland were rebuilt to modern standards. Industry was in recession but it was clear that many areas had no suitable reserves of supply to offer any prospective new arrival and if anything were to be done to restructure employment opportunities in Scotland permanently, water supplies would have an important role to play. The solution to existing and likely future demands was clear: regional co-operation could do much to ease the burden of new supplies and alleviate immediate problems through the pooling of surpluses. Many rural areas were chronically underfinanced: a share of a comprehensive regional scheme would satisfy their needs more efficiently than any policy of independent action. The problems were clear. The solution was clear. What was not clear was how DHS could marry the two. As an essentially supervisory agency DHS had little or no power to intervene. Only those schemes of supply financed by the Public Loans Board or those for which a loan repayment period of more than thirty years was felt appropriate (and these were a small proportion of the total) need be referred to DHS for approval. Only seventy schemes came under the wing of DHS in dispensing grant-aid. Until DHS either had money to spend to extend its area of influence or had co-ercive powers little could be done.

Reorganisation of the Scottish Office in 1939

Kellas has identified the publication of the Gilmour Report in 1937 as a turning point in the history of the Scottish Office and

perhaps also of Scotland.²² It pointed to the impracticability of separating the office of the Secretary of State (in London) from the other Scottish departments (in Edinburgh). In future they should all be in Edinburgh and all the administrative functions exercised by Scottish agencies should be directly vested in the Scottish Secretary, thus eliminating the quasi-independence of the departments. It produced a standard constitution for four principal departments, each with its own administrative head but the Secretary of State now its political head. These were, in order of size of establishment at the time; the Department of Health for Scotland, the Department of Agriculture for Scotland, the Scottish Education Department and the Scottish Home Department. The Reorganisation of Offices (Scotland) Act 1939 implemented the Gilmour Committees' recommendations and the new Scottish Office was established in Edinburgh immediately prior to the outbreak of the Second World War.

Kellas also points to the way in which war-time Secretary of State, Thomas Johnston, and a council of the five living former Secretaries of State appears to have been granted virtually a free hand in the running of Scotland by Churchill. The North of Scotland Hydro-Electricity Board was established in 1943 and, to counteract the absence of a Scottish Board of Trade, a Scottish Council on Industry, an independent body composed of representatives of interest groups in the economy was established. The result was a rapid improvement in Scottish production and, between 1942 and 1945, seven hundred new industrial enterprises were established.

With regard to water supplies, the latter years of the 1930s

appear to have been devoted to war preparations. In its tenth annual report, for 1938, DHS noted how local authorities had had cause to consider the question of maintenance of supplies in an emergency and took the opportunity to advocate the interconnection of water mains running in close juxtaposition but the property of different undertakings although in normal circumstances water would not be transferred between systems. In the same year an application for assistance by Paisley Burgh Council had to be turned down by the Commissioner for Special Areas because the War Office had decided to support the scheme.²³ It was not until 1943 that the technical survey of all Scottish Water Supplies, advocated by the Committee on Health Services, was undertaken. Nevertheless, by the end of the war it was complete and full information was to hand to co-ordinate a wide variety of measures which stemmed from programmes of planning for peace.

Planning for Peace

Two reports were highly influential in this process. The Barlow Report laid the foundation stone for post-war town and country planning and an interest in regional policy, attempting to rectify imbalances in employment opportunities between one part of the country and another.²⁴ The Beveridge Report urged that public responsibility should be admitted for securing to all citizens, regardless of where they lived, an important part of their fundamental needs; education, health services, housing and an insurance system providing some insulation from fear of sickness, accident or old age, in short "the welfare state".²⁵ An increased interest by Central Government in planning,

industrial development in the regions, housing and health meant a swing from central supervision over local powers to central direction of the activities of local authorities in the fields at least insofar as necessary to assure a measure of equality of treatment throughout the country. A further resolution dating from the latter war years was the acceptance by governments of responsibility for maintaining full employment, a commitment that implied a continuing intervention in economic affairs. ²⁶ A continuation of the direct controls of war time was impracticable and instead governments were to attempt to regulate the economy through financial management of taxation and public expenditure. Henceforth, one of the central governments most constant functions with regard to water management was to be the regulation of investment in accordance with national economic policy.

The mid 1940s saw the completion of the first comprehensive survey of the water resources of Scotland (which remains unpublished), a national White Paper on water policy and three major Acts of reform. Although the survey was not complete until 1946 it was clear by the time of the publication of a White Paper on National Water Policy in 1944 ²⁷ that many of the smaller systems of supply in rural areas were inadequate at any time and severely lacking in dry spells, and there was a distinct poverty of adequate treatment. These were the sort of problems which had been dealt with by the Rural Water Supplies Act of 1934.

The Rural Water Supplies and Sewerage (Scotland) Act 1944

A new Act made available £6.4 million in grants. The principle

involved was the provision of basic services in rural areas by now taken for granted by town dwellers. The need was clear. A survey undertaken by the Scottish Housing Advisory Committee of three typical rural parishes in 1936 had revealed that 67% of houses had no internal supply of water and in 42% of these cases water had to be carried more than 25 yards.²⁸ Approved schemes would receive between 25 and 90% grant according to the severity of the impact of raising finance locally through the rates. DHS announced that it wished to allocate the money only after all schemes had been submitted and so it was some time before schemes got underway.²⁹ On the completion of the water survey in 1946, 25 reports outlining potential regional schemes were issued to authorities concerned with the suggestion that they should be considered as the basis of plans. Nineteen of the reports covered the supply of large areas and envisaged joint action by several authorities. By 1951 almost every county council had schemes actively under consideration.³⁰ The four hundred applications for grant that had been submitted would have cost something of the order of £25 million, qualifying for grant-aid of £8 million. In view of such demand and the need revealed by the DHS survey, the total amount made available was increased to £20 million in 1949, £50 million in 1955, £45 million in 1963 and £60 million in 1969, with an increasing emphasis on sewerage and sewage treatment. Post-war shortages of materials and labour prevented an early start but by 1952 significant sections of ten schemes were underway covering approximately one third of the total area requiring general piped supplies. By 1966 95% of the population were in receipt of a piped supply and by 1971, 98% - the problem had been solved as one after another, schemes went forward with the DHS regional reports

as the basis for action.

A National Water Policy

The intention of the National Water Policy was to outline ways and means of ensuring that all future needs for water could be met. Sources of water were more than ample: problems were not of resources but of organisation and distribution. Much could be achieved through evaluation of avoidable waste: both of water through the less than optimum use of existing sources and leakage from the distribution system, and the waste of managerial resources through an inappropriate administrative structure. Three needs were identified; to extend piped supplies to all; to secure the most economical and effective use of existing resources; and to build up an accurate body of information. Measures to satisfy the first and the last were already underway although a mechanism would be required to ensure that the data held at the centre were kept fully up to date in a routine manner.

Action was urgently required to secure the most effective use of existing resources if plans for large scale reconstruction, notably of housing, were not to be impeded. Although several water undertakings provided supplies across their official boundaries and several had merged to form the six ad hoc water boards, there had been a general lack of co-operation. The government was convinced that the multiplicity of small undertakings could provide more water more efficiently and more economically if they were to combine for the purpose. Echoing the conclusions of the Health Committee, the government thought it preferable that combined action should occur by

agreement but the Secretary of State it was agreed would be empowered to bring it about as a last resort in 'the public' interest. Improvements could be achieved without any interference with the structure of local government, but if progress was to be made within a reasonable time, it may not be possible to depend on the formation of voluntary combinations. Experience had shown that a single authority could often halt progress by remaining unco-operative, and not always one with a major interest at stake.³¹

The Water (Scotland) Act 1946

The effect of the Water (Scotland) Act 1946 was essentially threefold. First it synthesised the jumble of previous legislation into a single code. Second, it removed the need for local legislation and so saved Parliamentary time and third, it brought innovations, particularly concerning the role of central authority, intended to give effect to the National Water Policy.

Three duties were ascribed to the Secretary of State as the political and legal head of the restructured DHS. He was to promote the conservation of water resources in the sense of making the most effective use of them or of promoting their optimum development. Accordingly he could require water authorities to formulate proposals for meeting the existing and future requirements of their area, significantly, 'including proposals for the joint use with any other water authority of any existing or proposed new source of water supply'³² and submit a report of these to him. If it appeared to the Secretary of State 'to be of advantage to the districts of two or more local

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authorities that they should combine for such purposes', he could make an order compulsorily combining them. These provisions gave the DHS a statutory right not only to information on water resource planning around the country but also to intervene and ultimately coerce recalcitrants in the public interest. To broaden the range of consultation the Secretary of State was to appoint an advisory committee subsequently entitled the 'Scottish Water Advisory Committee' (SWAC).

In addition, substantial powers of intervention were granted through provisions requiring the terms and conditions of all new acquisitions of water rights by local authorities to be referred to DHS and requiring all propositions involving capital expenditure to be referred to the Secretary of State for approval prior to their implementation. Finally the Secretary of State was to act as a court of appeal in the event of a dispute arising between a water authority and other interests in the river: he had to be satisfied that arrangements had been made to ensure that an 'adequate' flow remained in streams.

Central government was to promote an efficient water service by monitoring the performance of local authorities and vetting their proposals. The role was largely outlined in passive terms: unfortunate trends might be cut out in the process of review, but there was little or nothing in the way of power to initiate specific actions, at least overtly. The traditional reliance on persuasion was to continue. In this vein, the explanatory memorandum published by DHS immediately after the passing of the Act is significant. It

was to be the Secretary of State's policy to continue to encourage voluntary co-operation between authorities: but he might find it necessary to use his powers of compulsory combination where it was in his judgement, essential in the public interest to secure an efficient and economic water supply of proper quality and quantity which could not otherwise be achieved.³⁴ The message was clear: local authorities were to anticipate central reserve powers and present joint schemes as their first choice of solution where appropriate in solving difficulties of supply.

The Water (Scotland) Act 1949

Although provision was made for metering and charging for industrial consumption, the 1946 Act made no provisions concerning water rates. These were being considered by a committee on water rating with the remit 'to consider the basis of valuation for the purposes of water rates and the methods of rating and charging for water supplied by statutory undertakers in Scotland'.³⁵ The committee reported that the greater part of the population lived in the areas of the 63 authorities who were supplying water under local Acts and that 33 of these had also made their own arrangements for rating so that there were seven different systems of rating in operation.³⁶ The most commonly prevailing system involved the levy of both a public and a domestic rate for water in contrast to the single rate system provided for in existing public and general legislation.

The Committee examined alternatives to the public and domestic rate. One was to make a charge according to the number of water-

using fittings in a home; per tap, bath, water closet etc. But in their view such a system would discourage the free use of water in personal hygiene and the introduction of W.C.s and baths into houses at present lacking them. This was unacceptable in the light of the Scottish Housing Advisory Committee's view (of 1944) that it was 'not unreasonable to assume that 405,000 houses out of the total of 1,300,000 (31%) have either no independent water closets, no water closets at all or no sanitary conveniences of any description.'

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A second alternative would be to meter consumption and charge each consumer according to the quantity used. But the committee did not favour this either, saying 'while there may be a case for it in a country not so rich in water resources as Scotland, there is none where the problem of water supply is largely one of organisation and distribution'.³⁸ A system of metering would have the disadvantage of a high initial capital expenditure installing meters and would involve the employment of large administrative and inspectorate staffs.

In these circumstances, the committee discounted both alternatives in favour of water rates although they admitted this system also had its faults. They recognised that valuation for rating purposes was not an accurate index of occupancy or personal habits. But they thought that a rating system would operate quite fairly on average: indeed, they had received evidence (unpublished and unspecified) indicating that the product of a metered charge would not materially differ from the sum actually charged under the rating system.

The committee wished to see the adoption of a separate domestic

water rate, presented to householders in a distinctive manner, because the anonymous inclusion of water charges in the general rate tended to draw public attention away from the value for money they were receiving from the service. The water rate had sometimes been regarded as prohibitively high because it was measured against the level of rate for public services as a whole (which at that time was relatively low) and not against the value of the service to the individual. Finally, the committee also considered what should happen when local authorities combined to form joint water boards. Should the board levy public and domestic rates or should it requisition from the constituent authorities? The committee were in favour of the principle embodied in the Rating (Scotland) Act 1926 of restricting the number of authorities levying rates to an absolute minimum and accordingly recommended that the water boards should requisition.

Accordingly, the Water (Scotland) Act 1949 instituted a uniform system of domestic water rates. The problematic system of Special Districts for water rating in rural areas was abolished and existing arrangements where joint water boards levied their own water rates were suspended. The universal adoption of domestic water rates levied by local authorities within their own areas had several important repercussions. First, the financing of the water service was inherently associated with the financing of local government services as a whole where the practice of raising capital by public borrowing means that over half the expenditure on capital intensive services such as water and sewerage relates to debt and interest payments. This might mean that, faced with increases in current costs elsewhere, local authorities may be loathe to commit themselves

to further forced expenditure on a service which at the end of the day appears to have relatively low priority in political terms. It also meant that new schemes have quite a recognisable and significant effect on the local level of rates, a factor which might operate against their initiation until absolutely necessary or unavoidable, given a general political demand to avoid sharp increases in rates.

Second, the element of redistribution of wealth involved in the rating system inevitably characterises water management decisions as 'political', such that it can be argued that ultimate control of the service should rest in the hands of elected representatives of the people whose wealth is being redistributed. This factor combines with the first to imply that the business of water management is far from being a simple task of supplying water at the lowest possible cost. Indeed, the effect of spreading costs over discrete units of rateable value worked against the adoption of the National Water Policy of promoting amalgamations for the more satisfactory development of new services and better use of existing surpluses. Inevitably, in almost any proposed combination some authorities would not be advantaged because the process would involve them in taking a share of other peoples costs thus involving them in an increased rate burden with no visible benefit to themselves.

The New Acts in Operation

Such problems, however, were not to assume a critical significance for another fifteen years. In the meantime, with a thoroughly overhauled institutional framework, the mood of DHS seemed optimistic

as all over the country local authorities got down to the task of examining their suggested schemes of improvement.

The mood of optimism is reflected in DHS's annual report for 1948: ³⁹

"With the augmentation of technical staffs of local authorities, the bringing up to date of the water code by the 1946 Act, the promise of grant from improving water supplies in the development area and in rural areas and the general encouragement given by the Department following their engineering survey in 1943-45 to the planning of schemes on a wider and more comprehensive basis, Scottish local authorities now have before them a programme of £60 to £65m about two-thirds of which relates to rural areas. This will keep the authorities busily engaged on these services for the next fifteen to twenty years."

It seemed that the exercise of the Secretary of State's coercive powers would not be necessary. The same annual report heralded 'a new technique for surmounting difficulties'. A dispute over new supplies had arisen between two contiguous authorities, Grangemouth Town Council and the Stirlingshire and Falkirk Water Board. The Department convened a working party and the agreement which emerged: ⁴⁰

"Not only affords a practical solution to the immediate problem of providing much needed water supplies in the burgh and water boards area, but offers to both local authorities advantages that are bound to have important and far reaching results".

The Town Council, through the bulk supply agreement, quadrupled their supply virtually immediately whilst the water board received a substantial contribution to its current costs, at a stroke doubling the consumption which bore the debt and interest repayments of their works at Loch Carron.

It was not long, however, before clouds appeared on the horizon. Progress with several schemes was necessarily restricted through

shortage of labour and materials in the post-war years. The DES Annual Report for 1950 announced that it had been necessary to inform a number of local authorities that work on particular schemes must be deferred until a place could be found for them in the programme.⁴¹

"It has been demonstrated on a number of occasions that over-authorization of work leads to longer delivery periods of essential materials, the under-manning of contracts, especially where the work is in remote areas, and the general slowing down of work of a similiar type".

It seemed inevitable that some schemes would have to be postponed for a considerable time.

As soon as these shortages had eased progress began to be affected by the series of cut-backs in public expenditure that characterised the so-called 'stop-go' policy of the Conservative government of the 1950s. The Annual Report for 1957 announced that general restrictions on new loans had come into operation in February 1956 and that no consents to borrow capital monies had been granted for any new scheme or expansion of an existing scheme since, except where considerations of health, safety or other vital interest had made deferment impracticable. Some 86 schemes of water supply were deferred in 1956 and 1957.⁴²

It would seem that, in this atmosphere of austerity, goodwill amongst at least some local authorities evaporated. One of the DES regional schemes circulated for discussion in 1945 involved the re-development of the Turret water catchment. (Other illustrations are discussed in Chapters 6 and 7 below). It had been the source of water for the small burgh of Crieff since 1872 and the source of mill-water for some time before that. DES engineers devised a scheme

whereby a further 13 mgd could be derived from the partially developed catchment, to supply the future needs of the landward areas and burghs of southern Perthshire and Clackmannanshire. The full details of a viable scheme were reported by consultants commissioned by Perth County Council, but the County Council only required 3mgd and partners in the development were sought. Clackmannanshire, also requiring 3mgd, immediately agreed. Alloa Town Council decided to participate in 1950 but withdrew again in 1952 and Perth Town Council and Fife County Council, other potential partners, declined to participate. By 1954⁴³ the two County Councils were resigned to going it alone.

But meanwhile the harmonious relations between Grangemouth Town Council and the contiguous Stirlingshire and Falkirk Water Board had broken down. Continuing to expand, Grangemouth required at least a further 2 mgd. The Stirlingshire and Falkirk Water Board had extended their Carron complex to include the last 4mgd economically recoverable but terms between the two could not be agreed. Instead Grangemouth looked north and in 1955 approached the two County Councils with an interest in the Turret scheme, with a view to a bulk supply of 10mgd. Agreement was reached and an authorising order issued in 1958 establishing the Loch Turret Water Board, a bulk supply body. It is said, however, that Grangemouth went against the express wish of DHS in rebuffing co-operation with its immediate⁴⁴ neighbour although it is questionable whether any other source could have served its unusually large industrial requirements.

The County of West Lothian was also facing the exhaustion of obvious possibilities in the immediate area. At the beginning of 1960

it became certain that there was to be a new motor vehicle manufacturing plant at Bathgate, largely at the insistence of Government, and it seemed that other industries might follow in its wake. It became apparent that local sources would satisfy future needs for less than a decade.

Thus the water resources of the Campsies and of the Pentlands were apparently drawing near to the point of exhaustion, largely because of very large industrial demands. The prospect of major new developments arriving and creating a level of demand equivalent to a small town in a very short timespan apparently set DHS engineers thinking along the lines of a very large regional scheme for the whole of the central belt of Scotland between Glasgow and Edinburgh. Any scheme would have to satisfy four requirements: the source should have a very large potential yield; it should be capable of development in stages; its capital cost should be as low as possible since no-one could possibly predict how rapidly demand would increase; and it should be as near as possible to the Central Belt.

A working party was set up in 1960 drawn from those local authorities with a potential interest in water from a large scheme and this technical group examined various possibilities including the Knaik catchment of the Teith Basin and an abstraction near the tidal limit of the River Tay (see Chapter 8 below). In August 1961, however, consulting engineers reported that a scheme based on pumping water across a large part of Central Scotland from Loch Lomond was both engineeringly sound and an economic solution to the problem. A Loch Lomond Committee was then formed to promote a water

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order. But this was to be no simple repetition of the co-operation which set the Loch Turret scheme and bulk supply board underway. To set the scene, one must return to Government policy with regard to industry and economic development.

Regional Policy Revived

There was a pronounced swing against the government in Scotland and Northern England in the general election of 1959 yet its overall majority had been increased. The reason was clear: whilst the country as a whole was enjoying a boom the local economy of these two regions was in decline. Subsequent analysis has shown that the growth of the Scottish gross domestic product began to lag behind the U.K. in 1954 and that by 1958 there was a serious shortfall. Two staple Scottish industries, coal and shipbuilding, both began to feel the effects of competition, from other fuels and from overseas and went into serious decline. Unemployment in Scotland in 1960 stood at more than twice the national average. The result was that regional policy in the 1960s was accorded a much higher priority by government than it had been in the 1950s. Attention turned to ways of promoting regional expansion and to the contributions which the regions might make to a higher rate of national growth.

The importance of creating an environment conducive to growth and the role which new towns, urban renewal and a revitalised infrastructure of industrial services could play in this respect began to receive recognition. Very little of this was original. The importance of promoting sound economic growth based on areas capable

of expansion, and of economic planning or the links between regional (economic) and physical (town and country) planning had been emphasised by the Barlow Report some twenty years before. Specifically with regard to Scotland, the Cairncross Report of 1952 had assessed the problem and made recommendations.⁴⁶ Faced by the end of the decade with a worsening economic and employment situation, the Secretary of State suggested in November 1959 that the Scottish Council (Development and Industry) should establish an enquiry into the Scottish Economy, an exercise backed by the full co-operation of government departments.

The Tothill Committee reported in 1961.⁴⁷ The primary need was to increase the proportion of the more rapidly expanding types of production and this meant the attraction of more firms. The committee made a wide variety of recommendations, but of particular interest in the context of water management were its views on three areas of public policy; housing, new towns and amenity. Despite the post-war building programme, there were still industrial areas where housing was inadequate and its distribution unsatisfactory, so that the geographical mobility of labour was hindered and growth and flexibility in the economy inhibited. Local authorities should be better equipped to build houses, often of a better type than formerly, for incoming workers. The advantages to the economy of alleviated congestion in Glasgow and the creation of more growing industrial areas were such that the Government should pursue and intensify its existing policies of 'overspill' and of creating new towns. Poor amenity in some parts of Scotland had lost the nation new firms and the committee emphasised the need to present an attractive face to prospective entrepreneurs.

Although no specific comments were made on the role the improvements in the quality of streams might play in this latter respect, recommendations of this type had important implications for the supply of water. The strong association of rehousing and an expanding supply must now go one step further to include the potential requirements of industrial consumers, and the redistribution of that demand took on a new, regional dimension in accord with policies of overspill and new town expansion. Significant quantities of new water were required in areas hitherto free of such pressure and the question arose; would the existing structure of administration be able to cope?

At the level of central government the committee recommended that a new department be created within the Scottish Office to bring together the existing industrial and planning functions of existing departments. The Scottish Development Department was accordingly established in June 1962 to take over the duties of the Scottish Home Department with regard to industry and development (electricity, roads and local government) together with those of the Department of Health for Scotland relating to housing, town and country planning, water and sewerage. A new phase of government intervention in local affairs was about to begin. But this is the subject of the following chapter.

Overview

Over the period under consideration in this chapter the basic institutional structure was formed. The reorganisation of local

government of 1929 had swept away the district level of government (see Chapter 6 below) although it was left to linger with respect to water supply and sewerage for another twenty years. The Scottish Office was established with political responsibility for its actions vested in the Secretary of State. By 1960 a lot had been achieved since 1929 when water supply management was still cast in its original highly localised terms, a fact nowhere more apparent than in the rural special water supply districts. Water supplies were managed in units strictly drawn around the areas served. Of course, suburban expansion put pressure on this straight-jacket but whereas the burghs extended their boundaries by promoting their own legislation no such option was open to the SWDs so that the drought of 1933 inevitably exposed fundamental weaknesses.

There was clearly a need for a greater degree of central intervention by the 1930s but it came as the indirect result of changes in the broader context of water supply. As Parliament progressively gave central government more and more powers of intervention in the economic and social life of the nation there was less and less scope for it to deal with detailed matters such as new sources of water supply and these had to be delegated to the civil service.

With reorganisation of local government accomplished such a short time before the establishment of the modern Scottish Office there was a limit to the extent to which the Secretary of State could intervene in matters of water supply: proposals could be vetted and unsatisfactory elements rejected but clearly reliance was being

placed on guidance rather than authority now that the central department had a legitimate right to intervene. Although precedents suggested direct intervention was necessary and members of the Committee on Scottish Health Services had warned that this was ultimately inevitable, the exercise of informed influence on the part of central authority worked well until the mid 1960s, achieving, most notably, the extension of piped supplies to all.

In these early decades the focus of attention lay on the relationship between water and general development rather than on water resources management in particular. The sustained attack on housing problems fuelled demands for water and the intervention of the Commissioner for Special Areas provided an important precedent for the industrial use of water, continued in the post-war years by means of grants under the auspices of the Industry Act 1945. Nevertheless, neither the pressures of new housing nor industrial requirements forced any change in the basic institutional structure although the abolition of SWDs in 1949 eased the passage of comprehensive schemes of water supply for development outside the burghs.

The role of adequate information is an important theme in these early decades. The lack of it was not recognised as important until the crisis of drought struck and it took another crisis, war, to bring action. Once the whole picture had been collated, however, it was put to good use although the delicate relationship that developed between central and local authority apparently excluded its publication for all to see and comment upon.

There were a number of indications that the areas of units of local government were not appropriate for the management for water supply, but the informal relationship between the Scottish Office and local authorities seemed able to transcend occasional difficulties, at least until the government became politically committed to specific developments in the 1960s. Radical revisions were about to be made as 'development' became a major political issue in Scotland and it is to these that attention now turns.

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CHAPTER 5

The Water Service in Scotland is reorganised twice: Central Government Policy on water supply, 1960-1975

In the context of political pressure that nothing should hinder the government's programme for growth and development, the process of securing sources of water for the future and more importantly of financing their procural at last led to the regionalisation of water management. In the period considered in this chapter, local administration of water was reorganised out of direct local authority control to special ad hoc boards and then returned to much more broadly based areal units than ever before envisaged. A new level of water administration also made its appearance in the form of the ad hoc Central Scotland Water Development Board.

Once the Scottish Office had become committed to 'development', it was no longer possible for central government water engineers to continue in their role of guiding light, as the only means of co-ordinating inter-regional developments with the Scottish Development Department (SDD) anxious to implement the programme of successive governments, central-local relations changed dramatically in the 1960s: SDD found itself in open conflict with several local water authorities, something that was unthinkable only a decade before. The reorganisation of central government that produced SDD was not merely cosmetic.

A Programme of Development

The new Scottish Development Department (SDD) wasted no time and within a year produced the first regional economic plan of the 1960s - 'Central Scotland: A Programme for Development and Growth'.¹

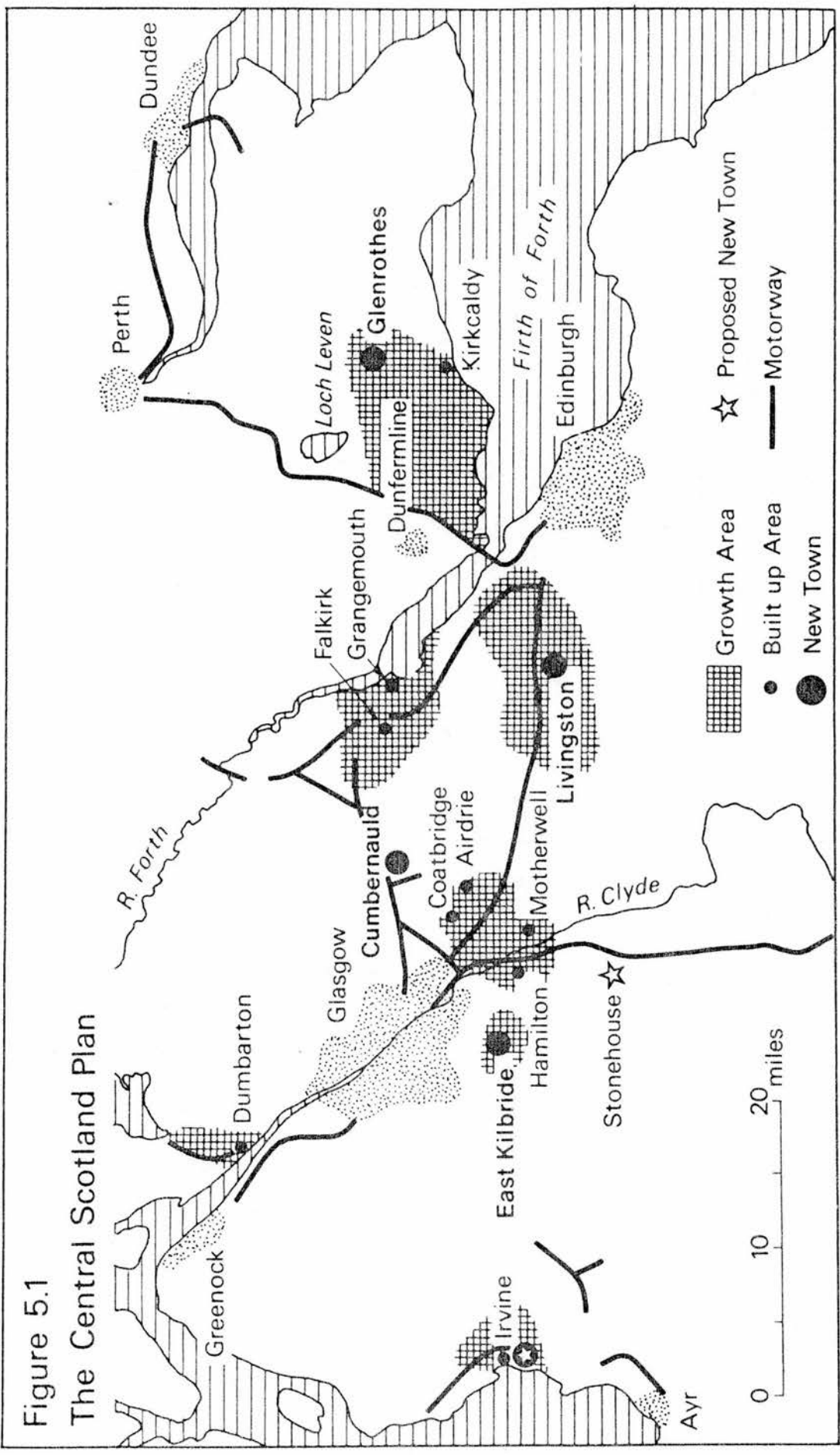
Figure 5.1 is a diagrammatic portrayal of the principal developments it announced. Few of these were new initiatives. What was new was their presentation as a coherent package and the commitment of the government to foster their implementation in a coherent and concerted manner. Of particular significance for water supply were two elements of a six point strategy. First, increased public investment would modernise the infrastructure services the modern economy required. These included main roads, docks and airports; regional water schemes; the repair and removal of the older industrial areas; and a substantial programme of new housing in support of economic growth. Second, growth areas had been chosen as potentially the best locations for industrial expansion and the foci of services.

These were:

1. The new towns of East Kilbride, Cumbernauld and Livingston.
2. The new town of Glenrothes.
3. The Irvine district of North Ayrshire.
4. The Grangemouth-Falkirk area.
5. The Vale of Leven district of Dumbartonshire.

Abundance of water could be a particular attraction to certain types of industry and in this respect the plan contained measures to assure Central Scotland's foreseeable needs. Loch Lomond was to provide up to 100 million gallons per day: work was going to begin the following year. The scheme would serve all the major developments mentioned in the paper except those in Fife and Ayrshire. For Fife 'it would be possible to obtain supplies from other sources' when required whereas

Figure 5.1
The Central Scotland Plan



Ayrshire's needs were to be fully catered for by a scheme based on Loch Bradan, about which consultations were already taking place. (The scheme had been under discussion since 1956, see Chapter 7 below). The government had now committed themselves as a top priority to the Loch Lomond and schemes of regional water supply. The latter were now rather more 'essential for industrial expansion' than as formerly described, 'the very basis of public health'.

The Department also quickly turned its attention to problems of local co-ordination and co-operation. The structure of local government was examined to see how far it matched the needs of the 'expanding Scotland of today and tomorrow' and SDD's views were published in 1963 in a second White Paper.² Since the last re-organisation of local government, in 1929, the extent to which the economic development of the local authority areas depended upon its activities, particularly through the provision of basic services such as housing, roads and water, had greatly increased. A new structure was required to facilitate economic growth and regional development. Those services which would benefit most from the administration of a large area should become the responsibility of large regional authorities while those services for which more local control was thought appropriate should be allocated to a second, lower tier of authorities, perhaps created through the amalgamation of burghs with their surrounding landward areas. Water supplies should be the responsibility of top-tier, regional authorities, as should sewerage and river purification.

A reorganisation of this sort, it was claimed, would enable local

government to play an increasingly effective part in providing and managing the infrastructure on which a modern economy must, to an increasing degree, depend.

The Scottish Water Advisory Committee investigates

The White Paper on local government as a whole was for consultation only, however, and in the meantime, particular services such as water supplies required more specific proposals. A policy had existed in this respect since 1944: the time had now come to mount a determined effort of implementation, at least with regard to Central Scotland. The new Scottish Development Department awaited the views of the Scottish Water Advisory Committee (SWAC) which had been commissioned in January 1962 to examine local administrative control over the development and distribution of water supplies in Central Scotland, and examine 'how far it might be desirable to draw together local water authorities in the area, with a view to facilitating measures for securing an efficient and economic supply of water adequate for all purposes, throughout the area'.³ This was the thorough enquiry into the legal and administrative aspects of water supply the Committee on Scottish Health Services had called for some twenty five years before.

In effect, SWAC was to hear opinions and assess the viability of a long standing policy. The men to do the job were drawn from a wide range of authorities, largely from the corps of professional engineers in the public service, but all had one thing in common, an understanding of what was, and what was not possible in the world of

central-local government relations. As with the Toothill Committee, they were assisted in their task by the permanent officials of DHS.

Whilst a working grasp of the essential facts about the history, present state and possible future development of the water service in the area could be got from central government files, only the local water authorities themselves, the three associations of local authorities and the professional bodies could supply information as to the prevailing climate of opinion and the likelihood of moves for change proving successful. The background of members of SWAC is listed in table 5.1 whilst those who gave evidence, and those who did not are listed in table 5.2. Perhaps significantly, it was primarily the professional associations and the larger water authorities that responded to the committee's quest for views: only five of the 37 small burghs submitted evidence.

With regard to the existing pattern of development and distribution in Central Scotland SWAC was conciliatory. It recognised that the primary duty of the individual authorities concerned had been to supply water to those in their own area, and that the separate development of sources, which in some cases now seemed to have been short sighted or self-interested, was not so in the different circumstances existing when the projects were undertaken. It was thought that, although little could now be done about the needless expenditures on some projects, it was conceivable that some of the burden of maintenance and management could be shed and that further duplication and anomalies could be avoided if administrative control was rationalised.

Table 5.1 Background of the members of the Scottish Water Advisory Committee, 1963 - 1966.

P.L. Aitken	Chief Hydraulic Engineer, North of Scotland Hydro-electricity Board.
J.C.O. Burns	Former Chief Engineer, Department of Health for Scotland.
S.F. Carruthers	Estate factor and land agent.
A. Convery	Chairman, Glasgow Corporation Water Committee
J.W. Fletcher	County Engineer, Dumfries County Council
T. Gibb	County Clerk, East Lothian County Council
G. Grant	Town Clerk, Dumfries Burgh
A. Imrie	City Treasurer, Edinburgh
T.W. Leslie	County Engineer, Ayrshire
R. McGill	County Clerk, Morayshire
A.H. Martin	Town Clerk, Perth
C. Mitchell	Former Under-Secretary, Department of Health for Scotland.
G. Sharp	Chairman, Fife County Council Water Committee
A.E.R. Taylor	Paper Manufacturer, Penicuik, Midlothian
I.B.L. Weir	Medical Officer of Health, City of Dundee

Table 5.2 Evidence to the Scottish Water Advisory Committee's investigation of the water service in Central Scotland.

Type of body.	Giving Evidence.	Not Giving evidence.
1. City Corporations	Edinburgh Dundee Glasgow	-
2. Water Boards and Joint Committees	Clydebank & District Loch Turret Stirlingshire & Falkirk West Lothian	Wemyss & District Airdrie, Coatbridge & District
3. Large Burghs	Dumbarton Stirling	Dunfermline Kirkcaldy Hamilton Motherwell & Wishaw
4. Small Burghs	Alloa Grangemouth Inverkiething Kirkintilloch St. Andrews	Bearsden, Milngavie, Rutherglen, Barrhead, Clydebank, Cove & Kilcreggan, Helensburgh, Kilsyth, Bridge of Allan, Denny & Dunnipace, Falkirk, Alva, Dollar, Tillicoultry, Auchtermuchty, Buckhaven & Methil, Burntisland, Cowdenbeath, Crail, Culross, Cupar, Elie & Earlsferry, Falkland, Inverkiething, Kilrenny & Anstruther, Kinghorn, Ladybank, Leslie, Leven, Lochgelly, Markinch, Newburgh, Pittenweem, St. Monance, Kinross, Bonnyrigg & Lasswade, Dalkieth, Musselburgh, Penicuik, Biggar.
5. County Councils	Dunbartonshire Stirlingshire & Clackmananshire Fife & Kinross Midlothian Lanarkshire	-
6. Representative Bodies	Association of County Councils in Scotland British Waterworks Association Convention of Royal Burghs Federation of British Industries Society of County Engineers in Scotland	

SWAC welcomed the proposal to embark on the Loch Lomond scheme which they considered 'to be conceived on the bold and imaginative lines necessary to hasten the challenge of the rising demand for water'.⁴ Indeed, in its view, 'the aim must be to align the maximum possible support for the scheme ... to broaden the back that must bear the heavy expenditure involved'. The degree of co-ordination effort required would be much easier to achieve if there were fewer, larger water authorities. SWAC believed that the Loch Lomond scheme made a major reorganisation of the administrative structure, which had for long been regarded as desirable, 'a matter of compelling urgency'.

There were too many water authorities, too small and too fundamentally weak to fill the role effectively; consequently, there was a lack of operational flexibility and co-ordinated planning: what was to be done? The Secretary of State had made it clear that a solution was expected that involved some sort of regional board of which there were two possible types: bulk supply boards which would supply water to existing local water authorities for distribution and 'source to tap' boards responsible for both supply and distribution. As outlined in Chapter 6 below, there were Scottish precedents for both, but the former had already been rejected in England and Wales where a circular of July 1958 had announced, 'the Minister is of the opinion that a general system of bulk supply boards, with distribution in the hands of existing water undertakers, would be wasteful of manpower and resources and that, in order to meet the overriding requirements of an efficient and economical water organisation, unified control over supply and distribution is

5

essential'. SWAC endorsed this view: a system of bulk supply boards would increase rather than reduce the number of water authorities. There would still be the danger of supplies being reserved for a distribution authority although these were not immediately required, in recognition of the capital contribution it had made to making them available so that another authority's urgent needs were denied. Neither greater co-ordination nor flexibility would necessarily follow the institution of such a system.

The Institution of Water Engineers favoured a single board for the whole of Central Scotland. Such an institution would ensure the best use of existing sources and facilitate rational forward planning. Day to day operations would require the delineation of six divisions which would reflect topography and be of a size most suitable for efficient routine maintenance and which would take no account of existing local authority boundaries. The Board would levy a single water rate and be appointed by the Secretary of State.

SWAC saw the merit in such a scheme from the engineering point of view but found it politically unacceptable and therefore an impracticable suggestion. First, replacing existing authorities with a single board consisting wholly or partly or non-elected members would be unacceptable from the democratic point of view, bearing in mind the traditional role of the water service as the very basis of local public health. The Institution had stressed that people appointed to the Board should be selected 'for the personal contribution they can make' and should be 'capable of taking broad policy decisions and leaving administration to the professional

officers'.⁶ But even if the membership was entirely of local authority nominees, not every one of the seventy or so authorities could be represented. Some would be inadequately represented in relation to their size, whilst others would not be represented at all.

Second, the institution sought a uniform charge for water over the whole area because of the extent to which engineering solutions to problems of supply had been adversely affected by the differential impact of joint projects on local rates. Under the institution's proposals local authority would have no financial responsibility and SWAC felt 'there should be no requisitioning without representation'. It was not convinced that 'in present circumstances' a uniform water charge was a practicable proposition.

After weighing the evidence submitted to it, SWAC was satisfied that a system of 'source to tap' boards would satisfy the objectives of the results. A small number of authorities of this kind would provide the administrative system which would remove difficulties of inflexibility and co-ordination, enable existing sources to be pooled for the common good and facilitate the degree of co-operation between sizeable authorities that was necessary for the development of major sources like Loch Lomond. Such a system would also remove another weakness: too often water management was the part-time task of technical officers heavily burdened with a wide variety of other duties. Only nine of the 61 authorities in Central Scotland had a full time engineer concerned with water supply.

Just as it was essential to secure unified control within each

region SWAC thought there should be some provision made for co-ordination and co-operation between regions. For this purpose they recommended the creation of a strong central development agency, a water development board, whose first major task would be to oversee the Loch Lomond project. This board, in the meantime, should be made up of representatives of regional boards participating in the scheme. SWAC attached particular importance to the need to authorise borrowing powers to the development board in its own right so that it would operate without the hinderance of having to reserve supplies for the whole use of particular regional boards. It would then finance its debt by the sale of water to regional boards at a uniform charge. A system was required whereby the high initial costs of developing Loch Lomond could be recovered as and when the reserves made available were taken up.

The Institution of Water Engineers, the Convention of Royal Burghs and the Federation of British Industries had all suggested that there was a need for a central authority in the administrative structure of the water service, the task of which would be to promote co-ordination and resolve disputes between boards. SWAC reminded them that this was the duty of the Secretary of State and was 'strongly of the opinion' that his department should not only continue to settle disputes 'as an independent authority above the battle' but also continue to exercise a strong role in the overall co-ordination of the development of new sources.⁷

Finally, in considering the areas of regional boards SWAC had not only worked to existing local government boundaries but also to

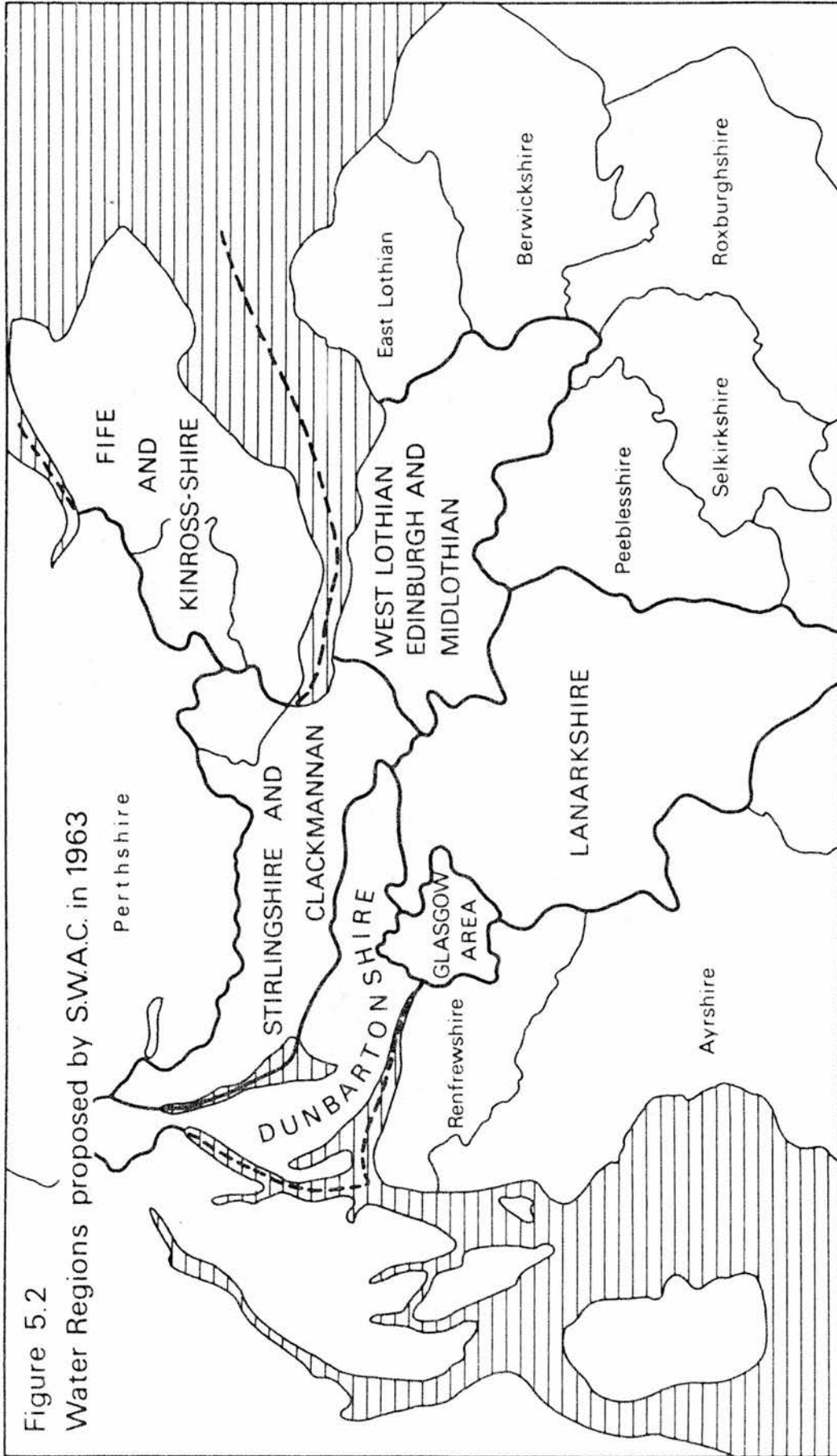
physical features and technical considerations which made it desirable in certain cases to depart from these boundaries. Six 'source to tap' water boards were recommended, the pattern of which is depicted in figure 5.2.

SWAC submitted their report on Central Scotland in March 1963. In November the government's programme for development and growth was published. The latter had defined Central Scotland to include Renfrewshire and Ayrshire, whilst the former had not. Accordingly SWAC was invited to repeat the exercise of consultation in these two areas. It reported in 1964 that two 'source to tap' water boards would be equally appropriate for these areas. But the 1964 general election brought a change of government and a new Secretary of State to the Scottish Office.

Regional development, if anything, was accorded a higher priority by the new government and within a year it announced its own 'Plan for Expansion' (a principal feature of which was the extension of the strategy of growth areas to the whole of Scotland)⁸. The previous Secretary of State had sent copies of SWAC's 1963 report to all water authorities outside the Central Belt and had invited these authorities 'to consider whether there was scope, in the general interest, for joining with other neighbouring authorities into units which can make more economic and flexible use of water resources than is possible, each by itself'. This had evoked no obvious response by November 1965 when the new Secretary of State asked SWAC to extend its study to those areas.⁹

Figure 5.2

Water Regions proposed by S.W.A.C. in 1963



SWAC began its investigation in the full knowledge that the principle of its previous recommendations had been accepted by the then government, in July 1963. In November 1964 the succeeding government had also adopted as policy the system of 'source to tap' regional boards and 'water development board' to administer the Loch Lomond scheme. In accordance with procedure laid down in the Water (Scotland) Act 1946 the Secretary of State had then published his intention of implementing the policy through draft amalgamation orders for Ayrshire and for Edinburgh, Midlothian and West Lothian in December 1964; for Fife and Kinross in March and for Lanarkshire in April 1965. Formal objections were made to all four and a statutory public enquiry for the Ayrshire proposal fixed for June 1965. The nature of opposition in Ayrshire is fully outlined in Chapter 7 below, whilst the bitter opposition of the city of Edinburgh to its compulsory amalgamation with West Lothian is reviewed in Chapter 6.

In these circumstances SWAC felt it unnecessary to review the arguments for and against regional boards for a second time. Its task was to ascertain if what was appropriate for the Central Belt would also be appropriate for the rest of the country, whilst also taking the opportunity to reconsider some of its earlier recommendations on regional combinations in the new context of a national perspective.

The administrative problems of water supply were admittedly different outside the Central Belt. Of the 126 authorities, 93 supplied fewer than 1000 people. These areas accounted for 86% of

the land surface but only 28% of population. Distance, unpopulated mountainous country and difficulty of communications had all to be taken into account. Nevertheless SWAC felt that the number of water authorities was 'needlessly large' and the majority were too small and too weak 'to be able to play a viable role' as separate authorities in modern conditions. Authorities had failed to cooperate 'as they should have done'.¹⁰ The differences between centre and periphery were of degree and not of kind. The case for re-organisation rested on a need for viable units and the real question was not so much whether amalgamations should take place but rather which particular amalgamations would be best.

Two earlier recommendations required some alteration in the light of the new national perspective: Renfrewshire and West Lothian. Since SWAC's last report consulting engineers had examined possibilities for the future supply of Renfrewshire, concluding that in the long term (after 1990) the area would have to look north to Loch Lomond. In this light they had recommended an involvement in the scheme from its inception. Other authorities in the Lower Clyde would also be interested in the scheme and so Renfrew County Council had proposed an amalgamation of themselves with the proposed Dumbartonshire Regional Board. The County had felt Glasgow should continue on its own but others felt that the city's financial resources would make a welcome contribution to any combination. The City itself, whilst generally sympathetic to the concept of regionalisation, declined to comment on a wider grouping until they had more information on its technical and financial implications. SWAC, however, saw advantages in linking their three former groupings,

Dumbartonshire, Glasgow and Renfrewshire, and recommended the creation of a Lower Clyde Water board including all three. With a population of 1.5 million it would not be out of scale with comparable areas of England.¹¹

The West Lothian Water Board had been formed in 1958 in response to the near exhaustion of local sources. In 1963 SWAC had taken the view that the West Lothian Water Board was too small to support the expense of future developments and had been concerned to ensure that difficulties over water supply and rising water rates did not hinder the development needs of industry, or indeed, the new town at Livingston. It seemed essential in the interests not only of Central Scotland but of the nation's economy as a whole that all possible steps should be taken to improve industrial facilities in the area and therefore a wider regional grouping was required for the administration of water supply.¹² The question was 'combination with whom?'

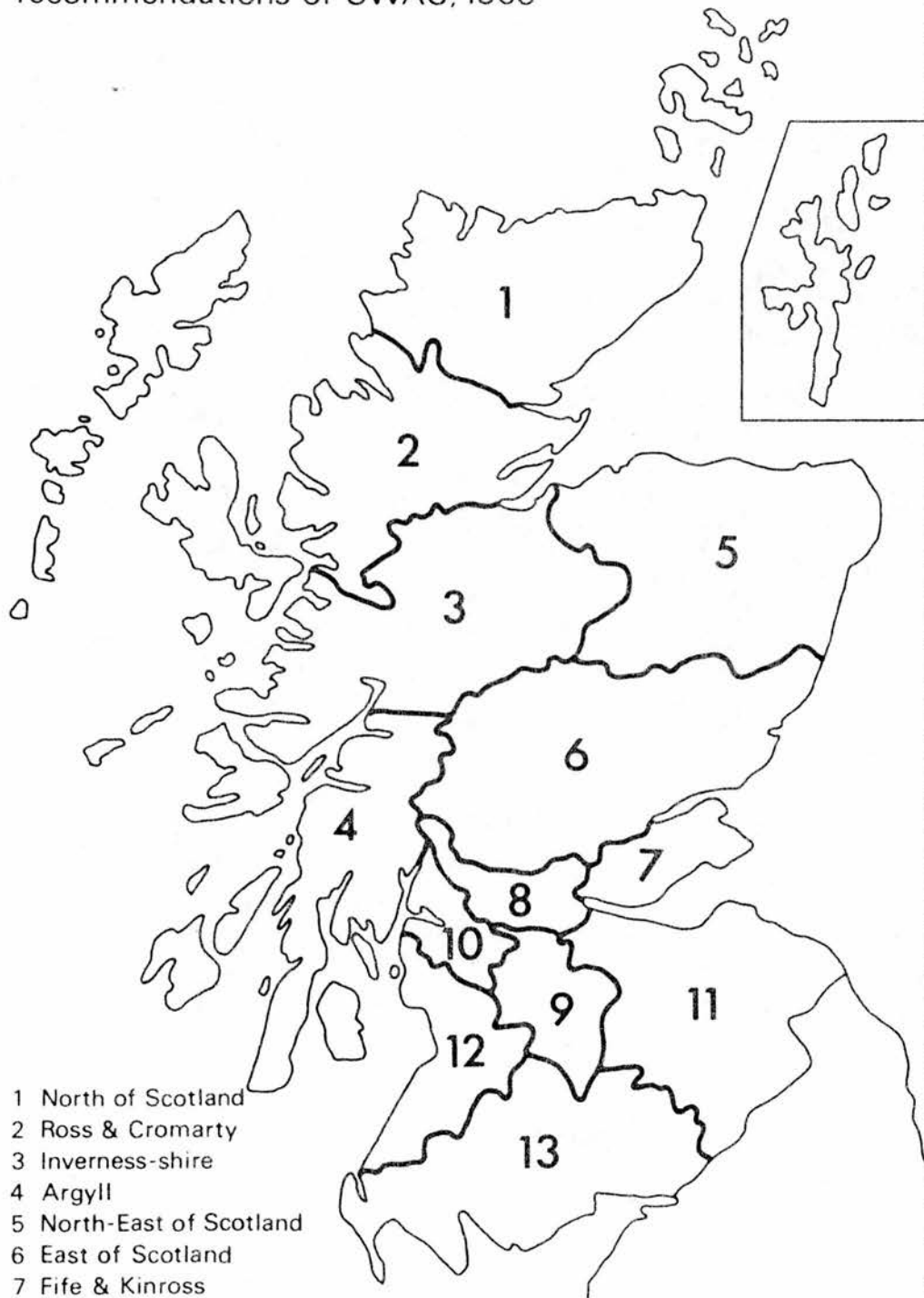
Topography ruled out a combination with the proposed Stirlingshire and Clackmannanshire Board to the north and therefore the only practicable alternative was combination with Edinburgh and Midlothian. Edinburgh had been examining its strategy of future supply and had considered Loch Lomond but had concluded that water from its traditional catchment area, the Upper Tweed, would be cheaper. Accordingly the Corporation had told SWAC that the city's interests lay in the Tweed basin and with other authorities there, and not with those to the West. SWAC was concerned with the future needs of Livingston, the area of which lay astride the boundary of West and

Midlothian. The growth centre was to benefit both counties and Edinburgh Corporation which had merged its water undertaking with Midlothian in 1948 would share responsibility for providing water with West Lothian. Edinburgh had asked WLB to undertake the watering of the whole area, but SWAC felt it wrong to contemplate divided control for this 'experiment of social and industrial planning'. Since West Lothian would be unviable on its own, the Corporation's area of supply should be extended not only to include the new town but also the remainder of the county: the two authorities should merge.

When SWAC came to review the administration of water supplies in the Tweed Basin, Edinburgh offered to act as bulk supplier to all other authorities with an interest in the catchment, but some authorities in the basin did not want 'to be incorporated as the terminal point in a water supply system centring on Edinburgh'.¹³ As elsewhere the sensible solution seemed to be the amalgamation of all authorities with overlapping interests in the same sources. These included West Lothian with its traditional source of supply in the Pentland Hills, shared with Edinburgh and Tweed authorities. Accordingly, SWAC recommended the extension of the Edinburgh and West Lothian merger to include East Lothian (which shared the Lammermuir catchment with Edinburgh) and the Tweed authorities. Accordingly, a single South-East of Scotland Water Board was recommended. A strong regional grouping such as this would provide the viable water undertaking required by the new governments White Paper on Development which laid plans for expansion in the Borders Region as well as take some of the heat out of Edinburgh's view that the city's water undertaking was being reorganised solely to underwrite

Figure 5.3

Water supply regions : final recommendations of SWAC, 1966



- 1 North of Scotland
- 2 Ross & Cromarty
- 3 Inverness-shire
- 4 Argyll
- 5 North-East of Scotland
- 6 East of Scotland
- 7 Fife & Kinross
- 8 Mid-Scotland
- 9 Lanarkshire
- 10 Lower Clyde
- 11 South-East of Scotland
- 12 Ayrshire & Bute
- 13 South-West of Scotland

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expansion in West Lothian. With these amendments SWAC now proposed a national system of 13 boards as depicted in figure 5.3.

With respect to the proposed water development board, SDD had published the Loch Lomond Water Board Order 1965 to create a bulk supply board and authorise the scheme. SWAC disapproved of this mechanism because of the inflexibility it might cause, for example, the published order made no provision for the admission of additional constituent authorities. SWAC reiterated its view that the development board proper should have its own borrowing powers and adopt a new system of charging for bulk supplies. The development board it had in mind would not only superintend the Loch Lomond scheme but also any subsequent inter-regional schemes although it was thought that these would only ever be required in Central Scotland.¹⁴

The British Waterworks Association and the Institution of Water Engineers had a much wider vision of the role of such an authority and again, by implication, the role of the Secretary of State as central authority in Scottish Water Management suffered some criticism. The Association suggested that an all-Scotland water development board might:

1. Survey the water resources of each area.
2. Assess demand in each area.
3. Determine the sources that would be developed to meet demand.
4. Plan programmes of work within each area.
5. Make specialised techniques and disciplines, which they might otherwise be unable to afford, available to the regions.
6. Provide specialised equipment, such as computing services.

7. Provide an engineering service for the remoter areas.
8. Advise the Secretary of State on the disposal of grant-aid for water.
9. Work towards the adoption of standard equipment and practices.
10. Arrange mutual aid programmes both in men and equipment.
11. Provide services for bacteriological and chemical analyses.

In effect, professionals were again arguing for a national water agency. All the above functions are those of a headquarters organisation with the regional boards merely being left the task of day to day maintenance and, of course, the task of raising the money to pay for new developments, whilst on the other side the Secretary of State would act as an agent of the Treasury and return to his pre-1946 role of administrative superintendent.

SWAC felt it undesirable to give advisory, planning and executive functions to a body whose primary role was to construct inter-regional schemes and hold resources for the future. An additional executive tier of administration 'would merely add a fifth wheel to the coach'. The Development Board was to be an equal partner of the regional boards, not their master.¹⁵

With regard to the implementation of SWACs proposals, SWAC now felt that the statutory procedure laid down in the 1946 Act would not work. It seemed likely that every regional amalgamation would be opposed; each would require a public enquiry to be held and even where objections were then withdrawn, at least a year would pass before implementation of any Order. On the other hand, if objections

were sustained and went to Parliament, a much longer period would elapse. The sheer weight of administrative work accompanying such a process would ensure that only a limited number of orders could be processed simultaneously. Accordingly, it would be some years before the complete reorganisation came about and in the interim some authorities might well be reluctant to spend on urgently needed improvements while the prospect of re-organisation hung over them. Existing procedures could not be relied on to produce results 'with the speed that the present situation demands, notably in industrial boom areas'.¹⁶ Now that a national reorganisation was being proposed they recommended that the whole matter might be considered in Parliament.

The Water (Scotland) Act 1967

This conclusion was published in September 1966. The draft orders to rationalise water management in Ayrshire and establish a Loch Lomond Water Board were both bogged down in procedure dealing with objections. The government's strategy for economic development seemed threatened and accordingly the Secretary of State placed a Bill to reorganise the water service in Scotland before the House of Commons in January 1967.

The Secretary of State introduced the Bill to the Scottish Grand Committee in the following terms.¹⁷ The previous Secretary of State, when accepting SWAC's 1963 recommendations for Central Scotland, had hoped that the regrouping of authorities could be achieved voluntarily. 'It was a pretty grim hope'. There was no prospect of

forming the boards voluntarily. In every case some local authorities blocked amalgamation by insisting on putting what they considered to be the interests of their own rate payers before the wider interest of the economic growth and prosperity of Scotland. Compulsory amalgamation orders had been published in 1964 but 'experience in the two years since then has demonstrated that it would take years to secure amalgamation by that means'. The 1963 plan for Central Scotland had envisaged the Loch Lomond scheme in operation by now. 'We cannot afford to wait any longer. The need to develop supplies for new industry and new communities is so immediate that changes proposed in the Bill must be made now'. No further steps would be taken to bring into effect any of the regionalisation orders that had been published in draft. The Loch Lomond Order would go ahead because 'we must continue with it because of the urgent need for water in Central Scotland'. This kind of action had to be taken if 'we are to face our responsibilities as legislators and mean what we say about economic growth in Scotland'.

In contrast to the 1946 Act, the 1967 Act was brief and to the point. It empowered the Secretary of State to establish 'as soon as possible' the regional water boards specified in a Schedule of the Act; it dealt with the transfer of assets, established the Central Scotland Water Development Board to develop inter-regional sources of water supply, allowed for subsequent modifications of the initial pattern of Boards and the creation of further water development boards should they be felt necessary.

The Royal Commission of Local Government Reform

Within a year all fourteen of the new institutions were in operation but events which were ultimately to accord to them merely temporary custody of Scottish water supplies were already well under way. Four months before SWAC published its final proposals and a year before the 1967 Act passed into law (in July 1967) a Royal Commission on Local Government in Scotland, chaired by the Rt. Hon. Lord Wheatley, was appointed in May 1966 with the remit 'to consider the structure of local government in Scotland in relation to its existing function; and to make recommendations for authorities and boundaries, and for functions and their division, having regard to the size and character of areas in which these can be most effectively executed and the need to sustain a viable system of democracy'.¹⁸ Water supply was a function of local government and consideration of what institutional arrangements might secure its optimum administration passed to a new broader perspective in a new forum.

The task and conclusions of the Wheatley Commission (hereafter referred to as 'Wheatley') are considered in detail in Chapter 6. In this chapter, only those aspects of the Commission's work of relevance to central authority's policy with regard to water supply are considered. Some knowledge of each function had to be obtained by Wheatley: a detailed study of the characteristics and problems of each function would have taken too long and so Wheatley invited written and oral evidence from representatives of each. Answers to clear questions on the requirements of each function were sought so that Wheatley would merely have to fit the pieces of the jig-saw

puzzle together. Wheatley took the view that the need for reform was urgent and there was time to take only the broadest of views. The detailed working of functions was a matter for experts in their respective fields but the Commission could reach conclusions on groups of functions, focussing on their links with each other.¹⁹

Wheatley received written evidence on the water service before the 1967 Act became law but oral evidence after its passage through Parliament. Not surprisingly the evidence was contradictory, most of the written contributions having been written even before it was clear that SWAC's proposals would be accepted. Hence the two sets of evidence are considered separately below. Similarly in oral evidence no-one could have adequately foreseen how successful the water boards could be and, further more, SDD *officials* could not be closely questioned on the *raison d'etre* of the 1967 Act, lest it be thought that it was improperly commenting on a matter which Parliament had under active consideration.

Written Evidence

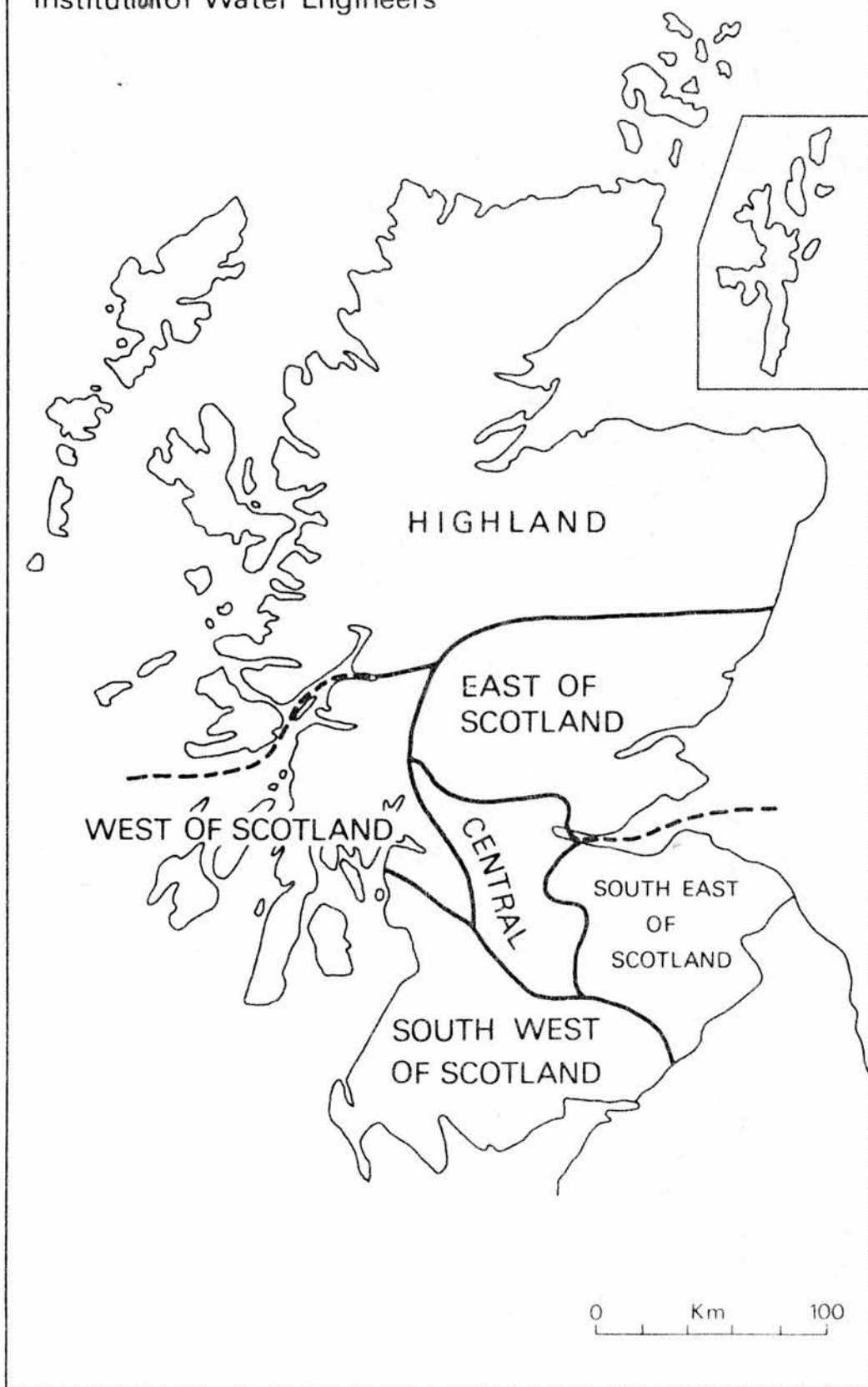
In written evidence SDD explained that SWAC had been considering the administration of water supplies for a number of years and that they had recommended a system of about a dozen regional authorities, the boundaries of which had, generally speaking, been drawn with regard to topographic features so as to include within their areas the main sources of supply which it may require to develop in future.²⁰ The recommendations were being considered by Ministers, the intention being to introduce a Bill later that session.

Confirmation of the need for regional organisation came from the Regional Development Division of SDD, which wrote that the initiative of most regional planning lay in the hands of Central Government, whereas implementation was to a very large extent in the hands of local authorities. Infrastructure, housing, water, sewerage and roads, were vital tasks of Regional development but local authorities has little incentive to administer them with a view to regional or national objectives. Many of these transcended local authority boundaries but, in turn, these often ran counter to the restricted financial interests of individual local authorities which it was the business of elected members to protect. 'A provident authority with cheap water, for example, may be required heavily to subsidise one with limited resources as part of a regional water scheme; or the strategic relation of housing and industry may require one hard pressed authority to undertake a great deal of expensive house building while another gets all the rateable value of a large industrial estate'. The basic units of regional planning were now very much larger than any single local authority area.²¹

The Institution of Water Engineers were not prepared to concede, at this stage, that SWAC had the correct solution to the problems of administration facing the water service.²²

"The Institution believes that previous remits (issued to SWAC) have been too restricted and too narrow and we have tried to look at the whole of Scotland now ... we must clear our minds of the existing proposed boards for which draft orders have already been prepared and/or published. When the Institution of Engineers gave evidence on Central Scotland they proposed one board which could be divided into areas for administrative purposes. We consider this to be the correct solution for the whole country but, if that is not acceptable ... much could be achieved by the following proposals ... Six Boards would be sufficient ... their boundaries ... drawn from a relief map on topographical considerations ...' (These are depicted in figure 5.4)

Figure 5.4
Regional Water Boards proposed by the
Institution of Water Engineers



The Institution clearly felt that those concerned with local government were inclined towards the trivial, hence

"It will be noted that the proposed views show no reference to the names of the constituent authorities. This is desirable'.

The boards should be small (15 members) and appointed by the Secretary of State from persons knowledgeable in matters of water supply as a health service and as a service to industry.

"No doubt the Secretary of State will wish to take advantage of the experience which has been acquired over the years by representatives of the existing local water authorities, but it is recommended that representation on the new boards should include at least three members having special knowledge and interest in water supply from considerations of the consumer'.

"We believe that ... there is no need for the water development Board proposed by SWAC. Instead there should be a co-ordination committee, composed of two members from each board and the six board managers. This committee would be informed of proposals by any Board to increase its resources before any order to carry out works is sought from the Secretary of State. If the committee considered that arrangements should be made for carrying out the scheme jointly by two or more boards they would advise the Secretary of State accordingly. The Boards concerned would then make their own joint arrangements'.

The Institution also took the opportunity to reply to SWAC's rebuff of its earlier proposals for a uniform water rate, suggesting three alternatives that might overcome practical difficulties:

1. The total requisitions of all six boards could be added together annually and re-allocated in accordance with domestic rate valuation.
2. The government could operate an equalisation grant scheme which would help to alleviate the poverty in the unproductive areas.
3. At the end of each year the average of the national domestic rates of the six boards could be taken as a norm and those boards whose national domestic rates were above the average for the country would then receive a payment from each of the other

boards of not less than half, nor more than all of the excess of the domestic rate above the average.

Oral Evidence

In oral evidence Mr. John Robertson MP emphasised the significance of central government's new interest in regional planning, saying that it 'radically altered the whole concept of local authority work' and amplified this by pointing out that any plan for a major set of concentrated developments, such as the new town at Livingston, must affect not only the immediate area of the town but also all local authorities in the wider region. For example, with regard to housing, unless there was a great increase in available resources, the other authorities would suffer. Major plans were funded through restricting the money available to other authorities. Therefore, decisions such as to build Livingston, impinged on every other local authority in Scotland. There would have been no Loch Lomond scheme had there been no Livingston; there would not have been all the trouble (discussed in Chapter 6) and doubted if there would have been a Bill before Parliament, because it was Livingston (and concentrated developments like it) that had brought about the need to re-organise water in Scotland. He went on to say that the fact of re-organisation of the water service itself pinpointed the need for Wheatley, 'because if there was ever a local authority function, it is water'.²³ His principal theme was that reform of local government was necessary so that major planning decisions need not be made by ad hoc (departmental) committees at the level of central government: there would be no local democracy unless there were elected people

where the decisions were being made.

In this context A.B.Hume, Secretary of the Scottish Development Department, told Wheatley 'I am a democrat before I am a technocrat, but I hope there is a better solution than making a simple direct choice'.²⁴ Nevertheless SDD believed 'special geographical areas' were necessary for the administration of water although, generally they continued to believe in the two tier system of local government outlined in the White Paper of 1963. Wheatley appreciated it would be difficult for Hume to express any view on the water service as the Bill to reorganise it was going through Parliament but asked whether special areas for water would still be required if in future there were only eight to ten top tier local authorities (the number suggested by SDD planners). Hume reiterated the view that water catchment and general local authority boundaries were incompatible.²⁵ SDD water engineers had compared the needs of water supply with the eight regions proposed by colleagues in the Regional Development division and had found 'serious conflicts of boundary'.²⁶

SDD therefore continued to support SWAC's recommendations. The Institution of Water Engineers had changed its view, however, since submitting written evidence. They gave oral evidence in February 1968 by which time the Water (Scotland) Act 1967 was in the process of implementation. It still saw a single Scottish Water authority as best in the long term but now felt that SWAC's 13 regional boards were satisfactory at this stage.²⁷

It would not be a good thing to repeat the 'considerable upset

there has been in this present reorganisation' for some time to come, in fact for at least twenty years. A reconstruction of local government would not necessarily affect the existing situation: 'We could continue to have our water industry managed under the arrangements set out in the Water (Scotland) Act'. 'But how would thirteen boards requisition from five to nine top tier authorities?' asked Wheatley. The Institution saw no difficulty in two boards requisitioning one top tier authority or if boundaries did not coincide, the top tier authorities might be requisitioned by two or three boards, the requisitions aggregated and the rate calculated from the total requisition.²⁸

'Would you never contemplate in the future replacing the water boards by large area authorities that would not require the inter position of the boards for the supply and distribution of water?' asked Wheatley.

The Institution's witness replied 'I think we would not wish to contemplate the area (top tier) authorities having the responsibility for water supply'.²⁹ Their own proposals had been to take water out of local government altogether but the system of regional boards was acceptable because it was still one stage removed from the direct control of local councils. The most important thing was to have water made the subject of single purpose management. Local government had too many other interests. When a conflict of interest arose, experience had shown that the different committees of an authority would reach a compromise not necessarily in the best interests of sound water management.

By now this theme was familiar to Wheatley.³⁰

"You see, Mr. Denholm, you make this case in respect of water. Other people make this case in respect of education, or planning, or social work and health. Is it your idea that

local government cannot in the first place be trusted to do these jobs themselves, so that you have got to appoint boards to do them and then allow these boards to requisition on local government for the discharge of that function?'

The Institution's representatives responded that they did not quite say that they did not trust local councils but the water industry, under that form of control had been in a considerable mess for some time and they felt that 'ad hoc' or independent management would give the opportunity of dealing properly with water.

The Wheatley Commission was insistent on the point that independent boards would mean a loss of financial control for the new local authorities to which Mr. Denholm replied that requisitioning had only been the norm since 1949; prior to that the water boards in Scotland (such as they were) had collected their own rate revenues. They could do so again. The water service should not become a department of local government against the best interests of its management simply because there would be objections to the way in which water rates were collected. The Commission insisted,³¹

'if your principle were extended to other services, wouldn't it mean that local authorities would be losing control over their own finances because they would be required to pay out on requisitions demanded from them by these various boards for supplying the services that it was the obligation of the local government unit to supply?'

The Institution's representatives agreed that requisitioning by independent boards was an undesirable principle because another independent body decided the extent of the requisition in any particular area and thus took a certain amount of control out of the hands of local authorities. But as against that, water boards, where they existed (in only six relatively limited locales) had been more

satisfactory than direct local authority control, principally because they were single-purpose authorities and their decisions were not affected by other local authority decisions. Wheatley then turned to the basic principle on which the water boards had been established: was it because local government, as local government, was not properly equipped to tackle water or because the (former) structure of local government was inappropriate? The Institution's witnesses agreed 'the provision of a satisfactory water supply required a considerable amount of capital, and there are very few local authorities who are prepared to lay out the necessary amount'. The Commission asked why, if a new structure would have much larger, financially stronger authorities, the service could not be returned to them if capitalisation lay at the root of the problem, to which the witness responded that they would have so many other things to do that they would not look on the service in a single-purpose manner. This led to the following exchange. ³² The Commission: 'So, this really gets back to the argument that for the specialised and important services like water or education or planning or even perhaps social work, or maybe even the police, you have got to hand each one to a board which would only be concerned with the individual function? Mr. Comrie: 'I think that is the general position'. The Commission: 'This is really a dismantling of local government?' Mr. Comrie: 'Yes'.

Thus the witnesses of the Institution of Water Engineers found themselves arguing to a Royal Commission on the reform of local government that, in their view, local government had no role to play.

A further exchange confirmed that the Institution's views seemed

to run somewhat counter to the Commission's search for a viable system of local democracy. The Commission: 'What advantages would there be in having a separate water board?' Mr. Comrie: 'An advantage amongst others would be that the engineer would be in charge as chief officer of the board'. The Commission: 'And he would hope to have a freer financial hand?' Mr. Comrie: 'Yes, a much freer financial hand'. The Commission: 'Is that in the interests of the local people?' Mr. Comrie: 'In the interests of the water industry'.³³

In fact, far from presenting an informed case to the advantage of the service which it represented, the Institution of Water Engineers evidence to Wheatley seems self-centred and contradictory. Three significantly different suggestions were made as to the most appropriate structure for the service: first, a single national water authority for Scotland; second, a system of six regional boards; and lastly the retention of the thirteen regional boards introduced under the 1967 Act. The Institution thought members of the six regional boards should be appointed by the Secretary of State yet found the nomination of counsellors to the 13 boards acceptable. Witnesses saw no difficulty in continuing the practices of water boards requisitioning new rating authorities yet agreed that requisitioning was an undesirable principle and that people who were responsible for raising money should have control of that expenditure.

The Institution initially suggested that there would be no need for the CSWDB if there were 6 regional boards but later stressed that one matter the Water (Scotland) Act 1967 made provision for which

might be difficult under further reorganisation of local government was that of obtaining water from sources which might serve several regions. The CSWDB would have to be retained, as an ad hoc authority if there were any further reorganisation of the water industry. The basic argument put forward by the Institution was that the water service was best left the subject of single purpose management. The Institution wanted more professional control but ran into difficulty when it was pointed out that this inevitably meant less democratic control. Such an approach, running counter to the questions in which Wheatley was interested (see below Chapter 6) seems to explain why no trace of the Institution's counsel can be found in the Royal Commission's final report other than as the object of criticism.³⁴

The Wheatley Commission's Conclusions

Wheatley thought that few functions seemed to belong more self-evidently to local government. Failure to think ahead over the provision of water supplies could have serious consequences for industry, for new housing development and for public health, yet its control had been placed substantially outside local government. The case for retaining the regional water boards must be made in the context of a new structure of local government, not the old. The onus of proof should lie on those who wished to see the function remain outside local authority control (the Institution of Water Engineers). Wheatley believed that the onus was particularly heavy and did not think it had been discharged in evidence placed before them.³⁴

The Commission was sympathetic towards those who saw difficulties

over boundaries (SDD), but the extent of problems in this sphere depended on the final structure resolved and accepted. In recommending that the function should become the direct responsibility of new top-tier authorities in line with the White Paper of 1963 the practical difficulties that might arise had not been overlooked but the Commission firmly believed that these could be overcome by administrative arrangements such as the 'added area' device whereby one authority administered part of a neighbouring authority's area for purposes of water supply only. Expedients of this kind were preferable to ad hoc boards outside the structure of local government.

SWAC considers the position

The Royal Commission reported in September 1969 barely a year after the implementation of SWAC's proposals of 1966. SWAC was re-constituted soon after in January 1970 to consider the Commission's proposals. However, the general election of June 1970 brought a change of government and the new Conservative Secretary of State clearly felt that the reform of local government warranted a high priority, for he published within nine months the White Paper 'Reform of Local Government in Scotland'.³⁵ The aim was to introduce a Bill in the 1972-73 Parliamentary Session so that councils could be elected in 1974 and the new systems become operational by 1975. The new government took the view that all the materials for decision were now to hand and that the time had come for action to put an end to the uncertainty which had been in the air since 1963. The content of the White Paper was a prescription for action, not a basis for negotiation.

Accordingly SWAC were called upon to examine the position of the water boards not only in the light of the Wheatley Commission's report but also the government's White Paper.³⁶ The remit was, in effect, severely restricted to an examination of the arrangements necessary to neaten the carefully derived 'source to tap' areas of the regional boards with those for the proposed Regional councils. But many witnesses took up Wheatley's challenge on the onus of proof lying with those who did not want to see the service controlled by regional councils so that the debate on the best form of administration was re-opened. Although the position of most interested parties and the arguments were well known a clear recommendation by this statutory advisory body, one way or the other, would carry some weight.

But it was not to be. SWAC could not reach a unanimous decision. Only a minority of the advisory committee came out in agreement with Wheatley and the use of 'added areas' to match boundaries. The basis for this preference was that it accepted the principle of direct accountability to the electorate and a straightforward transfer of function in this way would create least disturbance to the regional boards which were working well.

In the three and a half years since the boards had been established, there had been far-reaching changes in the water service; new and improved services had been provided, distribution systems had been rationalised, maintenance and management had improved generally. The observer was brought face to face with a service which was at once modern and efficient and which if general re-organisation of local government had not intervened could both from an engineering and

administrative point of view have continued with a high degree of efficiency for many years to come.³⁷ In short, the policy recommended in 1966 appeared to have proved highly successful in practice.

A majority of SWAC now preferred the concept of an ad hoc water authority covering the whole of Central Scotland, the main benefit of which was seen as being the creation of an authority wholly based on the 'source to tap' principle of unified control of sources and the advantages that would follow for planning future supplies.

Major works of multi-regional supply would be much more easily financed under the guidance of one strong authority and the burden would be more evenly spread as ultimately there would be a standardisation of charges over a large area. But this solution would involve indirect representation on water matters and requisitioning for about 80% of the Scottish population within 40% of the Country. Water was mainly a technical service, calling for less discussion and decision at local authority level than most other local authority functions. SWAC was aware that its predecessors had come out against similar proposals in 1963 and again in 1966 but felt that that had been in preference to the Regional Water Boards and that the new structure of Regional Councils removed many of the objections made then such as the difficulty of ensuring that each local authority would be represented on the ad hoc body. Elsewhere the new local authorities should be able to fulfil the role of water authority without any apparent difficulty.³⁸

SWAC had considered extending the powers of the CSWDB so that

it could operate all schemes of supply which supplied more than one Regional Council: in effect take over the Loch Carron scheme and the Glendevon and Glenfarg schemes which would otherwise require the creation of 'added areas'. This was reasonable engineering but SWAC had been advised that it would be extremely difficult and probably quite impracticable to satisfactorily arrange a separation of responsibility between the CSWDB and the regional councils because of the many instances where branches left the trunk mains before crossing regional boundaries.³⁹

SWAC did not accept that if the water service was made the direct responsibility of Regional Councils, its development would suffer in competition for funds with other functions more attractive politically speaking. The new authorities 'could be relied upon' to maintain their statutory duties with respect to water supply. Consequently they had not regarded any assumptions about the attitudes of regional councils as an important factor in their deliberations. Of the minority and majority views both were practicable propositions with distinctive advantages and disadvantages: there was little to choose between them on engineering and operational grounds. The issue resolved to one of political versus technical principle: it was best to maintain full accountability to the electorate versus the view that future needs would be better met through an ad hoc body with control over the full range of possibilities.

The Water Boards themselves had not presented a unanimous view to SWAC. Opinion was divided according to location. The boards outside the Central Belt found Wheatley's proposals quite satisfactory

with the exception of the Inverness-shire Board. Several constituent authorities in these areas had been unhappy with the re-organisation of water in advance of local government as a whole. As J.W.Fletcher, County Engineer for Dumfriesshire and a member of SWAC, had put it in 1968,⁴⁰

'...the problems requiring urgent solution were located almost entirely in the Central Belt of Scotland but a solution could not be applied without imposing the pattern on the area to the North and South of this belt where the problems were very much less pressing and could well have been left until the Royal Commission's proposals on the reorganisation of local government became known. Certainly in the more rural counties of the South and North, regionalisation of one service in advance of the rest has probably created more problems than it is likely to solve. While this may be only of temporary disadvantage, in view of the major reorganisation which is expected to follow the report of the Royal Commission, it is nevertheless likely to cause unnecessary interference with the efficient conduct of drainage and other services operated by the technical staffs of these authorities'.

The South East of Scotland Board and the CSWDB wished to remain as they were, the Mid-Scotland Board found the proposals quite satisfactory so long as the CSWDB was retained and in the West the Lower Clyde saw no difficulty in the proposals whilst the Lanarkshire Board agreed there would be no difficulty but felt it was a large enough region to warrant retention. The Ayrshire and Bute and the Fife and Kinross Boards would have found the proposals satisfactory if regional status had been granted to their areas. Except in the case of Fife it was clear that no serious consequences should follow the transfer of authority to the proposed regional councils. The Argyllshire Board gave no evidence.

SWAC's proposals are raised in Parliament

The argument continued into the House of Commons when the local

government Bill came to committee and was given some added impetus because by the time the matter of water supplies came to the floor the government had already conceded the retention of ad hoc river purification boards contrary to Wheatley's recommendation and their own White Paper (see Chapter 10 below). It was suggested that, having done this, the government should not now find it difficult to concede an ad hoc Central Scotland Water Authority.

For the government, Under-Secretary of State Younger, however, replied that the River Purification Board's functions were regulatory whilst water authorities provided a basic service.⁴¹ The water boards spent £28 million of public money. This was a substantial sum and it should dispose the House towards an organisation controlled by elected members directly accountable to the ratepayers who provided most of the money. (Domestic ratepayers contributed £16 million, the remainder being raised from industrial consumers who paid per thousand gallons consumed, and from specific capital grants awarded by Central Government). The government did not accept the majority view that there should be as few ad hoc authorities remaining after reorganisation as possible.

Nevertheless, an amendment was moved with a view to creating a Central Water Authority. The Government was accused of 'shutting their eyes to the facts of history'. Very few local authorities had ever been willing to spend very large sums of money on water supply which would only be required in exceptional periods of drought or, what seemed to them, the distant future. All over the country there was an acute shortage of water precisely because of this lack of

foresight. Local authorities habitually thought of only their own generation and councillors of their own period of power. There were no votes to be won in spending vast sums of money to ensure that there will be an adequate supply of water in ten to twenty years time. The water service, if returned to the control of regional councils, would be at the end of the list again and in ten to twenty years time difficulties would recur.⁴²

Another opposition speaker for the amendment Dr. Dickson-Mabon, was convinced that water, like gas or electricity, was a public utility and ought to be planned nationally. The water engineers and all those whom he had ^{contacted} connected with the water service supported the concept of a Central Scotland Water Authority. He thought this reflected experience since 1967. The boost to the morale of those people connected with financing water supplies had been so great that they trembled to go back into the hands of local councils. The CSWDB would increasingly have to take over much of the direction and development of water in Scotland. Perhaps the CSWDB, composed of councillors once removed, might themselves ultimately agitate for a National Water Authority but in the meantime SDD must maintain the momentum of the reforms of 1967. SDD must remind the new authorities that water cannot return to its former low priority without considerable and adverse consequences for the development of Scotland. The Government had been frightened to nationalise the water service; they had refused to do so because of ideological prejudice.⁴³

Under-Secretary of State Younger pointed out that the Government's decision to allow Fife the status of a regional council contrary to

their earlier intentions and Wheatley's recommendations, had removed one of the most difficult conflicts of boundary over which SWAC had expressed concern. Further, a major initiative with regard to the planning of future supplies was now underway. SDD would shortly publish an important planning document which would include an assessment of likely needs in different parts of Scotland with an account of the potential sources available to satisfy them. This was a first step towards a repetition of the post-war exercise of central authority issuing plan guidelines to local water authorities for their consideration and ultimate implementation.

Central authority and local authorities should jointly undertake this task because an ad hoc body doing it would be diverted from the process of making strategic plans for the regions such that its decisions might give rise to conflicts; about, for example, whether priority should be given to augmenting supplies at ^{the} Ayrshire-end or the Dundee-end of Central Scotland. Choices of this kind should not have to be made by an ad hoc organisation solely concerned with the supply and distribution of water and not generally responsible to the electorate for a wider range of strategic considerations and services. Control over water resources and their development should be exercised by the Regional Council responsible for planning the strategic growth in the area or through the CSWDB which was to be retained to act as a vehicle for consultation and co-operation between Regions. ⁴⁴

In his view the real choice lay between preserving the 13 existing boards and making water the direct responsibility of an elected body. The amendment was defeated by 17 votes to 7. Water supply was to be

a function of nine regional and three islands councils with effect from May 1975. The month before a Bill to reorganise the water services in England and Wales had also gone through its committee stage - enacting a diametrically opposed principle, that of taking the water service out of local authority control altogether and establishing it on a basis more akin to an independent nationalised industry. The reasons for this remarkable divergence of policy are however the subject of Chapter 13 below.

Conclusion

A new and strong commitment to the ideals of regional planning had two consequences for water management in Scotland. First, it brought the long established need for regional administration of water supplies into sharp focus, particularly with respect to the Loch Lomond scheme and the supply of individual growth centres, such as Livingston which straddled the boundaries of the existing structure of administration. Secondly, it engendered the concept of bringing all of the infrastructural services under the same roof to new problems of development from a similar, regional perspective and therefore the process of local government reform was set underway. Such major changes were conditioned on them being accepted by local people and for that considerable attention to 'democracy' and equal representation was required.

The two radical changes to the structure of water management which took place during the decade 1966 to 1976 reflect the paradox of the implications of a commitment to regional planning. On the one hand,

single purpose management was required to get the Loch Lomond scheme and the water supply of Livingston underway. On the other hand, every existing authority had to be represented and therefore a pattern of regional water boards was necessary to ensure representation accompanied requisition with a top tier Central Water Development Board (the CSWDB) for the finance of inter-regional schemes. Later, when all *services* were considered by the Wheatley commission, there could be no ad hoc exceptions in the interests of fairness and therefore the acceptability of the proposed reforms. Proposals from the Institution of Water Engineers consistently failed to gain support because they failed to take into account the need to move away from the existing position slowly, paying due regard to ways in which existing interest groups may be satisfied by the prospect of a continual involvement after reform. The CSWDB could survive as an exception because, as a new institution, it had no long standing interests attached to it.

The main purpose of SWAC was clearly to reconcile existing interests into line with the objectives of government policy in the same way as the Wheatley commission was to produce an acceptable pattern of overall institutional reform. Both bodies, through their remits, were not allowed to examine the role of Central Government although with respect to the water services, the controversy engendered over the benefits of single purpose management and 'the lessons of history' of the water services in the context of multi-purpose local authorities did produce commitment from the government for a public review of future strategies of supply (see (Chapter 8), albeit at the eleventh hour.

It cannot be overemphasised, however, that 'the lessons of history' - the wasteful duplication and bad planning of the provision of water supplies, which are exemplified in the following chapter - would not have come to the fore of public debate had it not been for their importance in the light of wider goals of economic growth and regional development.

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41. Hansard, House of Commons, First Scottish Standing Committee, Official Report 8th May 1973, Col.2044-2046.
42. First Scottish Standing Committee, *ibid.*, (Mr.Doig: Dundee West) Cols.2056-2058.
43. First Scottish Standing Committee, *ibid.*, Cols.2052-2054.
44. First Scottish Standing Committee, *ibid.*, Col.2068.

CHAPTER 6

Local Perspectives on the administration of water supplies

The previous two chapters dealt with policy for water supplies from a national perspective. In this chapter the changing structure of local government in Scotland is examined as is the relationship between that structure and difficulties in implementing the regional management of water supplies. Specifically, the chapter begins with the structure of local authorities prior to, and after, local government reform in 1929 and an account given of the development of local water supplies in Lanarkshire.

The reorganisation of 1929 appears to have induced a rigidity of attitude poisoning relations between urban and rural authorities so that post-war hopes of implementing rational schemes of regional water supply were compromised. At the root of difficulties in merging the interests of adjacent water undertakings by radically different cost structures, stemming from differential development over time, with, broadly speaking, the larger authorities deriving benefit from economies of scale and the lower costs of a Victorian inheritance of sources of supply.

Such themes underly the second part of the chapter, dealing with the opposition of the City of Edinburgh to the proposal of the Scottish Water Advisory Committee (SWAC) that the city should merge its water interests with neighbouring West Lothian. The vociferous objections raised by the city were a major factor in forcing the Government to implement regional water management by Act of Parliament

(the 1967 Act).

The third section of the chapter is concerned with the work of the Royal Commission on Local Government's approach to the root cause of many of these difficulties.

The Changing Pattern of Authorities

A pattern of authority in the towns that could later respond to the public health movement was established in the Burgh Reform Acts of 1833 and 1834 in which Burghs were empowered to accept a 'police system', to be administered by a new local authority, 'the commissioners of police'. The right to adopt the 'police system' was extended to 'populous places' of over 12,000 in 1850 and of over 700 in 1862 and henceforth the duties of police commissioners were steadily augmented.¹ Hence the legal basis of such public purposes as watching, lighting, paving and cleansing the streets, the improvement of water and gas supplies and the prevention of infectious diseases is to be found in a series of Burgh Police Acts dating from 1850 and 1892. Existing burghs did not become police burghs: a system of dual administration was established.

The Burgh Police (Scotland) Act of 1892 consolidated and superseded all previous legislation and in 1900 'police commissioners' were abolished in favour of town councils.

Progress in similar fields in rural Scotland was delayed by the lack of any responsible body like the police commissioners. Until the

Local Government Act of 1889, at which time County Councils were formed, ad hoc parochial boards were responsible for public health services. These were replaced by Parish Councils in 1894. After 1889 the larger counties were divided into 'district' divisions for the administration of roads and public health (spheres of overlapping interest between parish and county) purposes and services administered by District Committees comprising the County Counsellors for the district plus one representative of each parochial board (later parish council) and each burgh in the district.² In 1929 Parish Councils were abolished and the District Committees of County Councils were replaced by District Councils; but the full County Council assumed responsibility for all social services, education, public health, roads, housing slum clearance and town planning. The rights of the small and large burghs to operate water undertakings continued undisturbed until the Water (Scotland) act 1967, but the process of reform in 1929 meant a loss of function for these councils in other directions. Within this changing framework systems of water supply developed at different paces in different places.

The differential development of water supplies

One of the earliest accounts of water supplies in Scotland is to be found in the Report of Commissioners inquiring into the best means of preventing the pollution of rivers, published in 1872.³ Two themes emerge from a reading of their survey: the importance of safe water supplies in the drive to improve the public health of the towns and the extent to which the ability of different types of authorities to satisfy this demand seems to have varied. The public health movement

in Scotland has been described elsewhere;⁴ suffice to say here that the views of the medical officers of health for the burghs of Hamilton and Inverness appear representative of the day:⁵

'...the connection between the escape of excremental matters from patients ... into wells and the outbreak of the same fever among those using the water of these wells has been quite well established.';

and 'I do not consider that the supply can ever be satisfactory until it is got by gravitation from the hill lochs.'

The extent to which supplies had been arranged in adequate quantities and satisfactory quality seems to have been related to the size of the responsible authority. The cities clearly led the field. The Loch Katrine scheme by Glasgow Corporation was rightly acclaimed: by 1869, 26 million gallons^{per day} of pure soft water were being supplied over an area of 144 sq miles including neighbouring communities such as Pollockshaws. The foundation for today's supply had also been laid in Aberdeen where water was abstracted from the Dee after 1866. Dundee's supplies were said to be unsatisfactory in quality through inadequate control over the use of gathering grounds, but new supplies were shortly to be provided. Edinburgh's supply, although already involving a complex pattern of local resources was described as totally inadequate, but here too improvements were planned for the immediate future. An attempt to emulate Glasgow and develop St. Mary's Loch in the Tweed Basin had failed to gain Parliamentary approval in 1871 but the city now proposed to develop a catchment at Gladhouse in the basin of the South Esk. Within thirty years, however, the city gained the foothold it sought in the Tweed.

Glasgow had spent £1.67 million on its supply, a staggering sum

at that time. Smaller towns could not afford provision on this scale. Most of the larger towns, however, were adequately if modestly supplied. A gravity supply had been arranged for Paisley in 1835, Airdrie in 1846, Stirling in 1848, Hamilton in 1857, Dunbarton in 1859, and Port Glasgow in 1867. These were small projects requiring frequent augmentation as supplies were extended to more houses and the urban population grew. For example, Paisley's initial reservoir at Stavely was augmented by a second at Harelaw in 1841, a third at Rowbank in 1870, a fourth at Glenburn in 1887, a fifth at Camphill in 1886 and a sixth at Barcraigs in 1916.⁶ Whilst Edinburgh and Glasgow were working from 15 to 35 miles distant for a long term large source, the other larger towns of Central Scotland seem to have sought their supply no more than 5 miles distant, at least at first; extending further afield only later. Whilst most supplies were arranged by Burgh councils or police commissioners in some, such as Perth, Airdrie and Coatbridge, private companies had made the necessary arrangements. Companies had also been responsible for the initial and unsatisfactory supplies of Edinburgh and Glasgow, but these were progressively taken over by municipal authorities partly because they could not raise the necessary investment capital, but also partly because the spirit of the age lent towards the provision of public services by public monopolies.

A third group of urban communities had no proper supply in the 1870s. Small burghs such as Brechin, Arbroath, Forfar, Linlithgow, Kirkinloch and Musselburgh relied on a series of local wells and springs. Musselburgh had taken its water from the River Esk but by the 1860s this had become impracticable because of industrial development upstream (principally paper manufacture) and the town had

had to resort to shallow wells in a thin bed of gravel on top of clay. Dirty water from streets and sewers soaked to this bed, so that the supply could be described as dangerous and the high incidence of diarrhoea in the town commented upon.

If conditions were bad in the small towns, they were worse in the industrial villages and furthermore, because the institutional structure to tackle the problems was lacking until the end of the century, they remained unsatisfactory for longer. Robert Lambie was one of the first councillors elected to the reformed Lanarkshire County Council in 1890. He was convinced that an abundant supply was necessary to the welfare of the community and served on the water committee in the Middle Ward District of the County for many years. He published an account of his experience in 1919.⁷

The Water Supply of Middle District, Lanarkshire

Soon after the County's District Committee was formed in 1889, it set underway an investigation of the water supplies of the area. A large number of villages lacked a proper supply. Prior to reform of local government in Scotland in 1888, the responsibility for arranging water supplies lay with parish councils although here and there, such as in the environs of Airdrie and Coatbridge, private water companies may have agreed to provide a supply. Under the Public Health (Scotland) Act of 1867, the basic administrative unit for the provision of supplies outside the towns was the Special Water Supply District. The principle underlying the formation of a special district (SWD) was that since the service provided was purely local, it should be paid for

purely locally by means of a special district rate. The promulgation of this procedure was to have most unfortunate consequences for the development of the Scottish network of water supply: it led to the partial development of sources and an unwillingness to co-operate with neighbouring committees because of the impact the cost of joint projects might have on local water rates.

Even where some action had been taken and SWDs formed in parts of Lanarkshire, lack of funds hindered development. For example, the Chapelhall SWD was formed in 1882 so that a bulk supply could be purchased from the Airdrie and Coatbridge Water Company. This was done only after the Board of Supervision of local government had threatened the parish with legal action under the public health code. The company had no water to spare. The parish authority was well aware of the necessity of proper water supplies, but the assessed rental of rateable property within its boundaries was insufficient for it to undertake a project on its own account. So the growing population continued to carry water from mineral bores and a channel bed. The Holytown SWD, formed in 1884, faced a similar dilemma. The Cambuslang SWD had built a reservoir in 1869, but one so small that its dry weather supply was acknowledged to be deficient for the population of the district within a year.

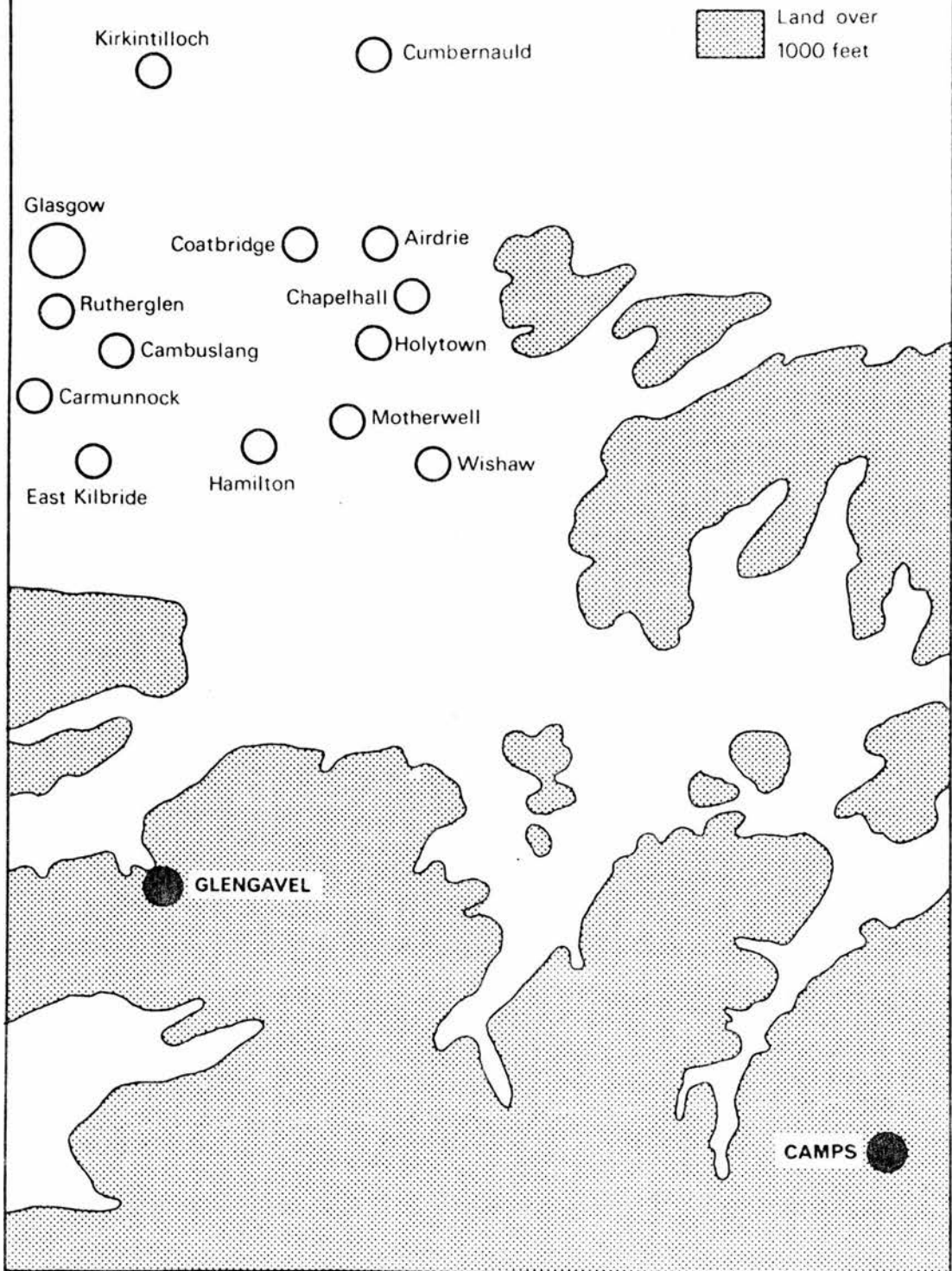
Until the Public Health (Scotland) Amendment Act of 1891, there was an upper limit of 2/6d in the £1 imposed on the rates levied in SWDs. This failed to raise an appropriate amount to arrange a water supply in quite a number of cases. The 1891 Act allowed County Councils to cross-subsidise SWDs through the imposition of a public

water rate, but this was not to exceed 3d in the £1. The Middle District of Lanarkshire was unusual in using this power to work towards the proper supply of the whole of their area. But thirty years were to pass before this vision was fully realised. The difficulties encountered by this far-sighted committee are worthy of some detailed consideration if the background to subsequent policies and events is to be fully understood. These are the lessons of history referred to by the Committee on Scottish Health Services in 1934 and discussed in Chapter 4 above.

The Lessons of History

The District Committee promoted private legislation in 1892, authorising a merger of the nine existing SWDs in their area and the construction of two reservoirs to assure their future joint supply. Consultants identified a catchment at Glengavel to suitably supply the district's needs (see Figure 6.1), but contractors could not reach bed rock. A second set of consultants recommended the resiting of the dam further upstream and this required a second private water Act in 1896. In the meantime, temporary intakes had been arranged on the catchment streams in 1894. A third Act was required in 1898 to authorise the construction of a railway to the construction site and clarify the District committees right to levy water rates authorised in the 1892 Act, even although the reservoir specified in that Act had not been constructed. A start on the dam was further delayed, however, as the contractors awaited completion of the Caledonian Railway Company's branch in the vicinity of the new dam. Consequently, a fourth Act was required in 1902 to extend the time allowed for

Figure 6.1
Locii in Lanarkshire



construction of the dam and the railway.

Meanwhile, an additional set of demands arose when the Upper District Committee of Renfrew County took over the Busby Water Company in 1907 and it was agreed that the company's territory in Lanarkshire, in the parishes of East Kilbride and Carmunnock would become the responsibility of Middle District. The District Committee decided to confer with the Burghs in its area and discussions took place with the town councils of Hamilton, Motherwell, Wishaw, Airdrie and Coatbridge, but with no immediate outcome. Indeed, relations soon deteriorated markedly with Motherwell. The county successfully opposed Motherwell's plans to extend its area of water supply following boundary extensions in 1908. By way of retaliation, Motherwell then opposed the County's plans to establish a network of trunk mains linking the main sources of Middle District and connecting East Kilbride and Carmunnock to the system, albeit unsuccessfully.

By 1910 the Middle Ward District was facing something of a crisis; a sub-committee was appointed to consider the alternatives open to the authority. They could continue with the Glengavel dam as originally planned, or they could investigate the cheaper alternative of taking bulk supplies from one of the burghs. A review was made of the position of the latter from which Motherwell emerged as the only possible source of assistance. Wishaw refused to co-operate even in the review. Setting aside the somewhat strained history of relations between Motherwell and the County, the burgh could only meet the District's needs for a limited period. Therefore the consultants could see no advantage in the combination of burgh and county water undertakings.

Combination was physically possible, but the only gain would lie in the relatively minor area of management costs and perhaps the larger body could negotiate better borrowing terms. They did say, however, that if co-operation had been the order of the day earlier, a comprehensive scheme could have been devised to the benefit of all concerned.

Instead consultants identified 'the finest natural site for a reservoir which I have seen' at Camps near Crawford in the headwaters of the Clyde. An Act authorising a scheme to supply the district based on the Camps reservoir was obtained in 1913. A second Act was required two years later to make provision for the construction of a railway to the site and allow for the compulsory purchase of the single remaining parcel of land required. The opportunity was also taken to extend the Middle Water District's statutory area of supply into Dunbartonshire's parishes of Cumbernauld and Kirkintilloch.

These had been the cause of concern for some years. Existing sources were quite inadequate; in some places after a period of drought it was common to find the inhabitants buying water from itinerant hawkers who took their supply from disused quarries. Middle District had agreed to supply these areas after 0.2 mgd had become available following Motherwell's second attempt to extend its statutory area of water supply to the full extent of the burgh. This had been successfully achieved in 1914. Unfortunately, the Bill of 1915 also contained clauses relating to the Middle District's gas undertaking which caused some controversy so that this extension and authorisation for the Camps railway were delayed until 1917, by which time the war

in Europe had engendered shortages in the supply of both materials and labour. The scheme was completed two years later with the assistance of 200 prisoners of war and parties of schoolboys.

In Lambie's view, events then fully justified his conviction that proper water supplies could only be obtained by the formation of a large district. An expanding area needed water to facilitate new housing, good sanitary housing and the extension and development of industry. For instance, when a large steel works came to the district in 1919, the District were asked to build 5000 new houses for the work force. Neither development could proceed without the Camps scheme.

It should be stressed that although Middle District was atypical in amalgamating the SWS within its area, its experience in other respects appears quite typical with regard to four themes in particular: first the frequently changing nature of the boundaries of supply of different authorities; second, the large number of authorities involved in the supply of a relatively small area; third, the frequency with which recourse had to be made to private legislation, the consequent jumble of enactments relating to the water undertaking, and the time taken by legal processes; and lastly, the fact that as early as 1910 it could be said that the opportunity to exploit local water resources in a more rational manner had already been lost because of the division of responsibility between burgh and landward authorities.

Fluidity of boundaries is apparent in the facts that when the Middle District Committee took over, parts of its area were supplied

by Glasgow Corporation, the Airdrie and Coatbridge Water Company and the Busby Water Company. When the latter was taken over by Renfrew County Council, new arrangements were made to supply its Lanarkshire territory, but when the Airdrie Company was municipalised to form the Airdrie, Coatbridge and District Water Trust, no such rearrangement took place. The Middle District came to the aid of Dunbartonshire in supplying two of its outlying parishes, whilst parts of its own territory (and rateable assessment) were lost through the extension of burgh areas to accommodate suburban growth. By 1910, five authorities (the district plus three burghs and the Airdrie District Trust) were involved in the supply of this relatively small but important part of West Central Scotland as compared with fourteen, twenty years before (9 SWDs, two water companies and three burghs). Added to this, the Middle Ward District committee promoted thirteen pieces of private legislation in connection with the water undertaking in their first thirty years.

Elsewhere, no attempt was made to substitute something better than the system of Special Districts for the supply of water to landward parishes. Hence the Committee on Scottish Health Services reporting in 1935 found it necessary to consider the system in some detail because of the problems it raised - different sanitary services and varying standards in different parts of a county.⁸ There were 1700 special districts in Scotland at that time, each with separate rates, for different purposes, not only water supply but also sewerage and drainage, street cleansing, lighting and public parks. Not only were many of the existing special districts unable to make adequate provision on modern lines for the necessary services because of their

limited financial resources, but also the existence of a great number of small schemes made it difficult to provide a comprehensive and satisfactory scheme for the whole county, or even for a region of the county. It was difficult to appreciate why housing was provided by the County as a whole, while water and drainage, essential to its provision, may be, and usually were, provided only by way of special district. On the other hand, in evidence, most of the distinctly rural counties were against their abolition. It was only in these counties that were largely industrial, such as Lanarkshire, and in which a service had been provided over a large part of the county that it would be comparatively easy to abolish all the special districts.

According to the Association of County Councils and others, the principal difficulty was financial: districts were not extensive, but capital costs particularly for water supply and drainage, were considerable. The difficulty had been accentuated by the derating provision of the Local Government (Scotland) Act 1929, particularly that under which agricultural land was rated only on one eighth of its gross annual value. While rate support grants had been introduced to compensate for this loss and to help new development, there was no provision in the Act to secure that any part of the additional money should go to compensate for the low rateable value of new special districts.

The reform of Local Government in Scotland in 1929 (there was no equivalent in England and Wales) had been, at least in part, engendered by the economic policy of the government of the day. As a fillip to a flagging economy and worsening unemployment, agricultural land and

industrial premises had been relieved of all or part of their rates burden. This undermined the financial basis of many rural parishes. The parish as a unit of local government disappeared and its functions were transferred to new District Councils: in turn, the functions of the former District Committees of County Councils were transferred to the full County Council. Many of the functions of the small burghs were also transferred to County Councils, as was the large burgh's responsibility for education and the prevention of river pollution. Many urban communities appear to have reacted strongly to the loss of local control over education, notwithstanding the fact that they sent representatives to the appropriate committees of the County Council. Henceforth, rivalry between the small burghs and the counties became an almost continuous feature of local politics.

Mackie and Pryde writing only five years after reform say:⁹

'the small burghs still claim that the (1929) Act was a piece of unwarranted over-centralisation which has led to increased costs and decreased efficiency, especially in road administration, public health and housing.';

and a similar theme was voiced by Thomas Burns in 1942:¹⁰

'the 1929 Scottish local government reorganisation which abolished at one blow 1100 Scottish local authorities, including 869 parish councils and (for nearly all local government purposes) all the Scottish Burghs (except the cities) and made the unwieldy and landlord-ridden County Councils the sole organ of Scottish local government, was a devastating blow against the potentialities of democracy in Scotland. Since 1929 the progressive element in the Burghs had been swamped and outvoted in the County Councils but the forces of huge landlord controlled rural areas elected on the undemocratic property franchise'.

Mr. Burns, a well known pamphleteer in the labour movement, favoured a Scottish Assembly to administer Central government and at the local level a revival of parish government. He recognised,

however, that 'affairs' such as water supplies, transport and electricity required some form of regional administration.

In a more official vein, the committee on Scottish Health Services recognised the impact of their reforms of 1929 as a serious problem saying: ¹¹

'The transfer of powers from small burghs has created fears in the minds of representatives of large burghs and has fostered jealousy between county and burgh. We are convinced that, if the existing organisation or local government is to survive, these fears and jealousies must be overcome, and we see no good reason why they should not.'

Thus, the result of differential development in water supply services, itself stemming from different lines of development of responsible authorities in town and country areas, was perpetuated in an institutional structure, which in the light of the circumstances of the creation contained the seeds of disastrous rigidity in terms of the likelihood of co-operation between urban and rural authorities.

Failure to implement a policy of regional water supply in the post-war years

The efforts (discussed in Chapter 4 above) of the DHS to induce some form of regional co-operation, usually involving joint action by county and burghs, consistently failed to meet with any success, whilst in Ayrshire a proposed merger between County and burghs for purposes of water supply met a similar fate (see Chapter 7 below). The answer to this lack of co-operation seemed to lie as outlined in Chapter 4 above, in a more determined effort on the part of a central government armed, after the war, with a new administrative code and

the power to influence events through the award of grant aid under either the Distribution of Industry Act of 1945 or the Rural Water Supplies and Sewerage Act of 1944.

Official Recognition of the problem

One of the first fruits of a post-war commitment to planning was the publication of the Clyde Valley Regional plan in 1946.¹² Four new towns were proposed: at Cumbernauld, East Kilbride, Bishopton and Houston to cater for approximately 250,000 people who would be dispersed from Glasgow. Indeed, the plan envisaged 20% of the City's population moving in an attempt to solve once and for all the city's housing problems.¹³

The Regional Planning Advisory Committee responsible for the plan had collected a good deal of information by 1945. With respect to water supply the committee noted that the policy of the government was now one of joint action among neighbouring authorities. They quoted from the White Paper of 1944 on water policies:¹⁴

'The time for considering joint action is now, when planning for housing developments on a large scale is in progress. The demand for water is increasing and will continue to increase with the elimination of unfit houses without proper sanitation and with the growing recognition of the place of water in matters of personal hygiene. Increased demands will render many supplies inadequate which are at present barely adequate for current demands.'

Over thirty authorities were involved in the supply of the area covered by the Clyde Valley Plan and the committee were struck by the extent to which some catchments were so far from the area of distribution that large costs were involved in piping and maintenance.

A considerable proportion of the supplies were not capable of meeting post-war increases and potential requirements. Consultations had taken place with the officials of the local authorities on the subject of grouping of water supplies, and it could be said that there would be no difficulty on technical grounds in effecting a combination of many of the water interests throughout the region. Consultations had also taken place with DHS who had furnished copies of their proposals for dealing with water supply. It seemed likely that something in the order of £2½ million was to be spent on new works and it seemed correct that such a large expenditure should be the subject of joint action to avoid any wasteful duplication. The three possibilities were: a joint water committee; a regional administration for the Clyde Valley including water supply as a function; or a Clyde Valley Water Board administering the distribution of bulk supplies.

In the event, it would seem that the speed with which developments were planned to get underway precluded all but the last option and even then in only a partial and localised context. The new town of East Kilbride had been designated in 1948 and was clearly going to be the first component of the plan to come to fruition. DHS engineers had concluded in 1945 that a new water scheme was required for the supply of the county as a whole, extending the logic of Middle District's Camps scheme discussed above. A Lanarkshire Water (Additional Requirements) Joint Committee was established in 1947, formed of representatives of the County and all the Burghs.¹⁵ But it seems that, once again, no agreement on a merger of interests in water supply could be achieved. In the light of the urgent need for additional water a compromise was struck - a bulk supply board.

Within a year a regional scheme based on the Daer Water in the upper reaches of the Clyde had been authorised (see Figure 6.2). This would make 28 mgd available in two stages. The first, for 14 mgd, had been allocated between the authorities in the following manner:

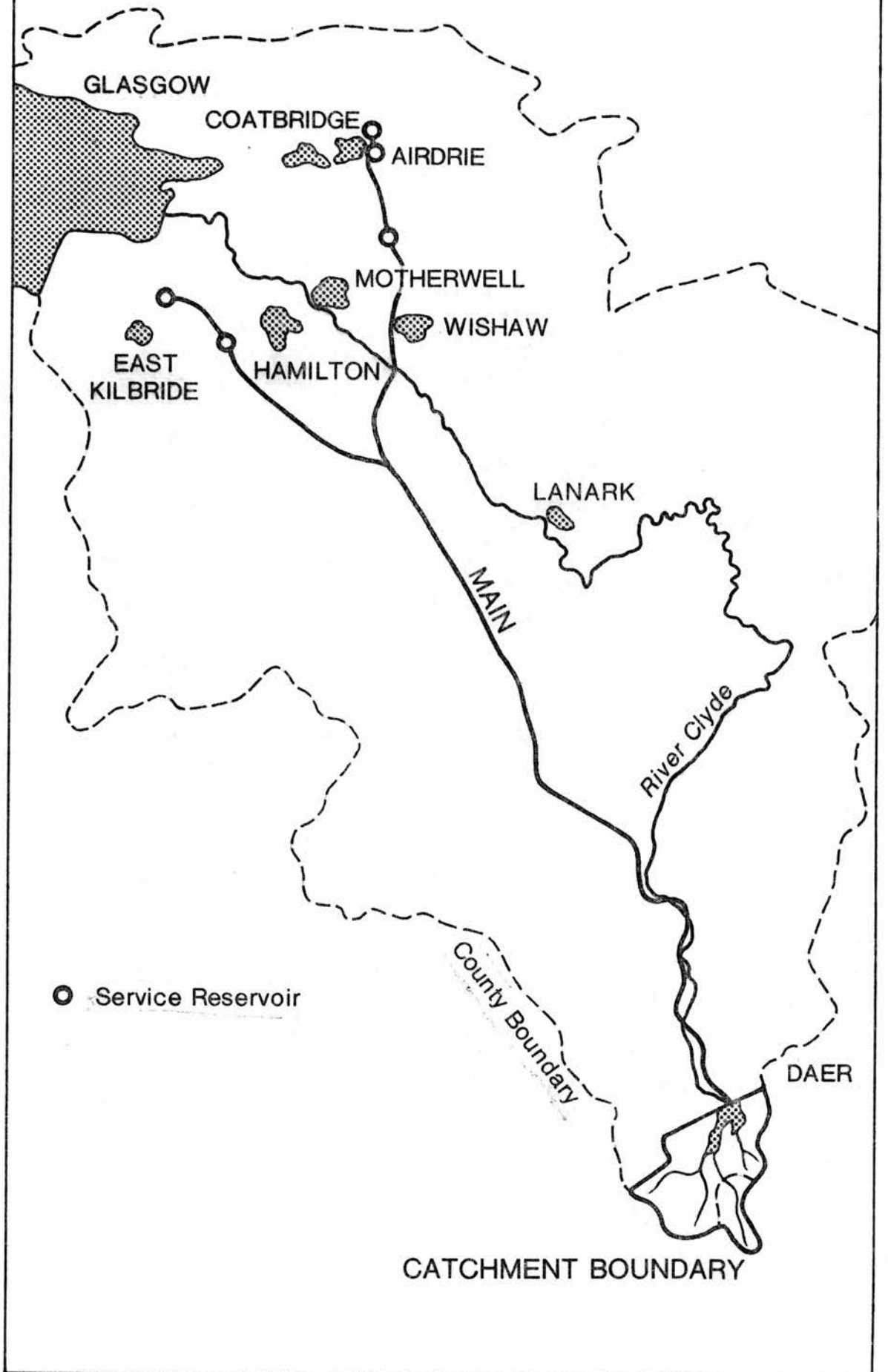
Lanark CC	8.2 mgd
Airdrie & Coatbridge District Water Trust	2.5 mgd
Hamilton TC	1.4 mgd
Motherwell & Wishaw TC	1.9 mgd

The cost had been allocated according to the proportion of supply reserved, hence the county would contribute nearly 60%.

This first phase cost £5.75m but a major factor in this compromise going ahead so smoothly was the substantial contribution made by Central Government. Grants were made under the Distribution of Industry Act to the extent of 47.5%. With such a substantial stake in the project one must assume that the Department of Health for Scotland had obtained the best administrative mechanism possible in the circumstances.

The scheme would be administered by a Bulk Supply Board, the Daer Water Board, especially established for the purpose. An initial estimate of 3 mgd had been allocated to East Kilbride new town by the County, but the scheme involved the construction of the highest earth dam in Britain and hence was not complete until 1955. In the meantime Renfrew County Council, from whom (as purchasers of the Busby Water Co.) responsibility for the supply of the area had passed forty years before, agreed to supply $\frac{1}{2}$ mgd.

Figure 6.2 Daer Water Scheme



More generally, and before continuing, it is interesting to ask what progress in the spirit of the 1944 White Paper had been made in joint-action in the post-war years. In 1944 there were 7 combinations of local water authorities:

The Irvine and District Water Board (1903)

The Blairgowrie, Raitray and District Water Board (1906)

The Clydebank and District Water Trust (1906)

The Wemyss and District Water Trustees (1910)

The Airdrie, Coatbridge and District Water Board (1923)

The Stirlingshire and District Water Board (1921)

The East Lothian Water Board (1922)

All of these except the latter two were limited in their area and jurisdiction and had been formed as a response to the need to supply the surrounding landward areas of burghs for the first time. The Airdrie and Coatbridge combination arose because a private company provided the original supply to both. The latter two, however, are examples of combination to provide new sources to mutual advantage. The East Lothian Board expanded its membership to include all water authorities in the County in 1950. All are of the 'source to tap' type, responsible for both supply and distribution.

In the post-war years, however, conflict between counties and burghs appears to have prevailed so that with few exceptions bulk supply combinations appear to have become the norm: ¹⁶

- 1949 Edinburgh/Midlothian combination to assure supplies to the latter from the former's Fruid scheme.
- 1950 The Laich of Moray Water Board (Source to Tap) Moray CC (North Eastern part) Burghead TC, Elgin TC and Lossiemouth TC from various sources and the Glenlatterach reservoir.
- 1951 Daer Water Board: bulk supplies to Lanark CC, Hamilton TC, Motherwell and Wishaw TC and the Airdrie and Coatbridge and District WB from the Daer scheme.
- 1958 The Loch Lee Water Board bulk supplies to Kincardine CC and Angus CC from Loch Lee.
- 1958 Loch Turret Water Board: bulk supplies to Grangemouth TC, Perth and Clackmannan CCs from Loch Turret.
- 1958 West Lothian Water Board: a 'source to tap' combination of West Lothian CC, Armadale TC, Bathgate TC, Bo'ness TC, Linlithgow TC, Queensferry TC and Whitburn TC, from various sources and the new West Water Reservoir.
- 1962 Nairn Joint Water Board: bulk supplies to Nairn CC and Nairn TC from a new Bruachmory Reservoir.
- 1960s The Lower Deveron Water Board: bulk supplies to Macduff TC and Banff TC abstracted from River Deveron gravel beds.

The basis of resistance to combination of town and county may be examined by referring to the objections of the City of Edinburgh to combinations proposed by SWAC. The logic of the combinations suggested by the latter rested on three factors: first, the 'source to tap' principle in which authorities with interests in the same catchment should be grouped together; second, the integration of town and country systems of supply to eliminate wasteful duplication and instances of

mains passing through areas without giving off a supply; and lastly, the amalgamation of units so as to give a viable grouping in terms of assessed rateable value and population so that a full-time water engineering staff might be justified.

In the Lothians area, Edinburgh shared the Lammermuir and Moorfoot hills with the Border counties and East Lothian, and shared the Tweed with Border authorities and West Lothian. The city merged with Midlothian to obviate needless duplication in 1949, as did East Lothian County Council with the burghs of the Council in 1950 and West Lothian with its burghs in 1958. The basis of controversy lay in the combination of the latter with the City along the lines of the third principle.

Edinburgh's objections to combination as suggested by SWAC in 1965 and 1966

The City of Edinburgh had originally intended to develop St. Mary's Loch as an equivalent to Glasgow's Loch Katrine, but Parliamentary opposition forced a rethink and the City's Moorfoot works in East Lothian were authorised in 1874 and 1876. Within twenty years, however, the City gained a foothold in the Tweed Basin. An Act of 1895 authorised the Talla works and the scheme, including 32 miles of aqueduct was completed in 1905. The design of the latter provided for the development of three adjacent catchments, Menzion, Fruid and Tweed, immediately to the west of Talla (see Figure 6.3). The first phase of the Menzion and Fruid extensions (river intakes fed by aqueduct to Talla) was completed in 1952 and the Talla aqueduct triplicated to cater for Edinburgh and Midlothian's post-war needs.

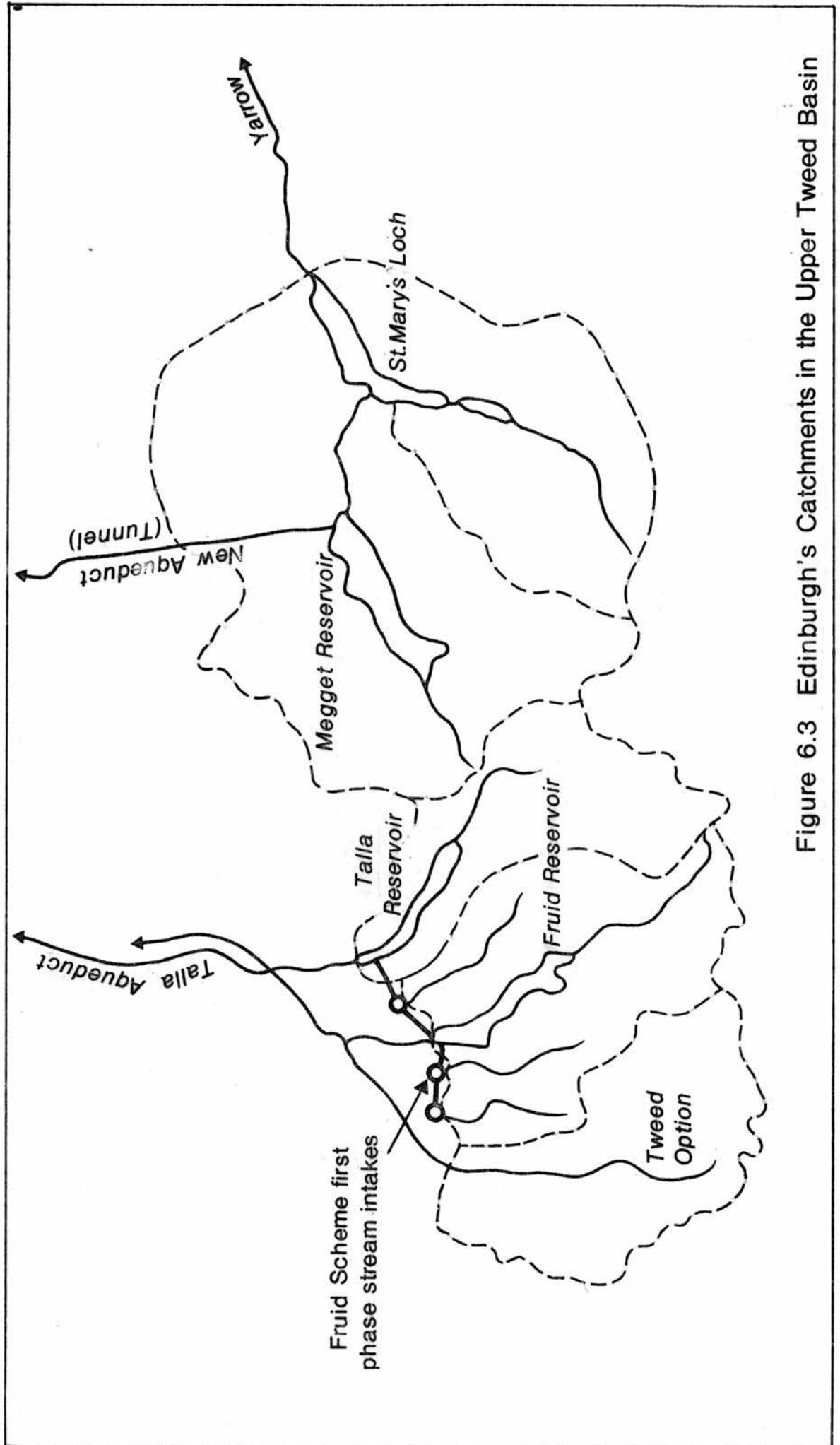


Figure 6.3 Edinburgh's Catchments in the Upper Tweed Basin

The Department of Health for Scotland suggested the combination of the Edinburgh and Midlothian water undertakings. The second phase of the Fruid extension (the construction of a dam and reservoir) could satisfy the requirements of the combined area easily and special water supply districts in the County, amounting to 60% of its area, already took supplies from aqueducts to Edinburgh passing close by.¹⁸ The burghs and county saw the logic of combination and merged with the City for purposes of water supply in 1948.

In West Lothian, a DHS regional report was followed by another by consultants in 1950 pointing out that the resources of the county were almost fully taxed. A reservoir at Baddingsgill, built between 1926 and 1929 for the Bathgate district of the county was the only source with a surplus, and even this would require augmenting from burn abstractions and the main running from it required duplication if expanding demands were to be met. The Burghs, except Bo'ness, were all dependent on the County for their supply and the other County districts could best gain extra supplies by interlinking their mains with those serving Bathgate. The formation of a regional water administration seemed an essential prerequisite of any solution. A new reservoir would be required but a start on that might be postponed temporarily, to 1960, by river abstraction to meet the shortfall until its completion. At the beginning of 1960 the arrival of a motor vehicle plant at Bathgate became certain, and it became apparent that West Water would satisfy future needs in the area for less than a decade.¹⁹ DHS guided the new Board to a share in the Loch Lomond scheme and as discussed above in Chapter 5 SWAC took the view that the authority could not bear the dual cost of two new water supply schemes,

Edinburgh and Midlothian were therefore called upon to share the burden.

The decision to attempt to merge West Lothian with Edinburgh met with some considerable opposition from the latter. The first stage of the Menzion/Fruid scheme would satisfy the needs of the City and environs for fifteen years. In the drought of 1959 the City experienced severe difficulties, water being cut off in some areas for twelve hours per day for a time. This crisis provoked the authorisation of the second stage of the scheme in 1963. This would give an additional 13 mgd. The city had, therefore, no interest in a further source of supply developed jointly with West Lothian. Furthermore, Edinburgh's water rate was half that of West Lothian and whilst it was not possible to forecast the precise financial effect of extending Edinburgh's area to include West Lothian, it seemed to SWAC that in view of the high rateable value over which joint costs would be spread, the financial impact on Edinburgh and Midlothian would not be substantial, saying that a rise in rates was never welcome,²⁰

'but it can be accepted the more readily if it can be shown to serve a worthwhile public purpose.'

As is outlined in greater detail in Chapter 8, the Edinburgh authorities thought that supplies from the Tweed could be arranged by pumping across the Pentland watershed from Glencorse reservoir which lay at the end of the aqueduct from the Corporation's existing Tweed sources and could also easily receive water from a new scheme based on the Megget water which they now saw as assuring the city's supplies to the end of the century. It seemed that the costs of this scheme were

similar to the cost of existing plans to arrange supplies from Loch Lomond. But if Edinburgh merged with the West Lothian Water Board it would become committed to both schemes (the Loch Lomond scheme had not been designed with Edinburgh's needs in mind and the City's consultants felt that the total capacity of the scheme at 100 mgd was not excessive for the whole of central Scotland and a reduction of this provision by 30 mgd for Edinburgh might have an adverse effect on the prime object of the scheme: to attract large water consuming industries to the industrial belt of Scotland).²¹

The Corporation received notice in May 1964 of the Secretary of State's intention to compulsorily amalgamate the two authorities. Counsellor McNally, convenor of Edinburgh's Water Committee criticised Central department officials for their 'complacent attitude' with regard to the financial effects of a merger after an interview with them.²² At a meeting with the Minister of State in June the Corporation made the offer to supply Livingston (the principal pressure on the availability of water in future in West Lothian) from the Tweed in an effort to co-operate without subjecting their ratepayers to the 'abortive' rate increases involved.²³ The Minister of State had replied that although this offer would be better from Edinburgh's financial point of view, on a wider view this local advantage would be more than offset by additional costs falling on other authorities less able to bear them (the participants in the Loch Lomond scheme).

In May 1965 a draft Loch Lomond Water Board Order was published. Edinburgh objected to its financial provisions. Nothing further had happened on the proposed compulsory merger of Edinburgh and West

Lothian but if the merger were completed, Edinburgh would contribute 76.5% of the assessed rateable value of the combination, Midlothian 12.5% and West Lothian only 11%. The cost of the Loch Lomond scheme was estimated at £9.2 million and West Lothian's share could be calculated as a result of the new Loch Lomond Water Board order at around £3.8 million. Without a merger West Lothian's water rate would increase by 400%; with a merger it would reduce by 27% whilst Edinburghs would increase by over 100% (to 19d). The Corporation had no intention of impeding the Loch Lomond scheme, but until the question of regionalisation had been settled, they must oppose the scheme. The question of water supply in Central Scotland, it seemed to them, had been badly handled and any responsibility for a delay in supplies being made available rested with the Scottish Office.²⁴

In May 1966 the Secretary of State announced his intention of confirming the Loch Lomond Water Board Order. Edinburgh Corporation reaffirmed their intention of fighting the order by initiating Parliamentary objections in the following month and these were heard by a special Parliamentary committee of enquiry in Edinburgh in September 1966.

The Parliamentary Commissioners explained to Edinburgh that objections to the Loch Lomond Order were technically invalid because it was not mentioned in its wording. In October 1966 Edinburgh announced its intention to petition Parliament over the matter again. Local M.P.s for three of the five city seats and the M.P. for Midlothian quickly pledged their support.²⁵ SWAC had by now recommended its final scheme for 13 water boards throughout Scotland. The

chairman of Edinburgh's Water Committee once again publicly voiced his view that SDD were desperately keen to foist the Loch Lomond scheme on SWAC's proposed Central Scotland Water Development Board before it was formed. Why the haste for pushing through the scheme? he asked. The Loch Lomond scheme would be partly built before administrative reorganisation came about, and the new authorities would start with their hands tied behind their backs, committed to the scheme pumping water uphill across Scotland. He had always felt that ^{26A}

'there is a big city called Glasgow not far away. If they could get a supply of water at a future date, 38% of the cost which has been met by the City of Edinburgh, this would be a good thing.'

Edinburgh saw the issue as a question of rule by SDD.

'If local councils are to be made a rubber stamp for the ^{26B} planning department of St. Andrews House, then we don't stand a chance.'

On October 20th the Edinburgh Evening News printed a centre page feature article entitled: 'Why should we have to take Loch Lomond water?' and proceeding to say: ²⁷

'We have been prudent and far sighted. But we now faced the prospect of having implanted on us the financial burden of a scheme which is not required by the South-East of Scotland and into which we are being dragged by the scruff of the neck'.

The Edinburgh area was said to be fighting a running battle against 'serried ranks of the faceless civil servants in the SDD' and 'The SDD's backroom boys are determined to force Edinburgh and the South East into a scheme of which they have no need'.

The decision to petition the full House of Parliament had the immediate effect of a meeting being called between the Minister of State and the Corporation to discuss the effect of Loch Lomond on the

rates. As a result, Edinburgh decided to amend its petition: instead of postponing West Lothian's commitment to the scheme the City now sought its complete exclusion. The Government then announced that it would give West Lothian a grant of £50,000 per annum and that Livingston Development Corporation might well make a contribution to the Loch Lomond scheme. This would reduce the impact on Edinburgh's water rate from the suggested additional 17p. to 0.64d. An Edinburgh spokesman commented that the amendment²⁸

'gives the impression that these figures are hurridly compiled at the eleventh hour and fifty-ninth minute.'

On December 1st, Mr. Clark Hutchinson, M.P. for South Edinburgh, tabled a motion annulling the Loch Lomond Water Board Order. Other M.P.s, however, amended this to a referral to a joint committee of both houses. Three weeks later the Secretary of State gave Parliament notice that he intended to introduce legislation to give effect to SWACs October report. A Bill was to be published the following month. The Secretary of State, Mr. Ross, expected some 'tough opposition from some regions over local issues particularly affecting the distribution of finances'.²⁹ The Bill was first debated on the 2nd February 1967 in the course of which Mr. Clark Hutchinson told the Scottish Grand Committee that the people of Edinburgh believed that there had been a deal of 'back stage skullduggery' over water supply.³⁰

Edinburgh's petition was heard on the 14th of February by which time the promoters of the Loch Lomond scheme had lodged a counter-petition. R.H.Cuthbertson, Edinburgh's consultant water engineer was one of those who gave evidence. He told the joint Parliamentary committee that West Lothian could be supplied from Megget at a cost

of £8.4 million, whilst the cost of Loch Lomond would be more like £11m. Counsel representing the Secretary of State said that if the Order was amended to exclude West Lothian, the scheme would be a dead letter and nothing would be done to help Central Scotland, to which Mr. Cuthbertson replied that the only reason why the scheme would not proceed was because other authorities were not prepared to pay their full share of its cost.³¹

Edinburgh's opposition was significant in bringing forward the Water (Scotland) Act 1967 so that development plans could proceed. Of importance here is the extent to which a development of a major scale required the co-operation of the city of the region to ensure its viability.

City regions emerged in the post-war era, as a significant factor in day to day life as well as dominating features of any strategic plans. Not surprisingly therefore, the concept featured prominently in deliberations on the most appropriate form of a restructured pattern of local government to which attention is now turned in the third section of this chapter.

Local Government Reform

(a) Criteria

Local government, not only the water service, was not working properly: it was not doing the job it ought to be doing and at the root of the trouble lay its structure which had remained basically the same for forty years whilst almost everything around it had changed. Many

boundaries were out of date in the light of suburban development, often dividing centres of population from hinterlands with which they had close functional connections, and sometimes even splitting continuously built-up areas. Many authorities were too small, with insufficient staff and financial resources to discharge all their functions effectively. Anomalies in the allocation of services between different types of authorities were causing fragmentation and friction in the provision of services with the consequences that electors were confused over who did what; services did not reach the highest standards and 'ad hoc' or joint administrative arrangements had proved necessary for several. As a result it was thought that responsibility to ratepayers had been eroded. Local government was weak and, partly because of this, too dependent on Central Government so that local control over local affairs had inevitably been lost.^{32A}

The Wheatley Commission (hereafter referred to as 'Wheatley') recognised that their work had to be both thorough and radical; patching up just would not do. Essentially it faced the problem of resolving the conflicting aims of increased efficiency with stronger democratic control of larger units that would allow greater division of labour so that more expertise could be concentrated on particular problems. Only a large organisation would provide the opportunity for such specialisation since only it could assure continuity of employment. On the other hand democracy thrives in small units where matters can be dealt with by people who have personal knowledge of the problem.

Wheatley set four requirements for a reformed structure of local

authorities: ^{32B}

- 1) Power
- 2) Effectiveness
- 3) Local Democracy and
- 4) Local Involvement

Local government was to play a more positive role in the running of the country after reform and should be equipped to provide services in the most satisfactory and efficient manner possible. At the same time power should be exercised by the elected representatives of the people fully accountable to them in a structure so designed as to bring about as much public participation in the making of decisions as possible. More power to local authorities could not be advocated without regard to local democracy and for that, local involvement was essential. Greater effectiveness was the key concept but for that, more power, in terms of finance and expert management, was necessary.

The needs of planning were of central concern to Wheatley when drawing boundaries. Those giving evidence had frequently used the term 'planning' but not always in the same sense; some clearly meant precise activities undertaken by virtue of Town and Country Planning Acts; others used the term in its broadest sense of 'policy-making'; whilst others referred to 'strategic planning', the planned use of resources and the direction of public investment in accordance with a strategy of national and regional development. The latter group evidently impressed Wheatley most. Wheatley took the view that the ordinary Scot's greatest concern was with his economic environment and hence any attempt to revitalise local government should pay close attention to the so-called 'implementing services'. These were the

components of strategic planning: the construction of advance factories, the provision of roads, public transport, utility services, including water and sewerage, as well as the promotion of urban development and renewal schemes or the designation of new towns.³³ The existing distribution of such functions was, in Wheatley's view, partial, fragmented and unsatisfactory, so that it did not realise the idea of partnership between local and central government, the latter playing by far the dominant role.

Six major groups of functions seemed readily identifiable; planning and its associated services; the social services, including education and social work; housing; the police and fire services; the environmental services and amenity services. Apriori, there seemed a good case for three levels of local government; first and largest the Regional, for planning, police and fire services which benefitted from as few bounded horizons as possible; second, the Intermediate, for education, health and social work, services which would not so much benefit from the removal of as many boundaries as possible as from economies of scale with large groupings able to support specialist services; and thirdly, the local which was best suited to the needs of amenity and environmental services plus some detailed aspects of planning, such as development control.³⁴

The regional scale which Wheatley envisaged was much larger than many people had hitherto contemplated, but Wheatley was convinced that areas as large as these were necessary to assure the effective discharge of the appropriate functions. But local authorities also had to represent the people who lived within their boundaries and these should

be drawn to include within them as many people with as much in common as possible. Local authorities should match the communities they served. But where were these communities? A number of activities were examined, such as public transport services, the circulation areas of local newspapers, travel to work patterns and where people went to shop for various types of goods. The boundaries of functions already administered on a regional basis were also examined. The Commission identified seven regions but acknowledged that there was room for further discussion over the actual number, which they thought would certainly lie between five and nine (see below).

Throughout its gathering of evidence Wheatley had heard many of the existing local authorities' style of policy-making roundly condemned. The Institution of Municipal Engineers wrote of: ³⁵

'the cumbrous ~~series~~ *series* of checks on decision making all too noticeable in their effects on technical design and estimating and the consequent delay in action'.

A report would be submitted by a technical officer to his particular committee; it would be considered and usually pass to another committee, who if satisfied would then pass it to the finance committee, who would take a decision on whether or not it could be fitted into the council's general financial programme thereafter to go to the full council, for decision. At any one of these stages the proposal could be referred back to substantiate certain points so that a proposal may go back and forth for months. The institution felt the process could be trimmed substantially

'without in any way reducing the effectiveness and necessary investigation by the elected representatives, which one accepts as being absolutely fundamental.'

In a similar vein John Robertson M.P. recounted his experience of local

government: committees were ways of avoiding decision making, or a way of rubber stamping a decision made by an official, in itself not necessarily a bad thing, but the fact was that the committee system was incapable of making decisions that were required. ³⁶

b) Joint Committees and requisitioning

A particular difficulty with regard to the former structure of local authorities concerned the frequent need to establish joint committees of two or more councils. These were regarded with almost universal distaste. The Society of Clerks and Treasurers in Scotland saw the main problem as one constituent member being a dominant party and, as such, taking charge and Wheatley put the following to representatives of the Society: ³⁷

'it is said that the principal objections to joint committees were, firstly, that the nominated representatives from the various local authorities do not really go as full representatives of the body, but merely as delegates of their organisation; they are therefore not really in the full capacity of elected representatives dealing with the overall problems of the particular function. Secondly, it is said that the system of requisitioning leads to a certain amount of irresponsibility in the sense that they are not immediately responsible to the electorate for the amount of money that they requisition from the constituent authorities. We have found in various places throughout local government, objections to joint committees on these two grounds.'

The practice of requisitioning, where people had the responsibility for spending money and collecting money without direct responsibility to the electorate was severely criticised. Representatives from Burghs on committees of County Councils responsible for providing some services in the Burghs were thought to have acted irresponsibly on occasion, since they did not have to defend their decisions in the light of the

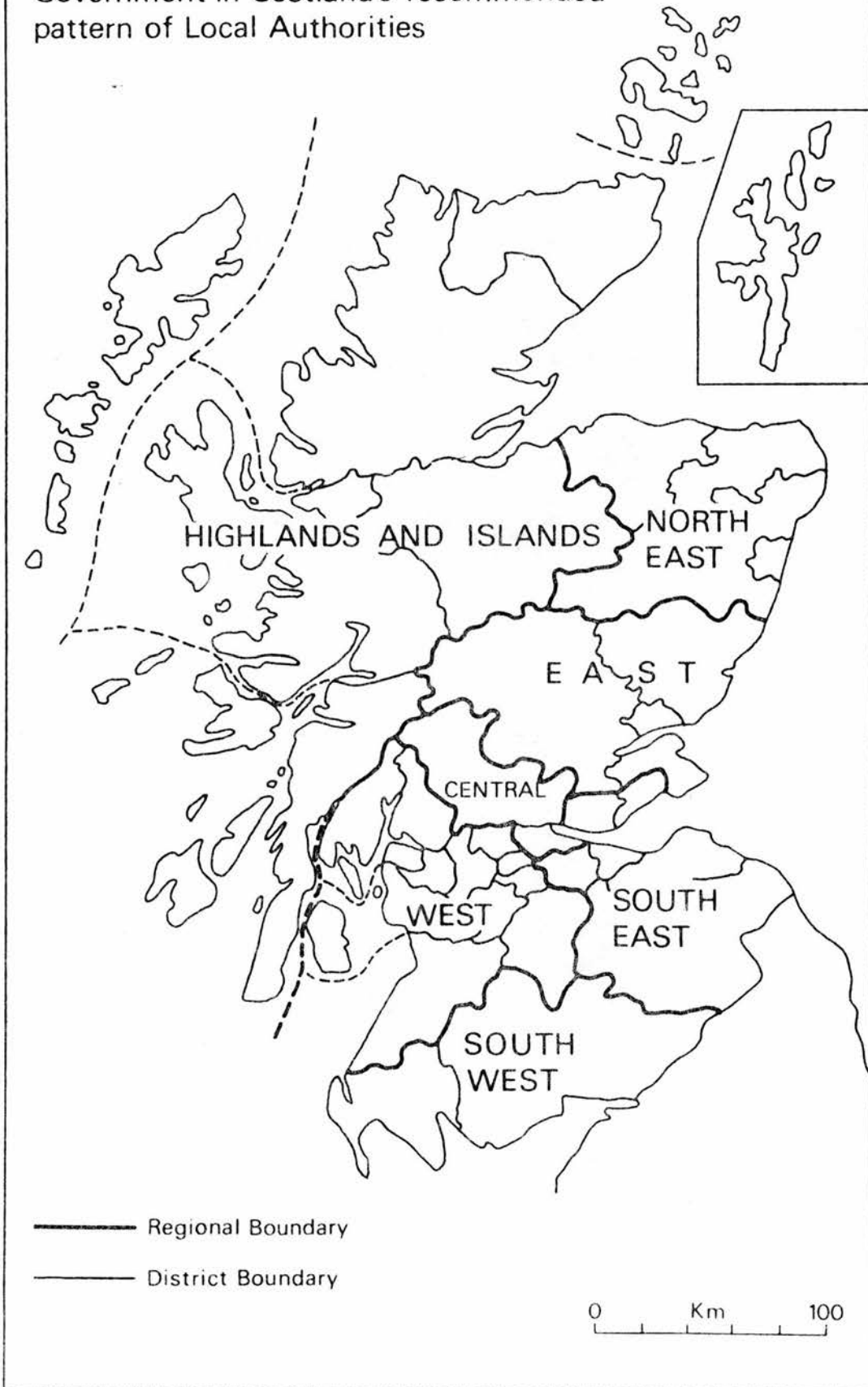
ultimate level of County Council rates, whilst at the same time Burgh Councils resented the requisitions made by the County on them to pay for such overlapping services, particularly education. Not surprisingly, therefore, the Convention of Royal Burghs in particular thought the practice a very bad thing and the Association of County Councils thought that it would be advantageous to have units of local government responsible for the whole range of functions appropriate to that scale rather than have multifarious boards operating over different areas.³⁸

In this light the Association of County Treasurers felt that the water boards should be fitted into the pattern of top-tier authorities.³⁹ In their view, the 1967 Act had put the cart before the horse and the Convention of Royal Burghs agreed that if technical difficulties could be overcome, it would be desirable to bring water within the same unit of local government as the other major services. Thus, in the main, the opinion of local authorities was that water should be included in any new units of local government if some sort of reasoned compromise could be reached between its special boundaries and general authority boundaries. This was largely because of the general feeling that requisitioning and joint committees were twin evils which should not survive the transition to a new system.

As outlined in Chapter 5, Wheatley agreed and proposed a pattern of six regions for the implementing (infrastructure and planning) and protective (police and fire) services (Figure 6.4). For the remaining functions, 37 districts were proposed, 10 of which had more inhabitants than the smallest region proposed, the South-West, showing, according to Honey, that Wheatley,⁴⁰

Figure 6.4

The Royal Commission on Local Government in Scotland's recommended pattern of Local Authorities



'was indeed much more interested in matching the spatial organisation of Scottish life than in meeting a functionally defined population threshold.'

c) Boundary Problems

The debate in Parliament on the Government's subsequent Local Government Bill, with respect to water supplies, has already been discussed in Chapter 5 as has the majority and minority recommendations of SWAC made in 1972. The key problem was the extent to which these boundaries best for general administration matched those appropriate for the management of water supply. In the course of Wheatley's proposals making the transition to White Paper and to the statute book, several important changes in the lie of Regional boundaries occurred.

The major difficulties with Wheatley's initial pattern lay in the partition of Fife and in the Cumbernauld area (see Figure 6.4). Although it was true that parts of the southern shore of the Tay had been supplied by Dundee Corporation, the proposed boundaries partitioned the regional supply of the county based on the Glenfarg and Glendevon catchments and cut across existing plans to assure the future supplies of the water board area through a further development of the latter. Several integrated systems of distribution would be divided between three regions (East, South East, and Central), so that at least 23 bulk supply meters would be required along boundaries to measure the quantities passing in and out of each region.⁴¹

East Dunbartonshire and South West Stirlingshire contained

Cumbernauld, clearly a satellite community of Glasgow and an essential component of Wheatley's proposed West region, and could be supplied from Loch Lomond, but 80% of the existing supply came from the Carron scheme, now under the control of the Mid Scotland Water Board. An expenditure of around £0.2 million would be required to effect the transfer with a further £0.2 million worth of assets consequently becoming redundant and a continuing annual charge of £40,000 incurred in extra pumping cost. In this light, this was a problem suitable for the application of the 'added area' device proposed by the minority of SWAC.⁴²

The Conservative Government did not accept Wheatley's pattern in its entirety. In the White Paper of 1971,⁴³ regional status was granted to the Borders; separate Island Areas for the Orkneys and Shetlands; 49 rather than 37 districts were proposed and several other minor changes in the lie of boundaries including the transfer of the whole of Kincardineshire to the North West region (rather than part as formerly), and the inclusion of the Girvan district of South West Ayrshire in the South West Region. The Government also accepted a minority view of two Wheatley members that the whole of Argyllshire rather than merely the South should be included in the West Region but this had little or no effect on the implications of reform for the administration of water supplies.

The partition of the Borders from the South East ran counter to SWAC's view of unified control over shared sources of supply. The Association of Water Board Engineers (Scotland) told SWAC that the proposed Borders region with a population of 96,000 would not be a

viable water unit by itself, although four of the existing water boards had fewer consumers.⁴⁴ SDD told SWAC, however, that there would be no difficulty in arranging future supplies for the region, especially now that with a proper system of control of the pollution of rivers fully established, they were thinking in terms of river abstraction as the most common strategy of water resources development. If necessary, substantial supplies could be abstracted from the Tweed between Galashiels and the English Border to provide for more than twice the existing population of the Borders, so that the needs of the Region would not conflict with Edinburgh and the Lothian's interest in the hill catchments.

The transfer of the whole of Kincardineshire once again raised the problem of the Loch Lee scheme serving both South Kincardineshire and North Angus. Here too there seemed a case for the application of the 'added area' device as did the supply of the Girvan District of South-West Ayrshire, where there were no economic alternatives for a future supply other than the Loch Bradan scheme discussed in Chapter 7 below.

With respect to Orkney and Shetland, SWAC retreated on the view expressed by their predecessors in 1966. Experience since then had suggested that the service could be satisfactorily operated by the new local government units proposed. In any event, the county council had continued to undertake much of the day to day work on an agency basis.

In Parliament, Ayrshire and Fife argued for separate regional status on the precedent of the concession granted to the Borders. A

successful amendment, questioning the proposed West Region was reversed by Government but defeat was conceded on the question of Fife and it was granted Regional status, thus solving the major problem of water supply.

Changes were also made to boundaries so that the need for an added area in South-West Ayrshire was removed and, all in all, the problems of matching water supply areas with those of the final pattern of Regional Councils were not nearly so serious as they had been, thus undermining the majority view taken by SWAC that problems of boundaries required an ad hoc authority for the whole of Central Scotland. The final pattern of local authorities and hence water authorities is depicted in Figure 6.5.

Lastly on the question of boundaries, it is interesting to consider the extent to which the water regions proposed by the Institution of Water Engineers (Chapter 5, Figure 5.4) would have nested with the pattern of regional councils which eventually emerged. It is important to remember that the Institution had in mind ad hoc single purpose authorities requisitioning the Regional Councils. The North Region would have had two regions (Grampian and Highland) and three island councils to draw on for its finance. The East would have had two principal regions (Tayside and Fife) but would also have to have had a representative of Grampian because of the Kincardineshire problem. The South East Board would draw on two regions (Borders and Lothians) as would the South West (Strathclyde and Dumfries and Galloway) and the Central Scotland Board (Central and Strathclyde). But their whole pattern falls apart somewhat when their proposals for the West of

Figure 6.5

The pattern of Local Authorities following the Local Government (Scotland) Act 1973



Scotland are examined. As Wheatley predicted would inevitably be the case, Strathclyde Regional Council would have been asked to wholly fund an ad hoc body responsible for serving only part of its area.

Concluding Comments

Whilst each of the three sections of this chapter sheds a more detailed light on the broad sweep of policy considered in Chapters 4 and 5, two themes thread each of them. First, the structure of local authorities has consistently influenced the provision of water supply whether in the very earliest days by prejudicing the adoption of the most rational schemes of supply for certain areas, as in Lanarkshire; or as in the case of Livingston New Town and the Loch Lomond scheme, creating difficulties over the financing of major new initiatives.

Second, the Wheatley Commission's contribution really was one of radical reform. In a sense, the Commission repeated the concept of reform adopted in 1929 with functions passing to larger units more in line with the spatial organisation of contemporary society. But the authors of the 1929 scheme balked at the eradication of administrative differences between town and country, albeit perhaps because real differences in patterns of life still existed, with important consequences. If this dichotomy had been avoided it seems likely that many of the problems of services best administered on a regional basis may have been avoided in the context of post-war enthusiasm for regional planning. Certainly, a major factor hindering change appears to have been jealousy between county and burgh. This was recognised by Wheatley to the extent that any new pattern of authorities was to

avoid overlap in the provision of services to an area as far as possible. This precluded any thought of water authorities operating independently in parallel with local authorities providing the other major infrastructural services.

Structural conflict between town and country lies at the root of difficulties in providing water supplies, since schemes were first promoted. The effects of such conflict lay at the root of the problems SWAC was called upon to resolve in 1962. With this in mind, the development of the supplies of Ayrshire is the subject of the next chapter, further amplifying the point within the discipline of a single area.

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CHAPTER 7

The development of water supplies in Ayrshire

The purpose of this chapter is to explore further the relationship between administrative structure and water resource development. Three phases of administrative development are discernible prior to the most recent reform of local government and each of these finds expression in the development of water resources for the supply of Ayrshire.

In the first phase the larger towns develop initial supplies, at first from resources closest to them, and then establish spheres of interest to meet their longer term needs. The rural demand centres having come to prominence somewhat later must wait until the reform of local government in 1929 before beginning to develop long term sources of supply.

In the second phase Ayrshire County Council responded well to national calls for a regional perspective in water resources development but were frustrated in the execution of a regional plan by the conflict between town and country featured in the preceding chapter, and by a certain amount of indecision on the part of central authorities to intervene over the heads of local authorities in the absence of any threat to national priorities.

In the third phase, just such a threat brought intervention, through the formal conciliation mechanism of an enquiry by the Scottish Water Advisory Committee (SWAC). But this was to no avail and the Water (Scotland) Act 1967 was required before the optimum regional scheme,

identified some twenty years before could be implemented. In the meantime, the waste of piecemeal and multiple development first identified in the 1930s continued to find expression in new developments undertaken in the 1960s. It has been argued that such general themes find expression over the whole of Scotland: in this chapter their detailed expression in Ayrshire is traced and supplementary themes emerge for concluding comment.

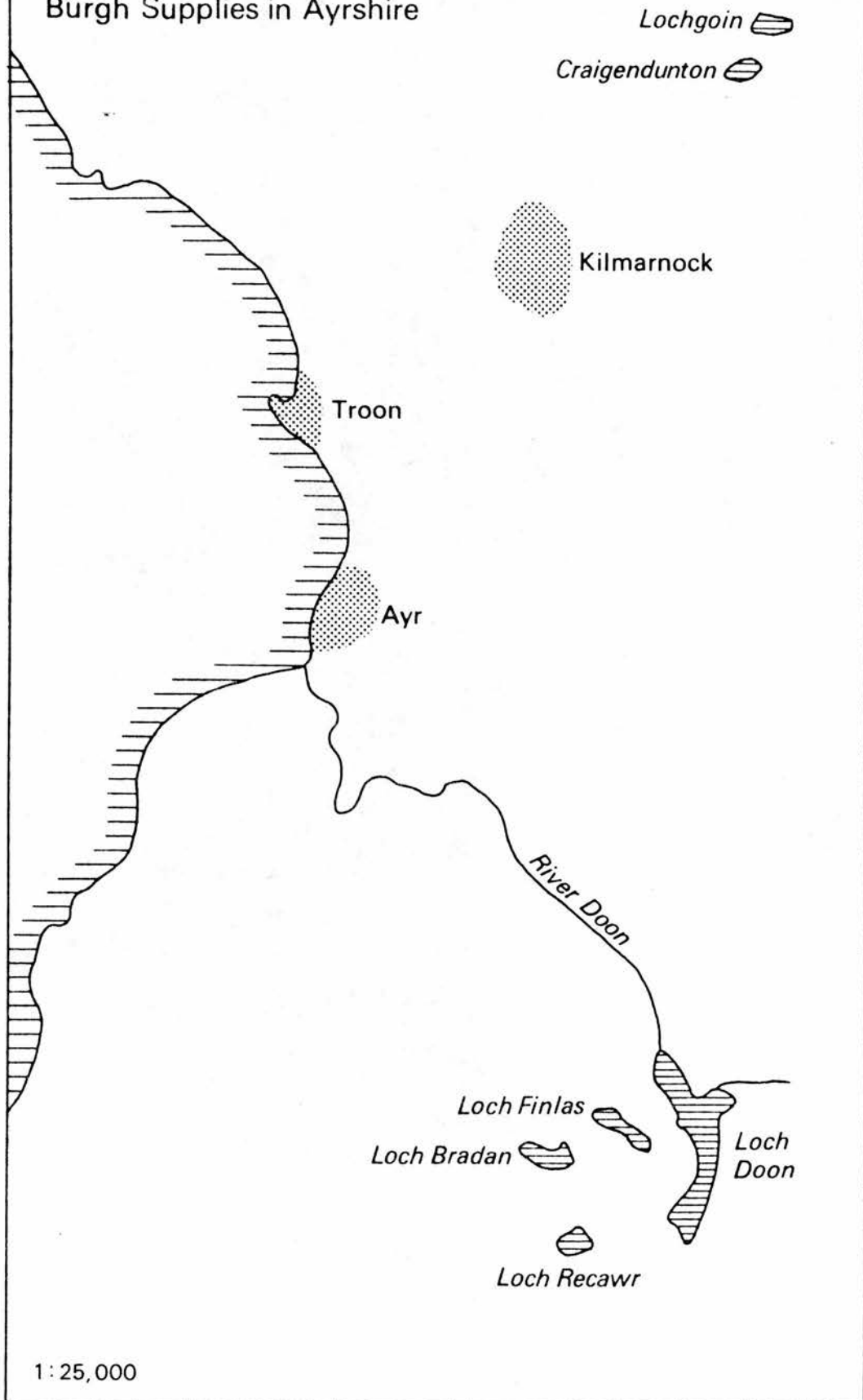
Early Developments: The First Phase

The general character of early development outlined in Chapter 6 is evident in Ayrshire where the burghs, as well as being first to arrange piped supplies, each identified a catchment as a sphere of interest and then progressively expanded their works in an incremental manner. In Ayr, a piped supply from springs four miles south of the town, from 1842, was supplanted by Loch Finlas, 22 miles distant, in 1887, and this development was shortly followed by the acquisition of Loch Recawr three miles further south. In Kilmarnock, a piped supply from the Fenwick Moors was established in 1850 and augmented in 1901, at which time a second source at Graigenduffton was established. A third, at Loch Goin, followed in 1910 (see Figure 7.1).¹

Ayrshire also saw the emergence of one of the first water boards in Scotland. In the light of an exceptionally high death rate, 36 per thousand, Irvine Town Council was pressed by the Central Board of Supervision on the matter of piped water supplies around 1873. The town made enquiries of its neighbours as to a joint scheme of supply to no positive effect. The Board of Supervision continued to press

Figure 7.1

Burgh Supplies in Ayrshire

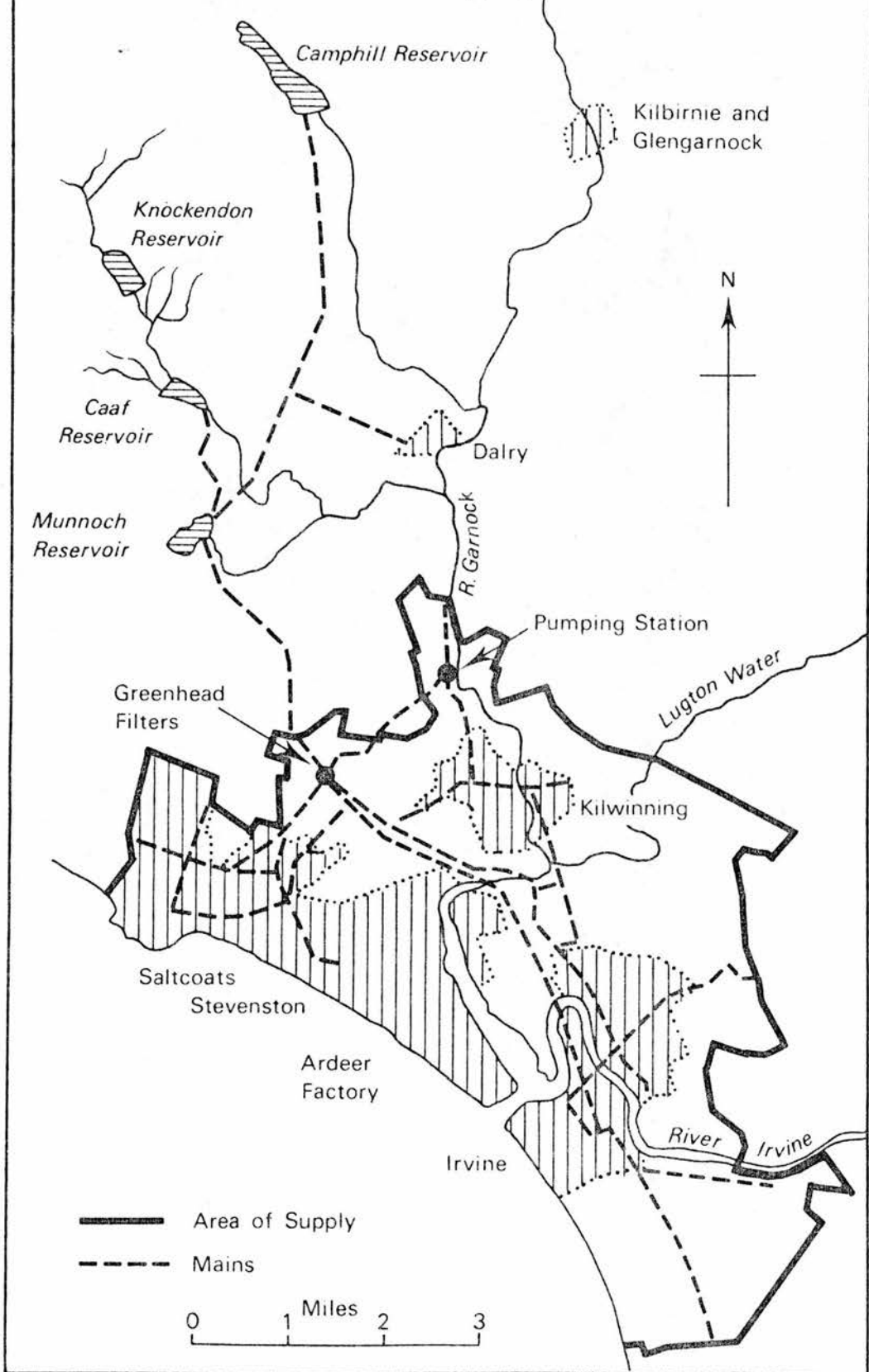


and in 1876 the town council, with the neighbouring parish of Dundonald (representing the 'Halfway' district adjoining the Burgh and subsequently included in the Burgh when boundaries were extended), constructed a reservoir at Munnoch. In 1878 the Kilwinning Parish authorities negotiated a supply from this source. Between 1881 and 1885 the Munnoch works were extended and arrangements made with the Parochial boards of Ardrossan and Stevenston Parishes for supplies to Saltcoats and Stevenston and included in its area of supply the Nobel Explosives works at Ardeer (see Figure 7.2) where the management had planned to construct its own supply at Glenbird. Chemical manufacturers in the Halfway district in the meantime secured priority over the domestic demands of this extended area. The Munnoch works quickly became insufficient and a pipe was laid in 1900 to feed additional water from the adjacent Caaf catchment, but this was removed after legal action by the riparian proprietors. An Act of Parliament thus became necessary to secure the extension of supplies from the Caaf, but their successful acquisition was delayed further by objections to the priority granted to the chemical manufacturers in Halfway District.

Parliamentary Commissioners declared that this arrangement, whilst continuing to apply to supplies from Munnoch, should not limit the use of the new reserves from the Caaf. A majority of Irvine Town Council refused to accept this ruling and tried to re-present an unamended Bill to Parliament. The objectors responded by widening their claims to include full representation on the management committee of the undertaking. At the time, the so-called 'outside authorities' accounted for 68% of the population supplied and paid 71% of the domestic rates charged annually. A second enquiry by Parliamentary Commissioners accepted these claims and recommended abolition of the priority afforded

Figure 7.2

The Irvine and District Water Board:
Reservoirs and Area of Supply



to the chemical manufacturers. The Irvine and District Water Board was formed the following year in 1903 and the Caaf Reservoir completed in 1906.

In 1915 and, in the context of a greatly expanded demand for explosives during the Great War, arrangements were made with Paisley Corporation for the supply of water in bulk between the latter's Camphill reservoir and Munnoch reservoir; a supply was given off to the Dalry Special Water district and authority was received to construct a third reservoir on the Drum Burn, though the latter project was, however, later abandoned.²

Thus by 1920 the pattern of supply was already quite complex with urban and rural areas being supplied by a joint board which had arisen in somewhat unique circumstances. Elsewhere in the County each Special District and small burgh made its own arrangements from separate small-scale sources. Another complex arrangement emerged, however, with respect to Troon's supplies. In 1896 Troon was a Special Water Supply District but was soon to become a burgh. The new town council took over the existing supply from a small reservoir at Collenan on Dundonald Hill. This was inadequate and the Ayr District Committee (of the County Council) was approached with a view to promoting a joint scheme to bring water from Loch Bradan, a distance of about 30 miles. In due course, the new Loch Bradan reservoir was connected to the existing works at Collenan and a supply of $\frac{1}{2}$ mgd distributed to the landward district, comprising over ten parishes and 112 square miles.³

The Second Phase: the 1930s

With this precedent in mind and following the lead of neighbouring Lanarkshire, one of the first acts of the County Council on taking responsibility for landward water supply in 1929 was to promote an order to form the whole county, excluding the Burghs, into a single Water District. If passed, this Order would have removed Stevenston, including the Ardeer Factory, and the landward parts of Kilwinning and Irvine parishes from the Irvine and District Board's area of supply, thus removing 60% of the Board's revenue. The Board and burghs opposed the order successfully before yet another investigation by Parliamentary Commissioners.

The County Council then attempted to amalgamate the remaining special water supply districts in the county with the Loch Bradan area of supply. In 1933 this move was also threatened by legal action on the part of the Irvine and District Board because of its impact on its supply to the parishes of Dreghorn and Dundonald.

The County had in mind the implementation of the sort of policy advocated by the Committee on Scottish Health Services (Chapter 4) emulating the example of Lanarkshire's Camps scheme (Chapter 6) by constructing a county-wide source of supply at Afton. This scheme was opened in 1935 and involved a reservoir with a yield of 5.5 mgd, 5 service tanks and 120 miles of distributing mains.⁴

Unabashed by its earlier defeat, the County Council promoted a Private Bill to constitute themselves as the sole water authority for

the whole County (this time including all the Burghs) and the transfer to themselves of all the water undertakings in the county in 1935. The Bill was opposed by all the Burghs and by the Irvine and District Board. A Select Committee heard the arguments for and against for nine days in March 1936 before deciding that the proposal should not succeed. Shaw has summarised the issues as follows:⁵

'There were places where mains belonging to different authorities of which there were 56 ran parallel along the same highway for several miles. Under the Local Government (Scotland) Act 1929 the burghs in Ayrshire had secured a majority of the number of members in the County Council by which it was accordingly proposed to constitute the County Council the controlling authority for water distribution following the lines of the authority for education. The intention was to make the supplies so far as retained, interchangeable, so as to ensure a constant and sufficient service throughout the whole area at all times, and so reduce the total cost of supply over all the area. It was opposed by every burgh in Ayrshire, not so much because they wanted to retain their own individual undertakings for themselves and not share the benefits with others less fortunate, but primarily because they dreaded any further encroachment on their prerogatives, which they saw gradually disappearing in view of the trend of recent legislation. One particularly erudite Provost in his 'swan song' gave solemn warning that the burghs might be completely blotted out. He was quite incapable of assessing the value of this prospect at other than his own point of view.'

but: 'The Bill was defeated, not on account of the opposition, which was obviously prejudiced, nor on account of any weakness in the proposal, but because the Secretary of State, while his Department had encouraged the County Council to proceed with the Bill, determined at the last moment to recommend that it should be the subject of public, rather than private, legislation.'

That public legislation was not to come for another thirty-two years, by which time history had replicated itself, a great deal of water had flowed down the pipes and a great amount of money had been wasted. Meanwhile, the Afton scheme served the needs of the landward area and the Irvine and District Water Board constructed their third

reservoir to consolidate their joint interest with Paisley Corporation in the Renfrew Heights.

Growing demands prompted the Irvine Board to proceed with a new reservoir in 1937.⁶ Consultants (Messrs. Babbie Shaw and Morton) submitted alternative schemes; either the Greeto water could be developed or there could be a further phase of exploitation of the Caaf drainage area at Knockendon. The latter was chosen, giving the Board an additional reliable yield of $2\frac{1}{2}$ mgd. The Commissioner for Special Areas in Scotland approved a grant of $33\frac{1}{3}\%$ towards the cost, but although work started in 1938, the reservoir was not completed until 1947. The outbreak of war within a year focussed attention, once again, on the supply of munitions factories in the area. Site conditions at Knockendon were such that the pace of work could not be speeded but the project was granted sufficient status as ensured its continuation throughout the war years. Instead, the pipeline from Camphill to Munnoch reservoirs was duplicated in 1939 and an abstraction point of the River Garnock installed with the stimulus of drought in 1942.

In the light of this growing fusion of interests in the water supply of North Ayrshire and Renfrewshire, DHS produced their post-war recommendations in the form of a joint report for Ayrshire and Renfrewshire.⁷ A scheme was devised which aimed at complete co-operation between the counties. It was thought that the multiplicity of sources already in the region ruled out the possibility of a single new scheme on the lines of the Daer in neighbouring Lanarkshire (Chapter 6). Instead, it was suggested that a new regional distribution

network should be fed from a number of sources. The proposals were put forward on the basis that eventually one single water board should function for the region but it was acknowledged that this might take some time. The final report stated the view:

'it is thought that the proposal of one board is the best method of putting the area in a sound position to meet demands for water that may arise.'

The original internal report of the Department's inspector, perhaps with a greater appreciation of the realities of the local politics of the counties, suggested a quite different pattern of institutional arrangements, viz. the creation of seven water boards and the retention of Ayr and Kilmarnock Burghs as separate water authorities. The original pattern proposed is portrayed in Figure 7.3. In the event, the official DHS view was that large water authorities could better offer to carry a surplus to deal with any local shortages that might arise seems to have prevailed as policy but as policy which could not be implemented.

Co-operation between the counties of Ayrshire and Renfrewshire seemed desirable on three counts:

- the concentration of population on topographically continuous lowlands;
 - the large proportion of Renfrew's supply drawn from sources in Ayrshire;
- and
- the ease with which developments on the coast of North Ayrshire could be supplied from catchments under the control of Renfrewshire authorities.

The major axis of the distribution scheme for the region proposed

Figure 7.3

Seven Suggested Water Boards for Ayrshire and Renfrewshire

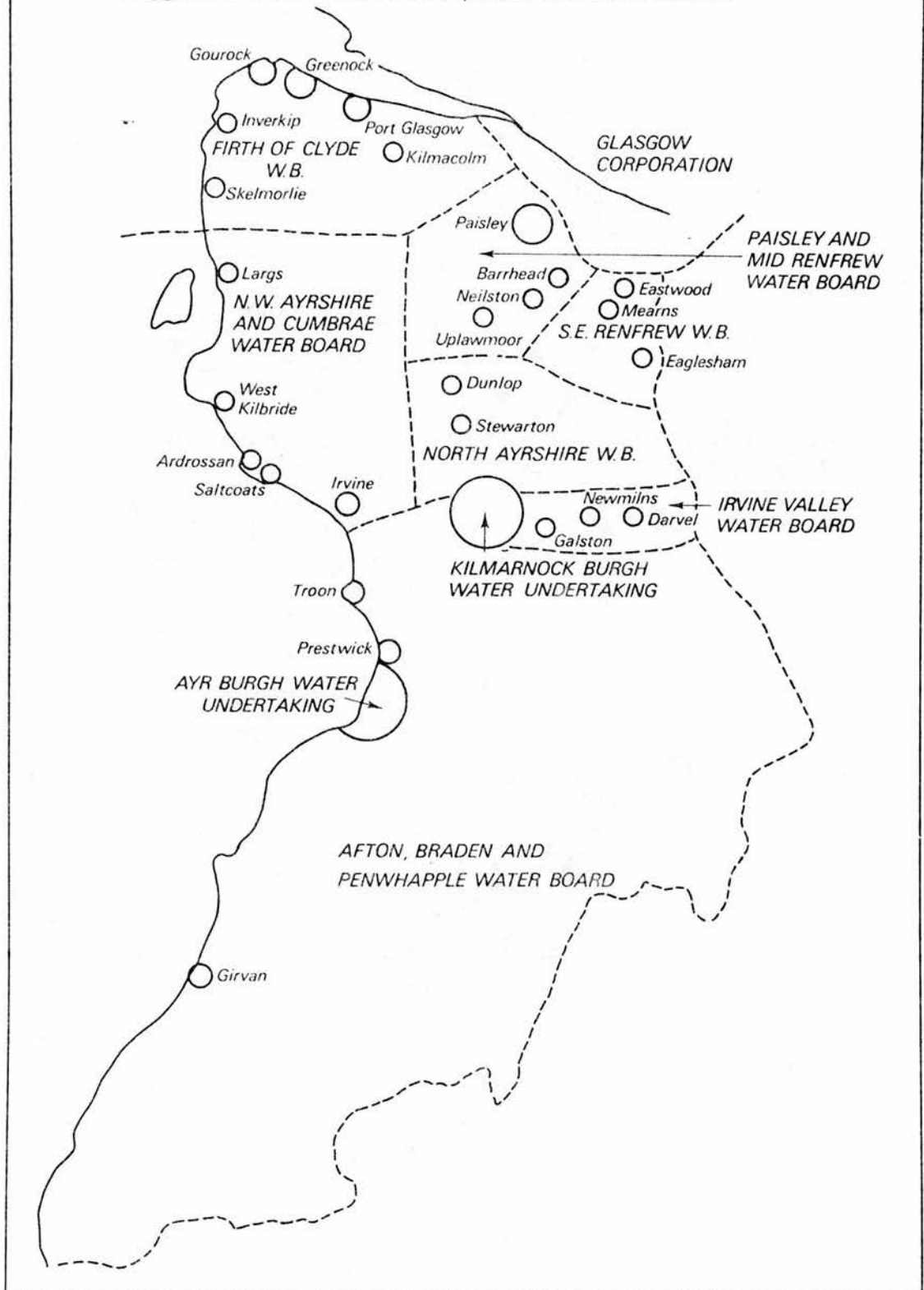
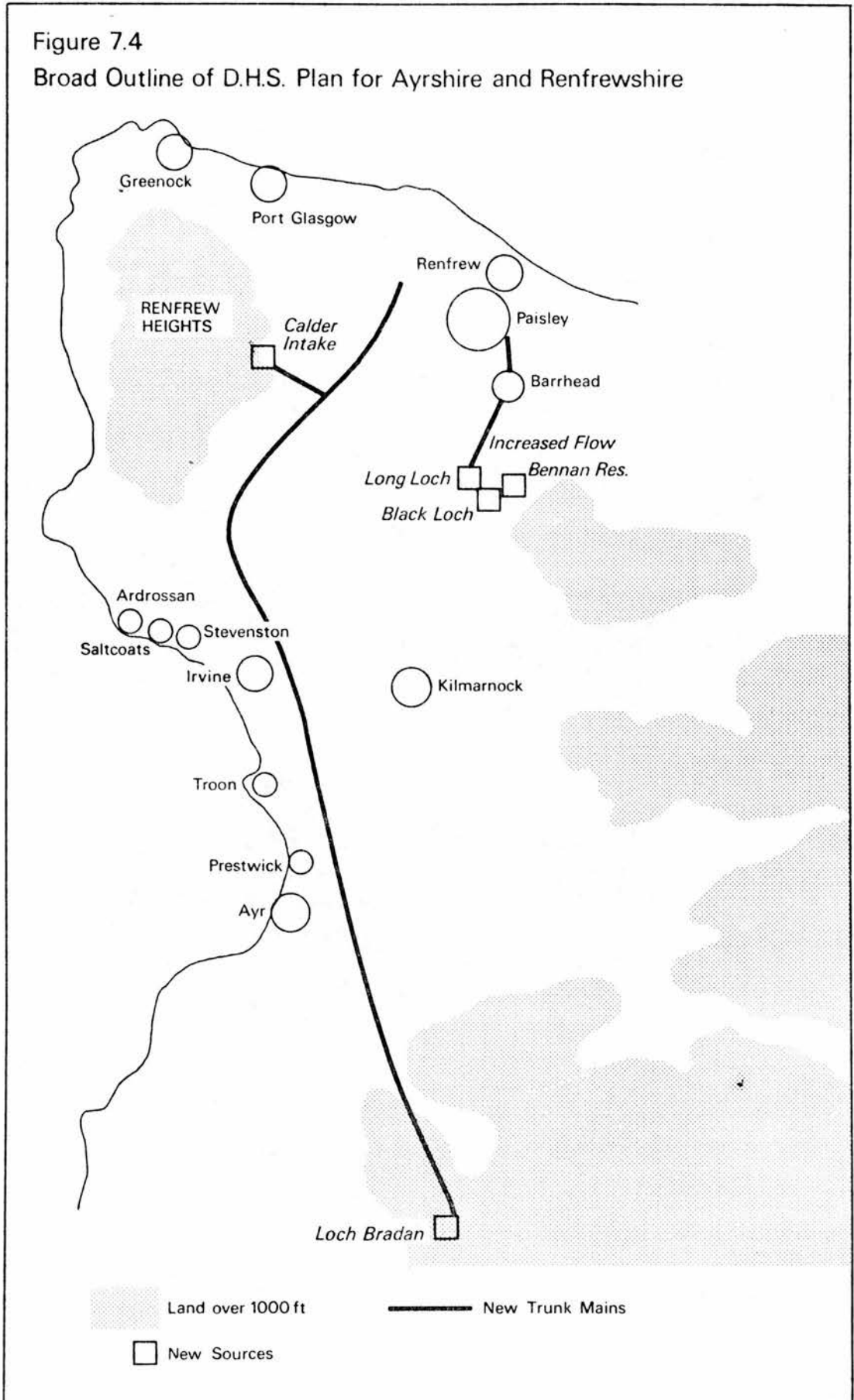


Figure 7.4

Broad Outline of D.H.S. Plan for Ayrshire and Renfrewshire



by DHS for the region would be a trunk main traversing the Ayrshire lowlands and the Garnock Valley into the heartland of Renfrewshire (see Fig.7.4). The sources of Ayr Burgh and Troon (Lochs Finlas, Recaur and Bradan) would be connected to those of the Irvine Board and Paisley in the North. The strategy was to feed water northwards, from South to Central Ayrshire, and from North Ayrshire to Renfrewshire. Five new sources were thought to be required: a completion of the Black Loch Reservoir already underway in the Eastwood district of Renfrewshire ($\frac{1}{2}$ mgd), an intake from Greenfield Burn to increase the yield of Bennan Reservoir (0.79 mgd), an increased intake at Long Loch (0.25 mgd), an abstraction from Calder Water (2 mgd) and, by far the largest, a redevelopment of Loch Bradan (3.75 mgd). An alternative to the last, a development of Glenmuir Water, had been considered but rejected as more expensive than the Loch Bradan project. It was emphasised that the outline was purely for the guidance of local authorities in framing future policy:

'Questions of administration will of necessity remain for decision locally but it is emphasised that a major scheme of the nature envisaged in this outline cannot be carried out without a full measure of co-operation between the two county councils and all the burghs.'

It was suggested that a joint-advisory committee might be set up to represent all interested parties.⁸ The first meeting of this body took place on July 15th 1946 at which time a technical committee was established. The latter body then divided themselves into five sub-area committees; for South Ayrshire, mid-Ayrshire, North Ayrshire, West Renfrewshire and East Renfrewshire. These sub-committees met frequently and were able to present their conclusions to the full advisory committee early in 1947. A meeting with the Chief Engineer

of DHS took place in March 1947, who apparently accepted the proposals put to him, though these did not involve the implementation of the DHS plan, with the notable exception of the proposed Calder intake. One factor in this decision was uncertainty over the location of possible new towns. The Clyde Valley regional plan, the area of which included north Ayrshire, had recommended a new town for Bishopton and Houston in Renfrewshire. It was thought that another, on similar lines to Glenrothes in Fife - to form a new centre for coal mining in the region - might be established in Central Ayrshire near Drongan. Neither of these possibilities, however, were subsequently translated into firm plans. This left Ayrshire County Council out on a limb, and the optimistic description of a contemporary reporter of the advisory committee's work was to prove remarkably inaccurate:⁹

'... a successful regional organisation has been set up on a voluntary basis within the counties of Ayrshire and Renfrewshire which might well be a model for other areas and would appear to indicate that at least in this area of South-West Scotland, regionalisation on a voluntary basis under the control of the constituent authorities can be made to function successfully.'

Throughout 1952 and 1953, the County Council convened meetings with the other water authorities in Ayrshire.¹⁰ Consultants, viz. Babbie, Shaw and Morton (BS & M) were consequently instructed to make a fact-finding survey to determine which of the available sources should be developed. This was done with the knowledge of all the other authorities and the approval of several, but most reserved their position on any future joint development. BS&M had already made independent reports for several authorities and were already possessed of much of the necessary information. They estimated that a further 18 mgd would be required to meet demand to the end of the century, most

of which would be required by the County Council and the Irvine and District Water Board (11.5 mgd). The Burghs of Ayr and Kilmarnock would require a further 3 mgd. The consultants also confirmed DHS's assessment of Loch Bradan as the most effective and economical source of future supply, although they now sought almost four times as much water from the catchment.

No agreement to proceed with this scheme on a joint basis could be achieved and BS&M therefore produced a second report in 1959, this time seeking to satisfy a more limited future demand of 7.5 mgd over the following twenty-five years.¹¹ The objective could best be met by revising the height of the Loch Finlas dam and diverting spill water from the existing Loch Bradan dam to the new enlarged reservoir. By this expedient, expenditure on a new dam at Loch Bradan would be deferred but its subsequent development would not be precluded. Faced with a major share of a cost of £2 million Ayr Town Council decided to withdraw from any joint scheme. They were still prepared to make Loch Finlas available to the others subject to 2 mgd being reserved for their own use. (In fact the town drew on this source only during the summer months, its principal source of supply being, by now, Loch Recaur). BS&M consequently reported for a third time in January 1960. Ayr's reservation had undermined the viability of their proposals of 1959 and a return to the original plan of 1956 was now recommended.

Meanwhile, the consultants were also investigating the needs of their second client in the region, the Irvine and District Water Board. ICI, the successors of Nobel explosives, had made it known that they

would require an additional 4.5 mgd over the next few years, and this added to a projection of increasing domestic demand led BS&M to conclude that the Board would shortly be facing a deficiency of 3.8 mgd.¹² Most of this could be obtained by reconstructing the war-time abstraction from the River Garnock. The Board had already obtained the necessary powers to do this immediately after the war, but if the Board were to retain a reasonable margin of supply over demand (around 10%) it should consider participation in the County Council's joint scheme, albeit on the rather low basis of a reservation of 1.5 mgd. In fact, if the Loch Bradan scheme was to proceed to active construction in the near future, it might be better to avoid the extra treatment costs of Garnock water (necessary because of the rivers liability to pollution) and obtain the whole requirement from the regional scheme.

The Third Phase: Water for 'development'

Thus, the Irvine Board were considering participation in a reconstruction of Loch Bradan when SDD published the plan for the development and growth of central Scotland which defined the Irvine area as a growth area and stated that Ayrshire's water could 'be fully supplied from the Loch Bradan scheme on which consultations were taking place.'

The plan also included the view that:¹³

'An expanded water supply from this source will be essential to cater for the substantial growth of population envisaged in the Northern part of the County.'

One month before the publication of this, the Minister of State at the Scottish Office convened a meeting with all the water authorities in

Ayrshire. The Secretary of State then issued a remit to SWAC concerning the county: SWAC was to advise on four questions:¹⁴

1. What changes are required to ensure that water needed now and likely to be needed in the future is provided in the most economical and efficient manner?
2. What areas should be included in a reorganisation for this purpose?
3. In the event of an all-purpose board being recommended, what form of transitional financial arrangements, if any, should be made to ensure that no existing local water authority is unfairly treated?
4. If a bulk-supply board is recommended for the development of Loch Bradan, how should costs be shared?

A memorandum outlining the Secretary of State's understanding of the situation was sent to all the water authorities. Each was asked to make observations on it, and the points raised in SWAC's specific remit. The salient points of the memorandum were as follows:¹⁵

1. With minor adjustments the picture of supplies in the County provided by BS&M in 1956 stood, though the need for more water had become more acute.
2. The indications were that more rapid industrial growth in Ayrshire could well be impeded by failure to develop the Loch Bradan source quickly.
3. A first phase of the Bradan scheme would yield 10 mgd, a second phase, by raising the dam and bringing in the headwaters of the adjacent River Stinchar would provide a further 8 mgd; and a third phase could, if necessary, add another 10 mgd by further developing the adjoining Lochs Finlas and Recaur.

4. Efforts to form a bulk-supply board to finance the scheme had been prolonged but agreement on the allocation of capacity and costs had proved impossible.
5. An attempt by Ayr County Council to start the scheme pending settlement of joint arrangements had failed because terms could not be agreed on the transfer of the existing Loch Bradan dam from Troon Town Council's ownership. (The latter wished to take bulk supplies from the scheme without becoming a member of the bulk-supply board).
6. Troon's withdrawal of their joint application for a Water Order made it clear that no progress with the Loch Bradan scheme was likely on a voluntary basis and central government had accordingly considered the application of SWAC's recommendation of 'source to tap' boards for Central Scotland to Ayrshire, but recently it had become clear that opinion still differed radically as to the arrangements which should be made.

The Irvine and District Board responded at some length.¹⁶ In their view there were two distinct questions; the general question of the entire reorganisation of the water service into appropriate regional areas and the particular question of the manner in which Loch Bradan should be jointly developed for the common good. The Board did not challenge the ultimate desirability of regional administration but felt the detailed form of reorganisation should emerge from a national enquiry: it could not be dealt with piecemeal, existing local government area by existing local government area, without risk of nullifying its whole ultimate purpose.

'The criteria by which the various sheriffdoms were delineated the basis of the County boundaries in the Reign of David I may have been appropriate enough in their day but suitability as a water supply area was certainly not one of them. Even if a national survey should surprisingly disclose that with the technical requirements of the 21st Century it would presumably be desirable to take into account the prospect of the entire re-organisation of local government administration in Scotland foreshadowed by the recent White Paper.'

The problem of Loch Bradan was more immediate because Ayrshire County Council required water urgently. Although the scheme was believed to be the best method of augmenting the existing sources of those authorities capable of being assisted from it, it would not, of course, replace any existing sources nor would it represent more than a fraction of the combined water resources within Ayrshire. The problem was entirely one of supply and not one of distribution.

'To seek to disrupt the present system in one locality only, in advance of nationally planned system of regional water boards and to seek to denude these local authorities of their whole water supply functions will not produce one single drop of extra water but it will certainly produce unnecessary opposition and consequent delay without gain to anyone.'

The Board favoured a bulk supply board on the obvious precedents of the Daer and Loch Turret Water Boards. SWAC were known to oppose the formation of bulk supply boards, having quoted the English Minister of Housing and Local Government in its report of 1963: ¹⁸

'the Minister is of the opinion that a general system of bulk supply boards, with distribution in the hands of existing water undertakers, would be wasteful of manpower and resources and that, in order to meet the over-riding requirements of an efficient and economical water organisation, unified control over supply and distribution is essential.'

The Irvine Board felt that this quotation misrepresented the view of the Minister. He had also said that the place of bulk supply boards was to evaluate major sources to be developed jointly by water

undertakers who themselves were large enough to have developed their local sources to best advantage and to be able to finance and supervise major capital works and employ an adequate full-time staff. The Irvine Board felt that all the Ayrshire undertakings concerned in Loch Bradan came into this category.

On the question of measures to ensure that each existing authority was treated fairly, the Board again quoted the English Minister's view:

'that the cost of the service provided by a new and stronger undertaking must be compared with the cost of a service to the same standard provided by each of the original undertakings.'

'This is of material effect in Ayrshire where it is the rate-payers in the areas of larger water authorities whose existing standards are already as high as could be provided by the new undertaking and who so far at least as can be foreseen at present will gain little if at all in standard by the development of Loch Bradan who have already by far the lowest costs by way of public and domestic water rates and who would suffer the most by a unification of charges under an 'all purpose' Board. This situation arises both by reason of good management and past repayment of capital debt and also by large revenue receipts from metred industrial consumption. The impact of the pooling of this industrial revenue could be even more severe on such ratepayers than the spread over the cost of disproportionately expensive or recently constructed works in other districts of the more conjoined areas. These ratepayers would be entitled to transitional financial arrangements to mitigate the heavy additional burden of an all purpose Board...'

These views are worthy of quotation at some length because of the extent to which they reveal the way in which the Irvine Board perceived themselves and the changes taking place around them.

The Board do not seem to have recognised the significance of Irvine being designated a growth area. They told SWAC that they required only 1.5 mgd in the near future, but this figure had been arrived at through the projection of past trends and after ICI, their

largest single consumer, had told them of a reduction in its long term requirements. Meanwhile, other growth centres such as West Lothian were expecting increased demands of between 5 and 10 mgd over the next decade. The Board would require a significantly augmented supply and if it were to arrange this on its own account it would have to bear the full costs of new construction, thus greatly changing its existing position of levying a relatively low water rate.

The Board also seems to have forgotten that a major proportion of its supplies had been arranged under the emergency conditions of war time and that, without the continued receipt of a bulk supply from Paisley's Camphill, the Board's position of supply would be radically different.

SWAC felt that the proposal for an interim bulk supply board would add an unnecessary complication to a pressing problem. It was ¹⁹

"not aware of any need to make a further national water survey in the foreseeable future since the information gathered during the survey of 1943-46, revised as necessary, would provide an adequate basis for operational work for some time to come". They were satisfied that the National Policy of 1944 was 'as valid today as when it was formulated'. The urgent need was not to find a new national water policy but 'to implement the one that we have.'

With regard to the possibility of a general reform of local government SWAC quoted the 1963 White Paper: 'the responsibility for water supplied could rest on the counties. In many cases, however, operating boundaries would be determined by physical considerations and would need to be settled ad hoc'. ²⁰ SWAC took the view that no matter how boundaries of new local government areas might be drawn, they would not necessarily determine the boundaries of regional water areas and there was therefore no need for the two systems to be reorganised together.

In the course of its enquiry, Ayr Town Council flatly told SWAC that they did not propose to participate in the Loch Bradan scheme in any circumstances; that there was no reason why they should, and that they saw no advantage in so doing; the only advantage resulting from their participation would accrue to their water authorities who would be relieved of part of their share of the cost of the scheme.²¹ It was true that the town had sufficient water in store for its own needs but it was not entirely free of problems. Ayr's works held 8.14 mgd (3.5 at Finlas and 4.64 at Recaur) but less than 75% of this yield was available for supply because of the limited carrying capacity of the twin trunk mains leading to the town. The town could meet their foreseeable needs by simply triplicating their trunk main. The town had been told, however, that participation in the Loch Bradan scheme would make this work unnecessary and that SDD would not approve their scheme because it would not be in the public interest. Its effect would be to throw an additional £ $\frac{1}{2}$ million into the shoulders of authorities drawing on Loch Bradan. The reservation of Finlas and Recaur to itself was clearly wasteful. Existing developments by Ayr and Troon gave a reliable yield of only 6.3 mgd whereas the catchment as a whole was capable of giving 36 mgd.

Kilmarnock Town Council were wavering over participation in the scheme. Consultants had told them that alternative sources of future supply would be more expensive to develop. Nevertheless they refused to commit themselves either way; a fact which appears to have greatly irritated SWAC which concluded that the town²²

'cannot have any reasonable complaint if the Secretary of State, faced on the one hand with his own statutory duty to promote the provision of adequate water supplies

throughout Scotland and on the other hand with so negative an attitude on the part of a local water authority whose co-operation he may well consider essential for the successful development of the water service in Ayrshire should feel obliged in the public interest to take the initiative in breaking the impasse.'

The County Council and the Burghs of Troon and Cumnock were in favour of an all-purpose water board for the region and SWAC concluded that the situation in Ayrshire was very similar to the rest of Central Scotland. The County exhibited all the characteristics which had led it to recommend the setting up of regional boards there; there was no justification for a different solution to the same problems. SWAC had been impressed by the need for prompt action in view of the County Council's dependency on the development of Loch Bradan. SWAC's experience during the investigation had led them to share the view that there was little hope of voluntary agreement on the scheme being reached and that further negotiations would merely lead to still more frustrating delay. Resolute action by the Secretary of State was necessary. He should ask the authorities whether or not they would accept a regionalisation of the water service and, if not, he should make an Order to bring it about compulsorily.

SWAC's report was circulated on the 9th of April 1964. Municipal elections were to be held in Ayr Burgh the following month and the proposed regional scheme for water supply and its impact on the level of local rates quickly became an election issue. Baillie Mclean (a 'moderate' or non-socialist) warned an election meeting that²³

'a regional water scheme which may be pressed on Ayr will mean heavy increases for town ratepayers ... National pressure may force Ayr as one of the large Burghs in Ayrshire to join the scheme planned by the County Councils to extend the Loch Bradan supply source on a County basis.'

He estimated that this would be followed by a five- or six-fold increase in water rates, from the current 2½p to 15p. Perhaps more important, the power to control its own water would be taken out of Ayr's hands. In the following election the 'moderates' gained control of the town council against the national trend at the General Election of that year. The County Council remained in the control of the Labour party.

The matter was raised again in June 1964 on the occasion of the annual official inspection of the Town waterworks, when the convener of the water committee told guests that as a result of recent moves by the Secretary of State, it seemed likely that Ayr would be losing its undertakings of which²⁴

'we are all very proud. It had been a legacy left by predecessors who had foresight and enterprise.'

Amongst the guests was the convener of the County's water committee who responded that if predecessors had responded to the County Council's suggestions of regional water management in the 1930s, the county as a whole would have benefitted and the equivalent of the Loch Bradan scheme would have been considerably cheaper then. As it was regionalisation 'was bound to cause heartburning and difficulty.'²⁵ The convener of Prestwick's public health committee, which was dependent on Ayr for the bulk of its supply, joined the debate the following month saying:²⁶

'we have been living in a hand-to-mouth fashion for some time and only through good luck have we managed to survive for so long.'

The Minister of State of the Scottish Office convened a meeting to elicit the response of local authorities to SWAC's report in July

1964 without any significant progress being made. At two subsequent public meetings in Ayr the regional scheme was variously described as 'wholesale theft', 'extravagant and unnecessary' or 'nothing short of highway robbery'. Some were concerned over the extent to which they were being dictated to by higher authority 'We are being told we must accept it.' But the main problem appeared to be²⁸

'how can we justify to our ratepayers that it is right to hand over for a water rate increase of 500%! No-one can justify this!'

Others stressed that more costly water might have harmful effects on their efforts to attract industrialists to local industrial estates.

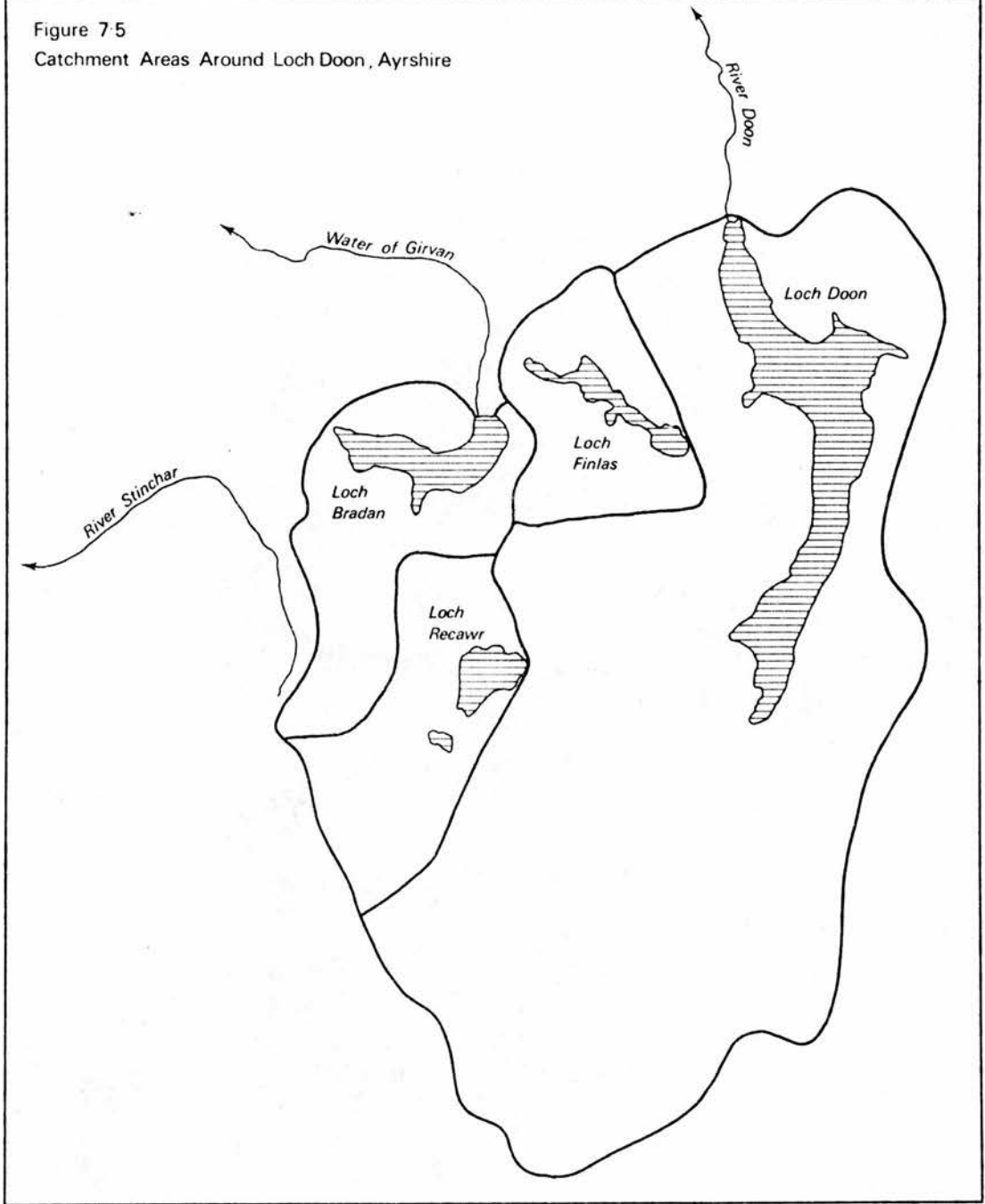
On the other hand, representatives from Cumnock welcomed the proposed regional scheme, because they desperately required more water: one opportunity to bring new jobs to the town had already been lost and even the house building programme now required some reconsideration. Ayrshire's water committee convener became particularly agitated over a remark made by 'a pokey burgh member' that the towns were being made to give the people of the landward areas water for nothing. The action of the burghs was 'near to sabotage': development would benefit both county and burghs and if there was to be development there must be water.²⁹

In December 1964, the Secretary of State published his intention to make an Order compulsorily regionalizing the water service in Ayrshire. The Order would also authorise the Loch Bradan scheme. By January, nine of the fifteen affected water authorities had lodged formal objections and it was announced in May 1965 that a public enquiry would consider these in June. Ayr Town Council immediately

applied to the Courts for an Order to stop the public enquiry proceeding.³⁰ The Council claimed that the Secretary of State's powers to bring about compulsory amalgamations was limited to cases where it could be shown to be to the advantage of the authorities concerned. The financial burden implicit in the scheme was demonstrably to the disadvantage of the town. Lord Fraser ruled, however, that once the Secretary of State had announced his intention to make an Order he was legally obliged to hold a public enquiry into any objections to its content. Ayr continued with a barrage of obstructive procedural objections when the public enquiry opened on June 17th.³¹

Ayr, Prestwick, Girvan and Largs all put forward their objection that the Order would not give them a better water supply whilst at the same time, setting aside the Loch Bradan scheme, it would have the effect of substantially increasing water rates. Ayr's town chamberlain estimated that amalgamation alone would add 8d to the present 6d whilst the proposed new works would add a further 18d.³² Ayr did not need any water from Loch Bradan, the first and second phases of which had by now been telescoped to meet the needs of the Irvine Growth centre, and they suggested that the county could also do without such a large scheme. They were willing to turn over the Finlas and Recawr works (see Figure 7.5). Raising the level of the former would provide an additional 2 mgd, raising the level of the latter would give 5.5 mgd and if the overspill of the existing Loch Bradan dam were also led to the new reservoirs, a further 2 mgd would be available. This, added to the existing surplus in Ayr's works, would make around 12.5 mgd available to the County at a cost of around £59,000 per mgd as compared with £76,000 per mgd for the first phase of the scheme proposed in the Order. In the longer

Figure 7.5
Catchment Areas Around Loch Doon, Ayrshire



term the obvious source of water for Ayrshire was Loch Doon.

Loch Doon acted as a regulating reservoir for hydro-electricity stations on the other side of the watershed and had done so since the 1930s. The County Council had been careful to protect its position in 1956 when the South of Scotland Electricity Board had re-affirmed its legal right to 'take and divert and impound and use the waters' of several lochs including Loch Doon. The County Council had had a clause inserted to the effect that if it wished to develop the loch for purposes of water supply at any time, the electricity board³³

'shall not be entitled to oppose such application merely by reason of the powers conferred on them' (here).

This had taken place before BS&M's report of 1956, but Ayr Burgh now suggested that, with the coming of nuclear power, the SSEB might no longer require the Galloway hydro-electric works.

In response to Ayr's alternative proposals, J.W. Shiell, SDD's Deputy Chief Engineer, said that the redevelopment of Loch Recawr and Finlas had not been considered by SDD because the Department was convinced that the appropriate target was of the order of 20 mgd and this could not come from these sources. He also expressed some doubts over Ayr's costing of their scheme. He felt the site contours did not allow the simple heightening of the existing Recawr dam so that an entirely new structure a short distance downstream would be required to give the suggested yield. This additional work would raise the cost of the Ayr alternative to £88,000 per mgd which compared unfavourably with the cost of water from Loch Bradan (which by now had risen to £77,500). The Assistant Secretary in SDD with responsibility

for water matters told the enquiry that SSEB had informed him that they would continue to regard their Galloway hydro-electricity works as a valuable asset even if new sources of power were found capable of development and R.M.Campbell of BS&M pointed out that any scheme 'would invite strong opposition from riparian interests on the Doon'. His firm had recently been instrumental in promoting such a scheme as a temporary source of supply for the County Council (see below).

On a different tack, objections had also been received from the three small burghs of Galston, Newmilns and Darvel, each with a population of between only three and four thousand, and each relying on springs and shallow wells for their water, with storage for only one or two days supply. It was intended to sink more wells if extra water was required, but population levels had fallen over the previous decade and Ayrshire's County Planning Officer had predicted that they would now remain static over the next twenty years. Water rates, perhaps not surprisingly, were low at between 4 and 7d. There would be no connection of Loch Bradan supplies and once again these authorities faced an increase in rates on amalgamation to no obvious advantage.

SWAC had recommended their inclusion in a regional board because they were not viable areas for purposes of water supply by modern standards. The expansion of the Irvine area might bring spin-off benefits to the valley. Mr. Shiell pointed out at the enquiry that none of the burghs had a full-time water engineer and in his view any unit that could not support the services of a fully qualified expert was unviable.³⁴

After listening carefully to the evidence the Q.C. appointed to take the enquiry identified four questions to consider in making a recommendation to the Secretary of State on the validity of objections:

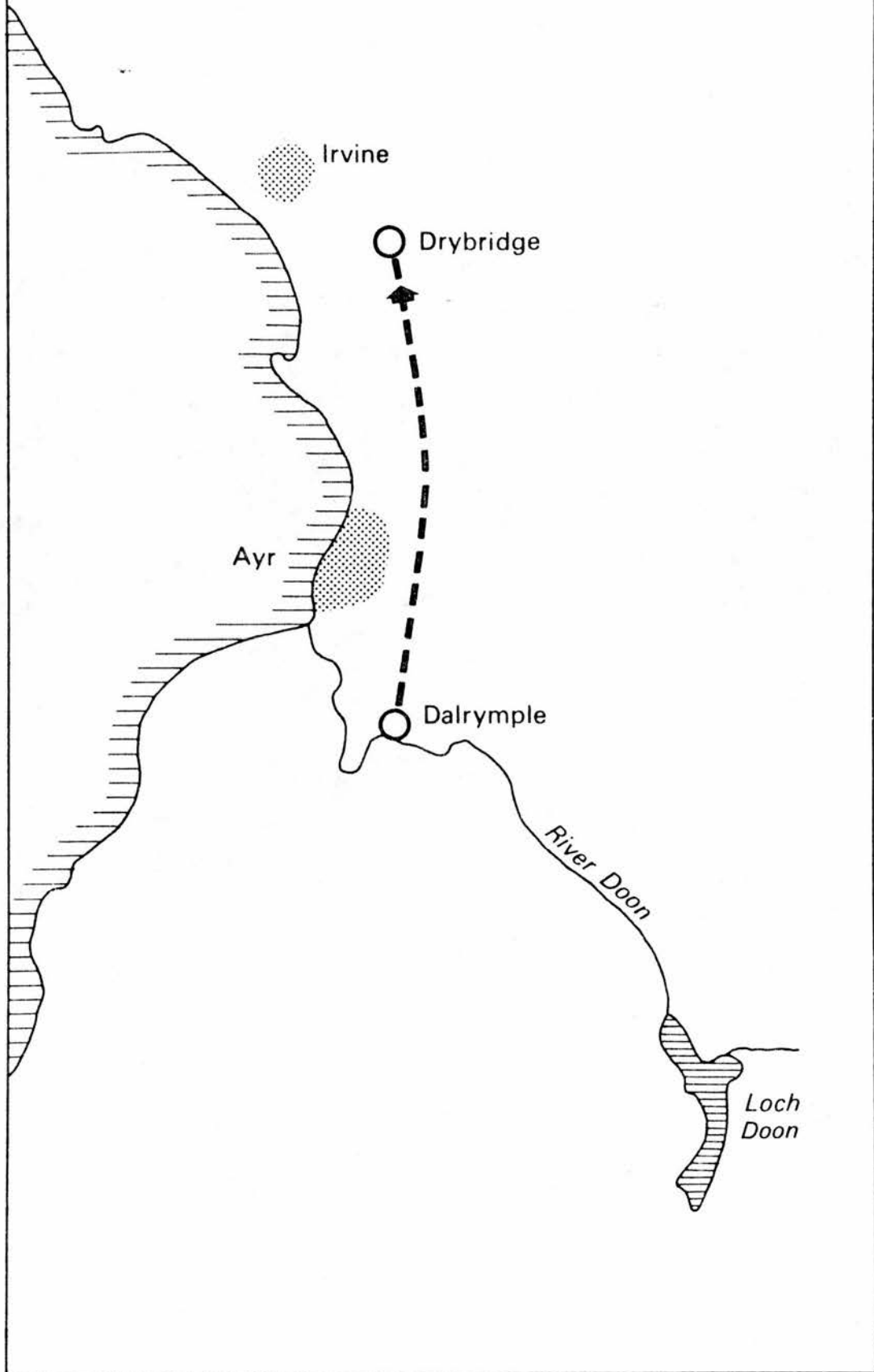
1. Was the amalgamation to the advantage of the districts affected?
2. Did it secure a better supply of water to these districts?
3. Did the districts require a better supply of water? and
4. What alterations, if any, should be made to the draft Order?

He concluded that the Order would be of overall advantage to eleven of the fifteen authorities or secure for them a better supply. In the case of the remaining four, the three burghs already mentioned and Girvan, their inclusion in the scheme would be of some advantage to them and would secure a better supply in the long term, although their current need for a better supply had not been established. He therefore made no recommendation with regard to them. The most strenuous opposition had come from those authorities threatened with significant increases in rates and he thought they could justifiably receive more favourable treatment than the Order then allowed. In broad outline, however, the amalgamation should take place.

Meanwhile, demand for water in Central Ayrshire had been increasing since 1956. The County Council had negotiated the purchase of additional supplies from SSEB's Loch Doon at an undisclosed price: water would be released from the Loch and abstracted downstream at Dalrymple. This was seen as a temporary expedient and authorised for a period of ten years in 1964, its essential purpose being the supply of new industrial developments at Drybridge (see Figure 7.6). Since the water abstracted would have entered the river in addition to the statutory amount of compensation water, the Order had gone unopposed.³⁵

Figure 7.6

The Central Ayrshire Scheme : Locii



Whilst work had barely begun on the intakem BS&M informed the County Council that the scheme would not be completed on time for the arrival of the manufacturers concerned. They therefore recommended the inter-connection of the County's mains with those of the Irvine and District Board's mains to ensure the supply when it was required. Water was to flow south from the north at first, and then a year later the direction of flow would be reversed. The scheme therefore inextricably linked the consultants two clients, the County and the Irvine Board, in plans for a future supply.

This was necessary because in September 1965, representatives of BS&M, SDD, Irvine and District Water Board and the County Council had met to consider the supply of a new nylon plant which ICI were planning, requiring at least 5.5 mgd and possibly 15 mgd within the next ten years. The Irvine and District Board could supply 4.5 mgd leaving up to 10.5 mgd to be found before 1975. It had been concluded that the only possible way of meeting the initial requirement would be by extending the scope and scale of the Doon abstraction. The full requirement would have to come from Loch Bradan.³⁶ Thus, within a year of SWAC's enquiry the Irvine and District Board's view of the Loch Bradan scheme radically altered.

But the public enquiry into regionalisation and the Loch Bradan scheme did not end matters. Ayr Town Council announced its intention of taking the matter to Parliament following the lead of Edinburgh (Chapter 6). The Order was overtaken by SWAC's recommendation that a national reorganisation should be enacted and the subsequent Water (Scotland) Act 1967. A regional water board was established for

Ayrshire and Bute in December 1967 but the difficulties encountered by the Loch Bradan scheme did not end there. The Stinchar District Salmon Fishery Board had objected to the location of abstraction points in the upper part of the basin to feed the new reservoir. They also sought assurances that the release of compensation water would be arranged in such a way as to safeguard the cleansing of the river by simulation of flood flashes so that a reasonable flow would be retained in the spawning season. Consultants to the Fishery Board had made specific suggestions as to how these aims might be achieved, and BS&M had responded that these would reduce the yield of the scheme by 3 mgd or 15% if accepted in toto. Informal negotiations took place early in 1968 and the need for yet another public enquiry was avoided. In May 1968, the Secretary of State made the Ayr County Council (Loch Bradan) Water Order some twelve years after the scheme it authorised had been designed.³⁷

The administrative wrangling had its consequences. Kilmarnock, which had 'sat on the fence' throughout the debate, found itself with water rationing in September 1969, despite an emergency arrangement of an extra $\frac{1}{2}$ mgd from Renfrewshire.³⁸ One of the first tasks of the Ayrshire Board was to convene meetings with the Lower Clyde Water Board (successors of Paisley Corporation) with a view to providing an increased supply to the North Ayrshire coast. It seemed likely that another growth centre might be established at Hunterston, based on a new oil terminal then planned. The Lower Clyde Board felt it could not give any more of its resources over to the supply of Ayrshire. In October 1969, however, a solution was reached whereby further use of Paisley's Camphill reservoir in Ayrshire might be compensated for by

supplies from Loch Lomond. But even then the temporary joint use of water from Camphill does not appear to have been conflict free. For example, a dispute arose in October 1970 over the charges for the water being proposed by the Lower Clyde Board.³⁹ This was a problem that disappeared in May 1975 when both boards became part of Strathclyde Regional Water Department, with the chairman of the new committee having previously served in the same capacity with the Ayrshire Board and the Director from the Lower Clyde Board.

Thus, after more than thirty years, the benefits of regional management came to be applied to the water supply networks of Ayrshire and Renfrewshire but not before conflict between burgh and county authorities had led to a further suboptimal utilisation of resources and, indeed, perhaps in the case of the Doon river abstraction, wasteful duplication of effort.

The close detail of the case also highlights several additional factors, concerning the nature and pace of changes in demand, the guidance or pressure applied by central authority, the allocation of resources and the perception of resources held by the parties concerned.

Domestic demand appears to have grown relatively slowly. It was unpredictable industrial demand that cast, at various times, the shadow of imminent failure of supply and provoked ad hoc measures of co-operation. This is a local reflection of the national theme emphasised in Chapter 5.

In that Chapter the guiding hand of SDD was emphasised with

particular reference to 'development'. In this chapter it is interesting to note the confusion caused by the lack of a firm stance on the part of central government: it would appear to have been the latter who undermined Ayr County Council's attempt to bring about a rational water administration in the 1930s.

The resolve of Central Authorities also appears to have slipped markedly in agreeing to the suggestion of local authorities that SWAC should later investigate the water services of Ayrshire and of Renfrewshire separately, despite the facts that their own plan for the region envisaged the administration of shared resources in the Renfrew Heights by a single body and that from the beginning supplies to North Ayrshire were dependent on agreement with Paisley Corporation.

With respect to the allocation of resources it is clear that the Parliamentary Commission or Local Bill procedure, so often invoked in the earlier years of resources development was a vehicle quite unsuited to the proper utilisation of water resources. This was not the intention of the procedure which, instead, was designed to give expression to objections - removing anything thought 'bad' about proposals rather than bringing about any positive 'good'.

It is equally clear from a glance at Figure 7.5 that Ayr Town Council were justified in regarding Loch Doon as the obvious source of water for the County. In view of the relatively low demand envisaged by DHS for Central Ayrshire in the immediate post-war years, it is perhaps not surprising that Loch Doon was not included in their plans. It is surprising, however, that this resource appears to have been

excluded from subsequent calculations merely because it had been partially developed for purposes of electricity generation.

Perception of resources appears to have been dominated by consultant engineers, Babbie, Shaw and Morton, advisors to the two authorities which ultimately faced the pressures of sharply rising demand. This central role for consultant engineers in water resource planning in Scotland appears typical and reflects the size of the administrative units that prevailed for so long and a relatively slow growth in demand (so that new sources were an infrequent requirement of individual authorities). Of concern here, however, is the extent to which the consultants' view of the situation appears to have become fixed in the early 1950s and changed little subsequently.

Finally, with respect to perception the large burghs, Ayr and Kilmarnock, and the Irvine Board clearly regarded the situation with regard to water supplies with some satisfaction and pride emphasising the foresight and vision of their predecessors - conveniently forgetting that the County authority had had no chance to make similar arrangements until the administrative reforms of 1929 and that the County had then had its attempts to emulate them sabotaged by one round of objections after another from the Burghs. Similarly, the Irvine Board appears to have had little recognition of the extent to which national priorities (of wartime) had brought about its relatively satisfactory situation or the extent to which it relied on the efforts of others, notably Paisley Corporation.

Thus, the perception of Scottish water resources for purposes of

supply appears to have been dominated by partial pictures of three sorts: those of the urban authorities able to establish a sphere of interest ahead of the rest of the field; those of consultants who presumably also had vested interests of their own; and those of the authorities who failed to recognise the extent to which they relied on others. These added to the uncertainties of demand forecasting and uncertainties associated with Central Government's resolve to implement its own policies combined to make the rational allocation of resources extremely difficult to achieve.

These themes eventually forced a crisis with respect to water resource planning. With the lessons of the Ayrshire and Loch Lomond (Chapter 6) conflicts in mind, Central Government's policy on water supply planning changed in 1971 with the publication of 'Measure of Plenty' containing a definite and coherent listing of possible sources of future supply for each part of the country. It is to this comprehensive, if belated, approach that attention is turned in the chapter that follows.

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CHAPTER 8

Water Resources Planning in Scotland

The subjects of this chapter are SDD's review of possible sources of future supply, 'A Measure of Plenty', published in 1973, and the subsequent detailed consideration of options for Central Scotland.¹ The emphasis of the chapter is on Central Scotland because it is here and only here that there is any doubt as to what the future strategy should be.

It is important to remember that, in the context of the ratio of potential supply to demand, outlined in Chapter 3, major new initiatives in the development of resources are relatively rare events. A listing of the major schemes promoted in Central Scotland since 1950 is given in Appendix A. A brief review of these developments precedes an account of SDD's review of future possibilities.

In the course of promoting the Loch Lomond scheme, SDD encountered significant opposition, not least from the City of Edinburgh, as already discussed in Chapters 5 and 6. In the course of that debate, it became apparent that no overview of the possibilities for Central Scotland as a whole existed. Cuthbertsons, Edinburgh Corporation's consultants, pointed out that it did not seem sensible to transfer water to South East Scotland from the West when one of the largest potential sources of water on the Eastern Seaboard (the Tweed Basin) remained partially developed (see Appendix B for a summary of the argument).² Others suggested that the largest single source of water in Scotland, the River Tay, should be considered as an obvious source for the country's

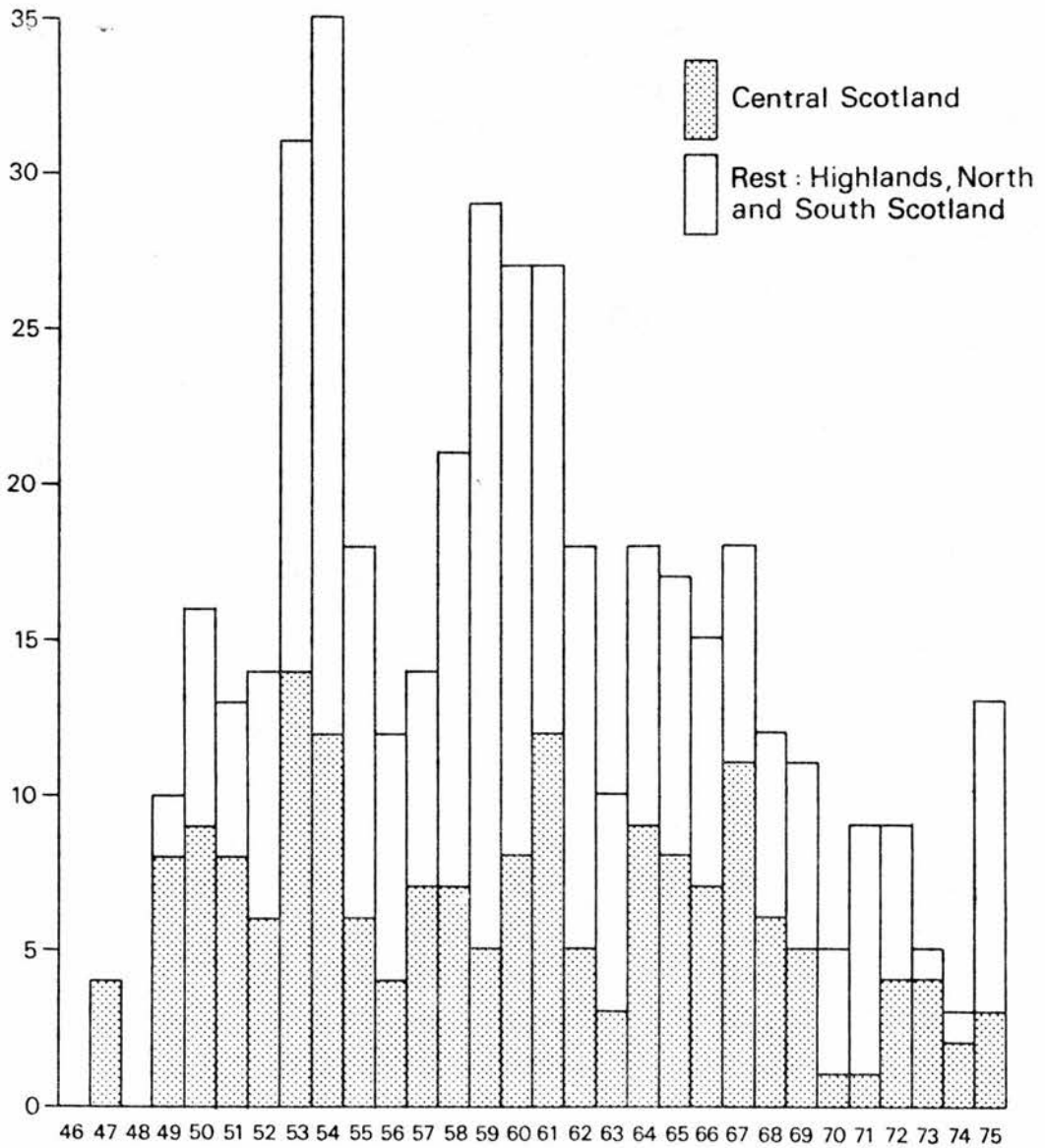
needs.

SDD's 'A Measure of Plenty' was brought forward to answer such questions and, in the same fashion as the post-war regional reports, were subsequently confirmed in engineering detail by consultants, a planning study recently commissioned by the CSWDB represents the detailed consideration of this outline of the range of general possibilities. The picture which emerges of the institutional arrangements for forward planning is quite different from that pertaining to England and Wales under the auspices of the Water Resources Board between 1963 and 1973, but the stages in the process are less dissimilar. These matters are considered in more detail in Chapter 13. What is of importance here is a synthesis of the material factors in the process in Scotland.

The Development of sources for Central Scotland

Figure 8.1 records the years of promulgation of all orders made under the Water Acts between 1946 and 1975 and applying to Central Scotland (defined as the present day Fife, Lothian, Central and Strathclyde Regions, although excluding what was formerly the County of Argyll).³ They can be classified into 5 groups, viz.: 'structural'; those bringing about changes in the structure of management of the water service; 'administrative'; those dealing with minor constitutional amendments, extension to an authorities area of supply and the like; and resource development. The latter group may be subdivided in turn into three subclassifications: developments making better use of existing resources or supplementing existing developments; minor

Figure 8.1
 Water Orders (1946 Act) 1946-1975 inc.



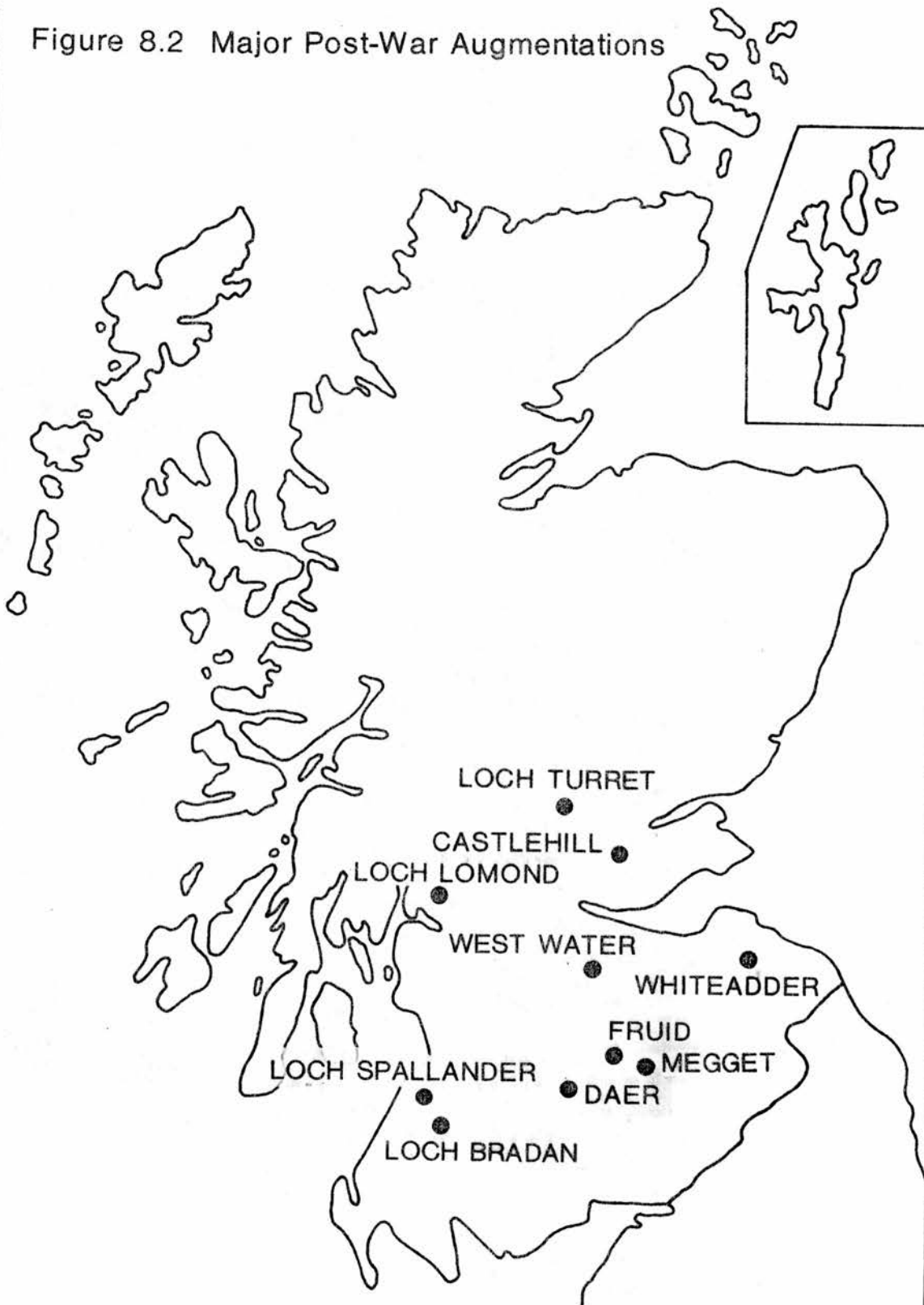
total = 439

developments authorising the use of burns and (four) springs; and, of primary interest, those authorising the abstraction of water from rivers and those authorising the construction of new reservoirs.

Summarising the first and last of these groups of resource developments: developments making better use of existing resources largely took the form of authorising additional river intakes to feed existing reservoirs or for direct distribution, for example, the Central Ayrshire scheme, involving the abstraction of a supply released from Loch Doon, referred to in the preceding chapter. Most of these developments reflect short-term responses to pressure on available supplies in anticipation of the completion of large scale, regional schemes of supply.

With respect to river abstractions creating a new supply and the construction of new reservoirs, many of these were also necessary only because of delays to major regional schemes. This leaves only the Daer (authorised 1951), Loch Turret (1958), West Water (1961), Fruid (Phase 2, 1963), Whiteadder (1964), Loch Lomond (1966), Loch Bradan (1968), Spallander (1968), Castlehill (1973) and Megget (1974) schemes as the ten major augmentations in the post-war period. Their location is plotted in Figure 8.2. In addition to the projects mentioned above, several were promoted before the end of the war, including West Lothian County Council's Baddingsgill Reservoir, completed in 1930, and the Stirlingshire and Falkirk Water Board's Loch Carron scheme. Fife County Council completed an Upper Devon Reservoir in 1955, this being the last part of the Fife regional scheme originally canvassed in the early 1930s, but not set underway until 1940 in the light of

Figure 8.2 Major Post-War Augmentations



the war-time needs of the major naval dockyard at Rosyth. Generally, very little in the way of resources development apart from these schemes, was undertaken between 1925 and 1945. Outside the Central Belt major developments over the post-war period include the Black Esk reservoir in Dumfriesshire (20 mgd), the Loch Lee reservoir in Angus (7 mgd), the Watch Water reservoir in Berwickshire (8 mgd), the reconstruction of the Loch Calder reservoir in Caithness (36 mgd), the Back Water reservoir for Dundee Corporation (41 mgd), Invernessshire's Loch Elich abstraction (11 mgd), the first stage of the Loch Glass abstraction scheme (13 mgd) (primarily in response to the establishment of an aluminium smelter at Invergordon), Argyllshire's Loch Eck (11 mgd) (for, amongst other consumers, the US Navy Base at Holy Loch) and Aberdeen County Council's abstraction from the Lower Deveron (23 mgd).

Thus, if those projects planned before 1945 are excluded (Finglas, Fruid, Upper Glendeven) there were only a score of major schemes of supply (over 4.5 mgd) authorised throughout Scotland, 11 of them for authorities in the Central Belt. If a higher threshold than 4.5 mgd is taken, the quantity required to serve the average requirements of 50,000 people in 1971, the threshold is raised to 23 mgd, there have been only nine major developments, or if the quantity required to supply a quarter of a million people is taken, there have been only ⁴ five. There have therefore been little more than a dozen major augmentations of water supply in the life span of a generation, with the prospect of even fewer in the remaining decades of the century (see below).

The water service in Scotland contrasts markedly with that in England and Wales in the extent to which new developments of supply have engendered public controversy. Undoubtedly principal reasons for this are the much better ratio of resources to population: the relative abundance of sparsely-populated upland catchments and the relatively small number of major projects which have been undertaken. A further factor, however, is the care taken by planners to avoid any possible conflict, this is apparent in what follows and in the statements of policy included in SDD's 'A Measure of Plenty'.

Measure of Plenty

The preparation of 'A Measure of Plenty' stemmed from three circumstances. First, the collation of a national picture had not been feasible until the regional water boards were formed; these had an interest in taking stock of each region's position and from there it was a relatively easy step to compiling a national report. Second, the dispute over Edinburgh's role with regard to the Loch Lomond scheme had highlighted the need for a regional frame of reference. The DHS regional reports had served as a valuable source of inspiration throughout the 1950s, but now that much larger schemes were in the offing, such as Megget and Loch Lomond, a much wider perspective was necessary. Third, the Water Resources Board had been engaged in a series of similar enquiries for the regions of England and Wales, and were preparing a national outline of the available options: it seemed worthwhile to produce a similar appraisal for Scotland.

Such an appraisal naturally began with an analysis of the existing

position. Each Region was examined in turn in a series of appendices which are summarised in Table 8.1. It would seem that the early 1970s represented something of a turning point in water resources development. In five of the thirteen regions, Fife and Kinross, Lanarkshire, Lower Clyde, Mid Scotland, and North-East, existing sources were on the point of exhaustion. The supplies of a seventh, Ayrshire and Bute, were temporarily bolstered by the purchase of water from the South of Scotland Electricity Board (for abstraction from the River Doon: the Central Ayrshire scheme - see Chapter 7), and the major part of the South East, the Lothians, required new sources. Many of the water boards had plans in hand: Megget in the Lothians, Castlehill in Fife and Kinross, Loch Bradan in Ayrshire, the Deveron abstraction for Aberdeen, but heading the list was the first phase of 50 mgd of the Loch Lomond Scheme.

Elsewhere, in Argyll, Inverness-shire, the North of Scotland, the East of Scotland and in the South-West, the position was eminently satisfactory, although the number of separate isolated systems of small-scale supply meant that local shortages could not be entirely precluded. Indeed, the needs of the ^{de}velopment of North Sea oil encouraged the promotion of a dozen or more small-scale abstractions in Orkney and Shetland.

But the 'Measure of Plenty' of the report's title did not refer to the existing position; rather it aptly described the very wide range of choice of alternatives for future development, both of a local nature (see Figure 8.3) and of a sufficient size to be considered worthy successors of the Loch Lomond Scheme. The problem of Scottish

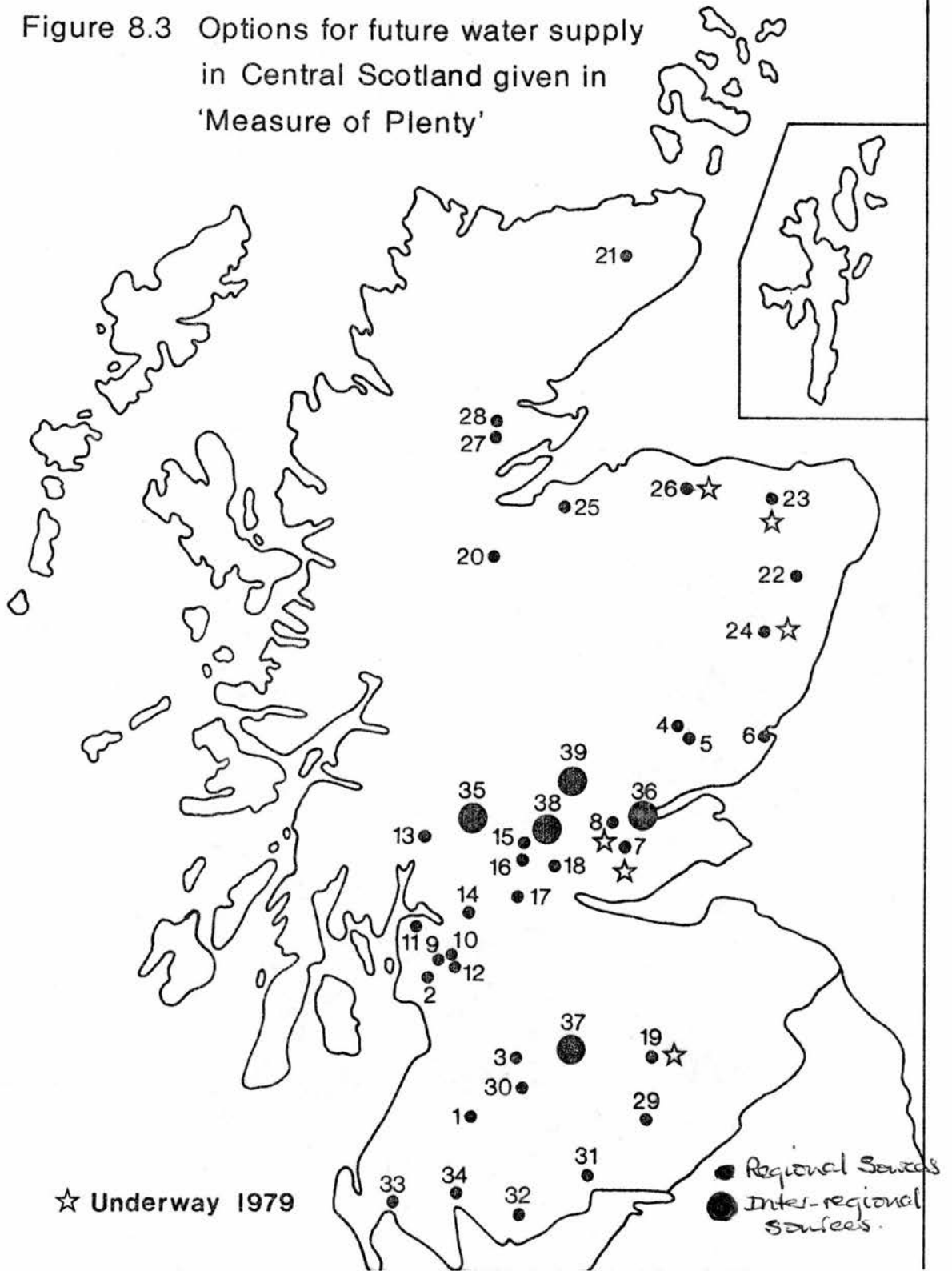
Table 8.1 Summary of position with respect to supply and demand given in 'Measure of Plenty'

Water Board	Yield of Sources (Million gallons per day)	Consumption 1971	Year in which Consumption projected to exceed yields.
Ayrshire and Bute	52.2	40.8	1979
East of Scotland	42.3	30.4	1986
Fife and Kinross	23.3	23.8	1971
Lanarkshire	49.8	44.9	1974
Lower Clyde	167.8	159.0	1975
Mid-Scotland	34.6 (A)	44.7	—
South-East Scotland	80.9	60.3	1984
Argyllshire	11.5	4.8	Next Century
Inverness-shire	13.6	6.3	1998
North of Scotland	21.2	6.3	Next Century
North-East Scotland	33.6	28.0	1995
Ross & Cromarty	7.1	5.8	1981
South-West Scotland	20.0	13.6	1989
Scotland	576.6 (B)	468.7	

- Notes: (A) Excluding a large share of the 18.7 m.g.d. available from the Central Scotland Water Development Board's Loch Turret source of supply.
 (B) Including Loch Turret.

Sources : Yields - SDD, Measure of Plenty, Table 2.1, p.7.
 Consumption - SDD, Measure of Plenty, Table 2.3, p.9.
 Dates - SDD, Measure of Plenty, Graphs, Appendix C, pp. 39 - 83.

Figure 8.3 Options for future water supply in Central Scotland given in 'Measure of Plenty'



☆ Underway 1979

● Regional Sources
● Inter-regional Sources

Key	12 Whittliemuir		
1 Loch Doon	13 Loch Sloy		
2 Garnock	14 Burncrooks		
3 Afton	15 Loch Mahaik	24 River Dee	33 Luce
4 Muckle/Newton	16 River Teith	25 Rierach Burn	34 Cree
5 Glen Isla	17 Drum	26 River Spey	35 Loch Voil
6 Montrose Basin	18 Wharryburn	27 Loch Glass	36 River Tay
7 Castlehill	19 Megget	28 Loch Morie	37 Duneaton
8 River Earn	20 River Farigaig	29 Black Esk	38 Knaik
9 Calder	21 Loch More	30 Euchan	39 Glenalmond
10 Green Water	22 River Don	31 Nith	
11 Greenock Mill	23 River Deveron	32 Dee	

water supply did not lie in determining where water could be found, but rather in the selection of which schemes to develop. No attempt was made to evaluate the alternatives. The aim was to demonstrate that there was a more than adequate range of choice. The final selection⁵

'must be left to the water authorities themselves because it is they who are in the best position to make the decision, which will not always rest solely on engineering economies but will require to take account of local amenity considerations including fishing and outdoor recreation interests before the final decision can be reached. In the end it may well prove that because of failure to resolve a conflict of interest it will be possible to develop some of the sources to a limited extent for water supply purposes. Indeed, it may not prove feasible to develop some of them at all.'

SDD had, however, given some guidance on the direction that policy might take in future in two respects: on the strategies of resource development that might most usefully be applied and on the scale of demand that might reasonably be expected to the end of the century and beyond.

If demand grew as expected the scope for conventional direct supply reservoirs in upland catchments would be exhausted. Instead, SDD followed the Water Resources Board in advocating a more thoughtful approach to resources development, river regulation. Broadly speaking, reservoirs used to regulate a river for downstream abstraction instead of for purposes of providing a supply from storage alone could make twice as much water available. The strategy has two disadvantages; pumping costs are likely to rise over time, increasing the running costs of a scheme, and there is a greater risk of contaminated supplies. The River Purification Boards were now in control, however, to the

6
extent that this risk:

'need not preclude the adoption of river regulating schemes if the engineering economies prove them to be right.'

In some cases it would not be necessary to undertake any new regulation; the electricity authorities already regulated several major basins. SDD drew attention to⁷

'the benefits which could accrue to the water industry by taking advantage of the increased minimum flow so provided ... the increasing demands for public water supplies may through time lead to consideration being given to some adjustment of hydro-electric operations to suit the provision of water supplies.'

There were obvious possibilities for the joint use, hydro-electric and water supply, of reservoirs in the Tay Basin, the Earn and Loch Doon. Conjunctive use of some existing schemes nearest to areas of highest demand seemed a sensible and viable strategy for the future.

Other possibilities had not been dismissed entirely. SDD would watch closely for any developments in the design of estuarial barrages but in view of the array of more *straight-forward* alternatives the application of this strategy was unlikely. Similarly, underground sources could play an important role, SDD would seek more information on their extent, but they would not contribute to the solution of problems of future supply in a major way.

The likely extent of such problems depended entirely on the rate of growth of demand. Table 8.2 shows the average rate of increase of demand (compound) over the period 1951-1971 and SDD's projected rates

Table 8.2 Historical and Projected Rates of Increase in Demand for Water in Scotland, 1951 - 1991.

Water Board	Overall	Projections	
	1951 - 71	1971 - 1991 Domestic	1971 - 1991 Trade
----- per cent per annum (compound) -----			
North of Scotland	3.8	1.35	2.1
Ross & Cromarty	3.95	2.3	2.75 (A)
Inverness-shire	1.7	2.9	2.8
Argyll-shire	3.45	2.15	-
North East Scotland	2.55	2.15	1.9
East of Scotland	1.35	2.05	2.0
Mid-Scotland	3.9	3.75	3.75
Fife and Kinross	0.95	2.6	2.45
South-East Scotland	1.35	2.55	2.5
Lower Clyde	1.05	1.6	1.6
Lanarkshire	2.8	2.9	2.95
Ayrshire	1.15	3.25	3.15
South West Scotland	2.0	2.05	2.2

Notes : (A) Excluding the requirements of a new aluminium smelter at Invergordon.

Sources: SDD, Measure of Plenty, Graphs, Appendix C, pp. 39 - 83.

of increase for the period 1971-1991. The former set of figures should not be regarded as a firm indication of variations in growth around the country because some records were incomplete or unavailable within water board areas. In general, however, compound increases of 2 per cent per annum in Central Scotland and 3.4 per cent in the more rural parts of the country were the norm. Within any unit of analysis there might, of course, be substantial variations, a feature illustrated by Table 8.3 which shows SWAC's forecasts of growth in demand for the larger authorities in Central Scotland. A picture emerges, at least in the 1960s, of growth of about 1 to 1.5 per cent per annum in the major urban centres and a considerably higher rate in the growth centres such as Dunbarton County (Cumbernauld New Town and the Vale of Leven growth centres), West Lothian (Livingston New Town), Fife (Glenrothes New Town) and the petrochemical complex at Grangemouth. Cuthbertsons had developed the Megget scheme on the basis of an estimated annual increase in demand of 1.2% in the Edinburgh and Midlothian area, but also recommended that a margin of 10% of existing resources (or 4.5 mgd) should be retained as an insurance against sudden upsurges in demand 'such as can now happen rapidly through industrial movement or government decision'.⁸

The high rates of growth in rural areas may be attributed to the success of grant-aided schemes for rural water supply, with many consumers receiving a supply for the first time, and the spread of higher sanitary standards through the post-war housing programme. SDD therefore considered that a target of around 2 per cent compound was the most appropriate level for the forward projection of demand. There were, however, as Table 8.2 confirms, considerable differences in the

Table 8.3 Projections published by the Scottish Water Advisory Committee in 'The Water Service in Central Scotland'

Authority	Consumption 1963 (M.g.d)	Projected for 1991 (m.g.d)	Compound rate of growth assumed (%)
Glasgow Corporation	94.71	122.00	0.91
Edinburgh Corporation	35.00	47.00	1.06
Dumbarton Burgh	2.38	3.31	1.19
Dunfermline Burgh	2.45	3.55	1.33
Kirkcaldy Burgh	3.01	6.33	2.69
Hamilton Burgh	3.26	4.40	1.08
Motherwell & Wishaw	5.72	8.71	1.51
Grangemouth Burgh	10.10	25.00	3.29
Stirling Burgh	2.8	5.05	2.13
Dunbarton County	3.84	10.9	3.80
Fife County	7.65	20.43	3.80
Lanark County	20.18	41.65	2.62
West Lothian Water Board	5.05	24.00	5.73

Source : SDD, The Water Service in Central Scotland, A Report of the Scottish Water Advisory Committee, HMSO, 1963, Table, Appendix II, pp. 60 - 61.

degree of industrial growth included in the forecast. It is also interesting to note that there are significant differences in the projections for Central Scotland published in 1963 and those published in 1971. Expectations appear to have risen quite dramatically particularly in Lanarkshire and Fife (the *apparent* sharp increase for the Edinburgh area can be explained by the inclusion of both the city and West Lothian within the same unit of analysis).

Both the industrial and the domestic rates of increase seem rather high. The figures for industrial projected growth are inevitably misleading since growth comes in sharp increments rather than as a steady annual progression; all that can be said of them is that SDD appears to have taken an optimistic view of the extent to which major new industrial installations would be attracted to Scotland over the remaining decades of the century (and the extent to which existing major consumers of water such as paper, steel and petrochemicals, would maintain their rate of increase in requirements through sustained growth in output). This view is understandable in the context of the governments policy for growth and development, but the increase in expectation between 1963 and 1971 seems surprisingly high in most cases.

The projection of domestic demand can be reviewed in more detail because information was made available about its two components: population forecasts and per capita consumption. SDD's Research Unit's publication, 'The Size and Distribution of Scotland's Population: Projections for Planning Purposes' provided the source for Table 8.4. The figures seem rather high, the projected rate of growth between 1971 and 1999 being over twice the historical rate since 1951. In fact, the

Table 8.4 Growth Rates and Population Projections, Scotland, 1951 - 1991.

Water Board Area	1951- 71	1971 - 91	Remarks
North of Scotland	-0.07 %	-0.55 %	
Ross & Cromarty	-0.08	0.41	Migration reversed.
Inverness-Shire	0.23	0.88	
North-East	-0.11	-0.01	Migration halted.
East	0.05	0.16	Threefold increase.
Fife and Kinross	0.30	0.59	Growth rate doubled.
South-East	0.21	0.54	Doubled and more.
Mid-Scotland	1.23	1.69	
Argyll	-0.25	0.17	
Lower Clyde	-0.35	-0.45	
Lanarkshire	0.89	0.87	
Ayrshire	0.03	0.15	Fivefold increase.
South-West	-0.14	0.10	
Scotland	0.13	0.34	

Source: SDD, Measure of Plenty, Appendix B, p.36

Table 8.5 Per Capita Consumption of water in 1971

(Gallons per head per day)

Above Average Areas		Below Average Areas	
Argyllshire	80.5	South-West	56.1
Ayrshire and Bute	73.9	Lanarkshire	54.8
Ross and Cromarty	70.8	Inverness-shire	52.6
Lower Clyde	70.2	East of Scotland	51.3
North of Scotland	66.2	Fife and Kinross	50.4
Mid-Scotland	60.5	South-East	46.9
		North-East	40.7
Scottish Average		58.5	

Source: SDD, Measure of Plenty, Table 2.2, p.8.

figures used in Measure of Plenty amount to an increase of 7 per cent in the Scottish population between 1971 and 1991, compared with an increase of 2.6 per cent over the preceding two decades.

Per capita consumption is even more difficult to predict than population. Remarkable differences were shown to exist between different water board areas (Table 8.5). This procedure almost certainly overestimates future domestic consumption as it includes present variations which may have more to do with the ownership of water using appliances. The variations, with the lowest little more than half the highest, are puzzling.

It seems likely that different levels of waste are largely responsible, and SDD confidently expected that 'in due course, the water boards and their successors will reduce (high per capita consumption) considerably'.⁹ In addition, allowance must be made for a significant influx of tourists and summer visitors in many parts of the country. In view of these factors, it seems certain that SDD's predictions of demand err on the high side.

Water for Central Scotland

Against the background of this broad appraisal, the Central Scotland Water Development Board (CSWDB) appointed the engineering firm of Cuthbertson and Associates in 1974 to review those sources listed in Measure of Plenty that seemed suitable for the supply of Central Scotland. Cuthbertsons were clear favourites for the task, the firm having been involved in many Scottish developments. The firm had

experience of large scale 'traditional' schemes, such as the Megget, were also familiar with large schemes of river abstraction (having acted for objectors in a dispute between Aberdeen County Council and fishery interests over the development of Loch Gabrach and having devised the alternative of an abstraction from the Lower Deveron which was ultimately adopted), and were also familiar with the details of the Loch Lomond scheme, the backbone of supplies to the Central area.

As a first step, Cuthbertsons translated SDD's forecast of demand into meaningful terms. If such predictions were correct a major new source would be required for Central Scotland by 1988. This would be required to supply 130 mgd in 2001 and ultimately 200 mgd in 2011. Bearing in mind the assumptions behind the forecasts it was felt that these targets represented maximum demand. Cuthbertsons believed that demand could not continue to increase exponentially: there must be at some point a level of per capita demand beyond which no improvements in standard of living would significantly increase the consumption of water, bearing in mind that the present use of water for domestic purposes is dominated by the use of water closets and automatic washing machines. In particular, the projected rate of 2% compound growth was regarded as excessive for three reasons. First, the historical average of 2% over the 1960s to some large extent reflected the Government's policy with respect to housing and 'development' which had been of a scale unlikely to bear repetition. Secondly, proper measures to prevent and control waste were being introduced and, thirdly, Cuthbertsons felt it better to approach major industrial consumers directly rather than have their needs included in a general forecast.¹⁰ The significance of the latter point is underlined



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by the fact that the petrochemical installations at Grangemouth accounted for 11.5% of all consumption in the CSWDB area in 1971.

Cuthbertsons therefore assumed a declining rate of growth, viz.: 1.75% compound throughout the 1970s; 1.5% throughout the 1980s; 1.25% throughout the 1990s ; and 1% compound thereafter. This produced the lower objectives of a new source required for 1992 to supply 60 mgd in 2001 and ultimately supply 11 mgd in 2011. Clearly, there is a considerable difference between the lower and higher targets and the one certain factor about a new source was that it should display the maximum flexibility in terms of development in stages whilst retaining the potential capacity of 200 mgd. This constraint made the adoption of a scheme of river abstraction inevitable as the only strategy for providing a supply with which capital and operating costs could be flexibly matched to demand.

Five broad possibilities were examined: further use of Loch Lomond with topping up from catchments to the North; further use of Loch Turret and the River Daer; and new developments in the Tay, Forth and Clyde basins. The first two could be excluded on the basis of their inability to meet the maximum demand thought possible and the study essentially resolved down to the determination of an optimum development for each of the three basins. Each of these is now reviewed in broad outline before a comparison of costs and environmental impacts is made.

The Tay Option

The Tay, as the largest river in Scotland and with the greatest mean daily discharge in Great Britain, is an obvious candidate for a river abstraction scheme; with the intake at the tidal limit to the north of Perth. Such a point would be within 40 miles of the centre of demand, a figure that compares favourably with the distance between Edinburgh and its reservoirs in the Upper Tweed basin and between Glasgow and Loch Katrine, the latter city's principal source of supply. The intervening territory is, however, not nearly so suitable for the mass transfer of water. Existing developments for water supply represent an insignificant loss to the catchment and no further major schemes are likely.

At the tidal limit the quality of water is good, the town of Perth having drawn its supply from the river without incident for a hundred years or more. No problems of treatment are therefore expected. By the same token, however, the river supports large stocks of salmon and is the subject of a good deal of intense local interest for both sport angling and commercial netting.

Extensive hydro-electric works in the upper catchments since the 1940s have already transformed the flow of the river. Indeed, it is estimated that the series of such dams has raised the minimum discharge from some 280 mgd to some 665 mgd, compared to the mean discharge of 3200 mgd. By arrangement with NSHEB it would be possible to increase the minimum flow still further, but with a requirement of only 200 mgd this step would seem unnecessary. Supplies from the Tay might be

important for strategic planning, perhaps to serve any major new petrochemical plants based on the proximity of North Sea oil and gas, of the type currently proposed at Mossmoran in Central Fife.

Four problems must, however, be considered: a) the effect of such an abstraction on migratory fish; b) its effect on the estuary downstream; c) its effect on water quality; and d) the problem of finding, at acceptable cost, a route for the mains across the intervening ranges of volcanic hills to Central Scotland.

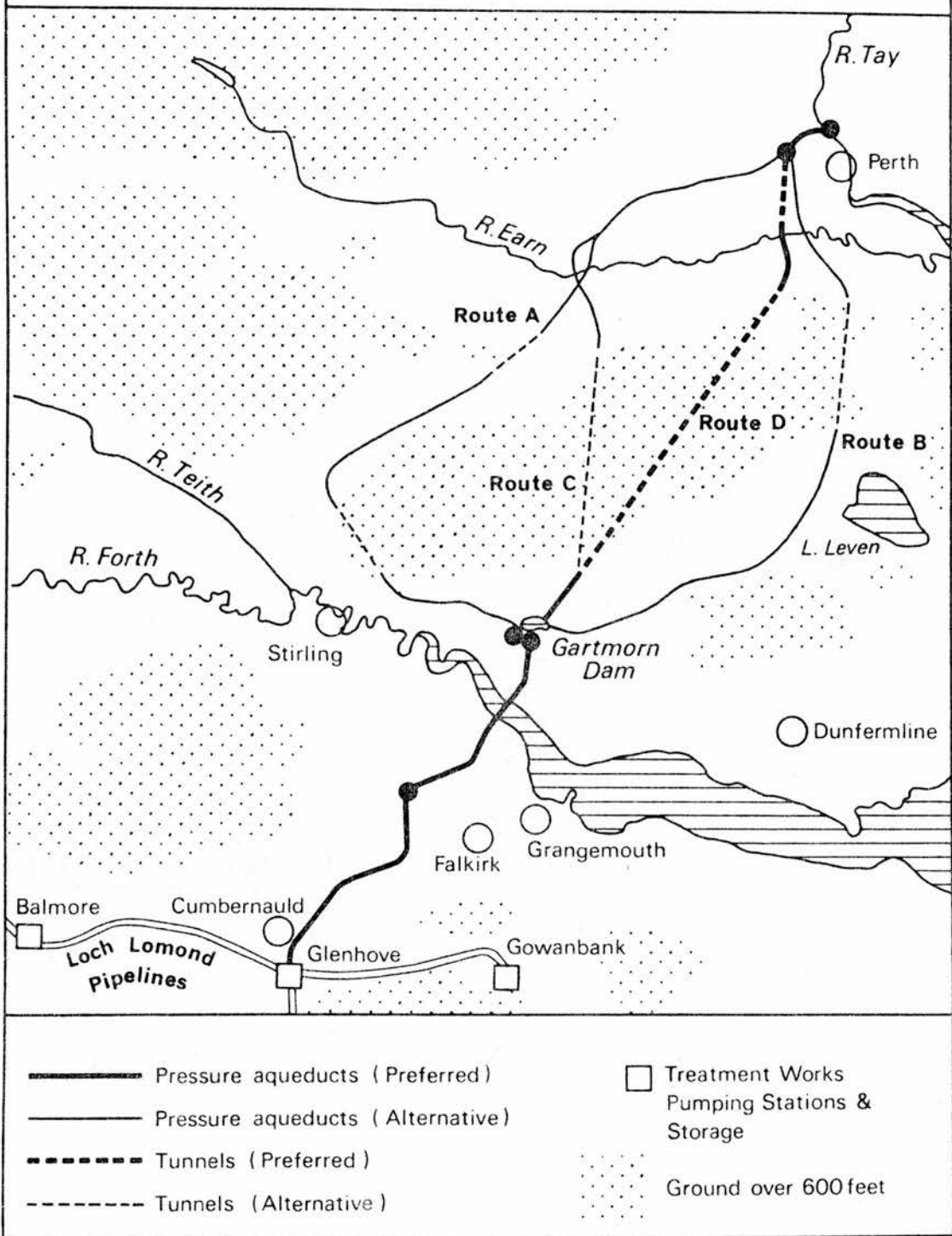
Because the minimum flow of the river has been increased through regulation by more than the proposed abstraction the consultants thought it was unlikely that fisheries would suffer. This view was confirmed by specialist advisors who believed that the passage of fish would be delayed only when flow fell below 400 mgd, particularly if temperatures were low. Records show that this is likely to happen on only a few days over any period of twenty-five years. The advisors did, however, see a possible conflict with salmon interests over the siting of the intake. Cuthbertsons had selected the latter on the basis of its low cost, but certain netting stations would almost certainly be adversely affected if no change was made. The matter would have to be resolved by comparing the loss to the netting stations with the extra expense to the water authority. Conflict seems inescapable, however, for the chairman of the Tay District Salmon Fisheries Board has expressed the view that abstraction should be limited to those flows above 750 mgd. This condition would require the provision of additional regulation upstream, at a cost which could not be justified over a supply of 200 mgd. It seems inevitable that, if the Tay is chosen, there would

be vociferous (and almost traditional) opposition from the fishery interest.

The shifting sands of the Tay estuary have been studied for a number of years by members of the Department of Civil Engineering at the University of Dundee and they predicted with confidence that an abstraction of 200 mgd would cause no significant changes in the estuary. As with fisheries, the effect of the proposed abstraction on water quality would be restricted to what might arise in the tidal reaches. The Director of the Tay RPB has expressed the view that, notwithstanding the discharge of a substantial volume of treated sewage effluents from Perth, the levels of pollution would remain low because of the very large volume of dilution which would remain in relation to the volume of discharges.

Any abstraction scheme would require a large storage tank containing several days supply so that maintenance on pumps or flushes of pollution or silt could be handled. As with treatment plant, such storage need not be immediately adjacent to the point of abstraction and Cuthbertsons suggest the use of an existing reservoir for this purpose at Gartmorn (Figure 8.4). The reservoir belongs to Central Region and is approximately half way between the Tay and CSWDBs existing trunk mains across Central Scotland. Most of its existing commitments to supply water could be maintained and the Central Regional Council has indicated that it has no objections in principle to the transfer of this reservoir to CSWDB, provided that financial terms can be agreed. The raising of the reservoir would either flood, or extend the proportion of water surface, of a wildfowl reserve surrounding the

Figure 8.4
River Tay - Scheme of Development



reservoir and this may cause some difficulty.

To overcome the problem of distribution, the crossing of the Ochil Hills, Cuthbertsons evaluated four possible routes, two skirting the range to east and west and two across the range. Their main features are given in Table 8.6 (see also Figure 8.5).

The solution depends mainly on the relative costs of tunnelling over short distances and piping for longer stretches, although the head against which water would have to be pumped is also, of course, an important factor.

Route D has a clear advantage in both capital and running costs, suggesting that distance is the most important consideration in the construction of aqueducts.

TABLE 8.6: Features of Alternative Routes for Transfer of Water from River Tay

	R O U T E			
	A	B	C	D
Length (in miles)	35	28.1	25.4	21.9
Within that, % pipe	84.6	76.5	58.3	12.3
Within that, % tunnel	15.4	23.5	41.7	87.7
Head (in feet)	466	485	261	207
Capital cost (£m)	73.8	51.1	50.5	47.2
Loan charges p.a. (£m)	8.4	5.8	5.7	5.3
Pumping costs p.a. (£m)	2.3	2.3	1.3	0.1

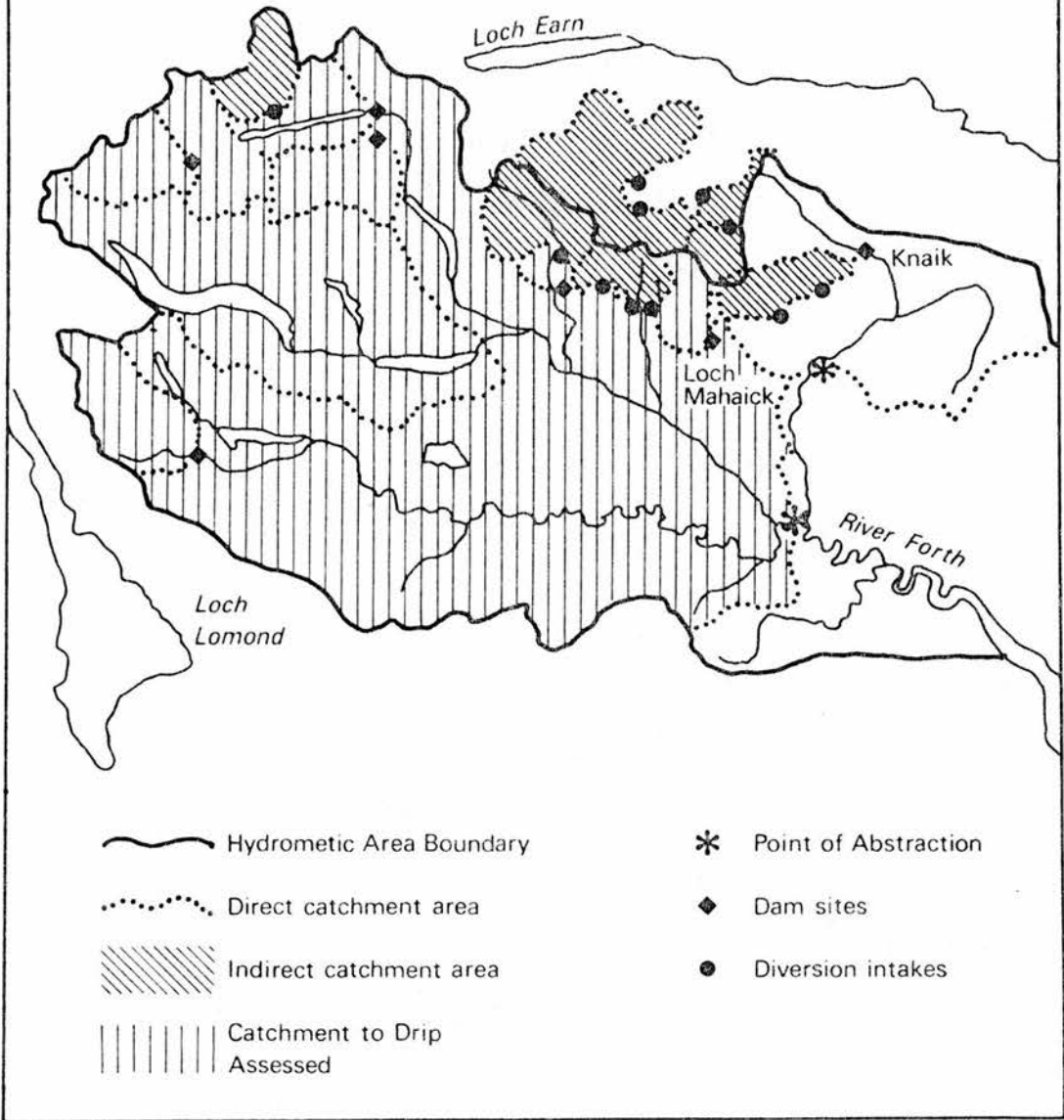
The Upper Forth Option 12

The natural mean discharge to the tidal limit of the Forth is estimated as 830 mgd, but 93.5 mgd of this is not available because of its capture and subsequent transfer to the Clyde Basin by way of the Loch Katrine complex of reservoirs. The regulating effect of overspill from the latter and of 49.3 mgd compensation water released from these reservoirs make a useful contribution to the mean daily discharge of 689 mgd at the most suitable point for abstraction. The latter, at Drip, has the advantage of being only 25 miles from the major centre of demand (see Figure 8.5). The quality of the river's water at Drip is excellent and there are no water supply schemes of any significance above the tidal limit other than the Loch Katrine scheme.

Three problems arise with this option: the effects of withdrawal of freshwater from the estuary; the impact that the latter and a new regulating dam in the upper reaches might have on fisheries; and the difficulty of finding an optimum location for a regulating reservoir. New regulating reservoirs would be required because the consultants took the view throughout that no more than 80 per cent of the natural mean flow could be removed (i.e. a minimum of 20 per cent should remain). Thus (excluding the Loch Katrine works) 139 mgd would have to be left in the Forth together with the desired 200 mgd upstream of the abstraction, making 338 mgd or almost half the total. In dry periods and in dry years, there will be less than half of the mean discharge available and storage to cover this potential deficit is necessary.

Figure 8.5

River Forth-Regulating Reservoir Schemes
Catchments Considered for Development



The Director of the the Forth RPB did, however, foresee problems of water quality arising from the withdrawal of freshwater; notably enhanced toxic effects and a reduced dissolved oxygen content in the upper part of the estuary, a greater retention period for polluting substances within the estuary, enhanced sedimentation of solid organic matter, with subsequent effects on dissolved oxygen when the deposits are disturbed by spring tides, and less cooling for the (significant volume of) thermal discharges to the estuary, so that critical temperatures in the estuary were reached more frequently and over a wider range. In response, Cuthbertsons pointed out that the full abstraction would not be required until next century and not begin until the 1990s, thus giving the RPB 20 or 30 years to effect the improvement of present unsatisfactory effluents; and that it might reasonably be expected that a good deal of the water would return to the Forth after use. Even so, they acknowledged that, with 11 per cent of the catchment already developed for purposes of water supply, the problem of further abstraction is more acute in the Forth than in either the Clyde or the Tay where the proportions currently taken are insignificant in relation to the total volume of flow.

Cuthbertsons examined eight possible reservoir sites and 19 different patterns of development from the point of view of yield. Nine of these were then taken forward to the stage of costing and a preliminary assessment of environmental impact. Fishery advisors reported on each of the possible sites and generally came out in favour of those downstream from the headwaters in order to minimize the flooding of spawning beds, particularly in the upper Teith .

This finding and the balance of engineering economics prompted Cuthbertsons to propose a two-reservoir system, Loch Mahaick in the first phase and a Knaick reservoir in the second. The former site was selected despite the need for further investigation of the implications of any development for the Nature Conservancy Council's present designation of part of the affected area as a site of Special Scientific Interest. The Knaick area, on the other hand, is such that an artificial body of water might well improve the amenity of what is otherwise a featureless area. Even so, in selecting this option the consultants had not chosen the cheapest: avoiding more environmentally sensitive areas involved an increase in unit costs of between two and five fold over alternatives.

The Upper Clyde Option¹³

The Clyde is perhaps the most obvious option for the supply of industrial Scotland, the more so in view of Glasgow's historical development of catchments elsewhere. The quality of the water starts to deteriorate below Lanark and the risks of short-term, accidental pollution significantly increase. Even so, 34 per cent of the mean discharge arises above the Falls of Clyde and is of first class quality; ten per cent of this has already been used for Lanarkshire's water supply. Nevertheless, a significant quantity remains in the river only 20 miles from the nominal centre of demand and perhaps even closer in view of the likelihood of other demands occurring in the Clyde Basin.

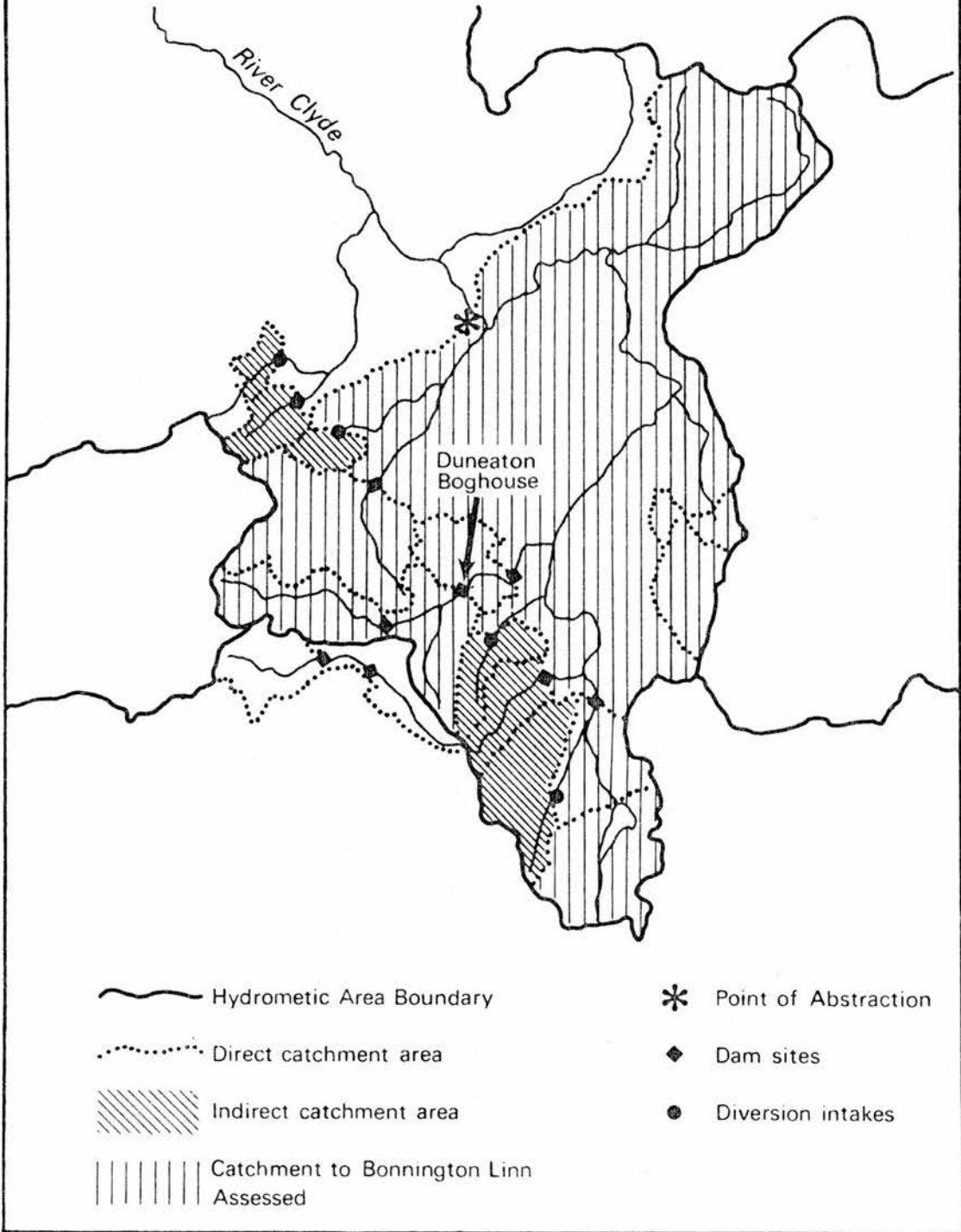
The Upper Clyde is closest and lacks problems of water quality and, perhaps more significantly, any potential conflict with fishery

interests. Indeed, such are the recreational opportunities of that river, that an additional regulating reservoir might well prove a positive asset. Regulation would be required for similar reasons to those advanced for the Forth option and comparable problems would arise over the effect of an abstraction of up to 200 mgd on the dilution of effluents further downstream. There is also a greater problem concerning the location of an abstraction point than in the case of either of the other two options.

The South of Scotland Electricity (SSEB) operates two small hydro-electric stations in the vicinity of the most suitable point, at Bonnington (Falls of Clyde) and Stonebyres (Stonebyers Falls) (see Figure 8.6). Both plants together produce only 70 kWh, a very small output in relation to SSEBs total of some 20,000 kWh; nevertheless, they represent a useful low cost source, as is shown by their uprating as recently as 1968. If the abstraction point were to be made downstream of the stations, their potential output would increase because of higher and more regular flows but at a cost to CSWDB as the lower elevations downstream would require increased pumping costs for distribution. On the other hand, an abstraction of up to 200 mgd above the stations would reduce their output and cause a loss to SSEB. The issue is one of an energy balance, the extra energy required by the CSWDB, compared with the production lost by SSEB. Cuthbertsons presented the following figures relating to energy requirements for the Upper Clyde scheme.

Figure 8.6

River Clyde-Regulating Reservoir Schemes
Catchments Considered for Development



	Power used NOW	Power used AFTER (all figures million kWh)	Power for pumping million kWh)	Balance
Abstraction ABOVE Bonnington	53.3	35.1	-30.0	- 48.2
Abstraction BELOW Stonebyers	53.3	80.2	-150.0	-123.1

Because pumping from below Stonebyers involves an increase in consumption of 500 per cent as compared with that above Bonnington, and the loss of generation through an abstraction in the latter area is said to stand at only about 35 per cent, the balance clearly favours the latter option. It remains to be seen if a satisfactory agreement can be negotiated with SSEB.

Having located the abstraction point, Cuthbertsons then examined a large number of alternative sites and combinations of options that would provide the required regulation. One of these involved the conversion of an existing direct supply reservoir to regulation (the Daer) followed by the construction of a second lower reservoir in the same valley. This project, however, had the serious drawback of requiring extensive re-construction of existing facilities in some parts of the region. Not only would existing, modern treatment plant and eighteen miles of large diameter pipeline be flooded but a substantial reorganization of the Region's distribution systems in Lanarkshire would be needed. In view of this disruption the option was not costed, although the consultants expressed the view that costs would probably be comparable with other options.

Most of the latter focussed on the hitherto undeveloped Duneaton

Water, first suggested by SDD in A Measure of Plenty and the lowest cost option of these was chosen. There is, however, the question of pollution in the lower basin noted earlier and, as is shown below (Chapter 10) the Clyde RPB is a formidable force. Although Clyde RPB had effected a remarkable recovery, the consultants acknowledged that the degree of improvement may not have reached the stage where the effect of a substantial abstraction might not be insignificant; indeed, they understood that some recently negotiated conditions of consent for the discharge of polluting effluents from major industrial concerns had, to some degree, relied upon the volume of clean water from the headwaters. Nevertheless, as with the Forth, the Clyde RPB would have twenty to thirty years to plan towards the new situation.

Meanwhile, the Director of the Clyde RPB has said that his board "would be strongly opposed to any abstraction on this scale, unless more detailed studies subsequently show (our) fears ¹⁴groundless." He was concerned over three matters: the effect on oxygen levels downstream at periods of low flow; the prolongation of high ammonia levels increasing weed growth in the upper reaches during the summer months, and the reduction of scouring capacity, i.e. the same broad areas of concern as expressed by Forth RPB. Lastly, it should not be forgotten that costs of this option depend entirely on SSEB agreeing to the location of the abstraction point.

Each of the three options thus present problems: the Tay scheme could lead to conflict with fishery interests, the Forth scheme involves a smaller similar risk but to significantly less valuable fisheries and also has significant implications for pollution control,

as has the Clyde scheme.

Relative Costs

Cuthbertsons conducted a desk study sufficiently detailed to select and evaluate options on the basis of their engineering feasibility and economies. The preferred options (Figures were costed as shown in Table 8.7.¹⁵

TABLE 8.7: Cumulative Yields and Costs of Options for Central Scotland

	<u>Tay Scheme</u>		<u>Forth Scheme</u>			<u>Clyde Scheme</u>		
	1	2	1	2	3	1	2	3
Yield (mgd)	100	200	97	176	200	100	150	200
Capital Cost £m	£86	132	72	140	146	72	130	143
Annual Cost £m	13.4	21.5	11.5	21.9	23.4	10.8	18.8	21.6
Unit Cost £/mgd	370	306	324	342	315	296	346	296

The initially high unit cost of the Tay Scheme relates to the aqueduct from Perth to Gartmore the preferred route for which is largely by tunnel which clearly would be constructed to match the maximum yield of the scheme rather than merely that of the first phase. The peaking of unit costs of the Forth and Clyde schemes relates the provision of a second storage reservoir in each case. Clearly, however, the Clyde scheme appears best for either the low or high target of demand. Proximity of the source to centres of demand seems to have been the most potent factor in determining the balance of costs.

Accordingly Cuthbertsons recommended that the CSWDB should proceed towards a Water Order authorising development of the upper reaches of the Clyde in January 1977. In view of when it seemed such supplies would be required, however, an environmental impact assessment should proceed.

Environmental Impact Analysis

In November 1977 the CSWDB commissioned such reports for all three preferred sources. Messrs. Davidson and Robertson, Chartered Surveyors, land and property valuers, were commissioned to make an assessment of the implications for agriculture of the three schemes. Messrs. Percy Johnson -Marshall and Associates, Planning Consultants, were commissioned to carry out an assessment of the overall environmental implications of the three schemes taking account of Davidson and Robertsons' conclusions.¹⁶

The latter's detailed assessment concluded that the schemes could be ordered in terms of agricultural impact as follows (in terms of least to greatest): Tay, Forth, Clyde. This was in accord with the views of the Department of Agriculture and Fisheries in Scotland who were also consulted on the matter from the point of view of the national agricultural interest. Johnson-Marshall applied a relatively simple form of environmental impact analysis involving the partitioning of each scheme into its components and the detailed researching of the impact of each of visual amenity, local ecology and existing land use, noting the extent to which impacts might be temporary or irreversible. Some indication was also given of the extent to which impact might be

reduced by redesign but at this stage no account was taken of the costs of so doing.

They concluded that the Tay option would give the best result: 17

'This is largely because the effects of abstraction from such a large river and the works required to convey the abstracted water into the central system are unlikely to produce long term deteriorious irreversible effects';

whereas:

'Both the Clyde and the Forth, on the other hand, represent major irreversible changes to large areas of countryside and to their river systems. Although some benefits, mainly in teems of recreation may accrue to these areas, this does not, in our view, compensate for the disadvantages of these schemes'.

Parts of Johnson-Marshall's summary matrix are presented in Figures 8.7 and 8.8. Overall, the impact of the schemes was assessed to increase in the following order: Tay, Forth and Clyde. Thus, CSWDB were presented with something of a dilemma; the balance of engineering economies appeared to favour the Clyde option whilst the balance of environmental considerations appeared to favour the Tay scheme. In the meanwhile, however, Cuthbertsons had been re-examining the key to the whole study - forecasts of future demand.

Demand Forecasts Revised 18

Since the beginning of the desk study three factors had operated to bring about a change in estimates of future demand. First, the 1970s saw a change from the previous pattern of recession in economic growth being followed relatively quickly by a resurgence in the demand for water tending to an overall increase in demand for water. In the

SCHEME	SUB AREA	VISUAL KEY ISSUES		ECOLOGICAL KEY ISSUES		REV. CLAS	C	U	REV. CLAS	C	U	
		REV. CLAS	C	U	REV. CLAS							C
TAY	1	NORTH MURTON	1. Visual intrusion of buildings at site intake	0	E				0	De+	E	1. Eff 2. Eff
	2	PIPELINE TO HUNTINGTOWER	1. Visual intrusion of the pumping station (unless located on industrial estate)	0	E				0	De	WE	1. De 2. De
	3	HUNTINGTOWER TO FORGANDENNY	1. The distribution of rock and spoil abstracted from the Aberfeldy tunnel	D	WE				D	WE	De	1. De 2. De
	4	OCHIL TUNNEL	1. The distribution of rock and spoil abstracted from the Ochil tunnel	D	WE				D	E	E	1. De 2. De
	5	GARTMORN RESERVOIR	1. The effects of raising the water level on firmly established habitats and on existing landscape 2. Disposal of excavated material from tunnel	W	ED				W	ED	ED	1. De 2. De 3. De 4. De
	6	GARTMORN TO OAKBANKWOOD	1. The creation of straight weathers through woodland	D	E				D	E	E	1. De 2. De
	7	OAKBANKWOOD TO GLENHORE	1. Siting of the pumping station 2. The creation of straight weathers through woodland	E	WE				E	E	E	1. De 2. De
	MIX	REVISED MIX			4D	4E	4D	4E	4D	4E	4D	4E
FORTH	1	LOCH MAHAICK	1. Spoil disposal from tunnel 2. Drawdown effects on reservoir banks and bed 3. Appearance of the site during construction on a tourist route (the Mill)	C	D				C	D	WE	1. De 2. De 3. De
	2	THE KNAIK		D	De				D	De+	E	1. De 2. De
	3	DOUNE BRACO CORRIDOR										
	4	RIVER TEITH - DUNIP	1. Visual intrusion in highly visible and historic area 2. Disturbance to the slope of construction site 3. Creation of straight weathers through woodland	D	WE				D	WE	WE	1. De 2. De 3. De
	5	DUNIP RESERVOIR INTAKE PUMPING	1. Visual intrusion in highly visible and historic area 2. Disturbance to the slope of construction site 3. Creation of straight weathers through woodland	D	WE				D	WE	WE	1. De 2. De 3. De
	6	DUNIP TO OAKBANKWOOD	1. Siting of treatment works and pumping station 2. Disturbance to woodland and the setting of weathers	E	WE				E	E	E	1. De 2. De
	7	OAKBANKWOOD TO GLENHORE		D	E				D	E	E	1. De 2. De
	MIX	REVISED MIX			2D	3E	4E		2D	3E	4E	
CLYDE	1	DUNEATON RESERVOIR	1. Establishment of a totally different visual character	BC	4D				BC	4D	4E	1. De 2. De 3. De
	2	DUNEATON TO BONNINGTON LINN										
	3	BONNINGTON LINN	1. Visual intrusion of the intake 2. Effects of reduced flow on falls of Clyde - longer periods of reduced flow 3. Downstream effects of changed flow on Clyde Gorge & SSSI	0	WE				0	WE	WE	1. De 2. De 3. De
	4	AQUEDUCT TO NEWKAYS	1. Visual intrusion of buildings through woodland 2. Disposal of tunnel spoil 3. Crossing of SSSI	E	WE				E	WE	WE	1. De 2. De 3. De
	5	RESERVOIR AND TREATMENT WORKS	1. Establishment of totally different character 2. High visibility from surrounding areas	WA	WE				WA	WE	WE	1. De 2. De
	6	AQUEDUCT TO CLYDE CROSSING	1. Creation of straight weathers through woodland 2. Crossing of the Methan Gorge SSSI and AGL	D	E				D	E	E	1. De 2. De
	7	CLYDE CROSSING	1. Creation of straight weathers through woodland - Jack's Burn SSSI	D	E				D	E	E	1. De 2. De
	MIX	REVISED MIX			3D	3E	4E		3D	3E	4E	

FIGURE 8.7

OVERALL WEIGHTINGS

EXISTING TAY SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					

ENVIRONMENTAL REVISED SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					
NONE					

EXISTING FORTH SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					

ENVIRONMENTAL REVISED SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					
NONE					

EXISTING CLYDE SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					

ENVIRONMENTAL REVISED SCHEME

	A	B	C	D	E
EXTREME					
MAJOR					
MINOR					
NONE					

HOW TO READ THE CHART

The Chart sets out the key issues identified in the study in such a way that their effects may be compared both within and between the three schemes. The object of the chart is not to crudely tot up these impacts but rather to illustrate the mix of problems and opportunities presented by each scheme, thus allowing a more qualitative assessment to be made.

The Chart is divided horizontally into the Tay, Forth and Clyde schemes. Within each scheme the sub areas are listed and against each are listed the key issues for that sub area. Key issues are grouped under visual, ecological, existing use and potential use headings. Against each heading there are three columns marked "Rev. Clas" C & U. C indicates impacts incurred during construction. U indicates impacts incurred during the long term use of facilities. "Rev Clas." indicates the change in classification which could be brought about within the scheme by design or by extra expenditure.

Within these columns each issue is given a classification indicating the degree of permanence of its impacts.

- A = long term benefit.
- B = short term benefit.
- C = No benefit or disbenefit
- D = Short term reversible damage.
- E = Long term irreversible damage.

A further small letter code is given where the impacts are assessed as extreme (E) or major (M). Where no further letter code is given the impact is considered minor.

Certain impacts which have downstream consequences are coded with an arrow. (↓)

We have also indicated in the diagram the effects of "designing out" or otherwise reducing or eradicating impacts. The revised classification indicates the character of the impact once this has been done. Those impacts coded with a black dot (●) are unavoidable and cannot be reduced or eradicated. The revised mix indicated at the bottom of the column indicates the character of a scheme once changes have been made and consists of the black dotted impacts and those in the revised classification column.

On the far right of the diagram the overall results of each scheme in its original and its adjusted form are indicated. (Note that the division into construction and use is dropped for these diagrams.)

Figure 8.8

absence of any such recovery the opportunity had been taken to revise forecasts. Secondly, population growth in Scotland slumped dramatically in the 1970s and the latest population projections now predict a population level in the year 2010 some 17% lower than projected at the beginning of the decade (see Figure 8.9).

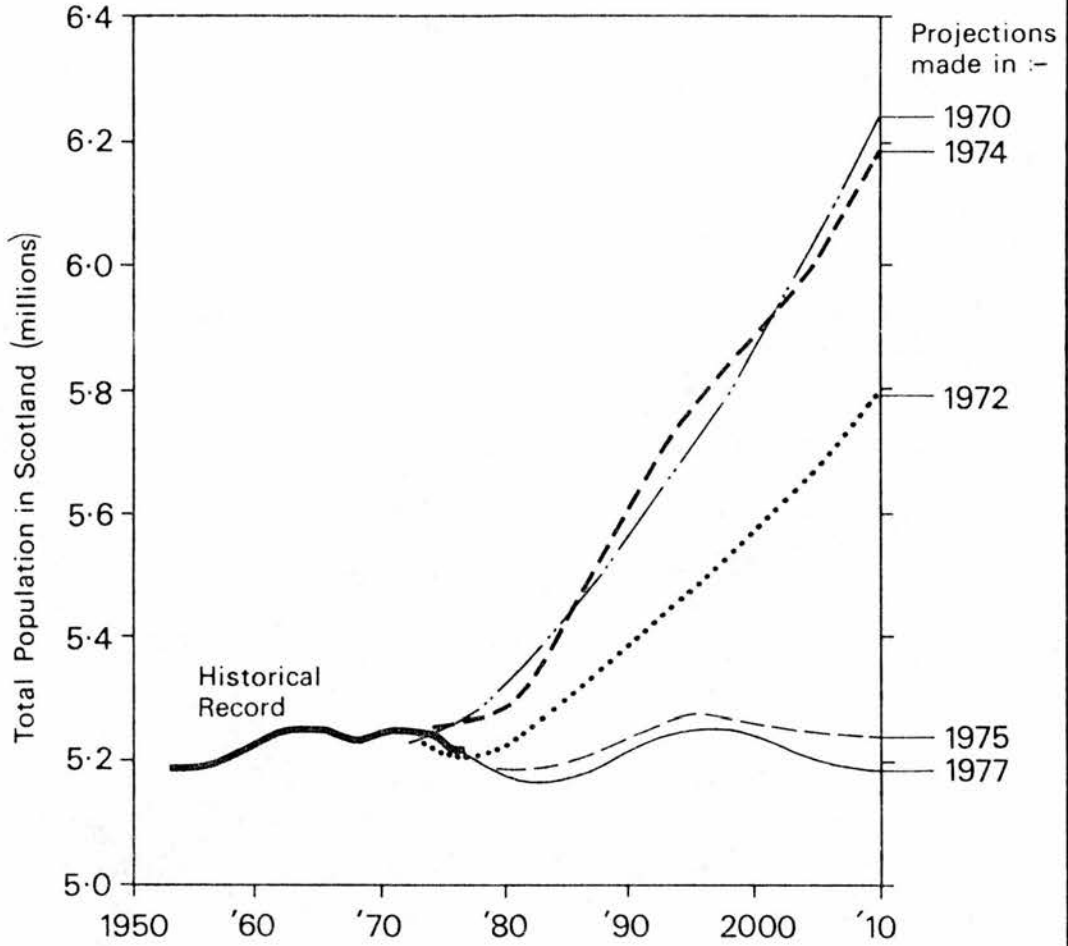
Thirdly and perhaps most importantly the water departments of the Regions involved in the study (Strathclyde, Central and Fife - the future supply of Lothians being planned to come from the Megget scheme) had had an opportunity to assess likely industrial demand for water in much greater detail than hitherto and prepare and implement waste prevention programmes. As is illustrated in Figure 8.11, these factors combined to make a considerable difference to the target size of a new source for Central Scotland.

The new assessment of the position in Strathclyde was most important. Not only did it seem that the demand for water in the year 2011 would amount to just over half the level predicted in 'Measure of Plenty' but also it was clear that no new sources would be required for this region until well into the next century. This, of course, has profound implications for the calculation of relative costs for the three options as the centre of demand is moved east, against the trends in favour of the Clyde option.

Indeed, whilst Cuthbertson's expectations of demand for the Central Region compared reasonably well with the Councils' own view, it was in Fife that the demand for water now seemed to be likely to grow fastest, even to the point of exceeding the expectations of

Figure 8.9

Total Population in Scotland
Historical Record and Projected Trends



'Measure of Plenty'. Of course the total quantities involved were still relatively small, but it was here that a new source of supply would be required in the late 1980s with an interest from Central Region anticipated for a decade later.

Cuthbertsons predicted, in line with these downward revisions in projection of demand, that only 40 mgd would be required of a new scheme in 2011 required only in East Central Scotland. Accordingly Cuthbertsons now envisage the Tay scheme as the recommended option with the Ochil tunnel scaled down to meet a maximum demand in future of 100 mgd. On the same basis as earlier cost calculations this revised scheme they cost at around £325 per mgd provided.

The matter now rests with Cuthbertsons preparing a definite scheme based on the Tay to accommodate the new scale of likely future demand, ameliorating so far as practicable the environmental implications of the development and devising a new pattern of integration with the CSWDB's existing resources.

Such developments in the trend of demand have profound implications for the institutional structure of Scottish water management. Such a relatively low target for the year 2011 as 40 mgd calls into question the need for the scheme to be administered by the CSWDB and indeed the need for the CSWDB at all. Cuthbertsons themselves state that the River Earn is capable of supplying 52 mgd at its tidal limit upstream of Bridge of Earn and 117 mgd if regulation were provided by pumping water back from the Earn to the existing Loch Turret reservoir. Fife Region already plans to abstract 15 mgd. Cuthbertsons seem to

perceive the changed circumstances as requiring an alteration of their initial plan for the Tay, whereas one might well ask why it should not be Fife's plan which should be scaled upwards with a bulk supply agreement to serve Central Region's needs in due course. It may be that just as with Babbie Shaw and Morton in Ayrshire, the consultants are displaying a deal of inertia in the face of changing circumstances.

Overview

Demand is clearly the determining factor in water resources planning. Water resources planning need not, however, be the determining factor in the design and evolution of an institutional structure for water management. Nevertheless, the principal conclusion of A Measure of Plenty was that, after being in operation for a few years, the much debated system of regional water boards had been so successful that the early 1970s marked a turning point in ensuring future water supplies. Through the interconnection of distribution systems which would allow the transfer of surpluses from source to source and through the Loch Lomond scheme and others under way, the future needs of virtually all areas had been assured for at least another 20 years. But, having played a significant part in these developments, engineers in central government were not going to rest on their laurels. The identification of alternatives for future development, particularly a successor for the Loch Lomond scheme, started what was, in effect, the national planning of water resources

that had frequently urged during the debate on the reform of local government and was already underway in England and Wales. The drought in the summer of 1976, which seriously disturbed the institutional calm of the water services in England, was much less severe in Scotland; but even if this had not been so, it can be argued that the discreet promotional role of the engineers in the Scottish Office behind the scenes in the last two decades (especially in relation to the Loch Lomond and Loch Bradan schemes) would have ensured an uninterrupted supply to the bulk of Scottish industry, although (depending on the location and severity of the drought) new developments in Fife and the North East might not have been able to cope, it is inconceivable that supplies from Loch Lomond, the largest inland water body in Great Britain, would not have been forthcoming. It is true that the provisions of the Drought Act 1976 apply in Scotland, but they are never likely to be used. If the reserves of the Tay are further developed as a water bank or strategic reserve after those of Loch Lomond have been allocated, this happy position will continue, though questions arise over the suitability of the present administrative structure to meet this challenge well in advance of need. For the moment, it is sufficient to note that A Measure of Plenty placed great emphasis on future sources which, because of their location and scale, will require co-ordinated, co-operative action by regional councils to ensure that the most economic and efficient development of remaining major sources and to facilitate the adoption of strategies involving conjunctive use. Now that the slack created by inflexible distribution systems is being, or has been, taken up, strategies involving the conjunctive use of sources offer scope for further advances in efficiency, though inter-regional co-operation is essential if they are

to succeed.

Now that the balance of economics appears to have swung in favour of river abstraction schemes provided that some kind of regulation occurs upstream so that the powerful fishery and other riparian interests have no grounds for complaint (see Chapter 12 below), an adequate minimum flow to safeguard their interests having been maintained, development of new sources may require, for the first time, some close co-operation between electricity and water authorities. Abundant as the significant water resources are, they are not so extensive that options such as the Rivers Doon and Earn can be left to one side whilst water supply agencies allow the pattern of operations developed to suit electricity boards go unchallenged.

River abstraction raises another, and in many ways the most far-reaching, implication for water management in Scotland. The development of the Forth or Clyde options would have required, for the first time, some close co-operation between water authorities, sewerage authorities and river purification boards. It is indeed unfortunate that recent changes in the consumption trends appear to favour the Tay or Earn for here, as with Loch Lomond, there is little interference with water quality management. Unless the improvement of river quality can be demonstrably tied to the need for further water supplies the objectives of water quality management are left in a limbo of aesthetic values so long as levels of quality so low as to induce the outbreak of public nuisances are avoided. Water quality management in Scotland has suffered greatly in comparison to water supply management because of the lack of any coherent set of objectives or any sense of urgency

because wider, important social goals, such as economic growth, have never been threatened by deficiencies in policy in this direction. The disjointed development and fragmented nature of policy with respect to water quality in Scotland is the subject of the next three chapters and these issues raised in this concluding chapter concerned with water supplies are returned to in the concluding chapter in the light of the experience of England and Wales (Chapter 13).

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5. SDD, Measure of Plenty, *ibid*, p.19.
6. SDD, Measure of Plenty, *ibid*, p.20.
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11. CSWDB, Water for Central Scotland, *ibid*, pp. 65 - 88.
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13. CSWDB, Water for Central Scotland, *ibid*, pp. 119 - 143.
14. CSWDB, Water For Central Scotland, *ibid*, p. 127.

15. CSWDB, Water for Central Scotland, *ibid*, p.88 (Tay); p.118 (Forth); p.143 (Clyde).
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CHAPTER 9The Evolution of the Scottish System of Pollution Control

The development of law with respect to the control of water pollution in Scotland is traced in this chapter. At its core lies the Rivers (Prevention of Pollution)(Scotland) Act 1951, but in marked contrast to policy in respect of supplies of clean water no clear stance is apparent on the part of Central Government. Although outlined in its essence many years before by enquiring committees, the appropriate institutional structure pertaining to pollution of Scottish rivers and coastal waters was not fully operational until the late 1960s - some thirty years or more after the basic problems of pollution control had been identified.

When the prospect of the reform of local government as a whole (the subject of the following chapter) overtook consideration of individual policies, the law and institutional arrangements with respect to water pollution control in Scotland had yet to reach a state of full fruition. A decentralised structure for the single purpose of controlling pollution was recommended by committees examining the problem in the 1930s and the 1940s and established throughout the 1950s. But two deficiencies remained in the circle of control: the extension of regulatory powers to 'existing' discharges (those in existence in 1951) and the matter of the rights of traders and manufacturers diverting their discharges from rivers to treatment works operated by local authorities.

In the first part of this chapter the findings of the Scottish

Advisory Committee on River Pollution Prevention, the Committee on Scottish Health Services, and a sub-committee of the Scottish Water Advisory Committee are considered. It is clear that the latter's proposals owe much to its predecessor and the progress of these, insofar as they were enacted in 1951, is then traced (although a detailed evaluation of the response of local authorities responsible for the treatment of sewage and the working of the river purification boards established by virtue of the Act is held over for review in Chapter 11).

In the second part of this chapter the role of the (English) sub-committee of the Central Advisory Water Committee and the Hill-Watson Committee in completing the circle of control is examined. Of the three components of pollution control - the law of control, provision of sewers and sewage treatment by local authorities, and disposal of trade wastes - confusion over the latter two remained until relatively recently. This confusion of purpose, arguably, damaged the efforts of river purification boards only marginally less than difficulties over the allocation of a satisfactory level of expenditure to the improvement of sewage treatment by local authorities given that there was (and is) little pressure to improve water quality for purposes of providing public water supplies or fostering economic growth in any other way.

Levels of public expenditure began as, and remain, the regulating factor in the operation of the system for controlling pollution. Well aware of this, Central Government has exhibited no anxiety to intervene, again, in marked contrast to the history of

policy with respect to water supply. Indeed, Scottish ministers appear to have been content to follow developments in England and Wales, albeit at a somewhat laggardly pace and in a partial manner.

Background to the Appointment of the Scottish Advisory Committee on River Pollution Prevention

In 1929 sewerage and sewage treatment were purely local concerns. The Department of Health for Scotland (DHS) had no powers of intervention other than acting as the authority of last resort to ensure that the basic minima of service were being provided in all localities according to the law. But by this date the seeds of change had been planted just as surely as was the case for water supplies.

The Scottish Advisory Committee of Rivers Pollution Prevention (ACRPP) had been appointed in 1928:¹

'to consider, and from time to time report to the Scottish Board of Health predecessors of DHS] on the position with regard to the pollution of rivers and streams in Scotland, and any legislative, administrative or other measures that appear ... desirable for reducing such pollution'.

The appointment had been made by way of direct response to representations from the British Waterworks Association and the Salmon and Trout Association. Several suggestions for changes in the law had been made over preceeding decades but little action taken, not least with respect to the recommendations of The Royal Commission on Sewage Disposal, made in 1915.²

The Royal Commission had published the view that the offence of pollution with respect to sewage should become the act of

discharging below the requirements of a prescribed standard, this to be prescribed either by statute or by Central Government and subject to modification by Central Government at least once every ten years.³

In England and Wales the Minister of Agriculture and Fisheries had appointed a Standing Committee on River Pollution in 1921. No similar body had been established in Scotland but the Scottish Board of Health had made an investigation of the extent of pollution of rivers by means of a questionnaire survey of local authorities and District Salmon Fishery Boards in 1922/23. The findings were as follows:⁴

Table 9.1 Types, Causes and Instances of Pollution reported in 1922/23

	<u>No</u> <u>Treatment</u>	<u>Unsatisfactory</u> <u>Treatment</u>	<u>Insufficient</u> <u>Treatment</u>	<u>Defect not</u> <u>Stated</u>	<u>Total</u>	<u>%</u>
Domestic Sewage	360	101	39	38	538	61
Trade Effs	179	43	55	65	342	39
Totals	539	144	94	103	880	100
%	61	16	11	12		

Clearly domestic sewage was the chief cause of reported incidents. The three categories of causes may be interpreted as: situations where no works had been provided; situations where works had been provided but these did not perform satisfactorily; and situations where works could not work satisfactorily because of inadequate design or overloading. Whilst the latter two remain the routine concern of pollution control officers the former dominated in

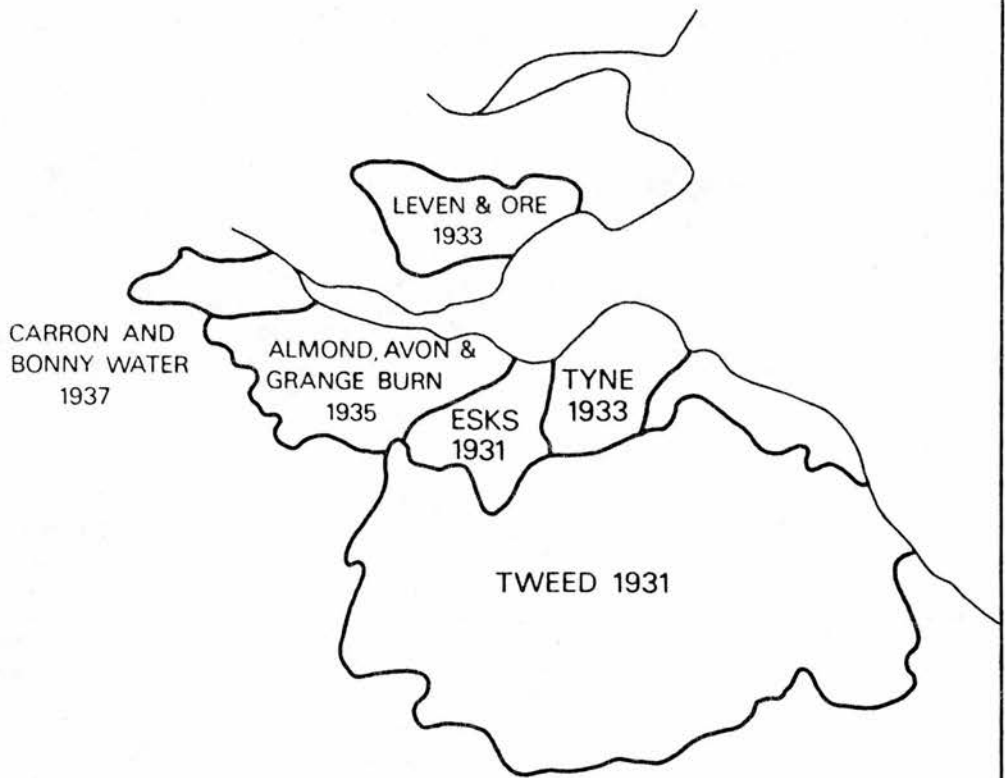
1920s and 1930s. A major task of local authorities in the 1930s was the provision of facilities for the first time. Some examples of the task are given in Chapter 11 below.

ACRPP Investigations

The Scottish Advisory Committee used the overview gathered in 1923 to select typical rivers for the study of the kinds of pollution present, the extent to which preventative measures had been taken and the administration of the Rivers Pollution Prevention Act by local authorities, all with the aim of formulating a comprehensive policy for general application. It intended to look at the Tweed first, then the North Esk and then the Forth Estuary (see fig.9.1).

Their first report concerning the Tweed was published in 1931. The survey of 1922/23 had shown the principal sources of pollution to be domestic sewage and woollen mills, respectively accounting for 54 and 23 of the 88 cases reported. Waste disposal arrangements made in all of the 16 Special Drainage Districts in the landward part of the basin failed to prevent pollution, and in seven of these there was no provision for treatment of any kind. Neither had six of the nine burghs made any arrangements, whilst those made by the other three were insufficient. The County Council and the burghs had a duty to enforce the Rivers Pollution Prevention Act but in fact these local authorities were themselves serious polluters. ACRPP made the general recommendation that the respective local authorities be urged to install and maintain in good working order works to remedy the existing pollutions and suggested that such works might reasonably be included

Figure 9.1
Scottish Advisory Committee on Rivers
Pollution Prevention : Reports



in the local authorities schemes of work for the unemployed. The trade wastes of the woollen mills could be treated and evidence put before ACRPP suggested that this would be most practicable in combination with domestic sewage. Other authorities should follow the lead of the burgh of Galashiels where the problem of trade wastes pre-dated the construction of a municipal scheme of sewerage and purification in 1908. From the first, trade wastes had been admitted to this, subject to the manufacturers paying a proportion of capital and maintenance costs equal to the proportion of trade waste running through the system. A similar arrangement had been made in Hawick in 1923 although pollution problems remained here as the purification works had not yet been completed.⁵

In fact, the works were not completed for another 25 years. Shortly after ACRPP's report Hawick Town Council altered the existing works that gave primary treatment and engaged consultants with regard to the provision of full treatment. Plant of various types was tested between 1937 and 1953, at which time a second set of consultants were called in. These reported that the previous tests were irrelevant and instituted more tests between 1954 and 1956. A full scale scheme was designed and approved in 1956 but a further year was lost in negotiations between the council and local traders over the latter's share of the cost.⁶

The treatment of domestic sewage and woollen wastes arising in and from the Burgh of Selkirk was most unsatisfactory. The Burgh was situated entirely on the right bank of the Ettrick Water. The left bank opposite the Burgh was within the jurisdiction of Selkirk County

Council and they could have taken proceedings in respect of pollution at that point. Representatives of the County Council admitted that they were fully aware of the pollution coming from the Burgh but had never taken action against offenders. When asked why not they replied:⁷

'because of the friendly relationship existing between the County Council and the Town Council'

The vice convenor added that he strongly deprecated one local authority taking proceedings against a neighbouring authority or against offenders within the jurisdiction of a neighbouring authority.

Perhaps because of this attitude, there had been a general failure among the local authorities to discharge their responsibilities under the Rivers Pollution Prevention Acts. This was to some large extent because the authorities concerned had also been the public health authority responsible for sewerage and were accustomed to perceiving pollution only in terms of it being a threat to public health.

ACRPP echoed the view of several witnesses that central government should be given power either to compel local authorities to discharge their duties with regard to pollution or to institute proceedings themselves. It had also been suggested to them that the administration of the 1876 Act by one river board would be desirable. Such a board should include representatives of manufacturing interests, fishing and angling interests, landed interests and amenity interests, as well as representatives of local authorities.

A procedure existed under existing legislation for the formation of joint-boards but the process was so cumbersome and protracted that it was hardly surprising that nowhere in Scotland had it been initiated.

In the certain event of opposition, the procedure might involve both promoters and objectors in very considerable expenditure, and ACRPP added that a joint board would merely bring together representatives of the authorities who, in the Tweed Basin, at least, had hitherto done practically nothing. They intended to return to the whole problem of administration in a later report but the problems which had to be addressed were clear at this early stage in their work.

Committee on Scottish Health Services investigations

The principal emphasis of local authorities with respect to sewage lay in the field of public health and this attracted the attention of the Committee on Scottish Health Services. They found that, whilst the cities and larger towns had reasonably adequate sewerage, in many other parts of the country the position was unsatisfactory. A memorandum submitted by the Sanitary Inspectors Association summarised the situation:⁸

'Progress in providing proper drainage facilities for the towns and villages in Scotland had not been so marked as is the case with water supplies. Many rural areas are without drainage due to the heavy cost involved in providing it. In such areas sanitary progress is consequently at a standstill. In a number of towns and villages the sewers are inadequate to deal with the volume of sewage they are required to carry, and the sewage works are of antiquated design and incapable of dealing efficiently with the sewage. Here again the cost is the obstacle which prevents improvements being carried out'.

Clearly the difficulty in many areas was to get waste water into pipes no matter what happened to it after that. The Health Committee felt that the rural authorities should be expressly bound to provide all necessary sewers for the drainage of the district in the same way as town councils of burghs had been required to provide

them under the Burgh Police Acts.

The problem of sewage disposal lay in its cost: efficient purification or other sewage disposal works and their maintenance exceeded the cost of the rest of the service. In some areas disposal was by means of trunk sewers to the sea (not subject to any law of pollution control). This could be satisfactory provided the outfall was far enough out to sea, but in some cases, there was a danger to public health caused by sewage washed back by the tide. The Committee wished to see the design and location of sea outfalls made subject to the consent of DHS.⁹

An example of the sort of difficulty that occurred was reported by DHS in 1931. Dunbarton County Council intended to divert 22 discharges of crude sewage to the River Leven by means of an intercepting trunk sewer leading to the Clyde. Representatives of the Loch Lomond Angling Improvement Association were concerned over the effect of the concentrated discharge on the passage of salmon and approached DHS. The Department had no power to interfere in the matter and the project was delayed whilst the anglers took the matter through the courts.¹⁰

As with the water supply, the Committee had been impressed with the multitude of small schemes in operation where larger schemes covering wider areas would have been more economical, more efficient and more easily maintained to a high standard. The Royal Sanitary Association had again summarised the position:¹¹

'It is to be regretted that greater advantage has not been

taken of opportunities to combine for drainage purposes, particularly on the part of authorities along the course of rivers and large streams. The adoption of separate schemes by each authority in areas suitably placed for the introduction of trunk sewers to the sea or to centralised purification works has resulted in capital expenditure being incurred which would have gone a long way in meeting the cost of regional schemes. The chief advantages of regional schemes are (1) The provision of an outfall to tidal waters or the provision of large and efficient sewage purification works; and (2) the prevention of pollution of rivers or streams and the comparatively low cost of management as compared with individual schemes. Where individual schemes have been carried out, it is difficult to depart therefrom and embark on large regional schemes on account of the capital expenditure already incurred.'

The Committee felt that some machinery should be devised whereby a local authority should be required to consult DHS before launching on any capital expenditure, as in England where authorities were obliged to obtain the consent of the Ministry of Health. With this provision DHS, on receiving an application, would consider how far it would be wise for the local authority to proceed independently and how far it ought to provide the service in combination.

Existing law with regard to rates lay at the root of many local inadequacies. Under the Burgh Sewerage Act 1901 the limit of the rates that may be levied in burghs for water and drainage was 4/- in the £ and in counties the Public Health Act 1897 limited the level of special rates for water and sewerage together to 3/-. Authorities could apply to DHS for permission to exceed these figures and 106 had done so, but it was clear that figures prescribed so long ago as 1897 and 1901 were inadequate.

Wallace has suggested that the period 1929-39 saw a 'massive leap

forward' in the treatment of sewage in inland areas: this was as much due to the provision of unemployment grants as any increase in consciousness with respect to pollution on the part of elected representatives and municipal engineers.¹³ The Commissioner for Special Areas attached great importance to the improvement of sewerage and sewage disposal works. Between 1934 and 1939, over £2.5 million was spent on schemes qualifying for assistance. Although each scheme assisted had to pass the test of urgency on public health grounds, the result was frequently enhanced attractiveness of an area to industrialists.

The Commissioner was instrumental in the construction of an Irvine Valley trunk sewer serving Kilmarnock, the three small burghs of Galston, Newmilns and Darvel, and no less than ten special drainage districts in North Ayrshire. In 1939 he was pleased to report that, in collaboration with a number of local authorities, substantial progress in freeing the Upper Clyde estuary from risk of pollution by sewage and industrial waste. The first significant move towards cleaning up the Clyde was taken by Glasgow Corporation in 1894. Two years later a conference of local authorities upstream of the city was convened by Lanark County Council to consider further steps. Since then 78 purification schemes, costing over £6 million, had been undertaken and 25 of these had qualified for grant. Lanarkshire was singled out for particular praise by the Commissioner for Special Areas but a sewage treatment works for the Burgh of Renfrew, an area including several new industrial estates, had also received a grant and a scheme by Paisley Town Council was the largest and costliest to be undertaken. An end to the discharge of raw sewage to the coast was

in sight. In fact¹⁴

'the problem would probably have been completely solved by this time if trade conditions on Clydeside since the war had been better, and if the difficulty of securing suitable sites had not been so acute'.

As a result of his close involvement in such projects the Commissioner had several comments and recommendations to make in his last pre-war report. Three facts were outstanding: the extent of discharge of raw sewage and untreated industrial waste; the primitive systems of disposal operating in some special districts and an almost complete absence of any attempt at combination by local authorities.

On the latter point he felt that the time had come for the government to take steps to ensure that any scheme for the construction of main trunk sewers and sewage purification works did not proceed until DHS had examined the scheme to see if it could be combined with other works to serve a wider area.

ACRPP Recommendations

DHS was aware that there was a need for change. After the publication of the Health Service Committee's report the department asked ACRPP to present a report dealing with any alterations in the law they considered desirable. This they did in 1936. The evidence received and the inspections made had convinced ACRPP beyond all doubt that a drastic change in administrative arrangements was necessary.¹⁵

'After fully reviewing the whole situation we feel that time has come when the problem of rivers pollution prevention should be dealt with on a much broader basis than hitherto, and that, wherever practicable, comprehensive schemes should be adopted whereby large sections of the country would be

brought within the scope of these schemes. Convinced that the solution of the problem lies in the administration of the law by a joint body and that, ... this end would not be attained by joint committees as can be constituted under the existing law, we have given careful consideration to the constitution of an alternative body. In our opinion, effective action could be taken by a River Board representative of all local authorities within the area of the water shed, together with representatives of the following interests - industry, land, fishing and navigation. The sole duty of the Board would be to ensure that the rivers within its area were not polluted, and experience has shown that a comprehensive or composite body of this nature, having one set purpose, is more disposed to see that the work entrusted to it is actively and efficiently undertaken.'

Present practice was unfair: some local authorities had spent very large sums of public money purifying the sewage from their districts while others on the same river had done little or nothing. Some industrialists had recognised their obligations while others had not. Many traders or farmers were unable to use the polluted water as it came to them. Fishing interests, including the commercially important salmon fisheries, had been seriously prejudiced and, in some places, completely destroyed.

A ten point plan was submitted: ¹⁶

1. DHS should define groups of catchments for the purpose of exercising control over pollution, including tidal waters.
2. A River Board should be established for each of these areas.
3. The Membership of Boards would reflect all interests in the rivers of the area; a majority of members would represent the local authorities of the area.
4. DHS should prescribe national standards of purification; these could be modified by individual Boards to meet local conditions as was thought appropriate.
5. All dischargers to rivers would have the legal duty to observe the standards laid down.
6. Each local authority should be required to prepare a scheme for ensuring that the rivers of its area were not polluted. The

authorities should have a statutory duty to consult each other in the preparation of such plans with a view to co-operative action.

7. The River Board would endeavour to co-ordinate the content and implementation of such plans to ensure that the most efficient and economical scheme would be devised for the area.
8. The River Board should appoint River Inspectors and other professional staff to superintend the implementation of the law and supervise the completion of necessary remedial work by the River Board in the event of a failure on the part of an offender to carry these out.
9. The expenses of the River Board would be met by requisitioning the local authorities within its area.
10. Each River Board should publish an annual report outlining the status quo and the achievements of each year.

ACRPP also wished to see the application to Scotland of the proposals which were about to be enacted in the Public Health (Drainage of Trade Premises) Act 1937 for England and Wales. Briefly, these sought to impose on local authorities the duty to receive trade waste waters into public sewers subject to certain safeguards and to confer on traders the right to demand a connection to public sewers.

ACRPP continued to investigate conditions on tributaries of the Forth and a report on the Forth and estuary was in draft at the outbreak of war. It was never published. Unlike the recommendations for change in the water supply service, the proposals for River Boards were not adopted in the National Water Policy of 1944. ACRPP's report was acknowledged but the government were not satisfied that the time was right for a move in this direction, bearing in mind the amount of work that had to be done in improving sewerage and sewage treatment.¹⁷

¹⁷The Government are satisfied that improvements with regard to the administration of the Rivers Pollution Prevention Acts in Scotland are necessary, but having in view the

different conditions prevailing there, it has yet to be determined whether these improvements can best be achieved by the setting up of river boards or in some other way. The Secretary of State accordingly proposes to open discussions on this question with the Associations of local authorities and the other interests concerned at an early date.'

The matter was referred to a subcommittee of the Scottish Water Advisory Committee (the Broun Lindsay Committee hereafter referred to as 'Broun Lindsay') on its formation in 1946 and over the following four years this body sent questionnaires to all authorities responsible for pollution prevention (counties and large burghs), and to District Salmon Fishery Boards, repeating the Scottish Board of Health's exercise of 1922-23. This enquiry coincided with the implementation of the Rural Water Supplies and Sewerage (Scotland) Act 1944 and assessments of the drainage of districts made as an essential part of post-war planning.

The context of a new law of pollution control: (a) Rural grants

While practically all landward communities of any size were served by public sewers of some sort, there were smaller villages where the only systems had been privately installed and there were still a large number of homes served by dry closets. Many sewage treatment works were overloaded and improperly maintained. DHS, in a similar fashion to their work with respect to rural water supply, had devised schemes of sewers and treatment works.¹⁸ The recommendations of the Royal Commission of Sewage Disposal had been taken as the standard, when deciding the nature of treatment required. Generally, sewage treatment works (STWs) offering more than primary treatment were recommended for communities of over 500 people whilst sedimentation

alone or septic tanks would suffice for smaller communities. Almost all county councils had schemes under consideration, but, as with water supply, a shortage of labour and materials limited the pace of progress. Developments in Dumfriesshire and Aberdeenshire were typical.

The distribution of settlement in Dumfriesshire limited the scope for regional drainage schemes. Instead the County had 40 separate schemes estimated to cost £193,000. Each served a single village and consisted of a system of main sewers intercepting existing private drains and leading to a small treatment works, ranging from septic tanks to filters. STWs were grouped for purposes of sludge collection by road tanker. Unusually, the sludge of rural Dumfriesshire was being converted to compost at a central depot.

A similar pattern applied in Aberdeenshire where fifteen villages were provided with sewerage and an STW where no facilities had existed before.¹⁹ The County experimented with composted sludge in 1952 but abandoned the process in view of its cost (said to be around £13 per ton) and inferior quality as compared with farmyard manure. Instead, sludge was dumped in disused quarries with other refuse. Aberdeenshire had scope for regional schemes: the outfall from three communities on the Lower Dee, the contents of only one of which had received any treatment, was intercepted and led to join the City of Aberdeen's sewerage system which in turn led to a sea outfall without treatment.

Finally on the matter of grant-aided rural schemes of sewerage

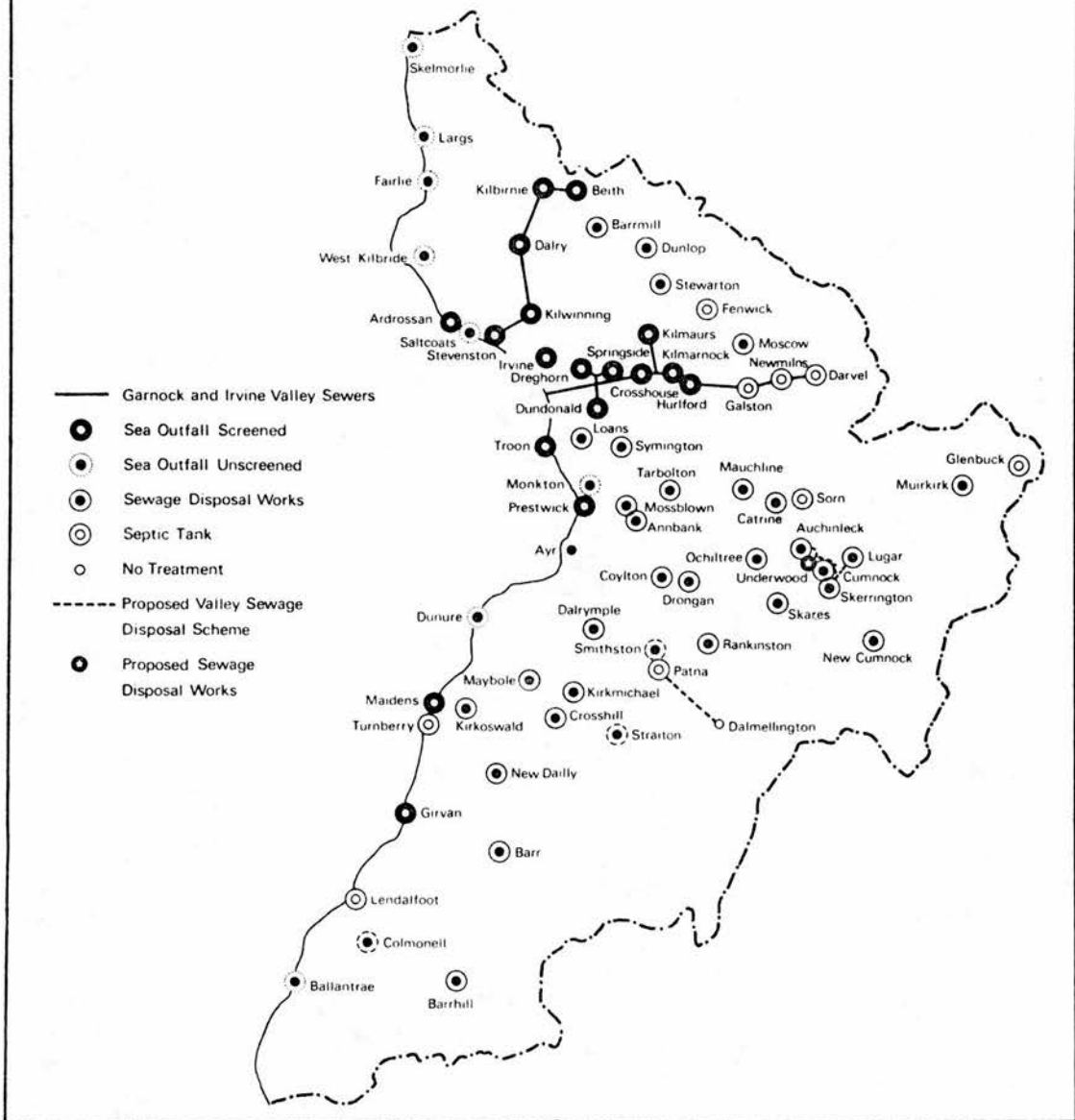
it is interesting to note that water and sewerage schemes were not always co-ordinated. Caithness benefitted from Government grants for regional water supply in the 1950s. The landward area of the County had had virtually no sewers before 1934. As piped water supplies were improved, consumption increased and so did the need for proper waste disposal facilities but it was not until 1961 that a start was made on new sewerage systems and STWs for the twenty villages in need of them. ²¹

(b) Post-war plans

In view of the large-scale developments in prospect in the post-war years the picture of sewerage obtained by the Clyde Valley Regional planning team presented a serious problem: systems were generally inadequate to take an increased volume from new housing schemes and improved sanitary arrangements, let alone industrial development. In nineteen of the thirty-two burghs there was no reserve capacity and in half of the drainage districts in the counties the position was the same. The study team noted the progress made before then was in the grouping of schemes and recommended that the Secretary of State should afford assistance to secure the grouping and integration of drainage schemes. ²²

In Ayrshire there were fifty-two Special Drainage Districts varying in rateable value from £540 and £130,000, each provided with its own sewerage system although a number of regional schemes had been completed or were in progress in 1953, viz. in the Garnock Valley, the Irvine Valley, the Lugar Valley and the Doon Valley. The importance

Figure 9-2
 Methods of Sewage Disposal in Ayrshire 1953



of these works is apparent in Figure 9.2 as is the strategy of disposal to the sea. Clearly a considerable amount of work was required in Central Ayrshire.

Ayrshire was one of the better counties: Turing in an independent survey in 1949 said:²³

'Thirty years ago industrial waste and domestic sewage had converted many (Ayrshire rivers) into something approaching open sewers, but of recent years a great improvement has been seen. The credit for this is due primarily to the energetic action of the Ayrshire County Council officials who have taken up the case of pollution with skill and address and have schemes for improvement in operation or in hand which will go far towards restoring to these beautiful streams something of their former purity. One main valley sewer, on the Irvine, is already in operation and others ... are planned for construction as soon as labour and materials are available.'

Lanarkshire County Council's officials were also praised for being 'commendably active' but attention was drawn to unnecessary pollution at Hamilton:²⁴

'for some unexplained reason the government has refused to allow the necessary expenditure on a full scale treatment plant and incredible as it may seem, the sludge is actually being passed into the river. The absurdity of such a state of affairs seems hardly to need comment.'

Turing was writing on behalf of the British Field Sports Society in the fourth of a series of reports on pollution which it was hoped

'will go a long way towards opening the eyes of all to the terrible things which are happening to our rivers today.'

It was clear that the law of pollution required a complete revision but it was also feared that the heavy programme of post-war legislation would mean that a considerable period would elapse before a Bill could reach the statute book. Broun Lindsay, therefore, came

to its task with growing public pressure at its back but a substantial backlog of expenditure on sewerage and sewage treatment around the country to the fore.

Committee on River Pollution Prevention in Scotland

Broun Lindsay published its conclusions in October 1950.²⁶ It confirmed ACRPP's view that the Rivers Pollution Prevention Act 1876 was ineffective; it lagged behind 'present day opinion' and was 'far short of present day needs'. Central Government, by refusing permission to proceed with prosecutions, had informally ruled that local sewerage authorities could not be prosecuted and these were responsible for most pollutions.

Since pollution moved with the stream, it was impossible for one authority to keep its part of the stream clean if the authority upstream was neglecting its duty or was permitted to escape it. Authorities who had made a considerable effort, such as Lanarkshire, complained that they had lost control of stretches of river as other authorities (large burghs) expanded their boundaries. Efforts to control pollution had proved ineffective partly because the law was inadequate and partly because the units of its administration were too small and too fragmented.

In their own defence the Association of County Councils had complained of inheriting on local government reform in 1929 'an unsatisfactory duty at an awkward time'. Since then councils had been 'preoccupied with other urgent matters'.²⁷ There had been an economy

drive, followed by preparations for war and the war itself, all of which had slowed down or suspended progress on many schemes of sewage purification.

The representatives of other organisations, however, had been unanimous in advocating wider areas of administration. Quite apart from anything else, the importance of salmon fisheries on Scottish rivers warranted 'source to sea' control. Representatives of angling and fishery interests all pressed the adoption of ACRPP's suggestion of single-purpose river boards.

The 1876 Act was clearly out of date; it had not kept pace with developments in sanitation, with scientific research or with 'new ideas of planning and the location of housing and industry' or the 'claim of the community generally to share in the country's natural heritage', of which clean rivers were an important part. With the development of modern methods of treatment, there was no real excuse for pollution from domestic sewage; the problem was one of providing appropriate and adequate works. Trade wastes were less easily dealt with, but great progress had been made. Effluents from paper mills appeared to be the only ones for which no economic form of treatment had so far been devised. It was technically possible to adopt the rule that pollution need be tolerated from existing industry only if the best practicable and available means of treatment had been provided. For new industrial developments a solution for any potential problems of pollution should be found early on in the process of planning. Pollution should be avoided as a matter of routine. Where efficient treatment was practicable the law should provide a

workable code for its enforcement by responsible authorities and where it was not, industry should be required to use as efficient a means of treatment as possible. An essential part of any workable code would be the derivation of standard definitions of adequate purification.

The Royal Commissions of 1872 and 1898-1917 had suggested general standards, but neither set of recommendations had been given legislative sanction (although the latter had influenced all subsequent approaches to the problem). Their work had been continued from 1926 by the Water Pollution Research Board that had been established in England under the auspices of central government. Progress had been such that the Broun Lindsay Committee now thought that a general code of standards could be devised on the basis of seven simple tests, so that an offence of 'pollution' could be defined. The tests would cover the oxygen absorbing capacity (B.O.D.), the pH value and toxicity to fish (and their food chain) of the effluents concerned. In addition, the extent of suspended solids, the presence of immiscible liquids (such as oil) and the colour and the temperature of the effluent should also be taken into consideration.

These tests could be applied once full knowledge of the flow and regime of a river was available. Knowledge of pollution levels and the availability of clean water for dilution at the appropriate places at all times were also required. A system of general standards was felt to be possible, but it would not be adopted until the rivers had been fully surveyed. It was also recognised that such surveys could not be complete for some time after any new system of controlling

authorities was established.

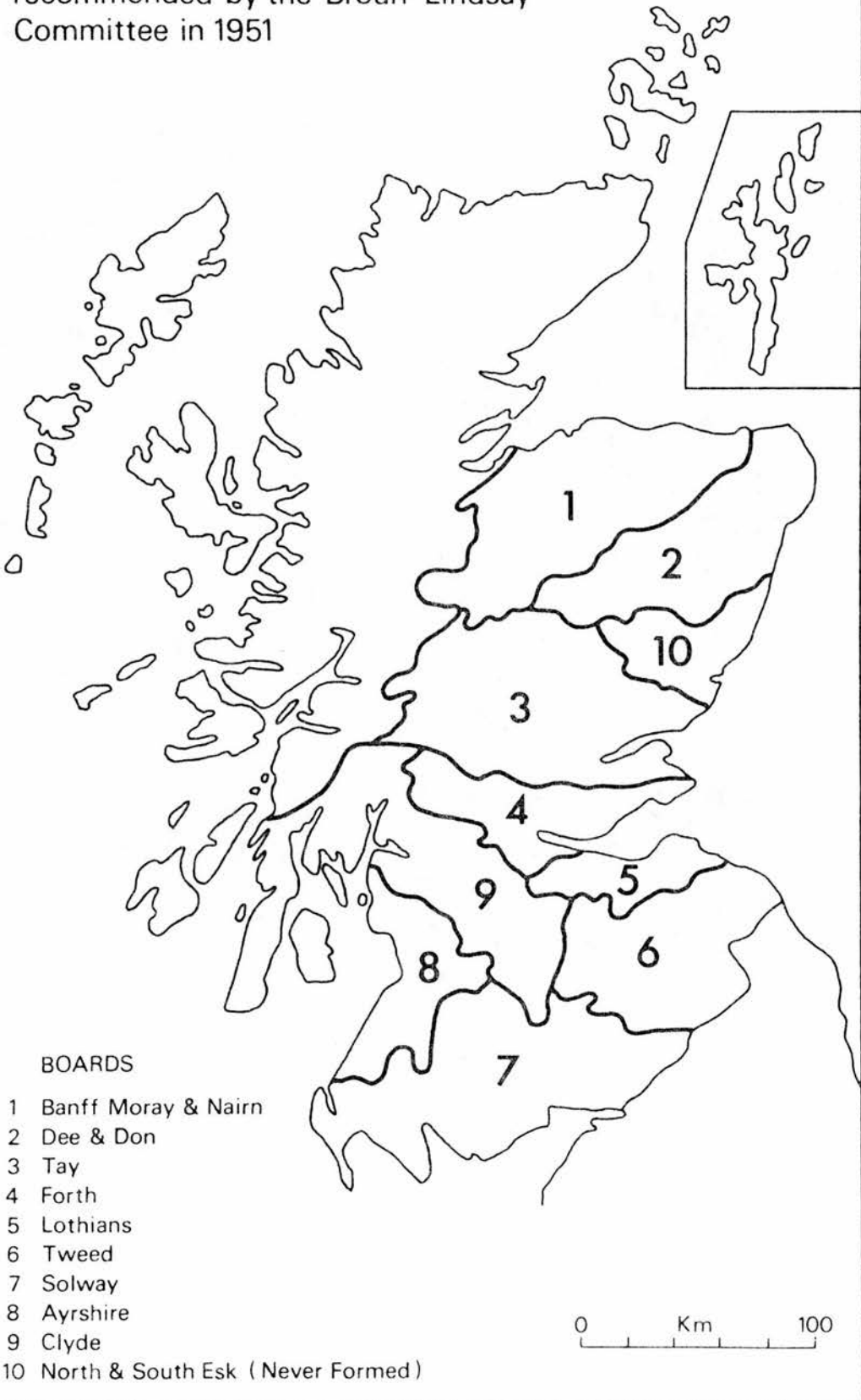
Perhaps more important, however, was the question whether such standards could be fairly applied. Discussion on this point largely revolved around the question of who should set standards. The principal 'pressure group' seeking an improvement in the code of pollution prevention, The Scottish Rivers Protection Council, felt that standards should be prescribed by the Government, presumably because it recognised the difficulties that might arise through local authorities having the dual and conflicting role for being responsible for the disposal of domestic sewage and setting standards.

The Council had been established in 1937 to press for the adoption of ACRPP's proposals, one of which had been the setting of general standards by DHS. Broun Lindsay felt, however, that instead of the Boards applying for permission to vary their standards according to local conditions, the procedure suggested by ACRPP should be reversed: River Boards should derive standards locally with provisions for their review by central authority where and when necessary. With this exception Broun Lindsay endorsed the proposals put forward by ACRPP fourteen years before. It then proceeded to define appropriate groupings of catchments and the detail of a new law more appropriate to the new concept of locally-derived standards.

The areas of the ten 'river purification boards' (RPBs) recommended by Broun Lindsay are depicted in Figure 9,3. It was believed that problems of pollution north of the line of the Highland Boundary fault were such that boards need not be formed. Local

Figure 9.3

River purification authorities recommended by the Broun-Lindsay Committee in 1951



authorities in these areas could enforce the new code. The RPBs would be made up of representatives from the existing authorities responsible for preventing pollution (county and large burgh councils) and representatives of special interests such as agriculture, fisheries, industry and the landowners. The new boards should have the services of River Inspectors who would be suitably qualified and have considerable experience in the operation of sewage purification works.

The new river purification authorities should be given powers to make bye-laws prescribing standards, i.e., the minimum standards with which waste waters and other effluents discharged into rivers must comply. Bye-laws would be subject to confirmation by the Secretary of State and would follow the normal procedure for all local authority bye-laws except that manufacturers and others would be given ample time to consider the implications of standards and their possible effects on works and processes. The Secretary of State would hold a local enquiry into any objection received from these interested parties. After bye-laws had been confirmed by the Secretary of State it would no longer be necessary to obtain his consent before proceedings were taken against an offending industry.

In the interim period, whilst the bye-laws were being formulated, new discharges would require the consent of the River Purification Authority and that consent could be made conditional. There should be a right of appeal to the Secretary of State against the refusal of consent or conditions attached to it.

Tidal waters, including estuarial and coastal waters, should be controlled up to a half mile from the shore. The existing provisions relating to proceedings should be simplified, although arrangements for a pre-prosecution hearing should be retained by giving persons involved one month's notice of intention to take proceedings and an opportunity to appear in person to show why proceedings should not be taken.

It was one thing to examine the position and produce a set of recommendations. It was quite another to get the new system adopted. There was, in the context of post-war reconstruction, a great deal of goodwill but, would there be sufficient Parliamentary time to effect the proposals?

The Rivers (Prevention of Pollution)(Scotland) Bill in Parliament

Fortunately, the Broun Lindsay Committee had their enthusiastic supporters amongst Members of Parliament. Soon after publication of their proposals Mr. McKie (member for Galloway) promoted a 28-clause private member's Bill in an attempt to have them adopted. This was subsequently taken up by the Government of the day although it was said of the Rivers (Prevention of Pollution)(Scotland) (No.2) Bill (which became the Act of 1951) 'like its partner for England and Wales, we might not have had it but for the very narrow balance in the present Parliament, and the necessity of keeping the House of Commons, so far as possible, on work of a non-controversial character. But, it is an ill wind that blows nobody any good, and the people of England and Wales and of Scotland are going to benefit, and nobody

really minds the reason for their benefitting so long as they do
benefit'.²⁸

In the course of the subsequent Parliamentary debate a number of points were made identifying subsequent issues. These are outlined below to give an impression of the prevailing views on river pollution prevention at that time.

All three local authority associations opposed the setting up of ad hoc authorities for pollution control purposes. They did not object to the inclusion of non-local authority interests but they wished to retain the function in the existing authorities. In the passage of the Bill through Parliament, however, several M.P.s took the view that, while they would normally be against the principle of transferring powers from elected authorities to ad hoc bodies, this case was an exception. Prevention of pollution was not purely a local authority matter, and industry and others had vital interests that could best be accommodated by an ad hoc body rather than by co-opting representatives to local authority committees, as some had advocated.

Many people were sceptical over the retention of a majority of membership for the representatives of local authorities; for example, Mr. Woodburn (Clackmannan and East Stirlingshire) said that the new boards would be composed of the very people responsible for polluting the rivers. This seemed to him very much like 'appointing a butcher's conference to promote vegetarianism'. He hoped the Secretary of State would play an active role in encouraging action.²⁹

Mr. Stewart (East Fife) put the local authority view: 'the further a function is removed from the present authorities and centred in ad hoc bodies, the less impact does local opinion have on the administration of that function. Persons nominated by a local authority for membership of an ad hoc body act on a different status from persons nominated by a local authority to a combination (joint-committee). In the former case they act purely as members of the ad hoc body with no particular responsibility to their local authority, whereas in the latter case they have a definite responsibility to put forward, or at least 'air', the views of their local authority'. It would be more democratic to combine local authorities into joint committees compulsorily. In response to earlier taunts that the local authorities were concerned about the issue because they had a vested interest in doing nothing, he stressed that local authorities had not taken action in the past because legislation had been inadequate.³⁰

Colonel J.R.H.Hutchison (Glasgow Scotstoun) was concerned about the damage an 'over enthusiastic' river board might do to local industries if it tried to impose too high a set of standards. 'If too great a burden is placed upon industry, we threaten to bring about the unemployment which it is the purpose of all of us in this House to avoid'.³¹ He thought the evolution of a workable set of bye-laws would be very complicated. They would presumably prescribe standards of purity. The same purity could not be expected in one stretch of a river, or indeed at one time of the year in a river, as was the case in another. He thought it would be easier to set a permissible amount of pollution for each discharge individually and that this was what would actually happen under the Bill because of the difficulty of

setting 'across the board' standards. If the attempt was made to set a standard for a particular stretch, that standard would either be set so high that not all discharges could achieve it, or else so low that those who could achieve a higher standard would neglect to do so.

Mr. T. G. D. Galbraith (Glasgow Hillhead) was worried about the principle that the proposed boards would be responsible both for defining the offence of pollution and for taking action against offenders, especially when a majority of the members would be local authority representatives who would be interested in keeping the standard as low as possible; for if it were too high they would have to do something about the sewage for which their authority was responsible. He would have preferred that standards be established by an outside body, perhaps the Secretary of State. Captain Duncan (South Angus) was also concerned to see 'the chain of command' properly organised. 'Who is to supervise the policemen?' he asked. In his view, the success of the Bill would depend entirely on the method of approach and the keenness of the individual boards.³² He was not sure that the Secretary of State should have a supervisory role because, at the end of the day, the Bill would stand or fail on the extent to which the Government gave permission for capital expenditure in order that local authorities might bring their disposal of sewage up to date. 'If nothing can be done because of a restriction on capital expenditure, then nothing else we are trying to do here will have the slightest effect'.³³

Whilst the majority of the Broun Lindsay Committee had recommended that all tidal waters should be brought under control, the industrial

representatives on the committee had opposed this. The Government adopted a compromise course. The Bill included provision to extend control to the Forth and Clyde estuaries, by an order of the Secretary of State. The Secretary of State thought a Bill that ignored these two estuaries 'would fail to tackle the very crux of the Scottish pollution problem'. However, the necessary capital works could be undertaken only over a period of years and it would, in any event, take a very long time to complete surveys, decide standards and determine where relaxed standards may be allowed, so that the application of the Bill to tidal waters would not be immediate. 'We have to remind ourselves that our heavy industries, our polluting industries, in the main are on tidal waters for the very simple reason that the sea was the place in which to discharge their effluents'. It would take some time before those industries could deal with their effluents to conform to any standard of the kind envisaged by the Bill.³⁵

The Rivers (Prevention of Pollution)(Scotland) Act 1951

The Act implemented most of the recommendations of the Broun Lindsay Committee: the bye-law system for defining offences of pollution; the interim consent system; and the river purification boards. The new code of pollution prevention altered the balance of power among existing interested parties concerned with keeping rivers clean and added some new groups. The angling interest achieved a more formal and influential role through potential membership of River Purification Boards by appointment of the Secretary of State. The fishery interest (largely the salmon fishery proprietors, both commercial and private) also appear to have achieved their aims. District Salmon Fishery

Boards would be represented where appropriate, but (probably more significantly) the new Act replaced the anti-pollution measures of the Salmon Fisheries (Scotland) Act 1862, in effect transferring the costs of taking action from the fishery proprietors themselves to the public purse. The agricultural and landowning interests became involved for the first time. Industry, although losing some of its formerly extensive rights of appeal, could now, through representatives on the boards, advocate the case for reasonableness on the grounds that there was no alternative or that the best practicable measures were already being taken. Furthermore, the procedures for appealing against consent conditions and the standards set in bye-laws substantially preserved the key rights of individual industrialists.

Of all the existing interests the greatest losers were perhaps the local authorities. The new structure operated against the interests of individual authorities by instituting arrangements that made it possible for advocates of cleaner rivers to isolate any local authority that had a strong vested interest in taking a soft line towards any new investment that was regarded as necessary. Although such local authorities had many other matters competing for their attention and funds, it was now possible for an individual local authority to be outvoted on a matter of effluent standards, so that it would have to divert resources to improving the purification of sewage. The only saving grace was that all local authorities were in the same position, so that members from other authorities could well understand and sympathize with a colleague who felt that his authority's programme of investment could not accommodate expenditure on treatment of sewage at that particular time.

Although he was charged with the general duty of promoting the cleanliness of Scottish rivers, the role of the Secretary of State was principally that of an arbitrator, settling disputes concerning bye-laws, relaxations and consent conditions placed on new discharges. He was also to superintend the establishment of the purification boards, although local authorities were expected to do much of the work themselves. It was they who would determine the detail of the administrative schemes and begin the process of information gathering, with the ultimate goal of producing standards for inclusion in bye-laws. The lack of any specific dates for the extension of control to the two estuaries or for the production of administrative schemes or bye-laws might suggest that the legislation as a whole was not expected to produce significant results immediately. The control of new discharges, however, would ensure that the position got no worse. In any event, through his control over borrowing to finance river gauges and the like, the Secretary of State could effectively determine the extent to which progress could be made towards the evolution of bye-laws, quite apart from his similar control over expenditure on sewage purification which would govern the likelihood of their having any good effect.

Unlike the Scottish Water Advisory Committee, the Scottish River Purification Advisory Committee was granted a two-way relationship with the Secretary of State. Not only could the latter put questions to the committee for its consideration but it was specifically empowered to make representations to him.

The most important addition to the network of interests, however,

was the creation of the corps of statutory river inspectors. For the first time a body of professional men would have the opportunity to make a career out of promoting clean rivers. They would have a day-to-day interest in making progress and would have the necessary expertise. Hitherto the problem of controlling pollution had been tackled on an emergency basis or incident by incident by sanitary inspectors who had many other duties to fulfil. Pollution would now become the full-time interest of specialists in that field.

The river inspectors would not, however, be the only officials with a voice, for one result of the concession to local democracy - allowing local authorities to draw up their own administrative schemes for the River Purification Boards - was that the other officials, notably clerks and treasurers, were mainly appointed from the ranks of the largest local authority in the RPB area, if only on a part-time basis. The clerk as legal officer could, nevertheless, influence the board on matters of interpretation of the 1951 Act and on whether a prosecution was likely to succeed or not, whilst the support of the treasurer with respect to borrowing and other financial matters would be necessary, if the information required for the formulation of bye-laws was to be obtained. Both these positions had considerable significance for the successful operation of the boards.

Closing the Circle of Control: trade effluents.

The successful operation of the RPBs was, however, frustrated by a significant loophole in the cycle of waste disposal: that of controls over the discharge of trade effluents to local authority

sewers. On the one hand, such discharges qualified the ability of local authorities to operate their treatment works properly if uncontrolled whilst, on the other hand, an obvious way of reducing direct discharges to watercourses was to divert such wastes to treatment plants.

Broun Lindsay had agreed with ACRPP that industry should be given the right to discharge to public sewers. In the context of the new pollution prevention code, however, this right might well have involved local authorities in a good deal of treatment of effluent, that had not previously been necessary. The question had therefore arisen whether or not industry should contribute to the cost of any modification of existing practices of disposal that were necessary to meet new standards. The issue was regarded as a 'separate but related matter' which could be dealt with by later legislation while surveys and the preparatory work towards the bye-law standards were being done by the River Purification Boards. That being so, the Secretary of State could assure local authorities that the Rivers Bill, in the meantime, did not place any additional financial obligation on them for the purification of trade wastes.

The case for a general right for industry to discharge into local authority sewers had been argued by the Royal Commission on Sewage Disposal (1898-1915) and the Scottish Advisory Committee on Rivers Pollution Prevention (1936) and had been granted in England and Wales in 1937 by virtue of the Public Health (Drainage of Trade Premises) Act. Some local authorities in Scotland had made provision for the reception of industrial waste in local Acts, most notably

Lanarkshire and, in practice, there was said to be no difficulty in the larger urban centres. The general adoption of this method of disposal had now been recommended by Broun Lindsay, because it was necessary 'if the public demand for cleaner rivers' was to be effectively met. There was a feeling that local authorities could handle and treat trade wastes more satisfactorily at a central point than could individual industrialists at the point of origin. Not only would treatment be more economical but it was likely that supervision would be better. In addition, duplication of sewerage and sewage treatment could be avoided.

The Rivers (Prevention of Pollution)(Scotland) Act 1951, however, had not included this recommendation because any new diversion of industrial effluent to local authority sewers would have the effect of making the ultimate outfall of the sewerage 'an altered discharge' and therefore subject to the same control as new discharges, that is, subject to the 'consent with conditions' procedure. The Secretary of State foresaw that, in order to comply with either the bye-laws or with the conditions attached to the 'altered discharge', local authorities might have to subject the contents of their sewers, including these trade effluents, to a degree of treatment that was not at present necessary. The question therefore arose whether, and to what extent, industry should bear part of the additional costs incurred in meeting new standards.

It was therefore decided to refer the matter 'for urgent consideration' to a committee consisting mainly of representatives of the local authorities and of industry (the Hill-Watson Committee).

Its remit was 'to consider on what conditions, and subject to what financial arrangements, industry should be given a right to discharge trade waste waters and effluents into local authority sewerage systems; and to make recommendations'³⁶.

Committee on the disposal of trade effluents

The Hill-Watson Committee first met in July 1951, but its report, was not published until April, 1954. It concluded that it would be inequitable to expect local authorities to shoulder the responsibility and cost of a duty to receive effluents without qualification. Any duty would have to be accompanied by the right to demand notice of a trader's intentions, to refuse to admit certain substances, to lay down that reception was conditional on certain requirements being met and to make charges where appropriate.

The Committee thought that the English Public Health (Drainage of Trade Premises) Act of 1937 would form a sound basis for Scottish legislation but it questioned whether so elaborate a set of provisions was actually necessary. In particular, the Committee thought the bye-law system was too restrictive and inflexible and that another system, such as that of conditional consents for each case, could better deal with local differences and problems. An account of experience in England and Wales on operating the Act had been furnished by the Ministry of Local Government which noted, in particular, that the powers for making bye-laws had in fact been inoperative.

Bye-laws also had the defect of being difficult to alter to take

account of changing conditions and, in view of the great variety of cases with which local authority would have to deal, the Committee thought that terms and conditions for the reception of new effluents should be fixed case by case and by agreement between the industrialist and the authority.

Under the procedure the Committee suggested a trader would have to notify the local authority of his wishes. On receipt of this notice the local authority would be required, within a specified period, to let the trader know the terms and conditions on which it would be willing to receive the proposed effluent and, failing agreement on these terms and conditions, the trader should have a right of appeal. Most of the Committee took the view that this appeal should be to the Secretary of State but some members thought that all appeals should go to the courts.

Where there was disagreement on financial terms between traders and local authorities, individual cases would have to be decided by the Secretary of State or other court of appeal laid down by statute. The Committee's view was that a local authority would be required to show how the proposed fees related to this expenditure incurred, although this did not mean that a local authority could charge only if works had been carried out and expenditure incurred as a result of a trader's application. A charge could equally well be made that related to the cost of works already carried out, account being taken of the proportion of the system that would be occupied by the trade effluent. Local authorities would thus be able to take account of expected industrial development and income from this source when

planning new facilities. It seems fairly clear, however, that the Committee did not intend that any system of charges would ever be set at a level that would encourage industry either to recycle its own wastes or to develop processes producing effluents that were less potentially polluting.

The Committee was well aware that the policies adopted by local authorities were likely to take a quite different form. Local authorities frequently encouraged traders to enter their districts by giving free facilities for sewerage disposal. It believed that, if the power to charge traders for the disposal of effluents was granted, this might eventually be regarded as a source of revenue which they had no right to forego. Ratepayers might challenge any action to give free facilities. On the other hand, the Committee did not wish to force local authorities to charge, since it might be undesirable to bring about this change and suggested that the statute should be framed so as to leave open (in clear terms) the option of providing a free service.

The Committee reported in April 1954 but in the light of difficulties of financing public expenditure and a slow rate of progress in establishing the new river purification boards, the matter lay dormant for a further ten years. In all, over thirty years were to pass before ACRPPs recommendation in this respect was put into practice (see The Sewerage (Scotland) Act 1968 below).

Implementing the Rivers (Prevention of Pollution)(Scotland) Act 1951

Broun Lindsay had said that the exact representation of local authorities on each board (which authorities held how many seats) should be a matter for the local authorities themselves to decide; but, having been defeated over the form of controlling authority, some at least, it seems, were not over-anxious to proceed with the formation of the new boards. By 1954, three years after the passing of the Act, five of the ten boards suggested by the Broun Lindsay Committee had been formed, viz., Tweed, Solway, Ayrshire, Lothians and Banff, Moray and Nairn. The Forth Board was established in 1955, the Clyde Board in 1956, the Dee and Don Board in 1957, while the Tay Board was not formed until 1960. One remained, the North and South Esk Board, but in 1961 the Department of Health announced that attempts to create it had been abandoned and that the county councils of Angus and Kincardine and the large burgh of Arbroath had been appointed as River Purification authorities for the area.³⁷

Second Thoughts on Bye-laws

Some Boards had not begun their work at all and most had barely begun when a sub-committee of the Central Advisory Water Committee in England and Wales was commissioned in October 1956 to examine several aspects of existing law, one of which was the definition of the polluting offence by contravention of standards fixed by bye-laws.³⁸ The making of such bye-laws had proved difficult and in fact none had been confirmed anywhere. On the other hand, the sub-committee had been informed that it had not been difficult to devise effective

conditions of quality for the great majority of new or altered discharges.

In each of these individual discharges, the type of effluent was known, as was its quantity and the consent conditions could usually deal with both quantity and quality. Bye-laws, on the other hand, had to be framed for all possible effluents and could contain no provision for controlling quantity. These differences, the sub-committee believed, were the root cause of the difficulties with bye-laws.

A second fundamental difficulty was more serious, in that there was 'less chance of it eventually being overcome'. It had been assumed that bye-laws would lay down limits of concentration of polluting matter which must not be exceeded, the concentration depending on the quantity discharged and the available dilution, but in any form of bye-law hitherto conceived the dilution factor had been absent. Any bye-law that did not accommodate available dilution would, unless it was revised frequently, either bear unnecessarily harshly on those who made small discharges or be disastrous for the river. The sub-committee concluded that, in general and for 'complete control with justice both to the discharger and to the river', progress could come only through the application of a procedure whereby river boards could consider each case separately and impose standards appropriate to that case.

The sub-committee was impressed by the successful operation of the system of consent conditions applying to new discharges, but discharges which might have been causing pollution for a very long time,

presented very different problems, for there was frequently no quick and simple remedy to hand. The sub-committee felt that 'a heritage of years of neglect can seldom be overcome except by patient work for improvement which inevitably requires time, and no useful purpose would be served by river boards imposing in respect of any existing discharge such immediate and onerous conditions that those responsible were quite unable to comply with them. Normally it could not even be contemplated to refuse consent outright in such cases'. What it had in mind was that a procedure essentially similar to the existing consent procedures for new discharges should be applied to old discharges, with the River Boards having the power to attach conditions to consents and to review and if necessary vary those conditions from time to time so as to achieve the maximum practicable rate of improvement. The adoption of this proposal would mean that no bye-laws would need to be made under the 1951 Act and relevant section of the Act should be repealed.

It would not always be practicable for the first consents for pre-1951 discharges to be 'in such terms as to produce the ultimate possible improvement', especially in the more polluted areas, nor would it generally be possible to proceed otherwise than gradually because of technical difficulties and the large number of discharges involved. The sub-committee felt that some consents would therefore have to be far less restrictive at first than the River Boards would ultimately want. Provision for a review of consent conditions would be needed which would allow boards to give some initial consents with very simple conditions 'where a holding control is all that is immediately practicable'.

In short, it had become clear that the system of bye-laws was not going to work, largely because a suitable range of general criteria was impracticable and the all-important dilution factor could not be adequately taken into consideration. Instead, the sub-committee proposed an extension of that part of the 1951 Act which had proved practicable, the attachment of conditions to consents for individual new discharges. Existing discharges, however, would have to be improved in an incremental manner, with more stringent conditions being progressively applied as more information became available and as it became possible to install technically improved means of treatment. In fact, the river purification authorities would have to deal with each particular case of effluent discharge on its merits rather than deal with each river as a whole.

These recommendations were taken up and, in England and Wales, bye-laws were abandoned and the control of effluents by making consent for their discharge conditional was extended to 'existing' discharges by the Rivers (Prevention of Pollution) Act of 1961 (applying to England and Wales only). The Scottish River Purification Advisory Committee argued for a similar extension in Scotland at the earliest opportunity and the Institute of Sewage Purification issued a memorandum on the urgent need for such additional legislation in Scotland: ³⁹ the law would apply to all discharges, not only the new. The following developments were cited in support of their case: the Loch Lomond scheme; abstraction of major water using industries; mounting abstraction of water for spray irrigation; improving standards of housing and hygiene; and an increased emphasis on amenities and facilities for leisure. By the goodwill and co-operation

of local authorities some success had been achieved in improving pre-1951 discharges but the result was piecemeal improvement and no co-ordinated programme was possible until the RPBs could set standards for all effluents entering a river. But it is a measure of the priority given to the control of pollution that the opportunity did not come until 1964 when the Rivers (Prevention of Pollution)(Scotland) Bill was presented to the Scottish Grand Committee. Again, legislation was introduced by a Labour Government with the narrowest of majorities.

The Rivers (Prevention of Pollution)(Scotland) Bill 1964 in Parliament

Mr. George Willis, the Minister of State said that the general result of the 1951 Act had been some improvement in the condition of Scottish rivers but the pattern varied markedly from locality to locality, with a noticeable improvement in some rivers and a deterioration in others.⁴⁰ He was, however, sure that the position would have been worse without the River Purification Boards. He seemed particularly pleased because 'the results achieved have come about through the co-operation of the boards with local authorities, industry and agriculture rather than by resort to the penal provisions of the 1951 Act'. In spite of this progress, it had now become evident that the RPBs required increased powers and that an extension of the consent procedure to existing discharge would be advantageous.

In the ensuing debate there was little dispute about the need to change the system; MPs seemed happy to follow legislative developments in England, though the debate differed markedly in tone from that in

1951. Gone were the traces of optimism and the opportunity was taken to bemoan the lack of apparent progress and to criticise the performance of the previous administration.

Many MPs saw the root cause of a lack of progress in the slowness of ministerial action, but the Secretary of State replied, that the delay in setting up the Boards had been due to difficulty in bringing all the parties together. Mr. Galbraith (Glasgow Hillhead), a prominent promoter of the original legislation in 1951, was disappointed in the impact it had made so far. As far as he was concerned, clean rivers and the prevention of pollution involved 'our whole sense of values': but 'quite frankly, because of that, I do not expect a very great deal to come out of this Bill'.⁴¹ He felt the RPBs had been afraid to withhold consents from big developments which could pollute rivers because employment in their district might be damaged. The Boards did not want to accept the responsibility for holding up or, perhaps, denying their areas new opportunities of employment. For example, a new coal pit at Killoch in Ayrshire had been allowed to go ahead although it had caused a flood of the most disgusting black water he had ever seen. He thought that the reluctance to be tough also stemmed from the composition of the RPBs, reflecting interests which might not be as anxious as they should be to see rivers really clean, because that could mean extra expenditure for local authorities or for industry, or even for farmers. He called on the Secretary of State to 'prod the (river purification) authorities on a bit'.⁴¹

Sir Myer Galpern (Glasgow Shettleston), on the other hand, argued

that the greatest factor in river pollution was the standard of sewage treatment by local authorities. Many disposal works had insufficient capacity and in some instances were dealing with as much as two or three times the flow for which they were originally designed. He thought that local authorities were anxious to approve capital expenditure on this score, but the Government would not allow them to spend what was necessary to bring sewage purification plants up to the required standards. 'This parsimonious attitude on the part of the Ministry towards sewage disposal is probably the biggest single factor today contributing to continued pollution'.⁴² He called for increased government grants to local authorities for the treatment of sewage.

Mr. William Baxter (West Stirlingshire, and a founder member of Forth River Purification Board) felt there was too much duplication of effort among local authorities on the purification of sewage, a situation which was not helped by a shortage of suitably qualified staffs, regional sewerage and sewage treatment schemes would solve many problems. He thought the Secretary of State had often taken far too long to come to a decision on schemes put to him by local authorities; indeed, Central Government may have deliberately delayed them, through control of borrowing powers. Even so, it was still very difficult to get local sewerage authorities to co-ordinate new purification plants with each other; too many authorities worked at problems only from their own point of view. He thought RPBs should take charge of sewage treatment.⁴³ In the same vein, Mr. Forbes Henry (Aberdeenshire West) felt that the title River Purification Boards was a misnomer. In fact, they had no powers to purify waters and could only give or withhold consents. RPBs should be given power to raise

finance to purify water where the problem was beyond the capacity of the local authorities involved.⁴⁴ He argued that there came a point on any river when the responsibility (for treatment) belonged to central government and not necessarily to the small local authorities which had cumulatively caused the pollution without in any single case producing an undesirable effluent. The purification of sewage could be a heavy financial burden for a small local authority. If an RPB were to be too vigorous in its requirements the cumulative cost of purification might amount to a substantial sum which could have an effect on the national economy as well as the economy of the area. The Secretary of State had a grave duty to advise and possibly control RPBs in this respect.

In summing up, Dr. J. Dickson Mabon, the Under-Secretary of State, agreed that progress achieved so far was disappointing.⁴⁵ There were three main reasons for this disappointment. First, local authorities had made insufficient progress in developing the sewage purification works that were necessary. The Secretary of State had just received a report from the Advisory Committee on this matter and was considering it 'as a matter of urgency'. Secondly, there had been the 'leisurely' pace with which the RPBs had been established, and, thirdly, the failure to implement the Hill-Watson Report. Its principle recommendations had a material bearing on the whole question of trade effluents and river pollution.

It was all very well to proclaim the desirable ends of clean and sparkling rivers 'but one must realise that there must be a practical balance'.⁴⁶ Industry was essential to Scotland and it would

be wrong to place obstacles in the way of new industry or to prevent established industries from prospering. 'A right balance' must be therefore struck between the needs of industry and the public's need for good amenities. Local authorities also had to strike a balance between the needs of investment programmes, not only in connection with sewage disposal, but in respect of housing and other spheres of social needs.

In response to suggestions that there should be an agency with the task of ensuring that the RPBs were applying themselves to the very different problems existing in different parts of the country, he suggested the Scottish River Purification Advisory Committee was a powerful and competent body 'which took itself seriously' and worked conscientiously to this end.

The Rivers (Prevention of Pollution)(Scotland) Act 1965

The 1965 Act should be seen as an adjustment of the original system of controlling pollution, introduced by the 1951 Act, in the light of practical experience. The system of bye-law controls was dropped as impracticable and the offence of pollution was now defined as contravening the conditions of consent laid down for each discharge individually by RPBs. Since all discharges were now to be made subject to this requirement, the procedure for appeals against consent conditions would have a greater significance and was accordingly spelt out in greater detail. The appeal procedure gave the Secretary of State an important new role. Applicants were given the right of appeal to the Secretary of State on any aspect of RPBs conditions and,

although an appeal had to be lodged within three months of the RPB setting conditions, these had no legal effect until the appeal had been decided. No time limit was put on the Secretary of State's handling of appeals.

The role of the River Purification Boards remained unaltered except insofar as they no longer had to look towards the formulation of bye-laws. They were to grant consents for the discharge of effluents as they thought fit, although the Act specifies that conditions should be related to the nature, composition, volume and rate of discharge of the discharge and to the provision of sampling and inspection facilities. The RPBs were empowered to review any condition when they wished although reviews should not take place at intervals of less than two years.

The 1965 Act thus confirmed the approach which had actually been adopted by the RPBs: each case was to be dealt with on its merits on the basis of what was reasonable at that place and at that time. The Secretary of State remained in the background with fairly extensive powers to review and define what could be considered 'reasonable' and to ensure that an over-zealous Board did not damage local industry or force a local sewerage authority into excessive expenditure too quickly. As the Minister said, 'there must be a practical balance' struck between the desire to see clean rivers, the needs of industry and the competing demands on the financial resources of local authorities.

Perhaps the greatest innovation brought by the 1965 Act was

the extension of control to existing discharges into tidal waters and the specific definition of 35 further controlled areas; but this, too, was a reaction to disappointing progress with the provisions of the 1951 Act relating to tidal waters.

Section 29 and Schedule Two of the 1951 Act had made provision for the extension of control over 'new' discharges to tidal waters and ultimately the formulation of bye-laws. Initially, the Act specifically empowered the Secretary of State to deal with the Forth and Clyde by Order but Controls could be extended to other areas if and when necessary.

Progress had been disappointing. The Order in respect of the Forth had come into operation on the 1st August 1960. A draft Order in respect of the Clyde had been published in January 1962. A public inquiry into objections to the Order had been held in September 1963 and the report of that inquiry received by the Secretary of State in July 1964. There had meanwhile been a change of government and the Minister of State told the Scottish Grand Committee in November 1964 that nothing further had been done about that Order, though an Order for the Solway Firth had been made in 1963. In fact the Clyde tidal waters did not come under control until 1970, although Mr. William Hannan (Glasgow Maryhill) had described the history of draft tidal water orders so far (up to 1964) as exemplifying a lack of enthusiasm and energy for pollution control on the part of central government.⁴⁷

The Sewerage (Scotland) Act 1968

Meanwhile the recommendations of the Hill-Watson Committee, which

had been published in 1954, were at last incorporated in legislation. The Labour Government (1966-1970) had intended to introduce in 1966 their proposals for a reform of the law on the provision of sewerage by local authorities and the rights of industrialists to discharge into these sewers, but the urgent and apparently unexpected need for legislation to reform the structure of the water undertakings in Scotland (by the Water (Scotland) Act 1967) delayed these plans for a further session. In introducing the Bill, the Secretary of State, Mr. Ross, characterised it as 'really a further step in our measures for modernising Scotland'⁴⁸. Although the 19th century Act that was about to be replaced had been useful, there were some irritating aspects in need of clarification. For example, there was no certainty over which authority should provide the sewers for new housing developments and practice varied from area to area and authority to authority. The basic problem lay in the fact that the expenditure of installing sewers to sites under development often had to be incurred several years before the sewers were required and before the local authority received any revenue from the occupiers of the development. The problem particularly applied to speculative private housing estates where several years might elapse between the state of building on any site and the occupation of the last house.

Mr. Ross felt that clarification of the position would help those trying to satisfy a need to expand the building of private houses. A more modern code of legislation was also needed to help local authorities plan ahead for the provision of sewerage to serve both private housing and industrial development. Henceforth, local authorities would have a statutory duty to provide sewerage, but while

this would help the process of planning new development (there being no room for debate on who should provide sewers), the Bill would increase expenditure by local authorities. In view of suggestions made to local authorities not long before, that they must exercise restraint in their spending, Mr. Ross intended to amend the Bill in committee so that it would not come into effect until a day appointed by the Secretary of State. In general, however, he felt that the Bill would make a useful contribution to the development of housing and industry in Scotland and of basic local government services.

Part one of the act, codifying the duty to provide sewerage, extended the existing practice of the larger authorities to the rest of the country whilst part two implemented the recommendations of the Hill-Watson committee and gave traders the right to discharge to public sewers subject to appropriate conditions.

Implementing the Sewerage (Scotland) Act 1968

Because restrictions on capital expenditure were in force, the effective date of introduction of this Act was postponed until a more appropriate time. It did not come into force until 1973, some thirty-seven years after ARCPP's recommendations. Furthermore, insofar as it concerned policy on trade effluents, the delay appears to have been even further extended because by 1973 the existing authorities were aware that they were to be re-organised in 1975 and seem to have postponed any innovative action because responsibility was soon to pass to new regional councils.

Part II of the Sewerage (Scotland) Act 1968 was apparently intended to complement the extension of control by RPBs to existing discharges. It was felt that a tightening of standards by RPBs would encourage industry to transfer its wastes to local authority sewers for disposal and the Act was intended to regularise and clarify the rights and duties of both parties in this event. Industries were given the right to request a local authority to receive their effluent although they had to be prepared to accede to certain conditions. Local authorities were also empowered to take over the running of a manufacturer's industrial treatment plants from which effluent was discharged to a river, (to ensure a higher standard of supervision), although no River Inspector has heard of any authority doing so. Although the Act was passed in 1968, it did not become effective until 1973. Implementation was delayed not only because of the financial implications, but also because local authorities needed time to build up appropriate staffs to meet the fairly heavy additional maintenance commitments imposed on them by Part I of the Act.

It would seem, therefore, that the Act was delayed because of the probable effects of Part One, although Part Two could have been self-financing because of the provisions allowing local authorities to make charges to recover the additional cost of receiving trade effluents. But many local authority members seem to have taken the view that the disposal of industrial effluents should be a free service so that the chances of industrial development being attracted to their area were not hampered. It is therefore unlikely that Part II of the Act could have been made effective before Part I without

involving local authorities in additional expenditure, even though this was a consequence of their own policy decision on making charges for the reception of trade effluents. Nevertheless, it seems fair to say that the lack of a clear legal picture as to rights and duties associated with situations where the pollution of rivers is prevented by diverting the offending effluents, through local authority sewers, to treatments works undoubtedly worked against the adoption of this solution, or at least made it much more difficult to adopt that it would otherwise have been, and hence delayed or hindered progress towards improvements in water quality. Furthermore, in this period of severe restraint in public expenditure, sewage treatment appears to have had a very low priority. The prevailing attitude of central government at that time (as in other periods of financial stringency) appears to have been that, while people could not do without wholesome water supplies, they could do without facilities for the treatment of sewage and tolerate polluted rivers for a few more years.

This principle appears to underlie delay in completing the circle of reform of pollution control by including powers and duties with respect to trade effluents by implementing the Act of 1968, as it does the extended period that lapsed before the recommendations of the Hill-Watson Committee were brought to the statute book. But this was just another manifestation of the conclusion that Central Government exhibited a marked lack of coherent interest in matters of water quality. The Broun Lindsay Committee largely reworked the conclusions of ACRPP and their recommendations came to the statute book almost by chance. Central Government was apparently unwilling to press their full implementation as is illustrated by the decision not

to force a river purification board for the Angus rivers, the extended delay in making a Tidal Water Order for the Clyde, and the four years that elapsed between the application of the consent control system to England and Wales over all discharges (in 1961) and the Scottish Act of 1965.

The difficulty lay in the treatment of sewage by local authorities although, in part, such delays related to the need for restraint in public expenditure and in part to the slow pace of innovation displayed by local authorities in establishing river purification boards. Underlying the inadequacies of the sewerage and sewage treatment services was the structure of local government as a whole, the reform of which forms the principle subject of the chapter that follows.

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CHAPTER 10Developments with regard to the control of Water Quality since 1965

The evolution of the Scottish system of pollution control was considered in the last chapter. In this chapter several influences are considered that amount to attempts to change that system. They have in common the fact that none were entirely the product of pressures immediately associable with poor water quality: enquiries were not undertaken and issues were not raised because of the condition of Scottish waters but rather because of legal and administrative developments in other spheres; specifically, the reform of local government and developments in the management of water resources in England and Wales.

Like the preceding chapter, what follows is in two parts, with, on this occasion, the conclusions of the Wheatley commission at its pivot. In the first part a paradox is considered: in the light of the (English) Water Resources Act of 1963, several river inspectors joined others in arguing for a wider role in the management of Scottish Water resources. Opportunities to do so came in the form of the Scottish Water Advisory Committee's enquiry into the water service in Scotland, considered in full in Chapter 4, and a Committee of Enquiry into Scottish Salmon and Trout, considered in greater detail in Chapter 12. But when the Royal Commission on local government came to take evidence, no-one wished to play an integrated role with respect to water management within the confines of a reconstructed system of local government.

The Wheatley Commission could see the advantages of managing water supplies, sewerage, sewage treatment and river pollution control all under the same roof and since the former two functions were constraints on strategic planning, this unit of administration was *perceived* as best placed in the context of the proposed regional councils.

Professional opinion then went rapidly into reverse and vehemently argued that pollution prevention must be separate from sewage treatment despite the fact that the two were to be combined in regional water authorities then proposed for England and Wales. It is clear that along with the water engineers (Chapter 5) and the fishery interests (Chapter 12), the pollution control people were most anxious to avoid direct control by elected counsellors. With the timely aid of the Royal Commission on Environmental Pollution the case was won and the Government withdrew its planned implementation of Wheatley's proposals.

In the second part of the chapter, administrative adjustments made to the system of pollution control in Scotland as a result of changes and pressures emanating from elsewhere are considered, those involved in the system having secured its perpetuation. Specifically three sets of pressures for change are reviewed. First, the opportunities of a reorganised and greatly rationalised structure of sewerage authorities are considered. Although it is too early to draw any firm conclusions, the trends revealed by regional reports produced by the Regional Councils and the overall picture displayed in national surveys of water quality and the trend of public expenditure with regard

to sewerage and sewage treatment are not encouraging. These issues are taken up in more detail in Chapter 11.

Secondly, the simultaneous reorganisation of the water industry in England and Wales engendered, amongst other factors, the Control of Pollution Act of 1974 with equally undefinable implications, as yet, for Scotland. The Act's principal potential impact would be (when implemented) on tidal waters and it is here that the third external influence also applies. A directive concerning the quality of bathing waters from the EEC has been made but its implications for the future policy of RPBs are, again, unclear.

The principal theme to emerge from the review of such diverse issues and events is, once again, the extent to which matters of water quality control are eccentric to water resources planning and consequently the essentially decentralised nature of much of Scottish water management with the need for a national perspective lacking and a distinctly low profile on the part of Central Government.

Quite a different view appears to have been taken by the embryonic group of professional water quality managers in their early days to whom attention is initially turned.

A Wider Role for River Purification Boards?

Almost as soon as river inspectors had established themselves several began to argue for a wider role in water management in individual papers and in evidence to committees of enquiry. The

Association of Scottish River Purification Boards and three individual Boards, the Clyde, Tweed and Solway, all made representations to this effect to SWAC in 1965 (see Chapter 4).¹ The Association stressed the role of RPBs in hydrological survey and in monitoring the quality of water, and argued that it should be formally recognised by allowing RPBs to be represented on the proposed regional water boards. This claim ran counter to SWAC's view that the regional water boards should be composed entirely of representatives of those local authorities which were to be requisitioned for the boards' expenditure, and that control of the operations of the new regional water boards should rest solely in the hands of the elected representatives and not be shared by other interests that had no financial responsibilities. The suggestion was therefore rejected.

The Clyde RPB pointed out that in the Clyde Valley, more water for industrial use was drawn from rivers and canals than was supplied by public authorities and that it was administering the necessary controls on quality so that in future upland reservoirs could maintain the flow of rivers in a controlled fashion to allow their maximum use for industry, agriculture, fishery and amenity. In oral evidence, members of the Board emphasised that they were exercising functions of river management and ^{were} anxious that this role should be recognised in any legislation on water that might be introduced. Specifically, the Board thought that RPBs should be consulted about all new abstractions (public and private); unless all abstractions were controlled, the work of local water authorities might well be prejudiced.

The Tweed RPB argued that public water supplies were only one aspect of the development of water resources and that all aspects of river management should be the responsibility of one authority covering entire river basins, although in oral evidence its witnesses agreed that it might be too early to take such a step. SWAC did not feel qualified to express an opinion on the merits of this proposal, which in effect involved the creation of boards with responsibilities similar to those of river authorities established in England and Wales under the Water Resources Act 1963. It could only comment that the serious competition for limited supplies of water, which was thought to have been a factor in the decision to set up river authorities in England, had no parallel in Scotland where *abundant* supplies were generally available. The question of creating authorities which would draw together all the interests concerned with water was outside its remit.

As was indicated in earlier chapters, SWAC's remit was concerned with the provision of adequate supplies of water to aid other development of industry and housing. To assure such supplies, the need for which was increasingly urgent if the Government's development strategy was to succeed, regional water authorities were required. It seems likely that the Government had no wish to complicate the process of reform by drawing in other interests and, by so doing, delaying progress in the long awaited reorganisation of water supplies. A proposal to introduce controls over private abstractions of water would change the nature of reforms in the water supply service from an adjustment of present arrangements which concerned the local authorities only, to a reform which significantly extended the degree

of public control over private riparian rights, and this might well have stirred opposition to such an extent that the benefits of rationalising the administrative structure of the water supply service might be seriously delayed.

A further chance to consider the possibility of emulating institutional arrangements in England and Wales came with the appointment of the Committee of Scottish Salmon and Trout Fisheries (the Hunter Committee). The committee's conclusions on the administration of fisheries were also published in 1965 and are discussed in Chapter 12.² The committee had examined the possibility of establishing river authorities in Scotland but did not favour such change in view of the opposition from fishery interests. The latter feared that they would be constantly out-voted on any multi-purpose authorities and that other interests would always take precedence. The committee firmly recommended that local fishery administration should remain separate from the administration of other aspects of rivers. It believed that the dangers presented to fisheries by pollution, water abstraction and land drainage were less serious in Scotland and thought that it would be 'a long step' from the existing partial coverage of Scotland by District Salmon Fishery Boards and River Purification Boards to a system of river authorities.

As far as the fisheries interest was concerned, the Committee suggested that river purification boards should use their powers to control pollution to ensure that all waters which sustained fish life continued to do so and it expressed the hope that some waters which had ceased to support fish might once again do so.

Nevertheless, the River Inspectors' calls for a wider role, particularly over abstractions of water from streams, did not go entirely unheeded. After a series of especially dry summers in the late 1950s it became clear that some sort of control over agricultural abstractions for spray irrigation in the drier, eastern parts of Scotland, might be desirable. New techniques of spray irrigation were expected to be increasingly adopted over large parts of Scotland. Legislation to control abstractions for such purposes was passed in 1964 in The Spray Irrigation (Scotland) Act even though the expected adoption of the practices had not materialised in the relatively wet 1960s. The Act authorised the Secretary of State to make an order empowering River Purification Boards to license abstractions for this purpose. Such an order could be made for specific areas at the request of the RPB which in turn should be acting at the request of the landowners concerned.

The Spray Irrigation (Scotland) Act 1964

Only the Lothians Board have attempted to implement it. In the early 1960s more and more farmers in East Lothian seemed to be taking an interest in the use of spray irrigation. The Lothians Board were anxious to prevent excessive abstractions in dry weather and to assist farmers to obtain an equitable share of the water that was available. The initial steps were taken to apply for an Order to control abstraction from the catchment of the West Peffer River under the Act in 1967, but strong opposition from farmers followed over what they saw as interference in their affairs and by 1971 formal approaches to the Secretary of State had not been made 'due to administrative delays'.³

The draft Order was eventually published in 1973 and was the subject of further objection so that it was not confirmed until 1975, nine years after its inception. With such a cumbersome procedure it is not surprising that other Boards have found it best to rely on voluntary agreements between the parties concerned.

The immediate fruits of pressure for a wider role in water management were therefore somewhat limited. The idea remained current, however, and was taken up with some enthusiasm by the Wheatley Commission on the reform of local government in Scotland. The background to the latter enquiry has already been considered in Chapter 5. In this chapter only evidence and conclusions concerning sewage treatment and water pollution control are considered.

Local Government Reform: (1) Evidence to Wheatley

The original White Paper of 1963 on the 'Modernisation of Local Government in Scotland' was not specific on the matter of water management but water supplies and river purification were both included in a list of functions thought best performed by the suggested 'top tier' authorities.

In written evidence to the Wheatley Commission, however, the Scottish Development Department (SDD) took the view that the existing organisation of pollution prevention seemed generally well suited to its task, with the boundaries of the River Purification Boards (RPBs) having been determined by topographic features to include the watersheds of the main rivers; a situation which was unlikely to suit any

of the other functions of local government.⁴

In oral evidence, however, an SDD witness was equivocal in response to a query whether existing RPB boundaries could be changed, saying that "there is a real difficulty between geographical and administrative desirability" though adding "we might be able to solve that in the end".⁵

In written and oral evidence on sewerage and sewage treatment, SDD expressed the view that valuable economies of scale would follow if these services were administered by much larger authorities than hitherto. Drainage generally followed the lie of the land and river catchments might therefore be thought of as the 'natural' areas to select for the purpose, but the staffs required for water supply and sewerage were interchangeable to some large extent. There would, therefore, be some advantage in allocating sewage management to the same agency as water supply. Facilities could be shared and this would to some degree alleviate the generally recognised problem of an unsatisfactory management of smaller works because of a lack of skilled supervision. SDD witnesses therefore thought that a combination of water and sewerage functions might be a more practical solution than a combination of RPBs and sewage authorities.⁶

The RPB was a prevention authority for the river basin and, while ideally a sewage authority for the same river basin might undertake the practical work of purifying sewage before it came into the river, that was a different type of function, requiring the same sort of staff as water supply.

The Commission asked why the water and sewerage services and RPBs should not be the subject of joint management, but was told that this was not possible for geographical reasons because water distribution systems did not coincide with the river basins.⁷ Thus SDD envisaged that sewerage might also go to the same ad hoc authorities as water (the Water Boards, see Chapter 5) but had no strong commitment to this view. 'If it were thought right to put sewerage into the first-tier multi-purpose authority, I would have thought this was quite sensible.'⁸

The Commission could not understand why SDD thought sewerage could more appropriately be associated with water supply than with river purification, for river purification and sewage treatment were surely parts of the same problem. SDD again replied that RPBs were enforcement authorities whilst sewerage authorities were practical treatment agencies. Sewerage authorities were not always efficient and that was one reason why RPBs were necessary. RPBs also included representatives not from local government but from interests whose livelihood was affected by what the RPB might require. This factor would make it difficult to include the work of RPBs within any new local authority structure.

The Institution of Water Pollution Control took the view that the physical pattern of future trunk sewers and sewage treatment works should be determined by topography rather than by local authority boundaries.⁹ The operations of autonomous local sewage authorities had given rise to schemes which, in retrospect, appeared unduly costly and restrictive. Furthermore, the law of the land was 'frequently being

disregarded both in action and spirit' and not only had the rate of improvement in the quality of many rivers been disappointingly slow but in places actual deterioration had taken place. Like the Institution of Water Engineers, the Institution was not impressed by the record of existing local authorities.

The lack of acceptable progress was almost certainly due to the inadequate response of many local authorities to problems rather than to any legal or other barriers to the solution of these problems. The failure of local authorities to recruit qualified staff to advise on these problems had added to the seriousness of the situation.

Combined schemes for sewage purification on either a regional or centralised basis were at present the exception rather than the rule. Proposed joint schemes often failed at the outset because of local jealousies and the success of such schemes might be illogically prejudiced by 'irrelevant or trivial issues'. Difficulties had arisen because of:

- 1) ineffectual agreements over trade effluents (through lack of specialist advice);
- 2) competition between local authorities for new industry, resulting in unsuitable siting of factories and subsequently difficult and costly problems of waste disposal; and
- 3) trade effluents that could have been accepted without difficulty at larger or centralised plants having serious effects on small sewage works.

River Purification Boards were often dissatisfied with the performance of existing plants resulting from:

- 1) unsatisfactory design
- 2) unsatisfactory management
- 3) inadequate capacity
- 4) failure to take remedial action.

The position was not helped by 'ineffective administrative procedures' and a 'cumbersome series of checks on decision making' associated with local authorities. There had been a general failure to provide specialised management and it was clear that the present structure of local government was unable to provide a generally satisfactory sewage purification service. The rating structure often led to financial difficulties affecting the design and implementation of new schemes, maintenance and technical supervision.

Failure was often due to competing demands on the administration of a multi-purpose authority. There was little electoral pressure on councillors in respect of sewage purification and the service was therefore neglected. The Institution suggested that a single-purpose authority was required which would provide and control all sewage treatment plant. A structure of single-purpose authorities responsible for large areas would be able to deal with maintenance much more satisfactorily, provide a better career structure and make the best use of the limited number of technical officers. Single-purpose authorities could also deal with the control of trade effluents discharged into sewers, bringing the benefits of scientific control and costing. Membership of the authorities should be on a similar basis to that of RPBs, with the majority coming from the constituent local authorities but also some members to represent special interests being appointed by the Secretary of State.

The Institution attached an appendix to its submission making it abundantly clear that there was a serious lack of specialist staff. Some of the biggest local authorities in Scotland, with complex waste treatment problems, had no I.W.P.C. members on their staff. Many authorities had no staff capable of negotiating trade effluent agreements and this had led to many agreements being formulated which were technically incompetent. The Institution had also surveyed the management of sewerage. Out of a total of 422 sewage treatment plants only 26 were the subject of control by a separate drainage department (17 of them in Midlothian); 416 works were under the control of 99 non-specialist officers. The Scottish River Purification Advisory Committee had earlier recommended that £50 million should be spent in Scotland on sewage purification in the next ten years.¹⁰

'Unless there are drastic changes in the management and control of local authority sewage treatment plants, these costly works are likely to be staffed by inadequately trained personnel lacking the necessary background for efficient operation, maintenance and trade effluent control'.

The Confederation of British Industry in Scotland supported this view, saying that the best way of spreading the burden of treatment costs, while at the same time obtaining the best results, would be through the creation of regional drainage authorities.¹¹ The Association of River Inspectors also favoured such a move, reminding the Commission that one of the reasons why RPBs had been created in the first place was that previous legislation had been administered by local authorities quite ineffectively.¹²

Thus, the Wheatley Commission heard evidence that suggested that the function of water management required special, ad hoc, units of

administration albeit in a variety of different arrangements. But, as emphasised in Chapter 5, ad hoc bodies were something that the Commission were determined to avoid in their reconstruction of the structure of decentralised public administration in Scotland.

Local Government Reform: (2) The Conclusions of the Wheatley Commission

In line with the general trend amongst professionals in favour of managing the whole hydrological cycle within the confines of a single structure of institutions especially in England and Wales, but without the benefit of any specific professional backing for their view, the Commission proposed that water, sewerage, river purification and flood control should all be direct functions of local government.¹³

The Commission was aware that this was 'a more robust line' than most of the witnesses had taken, but saw great advantages to be gained through planning the development of these services in combination with one another and with other local government services. Benefits would also follow the bringing together of the technical skills which the services required.

The Commission was also aware of practical difficulties that might arise. In a similar way to the 'added area' device for the administration of water supplies, administrative arrangements would have to be devised so that one local authority could look after another local authority's part of a river basin for purposes of river purification.

These conclusions were taken up and translated into firm proposals in the White Paper on Local Government Reform in 1971 and hence the Local Government Bill of 1973 contained a clause disbanding the River Purification Boards and transferring their functions to new regional councils.

Meanwhile, as this proposed change was first published, the Royal Commission on Environmental Pollution (RCEP) was examining pollution in some British estuaries, including the Forth and Clyde. It took evidence on the proposed changes and in 1972 published its view that the inclusion of the function of river pollution prevention within the remit of new local authorities in Scotland would be a retrograde step.¹⁴

While RCEP would have preferred to see independent authorities responsible for the whole water cycle, as then proposed for England and Wales, it took the view that the advantages of retaining river purification boards in Scotland as semi-independent ad hoc agencies would outweigh the advantages of integrated control under the aegis of local government, particularly since less emphasis was required in Scotland on the links between the control of sewage disposal and the control of water pollution so that additional water supplies could be taken from rivers.

RCEP had heard the Confederation of British Industry strongly argue the case for retaining RPBs, at first sight an unlikely source of support for the river inspectors. While the Confederation understood how the unification of sewage disposal and river purification under

the new regional authorities might be justified on grounds of administrative tidiness, local authorities had been consistently among the worst offenders and there was a danger that if they were again given responsibility for the control of pollution, there would be a considerable slackening in the rate of progress of control, even if the local authorities were the subject of increased statutory control by central government. It would also be unfortunate if the authorities responsible for controlling river purification were to lose the valuable contribution at present made by the Secretary of State's nominees as independent representatives of agricultural, fishing and industrial interests.

Thus, two separate Royal Commissions offered the Government conflicting advice on the matter of pollution control in Scotland. The more general, the Wheatley Commission, had reported first, but within a year of its recommendations being adopted these were criticised by the specialist Royal Commission on Environmental Pollution. In this context Government spokesmen found themselves in an invidious position but, apparently undaunted, J.W.Shiell, SDD's Chief (Water) Engineer, reviewed the Government's plans for the RPBs in a paper given to the Institution of Water Pollution Control's annual conference in 1972.¹⁵

He noted that the RPBs had succeeded, with the co-operation of the sewerage authorities and industrialists, in effecting improvements. He thought that much credit must be given to the patient and diplomatic way in which the river inspectors had carried out their duties. Since 1950, £100 million had been invested in sewerage and sewage treatment

and the rate of expenditure was now running at around £14 million per annum. In 1968, 85 per cent of Scottish sewage discharged to inland waters (or 35 per cent of the total discharge) was being given full treatment. Increasing attention was being given to the operational aspects of sewage treatment and in recent years SDD, the I.W.P.C. and the Association of River Inspectors had co-operated in running a number of short courses for the operators of sewage works. There could be no doubt that new regional authorities would be better equipped with much stronger resources of money, professional skills and manpower than existing authorities and so would be better able to deal with the problems confronting them. The proposed amalgamations of existing sewerage authorities would permit the promotion of regional drainage schemes and would eliminate the need for prolonged negotiations which hitherto had often been necessary before such schemes could even be investigated. Probably the greatest benefits would come through the ability of the new authorities to create a proper management structure for the control of water pollution, adequately staffed with qualified, fully-trained and experienced personnel.

Mr. Shiell was aware that the Government's proposals had their critics but after listening to all the arguments, he was not persuaded that there was any sound basis for many of the fears that had been expressed. In principle, the proposals in Scotland differed little from those that had received considerable acclaim in England. All functions relating to water, namely conservation, supply, distribution, sewerage, sewage treatment and water pollution control, would be performed by one authority in both countries. There was no reason to

suppose that, in the different needs and circumstances prevailing, the system in one country would be any less effective than that in the other. Neither was there any reason to suppose that adequate funds would not be available to enable the authorities on both sides of the Border to perform their function satisfactorily.

In the discussion that followed Mr. George Sharp (the Chairman of the Scottish River Purification Advisory Committee) could not share Mr. Shiell's enthusiasm for the forthcoming administrative changes. He was convinced that the decision to place both river purification and sewage disposal under the new regional authorities would in fact put the clock back in Scotland.

He expanded his views in an article in Municipal Engineering,¹⁶ entitled 'Scotland's water problems treated as second best'. The proposals of the Wheatley Commission were not, in his view, unified sets of proposals, designed with the best management of the water cycle in mind. The non-coincidence of boundaries would often make it impossible for a regional authority to proceed independently with river purification measures without having regard to its neighbouring region or regions.

The control of prevention of river pollution would not only cease to be in the hands of a single authority for each river, but would be exercised by two different types of authority (since the Local Government (Scotland) Bill had proposed that new outlets or new discharges of trade or sewage effluent made by the new local government authorities would be the subject of supervision by central

government).

There was no proposal to unify aspects of the water cycle by making special financial arrangements. The proposals were being opposed by both the RPBs and the Regional Water Boards which 'will be swept into limbo in spite of the good work they have done and the reasons for their formation in the first place (outside the structure of local government) are still patently obvious'.

The Government had said that the new regional authorities would have greater technical and financial resources. No-one was going to dispute that, but many people would doubt the willingness of these authorities to act urgently and spend on services, which were never seen by electors and candidates as 'vote catchers'. By way of conclusion he added, 'Local Government in Scotland must and will be reformed but I am not the only one who views with tremendous misgiving the singular lack of thought which appears to have been given to water supply and river purification'.

Pressure to reverse policy on pollution prevention

In the event, it was probably a successful campaign originating among the professional officers that prevented the creation of departments of water supply, sewerage and river quality within the Regions created by the reform of local government. Four lines of argument were stressed in an attempt to reverse government policy after the proposals in the White Paper of 1971 appeared in an unamended form in the Local Government Bill of 1973 in spite of the conflicting advice

of RCEP. First, there was past experience of the difficulty of getting local authorities to undertake remedial action. There was wide support for the view that the RPBs could assist local authority departments of sewerage to maintain a fair share of spending by retaining their status as external and independent bodies and acting as pressure groups. Elected members with a particular interest in environmental improvement would be able to argue their case more effectively if they could forcibly remind their colleagues that, unless something was done, the RPB might institute an embarrassing prosecution.

Secondly, the local authority sewerage departments, with which the river purification service would presumably be linked, were generally thought to be primarily responsible for the pollution that the river purification service was trying to eliminate. It was argued that one section was hardly likely to prosecute another section of the same department and fears were expressed that violations of the law would be 'covered up'. This anxiety was not universal, largely because there was the implication that members of the Scottish professions involved in sewerage and sewerage treatment either would not or could not perform their statutory duties and that elected members would be sufficiently lacking in integrity to prevent officers from performing their statutory duties. One river inspector (possibly significantly from a rural area and describing himself as a sufficiently 'big fish in a small pool' to get a good deal of assistance in his work from the local authorities in his area) strongly felt that an unwarranted slur had been cast on the sewerage authorities and that the mass of good work done by many authorities had been ignored in pressing this argument. He had written to the Secretary of State, when it seemed

likely that the campaign would be successful, suggesting that the views of the sewerage profession be sought. Unfortunately, many local authorities had not apparently any strong views on the question, probably because few had anyone specialising in the subject. After re-organisation, directors of water and sewerage, including the two sewerage directors, seemed to feel that it was a good idea to have separate RPBs on the basis of the 'police argument', believing that the public would not have any confidence in an arrangement whereby an authority set standards for its own adherence; but others pointed out that the 'police argument' was deceptive because many boards were unwilling to prosecute anyone, and existing arrangements which the campaign sought to retain already involved the elected representatives (the majority) on RPBs overseeing the operation of a department of their own councils and, if proceedings were being considered, they would still, in a sense, be prosecuting themselves.

Yet others pointed to the arrangements made by at least some of the English water authorities to meet this problem. These authorities had appointed 'water quality control panels', with the duty of reviewing the extent to which the standards set by the rivers pollution prevention division were being met by the sewage treatment division and the extent to which those standards constituted 'reasonable' requirements towards the general improvement of the river. Presumably such institutions could have been established in Scotland but no-one appears to have made this suggestion at the time, implying that those advancing arguments based on effective policing might have been more concerned with retaining the status quo than with the validity of the particular point itself.

Thirdly, it was agreed that river purification must be managed over whole river basins if problems of co-ordination between authorities were to be avoided, and difficulty was expected in matching the boundaries of river catchments with those of the new Regional Councils. This was a problem, however, which appeared less important *when* it was examined closely. What was essentially the same problem had been solved for 'source to tap' management of water supplies by the adoption of the device of 'added areas', and, in any case, non-contiguous boundaries were generally to be found in the unpolluted uplands. There was, however, a major problem over the control of the Forth basin, particularly its estuary, and this was aggravated by the subsequent amendment to the Local Government Bill to create the Fife Region. Administration of the prevention of pollution in the Forth had been split between RPBs, and straightforward transfer of the function to the proposed Central and South East Regions, would if anything have made the split more logical, with the Central Region dealing with the upper estuary and the South East with the lower. The creation of the Fife Region added a third authority concerned with the Northern half of the outer estuary and for the first time, *positioned*

the lower part of the Tay basin. Solving this problem would have required complex 'added areas'. Further, the system of shared control ran counter to a simultaneous recommendation from the Royal Commission on Environmental Pollution, that major estuaries should be the subject of unified control,¹⁷ and made the adoption of special arrangements of a joint committee type for East-Central Scotland almost inevitable. If the principle laid down by the Wheatley Commission had to be breached in this, the second most important area of Scotland, it was reasonable to ask why it should be observed elsewhere.

Finally, many professionals were concerned that the highly-regarded and 'useful' nominees to the RPBs, made by the Secretary of State to represent other interests, might be lost altogether. Lord Wheatley had been aware of the value of these people (he had taken part in the original debate of 1951), and the Local Government (Scotland) Bill empowered the regional authorities to make their own arrangements for the representation of affected or 'interested' parties. It may be that the lack of specific provisions in the Bill to retain this element in the system caused unnecessary confusion and provided an opportunity for some opponents to suggest that there might be no representation of industrial or other interests. This confusion was understandable, if unfortunate, since the Bill was, after all, primarily concerned with something else and the draughtsmen presumably envisaged that the SRPAC would subsequently be asked to consider exactly what specific arrangements should be made.

Many of these arguments had been advanced at the time of the original debate on RPBs, but the context of their exposition was quite different in the early 1970s. The RPBs had had at least a decade's experience and the full system of consent conditions had been in operation for five years. What was new and significant about their promotion on this occasion was that their most vociferous proponents were the 'children of the 1951 Act', the river inspectors and sympathetic chairman and board members.

The Local Government Bill in Parliament

When the appropriate clause of the Local Government Bill came

to the committee stage, an amendment to continue the system of RPBs (over new areas to be designated by the Secretary of State) was moved by Dr. J. Dickson Mabon.¹⁸ The arguments for it were fivefold and have already been discussed: first, the Royal Commission on Environmental Pollution had specifically recommended that the Scottish system of river purification be retained and that the function should not rest in the hands of local authorities; second, the RPBs have done a good job since 1965; third, Clyde and Ayrshire RPBs have been particularly vociferous in making representations to him; fourth, the boundaries of the new regional authorities would not coincide with river basins (especially the Forth); and fifth, local authority members would have divided loyalties as both pollution prevention authority and sewerage authority, a position that might not command public confidence. Many speakers reiterated similar arguments in favour of the amendment.

Only Mr. Hugh Brown (Glasgow Provan) spoke against it. He said that the pressure to retain RPBs did not come from electors or rate-payers, apart from one or two angling associations, but rather came from 'interested parties'. Industry was just as important a polluter as the local authorities. He felt the local authorities would manage the rivers well, especially if close liaison was established with amenity and angling pressure groups. It was well known that elected representatives were less effective on joint committees than when operating wholly within the local government structure.¹⁹

In the middle of the debate the Secretary of State announced that the Government was prepared to accept the amendment and it was accordingly adopted with only Hugh Brown voting against it.

Administrative Adjustments to the pattern of river purification
Boards in the light of a new structure of local government

The campaign was thus successful and the Scottish River Purification Advisory Committee was asked in October 1973 (with Mr. George Sharp in the chair), to consider the future organisation of river purification boards, particularly the areas of the new boards, the numbers of each board and the numbers of local authority members to be nominated by each constituent local authority. The Committee reported in 1974, so that a new structure could become effective at the same time as the new local authorities.²⁰

Although the performance of the existing boards had been 'uneven', the Committee considered that the existing structure had been reasonably satisfactory and that the RPBs had been able to bring about real improvements. This had not been easy because the RPBs had had to contend not only with the reluctance of local sewerage authorities to spend money on providing or improving treatment facilities, but also with recurrent situations of financial stringency 'when it seems to us sewerage and sewage treatment are among the first services to suffer cuts in capital investment'.

The evidence before the Committee revealed no unanimity of view as to how many boards there should be when the Local Government Act became effective. Some favoured a smaller number while others favoured no change. The case for a substantially smaller number of boards rested mainly on the grounds that smaller boards could not afford the staff and technical facilities required to do their jobs most effectively. This would be all the more so once the Control of

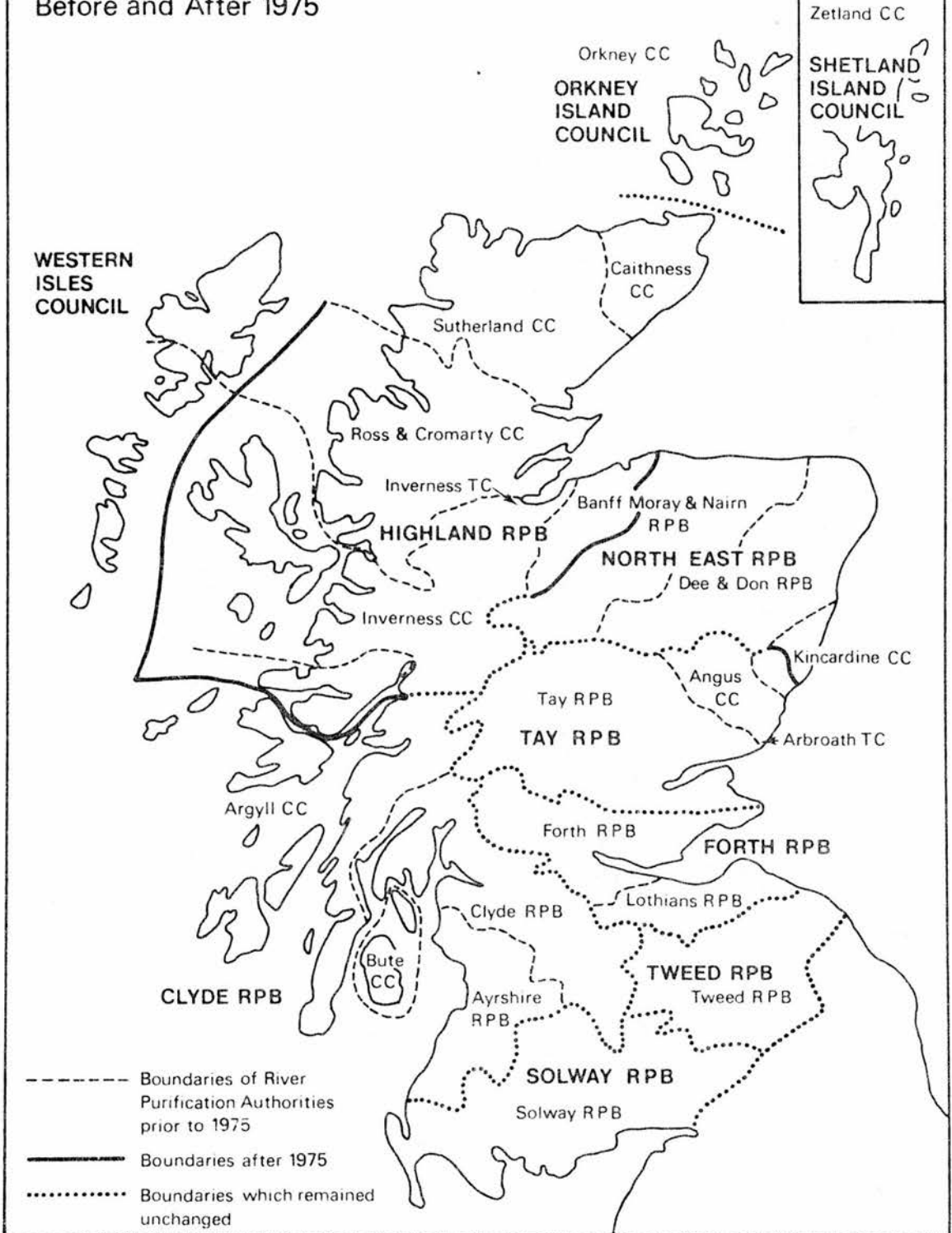
Pollution Act 1974 brought all coastal discharges under the control of RPBs, thus necessitating sophisticated marine survey equipment and additional expertise. According to this view, only a structure of three or four boards could meet the challenge (each having one of the cities as a major revenue base).

Those who favoured the existing pattern based their case on the disadvantages of large size. In their view, progress in dealing with problems of river pollution could best be made by continuing discussion and consultation with dischargers and creating large boards might throw away the advantages of local knowledge and advice at both member and technical officer levels. The local authorities felt that the new structure of RPBs should match as closely as possible the areas of the new regional councils. This would minimise difficulties with regard to representation and finance. They favoured, therefore, seven boards including one board for the Lothian, Central and Fife Regions (insofar as the streams concerned drained into the Forth). Everyone felt that the two major estuaries, the Clyde and Forth, should be the subject of unified control.

SRPAC agreed and recommended the new pattern of boards depicted in Figure 10.1, each being made up of one third appointees of the Secretary of State, one third regional council representatives and one third district council representatives. As the regional councils became the sewerage and sewage treatment authorities, this meant a significant strengthening of the pollution prevention interest as two-thirds of each board had no direct interest in the cost of improving sewage treatment works, although both industry and District Councils,

Figure 10· 1

The Boundaries of River Purification Authorities
Before and After 1975



of course, would have an interest in the level of Regional Council rates.

By way of recognition of the potential problems that might accompany the development of resources of oil and gas reserves under the North Sea and in the light of proposed developments for their on-shore use, a new river purification board for the Highland mainland was also established. The anomaly of local authority control over pollution prevention remains, however, in the Orkney, Shetland and Western Islands.

The re-organised pattern of RPBs came into effect from May 1975 on the basis of SRPAC's recommendations. All the major estuaries were brought under unified control and some satisfaction was expressed that the two (new) boards covering Central Scotland had a sufficiently secure financial base to support fully-equipped marine survey vessels and suitably qualified staffs (such as oceanographers) to service the whole of the east and west coasts. This was particularly important in view of proposals to extend controls to all tidal discharges contained in the Control of Pollution Act 1974 (see below).

But whilst the reorganised pattern of RPBs produced benefits in this direction, the real importance of the reforms implemented in 1975 lay in the reorganisation of the sewerage service.

Reorganisation of the Sewerage Service

Whereas the nature of problems of water supply had increasingly

and inevitably led to an inter-regional approach (at least in Central Scotland) and the regional unit of management was said to be 'right for sewerage', by SDD in evidence to Wheatley, reform and rationalisation of the sewerage service was considered for the first time only by the Wheatley Commission. The River Inspectors had taken the view in their evidence to the Commission in 1968 that parochial attitudes on the part of small authorities, particularly in Central Scotland, had all too often led to unnecessary duplication and there were apparently extreme examples where two authorities were building two separate works within sight of each other. By virtue of reorganisation, it was expected that sewerage authorities would have an improved capability to effect regional sewerage and sewage treatment schemes, and RPBs looked forward to more help in the prevention of river pollution from new regional directorates which were better staffed and better endowed with resources. Regional drainage schemes had been developing here and there since the war, particularly as a result of the recommendations of ACRPP, such as the Esk and Leven trunk sewer schemes, and in the light of stimulus of major developments, such as Livingston and Irvine New Towns. Such schemes, it was hoped, will be easier to initiate within the context of the regional councils.

In the immediate aftermath of local government reorganisation, most regional councils reported that their primary concern was taking stock of the inheritance bequeathed to them by their predecessors. Most reported a poor inheritance (especially outwith the immediate areas of Edinburgh and Glasgow) and most face the immediate problem of dealing with a number of treatment works which are currently dealing with loads far in excess of the levels for which they were designed.

This situation is said to have arisen as a result of a policy of 'industrial employment at any cost' on the part of many former local authorities. The first priority of the new sewerage authorities is to bring these existing works up to standard.

The sub-standard works are most usually to be found serving the former small burghs which could not afford to employ the qualified specialist staff required. Ironically, the County Councils could afford such specialist staffs so that there was a paradox whereby the disposal of waste from very small scattered communities was undertaken by qualified staffs while that of the towns (where most housing and industry were concentrated) was not.

Regional Reports

Some indication of the extent to which the hopes of professional water managers have subsequently been realised in practice can be gleaned from the 'Regional Reports' published by the new authorities at various dates in 1976.

Central Region appear typical in reporting that its old drainage systems were operating above the capacity for which they were designed or had reached an age at which they should be replaced; several existing treatment works were inadequate to deal with present loadings and sewage from certain communities was not treated, while elsewhere only primary forms of treatment were applied where secondary forms were required.²² A lack of action on deteriorating sewers, it was stressed, would result in overloading, breakdown or collapse, and

hence in prohibitive maintenance costs. Unless action was taken at treatment works, the standards of effluent would deteriorate and it would be impossible to comply with the River Purification Board's conditions. Ideally, a capital expenditure of the order of £800,000 per annum was thought necessary to undertake the necessary works identified by the Director of Water and Sewerage but, as a result of financial constraints, this had been cut by 75%.²³

Similar problems were to be found in Fife, and the essential problem was defined by the Region's Engineering Department as follows: 'sewage treatment is liable to receive scant consideration from the public - by its nature it is unpopular, relatively expensive to install and to run, but gives no obvious return, and can seldom be classed as a subject for which one would earn kudos'.²⁴ As a result of Government restrictions, 'the only drainage schemes upon which expenditure can be incurred without question are those related to sewerage or new housing or of oil industry (i.e., the laying of pipes without treatment facilities). All other schemes are the subject of delays, procrastinations and refusals, and in such a financial climate it is just not possible for obligations in respect of standards of discharges and provision or extension of sewerage works to be met'.

The same problem was identified by the Grampian Region. The authors of the Grampian's report added that if clear evidence of a risk to Public Health was established, some expenditure on sewage treatment might be approved and that the position would change during 1976/77 when the Regional Council would receive a block allocation of money for water and sewerage services. However, SDD approval would still be

required for schemes estimated to cost over £100,000 and most extensions to sewage works will thus still require approval. In the Council's view, the Secretary of State must accept responsibility for any pollution caused by his refusal to sanction necessary expenditure on sewage treatment and the legal position of the local authority (with respect to the Prevention of Pollution Acts) should be clarified.²⁵

The Lothian Regional Council confined itself to the view that, while local government reform had provided the opportunity to move away from a piecemeal approach to drainage and thus a more effective use of resources and the application of higher standards, these benefits could not be achieved without a substantial investment of time and money (which, by implication, would not be forthcoming in the near future).²⁶

In the Strathclyde Region, existing plans to achieve major improvements at Glasgow's Shieldhall works, in the Irvine valley, and elsewhere would continue, albeit at a reduced pace in some instances.²⁷

On balance, it seems that the reorganisation of the sewerage service into regional units of management came at a particularly unfortunate time. The unprecedented need for financial restraint, combined with the rather low priority of the service, seems to have ensured that no immediate benefits accrued. Money was (and is) simply not available to promote regional improvements. In most Regions there was a significant backlog of necessary action and a lack of suitable investment in the past seems to be the main problem facing the service. Expenditure on the sewerage service has increased

significantly over the last two decades or so (see below), but only so much can be done at a time. The need for heavy additional expenditure to meet RPB standards stems from the unwillingness of small local authorities to spend money on sewage treatment and SDD cannot be blamed for fulfilling their duty to regulate total expenditure in line with the needs of the national economy.

As to the policies to be applied notwithstanding difficulties over their financing, many Reports gave priority to improving the 'environment' in some parts of their regions, and most acknowledged that the Council was itself responsible for many of the principal sources of water pollution.

Fife Regional Council appears to have been particularly anxious to co-operate with local RPBs. The RPBs were asked to identify priorities for improvement, which were: ²⁸

- 1) to eliminate crude discharges to all inland waters;
- 2) to alleviate gross pollution of any water course;
- 3) to protect industrial use of rivers (e.g. salmon fishing);
- 4) to provide sewerage or sewage treatment for additional housing;
- 5) to safeguard or improve high amenity water courses;
- 6) to improve the quality of subsidiary streams;
- 7) to eliminate discharges of crude sewage to tidal waters;
- 8) to improve sewage effluents in low amenity water courses;
- 9) to upgrade discharges of sewage effluent to inland water courses from populations of 500 or more to the 'Royal Commission Standard' whatever the dilution;
- 10) to extend existing works that are reaching capacity.

Of particular interest is the low priority given to tidal discharges, a reflection of the fact that priority is related to the intensity of pollution rather than to the number of people affected. The polluting effect of existing developments was given greater emphasis than the effect of new developments.

In the Grampian Region a programme of necessary extensions to sewage treatment works has been agreed with the North East RPB but this programme cannot be achieved owing to the restriction on capital expenditure.

There is, therefore, at present something of a constitutional crisis in the prevention of pollution whereby the Regional authorities in many areas will not be able to improve the present position significantly and new housing and industrial developments could easily bring the standards of effluents well below that acceptable to local RPBs. The question therefore arises whether, in the current financial climate, RPBs can take any action.

Several of the Regional Councils appear to have significant worries over the open-ended nature of their duties to provide sewers for new development. In the Grampian Region, where there were no outline planning permissions, it was possible to direct development to locations where there was spare capacity, but when outline permissions existed, the Sewerage (Scotland) Act 1968 required the Regional Council to make drainage available. A Regional Council can therefore become committed to expenditure on infrastructure by a planning decision made by a District Council acting as a local planning

authority responsible for development control. It appears that the potential for conflict between different authorities in the two-tier structure of local government has been realised in this context. In the words of Grampian Regional Council: 'To claim that District Authorities must be expected to behave 'reasonably' and should therefore make decisions within Regional infrastructure constraints ignores the reality of a political situation in which two sets of people may hold conflicting views and will, quite reasonably, act in accordance with those views'. 'Clarification is required from the Secretary of State on the position which exists when an authority gives planning permission to a development and financial approvals are given by the Secretary of State for the necessary sewerage but not for the treatment of the sewage, and consequently, the effluent fails to meet the standard set by the River Purification Board which is empowered to insist on these standards' and 'clarification from the Secretary of State is sought on the extent to which a regional authority can reasonably use its call-in powers over planning applications - when the granting of planning permission would place unacceptable demands on the provision of infrastructure'.²⁹

Difficulties of this sort remain to be resolved case by case, and it is too early to assess the impact of reorganisation. A baseline for future comparison has been provided, however, by SDD through the publication of two editions of reports of surveys of Scottish water quality, aptly entitled 'Towards Cleaner Water'.

The River Pollution Surveys of Scotland

In a similar fashion to water supplies, the early 1970s saw the publication of the first national assessment of the quality of Scottish waters following a similar exercise in England and Wales.³⁰ The surveys refer to the position in 1968 and in 1974. The second survey had a much wider scope, an indication of an increasing interest in river pollution in recent years.³¹ Nevertheless, full information on effluents discharged by local authorities and by industry (particularly the former) became available only after decisions on major changes of policy such as those contained in the Sewerage (Scotland) Act, 1968, and the Control of Pollution Act, 1974, had been made.

The surveys represent a monitoring of the situation, and it is interesting to note that both preambles state that 'conditions over the country vary widely and factual information about these conditions is required at regular time intervals to assess the current position and the long-term effect of the control measures adopted'. The second survey was also marked by the introduction of a system of digital coding of stretches of river, the use of which has allowed information to be stored on tapes to be up-dated every five years. Unfortunately, the more limited extent of the 1968 survey makes comparison of the two surveys difficult, but Table 10.1 shows for each year, the length of river found to be either 'poor' or 'grossly polluted', together with an indication of the extent to which greater lengths were surveyed in each RPB area in 1974. (The right hand column shows the length surveyed in 1974 as a percentage of that surveyed in 1968 in round figures).

TABLE 10.1: The Extent of Poor Water Quality in Scotland

<u>Area</u>	Length classified as either 'poor' or 'grossly polluted'		
	<u>in 1968</u>	<u>in 1974</u>	
Banff, Moray and Nairn RPB	6 kms.	22 kms.	1,000%
Dee and Don RPB	7 "	66 "	600%
Tay RPB	8 "	62 "	800%
Forth RPB	48 "	102 "	400%
Lothians RPB	38 "	142 "	400%
Tweed RPB	7 "	1 "	500%
Solway RPB	10 "	11 "	600%
Ayrshire RPB	53 "	43 "	300%
Clyde RPB	197 "	192 "	600%
All RPB areas	374 "	641 "	600%

As might be expected, the surveys revealed a close correlation between the incidence of significant or severe pollution and the distribution of population and industry. Eighty per cent of the Scottish population live in the Central Belt between the Clyde and the Forth and Tay estuaries and it is in the Forth, Lothians and Clyde RPB areas that 'substantial water pollution control problems' occur. Elsewhere, there are 'effects of considerable local significance'.³⁴

Between 1968 and 1974 significant progress in containing the problems of pollution was made in the Clyde and Ayrshire areas although much remains to be done, especially in the former. Progress has also been made in Southern Scotland, in the Tweed and Solway basins. Progress on the east coast is difficult to evaluate though, with due allowance for the greater coverage in the second survey, it appears that pollution in the area of the Dee and Don RPB in North-East

Scotland has worsened although it is not extensive.

In general, the pattern of progress appears in line with the view of priorities published by Collet in 1967:³⁵

'If there is a choice to be made between a river which is substantially clean, save for one or two unsatisfactory discharges, a second river which is teetering on the balance between cleanliness and pollution, and a third which is grossly polluted for most of its length by a number of unsatisfactory discharges, I would venture to suggest that the order of priority of tackling these rivers should be 2,3,1. On the principle of a stitch in time, the cleaning up of a river in a marginal state can be accomplished with greater rapidity and economy than is possible with a river which is already far gone. It is the restitution of the grossly polluted rivers which will form the long term work of the purification authorities ...'

The title of the reports, 'Towards Cleaner Water', appears remarkably appropriate, but the results must nevertheless be somewhat disappointing in view of the lack of any significant reduction in the degree of gross pollution throughout Central Scotland.

The reason for this situation seems fairly clear. Apart from a brief period about 1972, remedial action on the grossly polluted stretches has been handicapped by severe restraint on public expenditure and the cycle of depression - boom - depression has left little opportunity for industry to put its house in order where required. In a depression, there is no money and in a boom neither time nor money is available, as firms that have run down strive to expand production quickly.

For most of the years from 1968 public expenditure has been subject to severe financial restraint of the type heralded by Scottish

Office Finance Circular 9/1975 (since superceded by even gloomier circulars) which stated that, with regard to the 'cleansing, sewers and drains, parks, other public health, planning and other' group of services, 'the reduced rate of growth on this block of services allows only for inescapable commitments, including the need to service new housing and industrial development (particularly those associated with North Sea Oil development)'.³⁶

Both reports stress the extent to which capital expenditure on sewerage and sewage treatment has increased in the post-war period, although the figures are somewhat misleading, since only a third of the expenditure relates to sewage treatment, the remaining two-thirds being devoted to the statutory provision of sewers which may, in places, worsen rather than lessen the incidence of pollution. A qualitative assessment was given by Wallace writing in 1973:³⁷

'Since the last war the construction of new sewage treatment plants has proceeded somewhat intermittently - largely because of the succession of financial crises and the numerous reductions in public expenditure. However, the provision of new sewers and extending of existing sewerage systems was a necessary part of the provision of new housing in the post-war years.'

'It cannot be claimed that the impetus of the 1930s has been maintained owing to a reluctance to update plants then provided'.

A more objective assessment may be made by referring to the published figures. Here, however, it is difficult to adequately account for inflation, in recent years in particular, but it seems that expenditure on sewerage and sewage treatment 'took off' in 1966 following the Rivers Act of the year before, and peaked under the Heath administration in the early 1970s. Of supplementary interest is the heavy reliance (in terms of its proportion of the whole) on government grants prior to the mid 1960s.

TABLE 10.2: Annual Expenditure on Projects in Progress

<u>Year</u>	<u>Attracting £M rural subsidy</u>	<u>Attracting £M industrial grant</u>	<u>Attracting £M no grants</u>	<u>Total £M</u>
1955	0.2	0.2	0.7	1.1
1956	0.5	0.1	0.3	0.9
1957	0.3	0.1	0.4	0.8
1958	0.3	0.1	0.5	0.9
1959	0.3	*	0.6	0.9
1960	0.5	*	0.5	1.0
1961	0.8	0.2	0.7	1.7
1962	0.9	0.2	1.2	2.3
1963	0.6	0.1	1.4	2.1
1964	0.8	0.1	1.7	2.6
1965	0.6	0.2	1.4	2.2
1966	1.1	0.5	4.5	6.1
1967	1.6	0.3	6.2	8.1
1968	1.2	0.7	7.4	9.3
1969	1.4	0.7	7.4	9.5
1970	2.7	0.4	6.8	9.9
1971	2.1	0.9	10.5	13.5
1972	2.1	0.7	15.5	18.3
1973	2.8	1.7	21.5	26.0
1974	2.7	2.4	18.7	23.8
1975	2.8	4.5	25.6	32.9
1976	2.6	3.3	27.6	33.5
1977	3.3	2.8	30.3	36.4

These may be summarised as in Table 10.3:

TABLE 10.3: Five Year Summary of Table 10.2

	<u>Rural</u>	<u>Industry</u>	<u>No Grant</u>	<u>Total</u>
1955-59 £M	1.6	0.5	2.5	4.6
%	35	11	54	2
1960-64 £M	3.6	0.6	5.5	9.7
%	37	6	57	4
1965-69 £M	5.9	2.4	26.9	35.2
%	17	7	76	14.5
1970-74 £M	12.4	6.1	73.0	91.5
%	13.5	6.5	80	37.5

Supplementing these data, 'Towards Cleaner Water' (1972) contained figures showing how £90 million had been spent on sewerage and sewage treatment (probably a maximum of £30 million on the latter) between 1945 and 1970, two thirds of it since 1962.³⁹ A further £75 million was planned for the period 1971-1976 and the edition published in 1976 (Towards Cleaner Water 1975) shows that £78 million was actually spent between 1970 and 1974, so that, with appropriate adjustments for inflation, it seems likely that planned increases in 'real' expenditure had been sharply reduced.⁴⁰ Over ten years from 1964 to 1974, Central Scotland received two-thirds of the available investment (i.e. less than its per capita share) with the Forth and Clyde basins receiving approximately equal shares. In terms of expenditure per head of population, local authorities in the Tweed, Forth, Banff - Moray and Nairn areas appear to have spent proportionately more than the other authorities.⁴¹

In the context of falling capital allocations (in real terms) in recent years, it seems hardly appropriate to extend the legal obligations of local authorities and perhaps for this reason further development of the law with regard to pollution control appears to have been frozen, particularly with respect to the Control of Pollution Act 1974. The Act does not appear to have arisen from any particularly Scottish pressures, indeed quite the reverse, but in the particular context of Scotland it did serve to close a particular loophole in the law, the existence of which was revealed in dramatic fashion in the Clyde RPB area.

The Clyde River Purification Board Act 1972

The Rivers (Prevention of Pollution)(Scotland) Act, 1951, had specifically authorised the promotion of private or local legislation by river purification boards, but only one board has done so. Indeed, the Clyde River Purification Board Act, 1972, has been described as 'an astonishing political achievement' because it was successfully promoted against the wishes of the Scottish Office, where officials believed that forthcoming public and general legislation would suffice. (See the section on the Control of Pollution Act, 1974, which follows). The Clyde Board, in the aftermath of a particularly severe outbreak of pollution over which existing powers of control had been found lacking, took immediate action and not only gained the necessary additional powers to deal with such situations but also received statutory authority to undertake several wider aspects of river management which it had been particularly keen to develop. With over thirty MPs representing constituencies within its area, the Clyde Board was particularly well placed to assist the passage of such a measure through Parliament. The Board's success was also aided by a degree of irresponsibility shown by 'big business' in this case and by the fact that most of the local MPs shared membership of the Labour Party with the Board's active and well-connected chairman. The effects of the outbreak of pollution had been sufficiently serious and obvious to create a momentum of public concern that was skillfully harnessed by the Board to help secure the additional powers of control that were felt to be necessary.

Because local sewage works were inadequate, a distillery had been

unable to discharge its effluent in the normal way and, instead, was discharging about 0.75 million gallons per day into abandoned mine workings. The entrances to these had been blocked up but the accumulating pressure of untreated effluents led to the collapse of a retaining wall and serious spillage into a nearby river. The RPB could not immediately prove that the distillery's method of disposing of its effluent was responsible for the firm had refused the Board access to make tests with tracer dyes which could have established the source of pollution beyond doubt: confusion arose because the 1951 Act referred to a right to take samples from waters entering a 'stream' and did not specifically refer to the discharge of effluents to underground waters.

Consequently, a principal aim of the Clyde Board's Act was to give the Board powers of access to conduct tracer tests. But the opportunity was also taken to extend the procedure of consent to make discharges to all underground waters and acquire other powers; some concerning the regulation of sand and gravel workings in river courses, others concerned with taking action to improve river courses. The Board had been undertaking various kinds of remedial action on river courses for some time and the opportunity was taken to clarify their legal right to do so. All in all, the Clyde Board now feel that the range of powers available to them is even better than the English Authorities .

As a result of the Act ten companies subsequently applied for consent to continue discharging underground. The initial problem of distillery wastes was solved, however, by their diversion to sewage

treatment works in Airdrie after pre-treatment.⁴² All discharges to abandoned mine workings were eventually dealt with in a similar manner, although some had to continue until such time as local treatment works had been extended.

The problem of discharges to abandoned mines also affected other Boards in Central Scotland and a general right to control discharges to underground waters may well have been welcomed by other Boards, if only to hold in reserve. The Clyde Board had at first pressed for national legislation but this call was resisted by SDD because they were aware that the forthcoming Control of Pollution Act, 1974, would contain some new powers in this respect and also because some Boards and their clerks were not in favour of any extension of powers. Some Boards had apparently exhibited a 'conservative' attitude, wishing the work of RPBs to remain as 'cheap and cosy' an activity as possible. There was a feeling amongst those who favoured the granting of additional powers that if they pressed for national legislation there would be such a delay whilst time was found in the programme of public legislation that Clyde Board would not get the powers they required to deal with immediate problems.

The Control of Pollution Act 1974

Whereas the Clyde River Purification Board Act deals with matters within the area of responsibility of one RPB, but is of wider significance, the Control of Pollution Act is conceived in a United Kingdom framework (and with European obligations in mind) and is of only marginal concern to Scotland.

The Act was first introduced to the House of Lords in 1973 as the Protection of the Environment Bill. It appears to have been introduced to the Upper House by the then Conservative Government both to save time and ease pressure of business in the Commons and also because it concerned matters in which the Lords had taken a considerable interest. When the Lord Advocate introduced the Bill, he referred to it as partly the result of the Conference on the Human Environment, generally known as the Stockholm Conference of 1972, and partly (and specifically to Part II concerning the protection of water quality) as 'seeking to extend and strengthen the powers which will be available to the (English) Regional Water Authorities in carrying out their duties for water supply and for its cleanliness, and for sewage disposal'.⁴³ Though opposition peers criticised its title as being somewhat pretentious and suggested that the Bill should be entitled the Control of Pollution Bill, they generally welcomed its content.

The chairman of the (English) National Water Council, Lord Nugent, saw the Bill as one of the greatest importance and one, perhaps for the first time, that justified the creation of the Department of the Environment because only such an all-embracing department could have brought together all the strands the Bill contained. It was 'a real response to the feelings of our people'.⁴⁴ Hitherto, the law had been quite inadequate to control pollution through underground sources into the groundwater system. In consultation with the Department of the Environment and fortified by the Report of the Royal Commission on Environmental Pollution, river managements had gradually made a case for taking control of the groundwater system. 'So, parts one and two of the Bill are really complementary to the (English) Water Act, 1973,

which we passed earlier this year'. Lord Nugent thought that when regional water authorities were contemplating their overall policies and the development of sources to meet increasing needs, they would have the choice of either developing a major new storage system or introducing a major new programme of reclamation so that effluents in the river reached a higher standard and the water could be used again in order to make supplies available. The final touches to the system of pollution control which the Bill contained would ensure that the alternative strategy of making more use of existing river resources (as opposed to building new storage) could be more easily adopted.

The Bill, however, was in fact lost because of the General Election in 1974, but the new Labour Government promptly introduced a virtually unchanged Bill to the Commons, this time bearing the title 'Control of Pollution'.

There was no Scottish member on the Committee which considered the Bill and its origins clearly lay within the Department of the Environment which had an eye to the requirements of the recently formed (English) Regional Water Authorities. The draft Bill was, however, passed to the Scottish Office for comment and for adaptation to Scottish law and conditions. The result is an extraordinary series of conditional clauses outlining the application of the Bill to Scotland. The principal difference was in its provisions relating to sewerage, for the Sewerage (Scotland) Act, 1968, had already effected many of the changes that the Bill was intended to bring about in England and Wales.

Perhaps the greatest innovation in the Act as applied to Scotland is that which empowers the Secretary of State to give RPBs the power to fix, demand, value and recover such charges in respect of trade or sewage effluents as a Board thinks fit. Any system of charging would have to include provision for appeals to the Secretary of State in respect of charges actually payable in individual cases, but the possibility of RPBs operating a 'polluter must pay' policy evoked a mixed reception. Local authorities do not appear to favour any sort of special charging system for waste disposal at present. Some river inspectors favour the principle since this could provide a very welcome incentive for those responsible for discharges to minimise their effects, but see immense practical difficulties in introducing such a system; for example, they say that a considerable increase in staff would be required to deal with the greatly increased amount of monitoring and analysis which would be necessary for the fair and equitable operation of the system, especially if charges were related to the volume and/or complexity of composition of the discharges. The provisions of the Act leave a good deal of uncertainty as to how the system of charges might operate and it seems clear that this provision has been included only as a long-term option.

Other river inspectors are clearly opposed to any system of charging. They stress that many pressures on RPBs are currently avoided by the fact that there are no (obvious) differences in the degree of control exercised over pollution between one part of the country and another. The introduction of a charging system could lead to a situation where an industrialist felt that his costs could be lower if he moved to, or established any new plant he was planning, in

another Board's area where charges were lower. There would undoubtedly be pressure from local authorities to set charges at levels that would be attractive to incoming industry. Further, it was felt that a system of charges levied on polluters might well come to be regarded as a system of licensing pollution, especially if charges were set at a low rate for political reasons or if consent conditions were relaxed to allow extra revenue to be raised through the charging system. There might be a return to 'industrial rivers' (i.e., those which are allowed to remain grossly polluted, in effect as open sewers), something which river inspectors were unanimous in saying should be avoided.

Still other river inspectors felt that the operation of such a system would make little difference to the state of rivers as effluents would be diverted to local authority sewers and most local authorities would not charge for their reception; furthermore, it would be politically impracticable to devise a system whereby RPBs charged local sewerage authorities for the discharge of their effluents. Thus, the introduction of any system for paying for pollution seems to be unlikely in Scotland.

The extension of controls to underground waters (albeit in a rather roundabout manner with relevant waters being designated as 'controlled' by order of the Secretary of State on application by the RPBs before any action can be taken) is likely to be important only in the Central Belt. Within this area, and for those parts with the greatest problem, the Clyde RPB already has powers of control through private legislation. The Board feels that its powers are much more

useful than the rather weak provisions of the 1974 Act and members appear to be pleased that they did not accept the Scottish Office view that they should not take their own powers but wait until the provisions of this Act became effective.

As with river abstraction (except in the Grampian Region), underground waters are not a significant source of public water supply in Scotland. In Fife and elsewhere, however, there is an increasingly strong interest in such sources for 'conjunctive use', i.e., their use to meet peak demands or to provide compensation water in place of the potable supplies presently released. In this light and with an eye to the future, measures to prevent their pollution are generally welcomed as reserve powers although few foresee any applications at present.

The extra provisions which seem to have been taken most seriously by all RPBs are those extending controls over the remaining tidal water areas. The Act is clearly intended to implement the recommendations of the Royal Commission in Environmental Pollution that British estuaries should be subject to the same sort of unified control as inland river basins. Of course, most of the problem areas have already been designated as controlled waters under the 1951 and 1965 Acts, but the provisions of the 1974 Act cover all waters within three miles of the coast, together with any other area that may be prescribed.

As already outlined the reorganisation of the RPBs in 1975 on the basis of SRPAC's recommendations did in fact, take some considerable account of the technical needs of such an extension of the area of control.

New powers to undertake restorative work on damaged flora and fauna at last provide some statutory justification for the Lothians and Clyde Boards' biological sections. In order to restore the status quo, this has to be known and therefore biological surveys of flora and fauna implicitly become a clearly legitimate activity of the RPBs for the first time. Again, apart from the two Boards based in Central Scotland, there must be some doubt about the preparedness of the others to undertake such work. The measures were undoubtedly conceived with the Regional Water Authorities in England in mind, which already had the necessary resources. These additional powers of the 1974 Act run quite contrary to the trend of events in Scotland and it is only those boards which have consistently taken the wider view (i.e., the Clyde and Lothians) that seem ready to take up the challenge offered by these powers (though they are permissive and it remains to be seen whether the other boards seek to use them). In fact, there is no guarantee that the present widely varying view on what RPBs should be doing will change as a result of the additional powers contained in the 1974 Act.

It was said in the House of Commons in February 1975 that 'some of the provisions had significant implications for local authority expenditure. The need to restrict increases in such expenditure to a minimum makes it inevitable that the implementation of these provisions should be delayed', but at that time it was expected that tidal waters would become the subject of control in mid-1976. There has been no subsequent announcement, the financial situation of local authorities has worsened considerably and it therefore appears that the date of implementation has been postponed indefinitely.

It seems inevitable that the next edition of 'Towards Cleaner Water', due in 1981 if original plans are not changed, will not show any significant improvements particularly with respect to tidal waters, and in some areas may be expected to reflect at least a marginal decline in water quality. In this light the latest outside influence on the control of water quality, common standards to be adopted by all member-countries of the EEC, almost seems irrelevant.

EEC Directive on Bathing Waters

The Commission directive 76/160/EEC of December 1975 was concerned with the quality of bathing water: member states will be expected to improve and maintain the quality of bathing water and conform with control standards irrespective of the circumstances under which discharges are made. This is a radically different policy of control from that prevailing and of particular importance in Scotland where so much effluent is piped to the sea and where official policy requires only primary treatment for this in view of the substantial quantities of dilution water normally available (see Chapter 11).

Nevertheless, the British government was a signatory to its adoption. The directive lists nineteen criteria of quality, the most important of which are total coliforms and *faecal* coliforms (*E. coli*). It applies to waters where bathing is traditionally practised by large numbers, and was originally intended for application to the Mediterranean. It has been suggested that the cold Scottish waters could never qualify, but there is some confusion as to how large 'a large number' is.

The Clyde River Purification Board has been bacteriologically monitoring the Ayrshire waste since 1976, with the results shown in Table 10.4:⁴⁷

TABLE 10.4: Results of a Bacteriological Study of Beaches in the Clyde RPB areas 1976/77

	<u>S.Ayrshire</u>	<u>Ayr Bay</u>	<u>Irvine Bay</u>	<u>N.Ayrshire</u>
% samples meeting EEC mandatory limit	67%	51%	27%	85%
% sample meeting EEC recommended guidelines	23%	13%	7%	30%
EEC mandatory limit: E. coli	2000		Total Coliform	10,000
guidelines	" 100		"	500

Clearly if EEC standards are to be met some considerable work is required before 1985 (by which time member countries are expected to have implemented the directive). Of particular interest is Irvine Bay. The early policy of piping wastes to the coast here from the Irvine and Garnock Valleys was described in Chapter 9. The selection of North Ayrshire as a growth centre has also been described. In the early 1960s eleven local authorities and the Irvine New Town Development Corporation commissioned a study of the implications of growth for drainage arrangements. In 1968 it was recommended that the two valley sewers should be reconstructed, further areas should be linked to them including some coastal areas, and primary treatment of the contents should be provided for each before discharge. The expense involved was such that the phasing of the schemes was considerably lengthened in the mid 1970s, but the construction of a new sea outfall for the

Irvine Valley was designated as the first phase and construction begun in 1974. The installation of treatment was postponed. The new Irvine Bay outfall is expected to be commissioned in 1981 and it will take effluents under the sea bed 1550 metres from the high water mark. The Clyde RPB estimates that it should provide conditions within the bay that meet the EEC mandatory limits but not the guideline, and warns that in this respect primary treatment may not help because the removal of bacteria by sedimentation is often counterbalanced by bacterial growth in the sedimentation tanks. More generally in relation to the whole coast:⁴⁸

'it is questionable whether seaside resorts could conform to the guideline limits unless they dispose of their sewerage inland or construct very long and unjustifiably expensive marine outfalls and even these would not guarantee compliance'.

Apart from the question of suitability for bathing it is clear that in many coastal areas conditions are unsatisfactory.⁴⁹

'Throughout the length of the Ayrshire coast, there are numerous outfall pipes which discharge untreated sewage into the sea. The majority of these outfalls are of inadequate length so that waste-water is poorly dispersed and sewage solids are often re-deposited onto the beaches. As a first step, all sewage should be screened and *aerated* before discharge but, in addition, many outfalls should be lengthened so as to increase the dilution of the waste. The beaches adjacent to the largest towns are particularly offensive and there have been many complaints about the quality of the shore at Ayr, Irvine, Prestwick and Barassie.'

This was written in 1974 since when plans to improve the sewage disposal arrangements of the towns had been deferred indefinitely. These words compare with views expressed in the Clyde Valley Plan almost thirty years before:⁵⁰

'The discharge of crude sewage into the sea often results in nuisance conditions at certain tides and with certain winds these objectionable discharges take place at some of the most popular seaside resorts.'

This aspect of nuisance conditions at holiday resorts and pollution of water courses clearly calls for early consideration and remedy. But, even with the added dimension of pressure from the EEC, this seems most unlikely in the near future.

Sewerage and sewage treatment have accounted for around 2% of total capital expenditure in recent years and although it reached 2.95% in 1972/73 this would appear to be its limit.⁵¹ This being so, the nature and pace of improvement must inevitably be slow. Thus, the improvement of coastal waters in line with EEC directives seems a long-term objective. Because such expenditure is incurred largely in the interests of amenity and not urgent considerations of public health, this is inevitable.

A relatively low level of capital expenditure in the general interest of amenity also underlies the other developments considered in this chapter. The natural desire of the river inspectors to emulate their professional colleagues in England and achieve the status of river authorities with power to control the abstraction of water and the development of water resources was inappropriate for two reasons. First, such a suggestion ran counter to the long-standing policy for achieving an improvement in water supply planning, that of regionalisation of water authorities, and secondly, water quality objectives were, and are, largely irrelevant to the process of water supply planning in Scotland.

The initial boundaries proposed by the Wheatley Commission, however, offered the opportunity for the joint management of water supply and water quality in the same way as that came about in England and Wales after the creation of regional water authorities in 1974. Ironically, this was successfully opposed by the river inspectors, largely because of the recognition that their role differed from that of their colleagues to the South. It became apparent that they were an institutionalised pressure group charged with the duty of protecting Scottish waters and pressing the fragmented and inadequate pattern of sewage treatment authorities to bring about improvements where and when they could.

The reform of the sewerage service into large regional units had not relieved them of this role in view of the continuing need to ensure that the claims of clean water are heard in the context of limited public expenditure. The Control of Pollution Act 1974 and the changes it will bring when implemented are incidental to Scottish practice and it remains to be seen if the existence of its provisions concerning making polluters pay and the improvement of sea outfalls exert any influence on events in future. For the first time institutions of water management in Scotland have powers to hand in advance of a need for their application.

Undoubtedly the creation of the nine large regional authorities responsible for sewerage and sewage treatment on the mainland stands out as the major advance. But in the context of financial stringency in which they were introduced it will be several more years, perhaps a decade, before the influences of professional management and a wider

perspective becomes apparent. In the meantime it is certainly true to say that the problems of matching the needs of development with existing capacity to absorb its effects would have been much more severe had the structure of local government not been reformed. The nature of that reform has brought conflicts of interest into the open, not created them. It seems inevitable that little significant progress will have been made to report in a third edition of 'Towards Cleaner Water', but any disappointment should be tempered by the thought that the position could well have been worse with a decline in the quality of water, despite the extensive efforts made in the late 1960s and early 1970s.

Some of these conclusions may seem unjustified in the light of the account of the legal and administrative developments given in this chapter and for this reason the policies adopted by river purification boards and local authorities in several sets of particular circumstances are the subject of the next chapter.

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CHAPTER 11Aspects of sewerage, sewage treatment and the prevention of pollution at the local level

The purpose of this chapter is to examine, by means of local case study, several themes raised in the preceding two chapters, concerning the work of sewerage authorities on the one hand and river purification boards on the other. Specifically with regard to the former, difficulties in effecting improvements at more than a relatively slow pace underlay the reluctance of Central Government to implement the recommendations of the Hill-Watson Committee concerning the diversion of trade effluents to centralised sewage treatment works. They also help explain the delay in extending the control of discharges to tidal waters and to 'existing' outlets as outlined in Chapter 9 and highlight the significance of the rationalisation of sewerage authorities effected by the reform of local government as considered in Chapter 10.

A principal theme of that chapter was the paradox of those closely associated with river purification boards at first arguing for a wider role and then retreating to fight a rearguard action to preserve the autonomy of their boards. Underlying these events in the arena of debate over local government reform is the detail of River Purification Board staffing, policy and practice and this forms the second set of themes considered here.

The Forth Basin has been selected as the setting for case studies largely because of the availability of reports of the Scottish Advisory Committee on River Pollution Prevention. Several difficulties

frustrate the examination of sewerage, sewage treatment and particularly the discharge of trade effluents at the local level. The consent conditions imposed by RPBs are confidential, as are specific data collected in their monitoring. Only Clyde RPB has followed the lead of the Severn Trent Water Authority in making some details public in anticipation of charges in this aspect of the law contained in the Control of Pollution Act 1974 (but, as yet, still to be implemented).¹ More generally, Hubbard's view (1968) remains true:²

'the absence of a systematic review of programmes - either by boards RPBs of their own objectives or by central government of the boards' activities - prevents an adequate record of accomplishments'.

This is so despite the publication of two editions of 'Towards Cleaner Water' and a survey of problems with sewerage overflows published by SDD in recent years. It is primarily for this reason that the case study approach has been adopted.

The administrative structure and outlook adopted by Lothian RPB are compared with those adopted in the adjacent Forth RPB to illustrate contrasting styles and amplify a study of 'normal' operations provided by Hubbard before the unusual case of the Scottish River Purification Advisory Committee's (SRPAC) investigation of the affairs of the Dee and Don RPB is examined. Hubbard's study and the latter unique event are the closest equivalents available of any systematic examination of the objectives of RPBs in Scotland. The rationale of SRPAC's administrative adjustments emerges from the study of such detail: the system was basically sound but amalgamation to give benefits of economies of scale and a wider perspective seemed appropriate.

Of course, the two sets of themes considered in the chapter are related: the improvements implemented by local sewerage authorities are the criteria of success that may be applied to the policies of RPBs. With this in mind, Clyde RPB published a complete list of improvement works effected in its area over the period 1960 to 1974³ (the latter year being its last year before amalgamation with the adjacent Ayrshire RPB under the auspices of SRPAC's proposals for administrative changes in the light of local government reform).

In all, 200 improvements had been effected over the period and these are classified according to type in Table 11.1. This is presented by way of introduction to case studies in the Forth Basin so that some impression of the overall context of these is available, particularly the extent to which they appear typical of Scotland as a whole.

TABLE 11.1: Improvements towards cleaner water in the Clyde RPB area
1960-1974

<u>Year</u>	Type 1	2	3	4	5	6	7	<u>Total</u>
	<u>Sewage Treatment</u>			<u>Trade Effluents</u>				
1960	1	0	0	0	0	0	0	1
1961	2	1	0	0	1	0	0	4
1962	3	0	0	1	1	0	0	5
1963	1	1	1	1	3	0	0	7
1964	1	0	1	3	5	0	1	11
1965	2	0	2	3	7	3	0	17
1966	3	0	0	11	1	3	1	19
1967	2	1	2	3	3	5	0	16
1968	4	0	1	3	5	3	0	16
1969	2	1	1	7	5	1	0	17
1970	1	0	3	7	1	1	2	15
1971	4	4	1	3	6	2	5	25
1972	6	1	2	4	4	1	1	19
1973	2	2	2	5	1	0	0	12
1974	4	1	3	3	2	1	2	16
Total	38	12	19	54	45	20	12	200

Key to type of improvement:

1. A new sewage treatment works provided
2. A scheme of regional sewerage and sewage treatment implemented
3. Existing sewage treatment works extended
4. Treatment plant installed to deal with discharges of trade effluent
5. The diversion of trade effluents to sewage treatment works
6. The cessation of a trade effluent
7. Improvements to sewerage.

Review of improvements in the Clyde RPB Area 1960-1974

The importance of the matter of the legal position with regard to the diversion of trade effluents to local authority works (the Hill-Watson Committee's recommendations) and the delay in implementing the Sewerage (Scotland) Act 1968 (until 1973) is highlighted by the fact that just under a quarter of all improvements were effected by this means. Unfortunately it is not possible to assess how many more improvements of this sort were delayed by an inadequate framework of law but the circumstances of the initiation of the Clyde River Purification Board Act of 1972 (with the discharge of waste to underground strata in the absence of the local authority being obliged to deal with them in a more satisfactory manner) seem to suggest that there were several.

Of supplementary interest is the extent to which a refashioning of the structure of local industry, perhaps in association with a changing spatial pattern in the context of government development policy, led to the cessation of discharges thereby accounting for fully 10% of improvements. Nevertheless, with a tally of 135 or two-thirds of improvements, the outstanding conclusion to be drawn from Table 11.1 relates to the central role of local sewerage authorities.

Of the three strategies adopted, new works, extended works and regional schemes, the former predominates in quantitative though not necessarily qualitative terms. This seems to support the view of the professional associations as expressed to the Wheatley Commission and recounted in Chapter 10 that the unreformed structure of local

government did not favour the promotion of rational regional schemes.

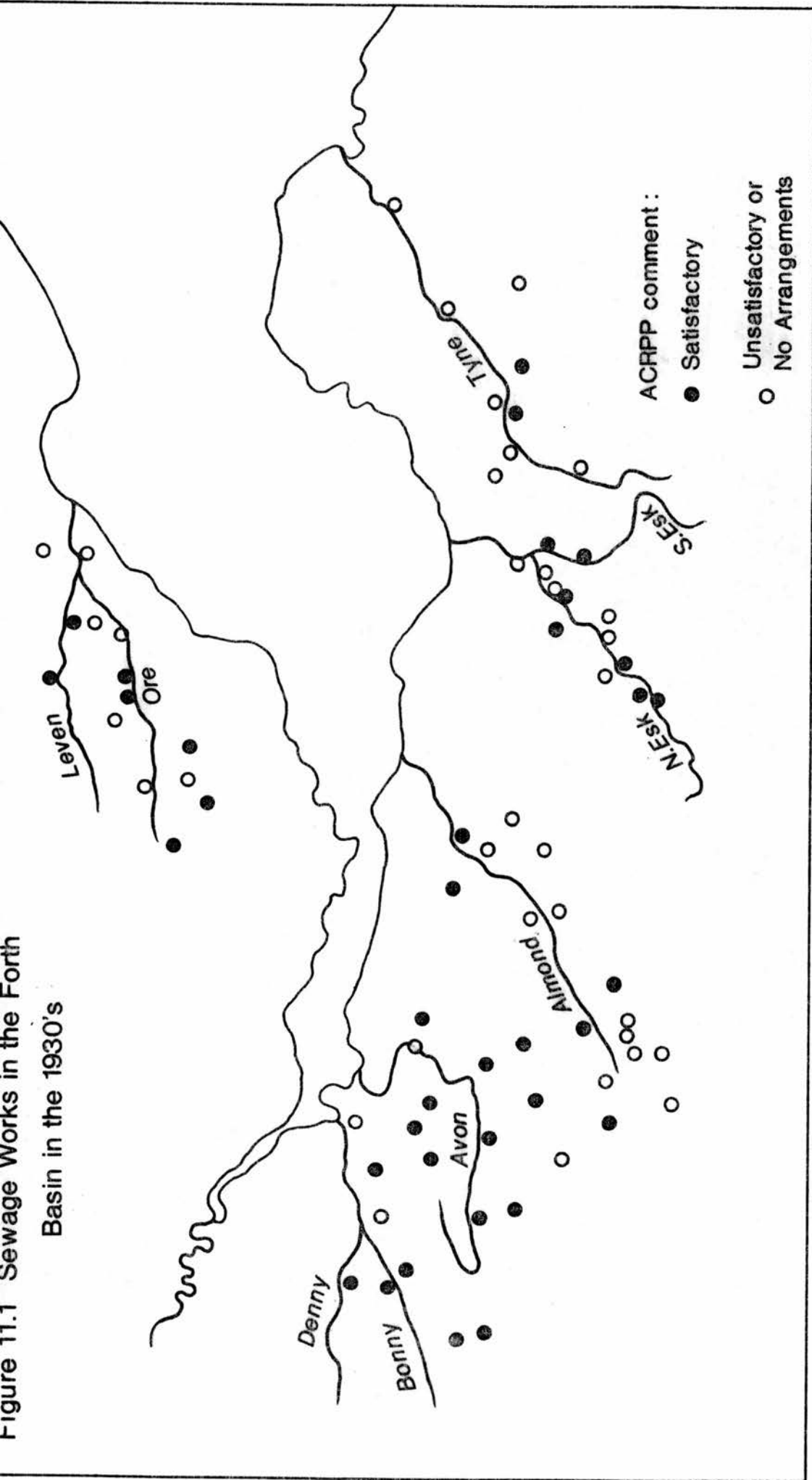
There seems to have been no lack of will to tackle the problems of pollution in the Clyde area, particularly after 1965, with the construction of 38 new works, the reconstruction of a further 19 and the institution of 12 regional schemes, and this in an area, it has to be remembered, that lacked any strong pressure group in the form of fishery interests and that apparently depended on the sense of civic responsibility held by local authority members for much of the push towards improvement.

Neither does there seem to have been any lack of will, after 1960, in the Forth Basin but the backlog of necessary work appears to have been so great that progress was necessarily slow.

Sewage Treatment Around the Forth Basin

As indicated in Chapter 9, ACRPP identified the absence of adequate sewage purification facilities as a major contributory factor to the pollution of the rivers they examined in the 1930s.⁴ Figure 11.1 depicts the works specifically mentioned in their reports. In the Tyne basin no major community was treating its sewage, neither were those in the Leven and Ore Basins. In the Esk and Almond basins most communities had made some arrangements with the notable exceptions of Dalkeith and Lasswade, but many of these works were producing unsatisfactory effluents. In the Avon, Carron and Grange Burn catchments, the arrangements that had been made were also mostly unsatisfactory. A feature of this last area, however, was the extent

Figure 11.1 Sewage Works in the Forth Basin in the 1930's



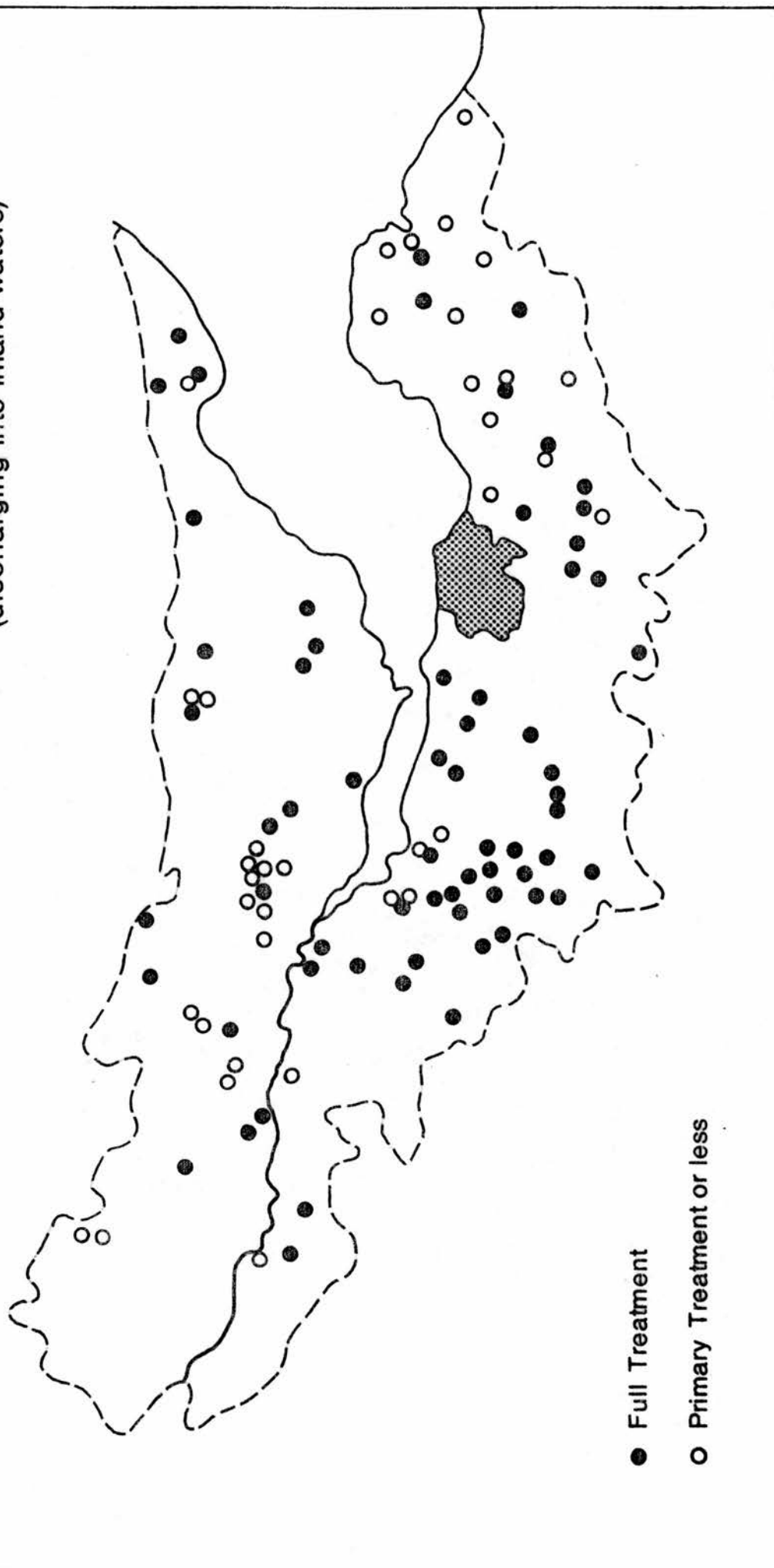
to which grants, made available by the Unemployment Grants Committee and later the Commissioner for Special Areas, had significantly contributed: modern works had been provided for Slamannan, Avonbridge, Maddiston, and the Polmont areas and for the Burgh of Bathgate.⁵ The coastal communities were not surveyed by ACRPP but Turing (1949) reported the universal practice of small burghs and traders leading untreated wastes to the Forth.⁶

'The Forth was once one of the finest salmon rivers of Scotland but its decay as a salmon river has been evident for forty years and it is now in imminent danger of extinction. This is due almost entirely to the foully polluted state of its upper estuary, which is increased by the pollution of many of the streams entering it'.

The principal problem was identified as untreated sewage from the ~~town~~ of Stirling, discharged to the narrow, twisting and slow moving channel between there and Kincardine; a resulting thick deposit of sewage sludge on the channel bottom was continuously churned up by tides so that there was a permanent flow of filthy water.

Figure 11.2 summarises the position in 1974. Clearly a considerable amount of remedial action had been taken since 1934, most of it after the establishment of the RPBs (Lothian and Forth) in 1954. The problem of untreated sewage being discharged to tidal waters remained, particularly with regard to Edinburgh (see below), but significant progress had been made inland, where there were virtually no instances of effluents being discharged in large volumes without full treatment. It is clear that most local authorities had responded to the requirements of the RPBs; but a reading of the annual reports of these bodies makes it equally clear that the pace of improvement

Figure 11.2 Sewage Treatment Works in the Forth Basin 1975
(discharging into inland waters)



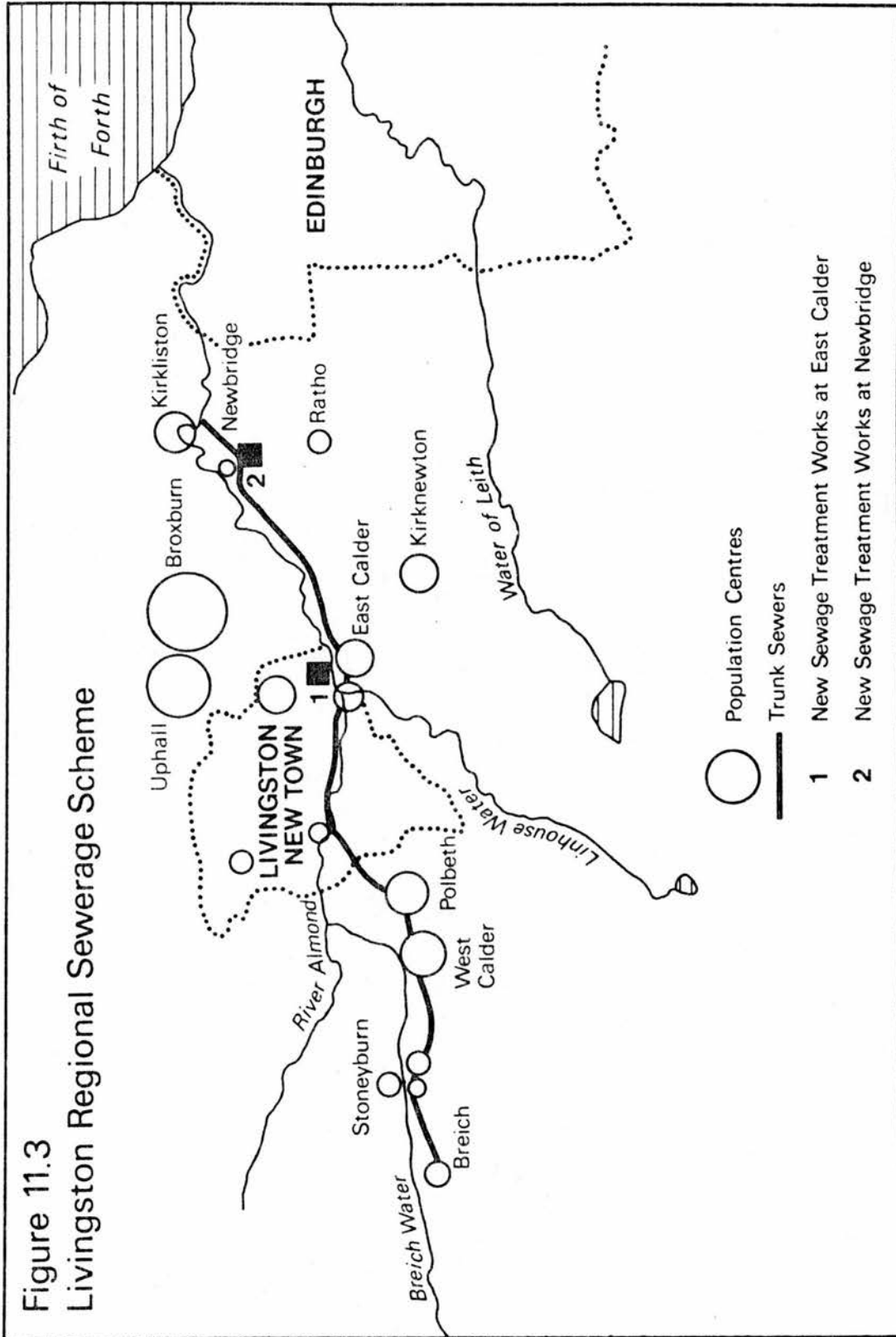
was extremely slow.

Major improvements followed the construction of trunk sewers in the Esk, Leven and Ore Valleys, but whilst ACRPP urged the adoption of such measures in the 1930s, connections to these schemes were not complete until the late 1960s, largely because of the lack of complementary legislation with regard to the acceptance of trade wastes. In other areas, the advice of the Scottish Health Services Committee directing local authorities to regional schemes of sewage purification, featured in Chapter 9, went unheeded until the same period.

Regional Sewerage Schemes

For example, the drainage of the western part of Midlothian received no comprehensive scrutiny until the Esk Valley project was in its final phases in 1961 and only then because of the likely impact of the designation of Livingston New Town.⁷ Clearly, proper sewerage had to be installed before the construction of the town. A joint-committee of West and Midlothian was established in 1962 to examine the implications of the designation of a growth area. In contrast to the history of policy with respect to water supplies considered in Chapter 6, agreement on sewerage was reached relatively quickly: Midlothian County Council's specialist drainage staff were to design and supervise the implementation of a suitable plan and the schemes which followed served a much larger area than that of the New Town (Figure 11.3). From the beginning the New Town Authority wished to make a feature of the River Almond and hence a considerable effort was made to clean up the headwaters of the river and early thoughts of a purification plant

Figure 11.3
Livingston Regional Sewerage Scheme



for the region upstream of the new town were abandoned. A large treatment works would accept wastes from a wide area by means of an Almond Valley trunk sewer, accommodating the New Town, West Calder, Addiewell, Stoneyburn and the communities of the Breich Valley. A further treatment plant at Newbridge would serve Broxburn, Kirkliston, Newbridge and Ratho to the north of the New Town. These works were completed in 1969.

Meanwhile, similar regional schemes were adopted to replace plants constructed in the 1930s and accommodate expansion to the West. A large purification works at Polton Hall was opened in 1970 to treat wastes from a wide area, work on the sewerage (known as the South-East Stirlingshire Regional Scheme) having begun eleven years before. On a more modest scale, the Bonny Water Regional Sewer was led to a new purification works in 1967, planning having begun on the problem of these discharges to the River Carron in 1958. To the North, two regional schemes served Clackmannanshire. Again work on sewerage began in 1959 but the associated purification plant was not complete until 1973.

Individual works had also been completed, of course, often in phase with regional purification schemes downstreams. In the Almond basin, such individual projects were completed to serve Fauldhouse and Livingston Station in 1957, to serve Bathgate and Winchburgh in 1963 and to serve Blackburn and Whitburn in 1965. To the West a new works to serve Cumbernauld New Town was constructed between 1959 and 1966 whilst at the same time Falkirk purification works was rebuilt to provide full treatment. To the East, meanwhile, the Esk Valley

trunk sewer was led to Wallyford sewage treatment works in 1971.

The Regional picture is summed up in the reports of the Forth RPB..

When first established:⁸

'Sewage and trade effluents in some cases was discharged untreated to tidal waters if practicable access was available while inland many populous places were served either by septic tanks or by sewage works twenty to fifty years old which for the most part were ruinous or grossly overloaded, or both. There were relatively few works constructed after the Second World War to a size and design capable of dealing with the large volumes of sewage resulting from improved post-war housing and water supply'.

Between 1958 and 1964 the population of the Forth RPB area increased by 1.5% but consumption of water rose by 18.5%. Overall, it was estimated that the gross polluting load had increased by 25% in the ten years 1956-1966. Meanwhile sewage treatment changed little, as is apparent in the following table:

TABLE 11.2: Sewage Disposal in the Forth RPB Area 1956-1966⁹

	<u>% Population</u>	
	<u>1956</u>	<u>1966</u>
Sewage discharged untreated to inland waters	6.1	0.1
" " " " tidal waters	55.2	58.3
" " after primary treatment to inland waters	13.3	9.1
" " " " " " tidal waters	11.0	5.3
" " " full treatment inland to	13.3	14.7
" " " tidal waters	1.1	12.5

The period before implementation of the 1965 Act saw little change in volumes of crude sewage being discharged, although most was transferred to tidal waters. An increase in the amount of full

treatment given was achieved by upgrading existing primary plants (such as in the example of Falkirk given above). After 1965 the coastal towns began to provide primary treatment following Stirling in 1964; Grangemouth in 1968, the town of Dunfermline (discharging to the Forth at North Queensferry) in 1972 and the City of Edinburgh in 1978.

As to the time required to effect improvements:¹⁰

'There is a fairly general recognition by local authorities that it is time for much needed improvements in sewage purification but there are three factors which operate against an immediate and widespread improvement. The first is the financial burden to be put on the ratepayer which necessitates a spreading of expenditure; second is the fact that firms of consultant engineers upon which the smaller authorities depend for designing their schemes have a great deal of work in hand already; thirdly, restrictions on capital expenditure are delaying the implementation of some completed plans'.

A particularly disappointing rate of progress was reported in 1960:¹¹

'In most cases there have been understandable reasons for the delay but from the viewpoint of the uninformed public, little progress would appear to have been made. Where, in regional schemes, there will be a heavy industrial participation it is recognised that a great deal of preliminary investigation and planning should be carried out and good working arrangements with the industries secured, particularly in the absence of any trade waste legislation'.

Of these factors contributing to delay, restricted capital spending appears to have been most serious: in 1969 it was regretted that once again central government was imposing restrictions:¹²

'This undoubtedly has had serious repercussions in the Board's area relative to proposals in respect of new regional works as well as in the instances of authorities desiring to carry out extensions to existing plants'.

Several of these constraints are apparent in the specific case

of the Burgh of Haddington, the impact of sewage discharges from there having been a problem for a very long time. The town first considered the problem in 1926 after the Council's first programme of house building significantly increased the volume of water-borne waste being discharged and had, in turn, provoked vociferous representations from a local angling association. Plans were drawn up for a purification works, the cheapest of a range of alternatives that included a trunk sewer to the sea. The County Council had declined to participate in the latter, taking the view that:¹³

'if money is to be spent on public health it would be better to continue the policy of improving the domestic water supplies and housing conditions which all tend to diminish disease, so making sewage less dangerous.'

Haddington Town Council also, apparently, saw the logic of this argument for nothing was to come of the planned sewage treatment works until 1958, at which time Lothian RPB initiated discussions on the installation of some treatment by the town. A primary treatment plant was opened in 1961. Plans for the second phase (full treatment) then appear to have been deferred by Government restriction of spending. No further action was taken in the 1960s. A difficulty with phase two of the scheme lay in the connection of a district of the town containing several trade premises producing significant quantities of waste. ACRPP had recommended that these premises divert their discharge to the town sewers thirty years before, but this had not occurred. Indeed, it was only when it was realised that such a connection was necessary to allow private housing development in the district that this extra load was diverted to the new primary treatment works, exacerbating the effect of its effluent on the river.

Lothians RPB finally lost patience after attempts to stimulate action failed, and refused consent to other new discharges in the area of the town until work on the full treatment plant began. This action had little apparent effect and the Town Council was, therefore, formally warned that if the sewage effluent did not comply with the Board's requirements by July 1973, a prosecution would be raised.¹⁴ It is said that members felt that the Town Council (which, as a small burgh, had no representatives on the Board) was deliberately ignoring them, and that there was an element of small burgh versus county authority rivalry (the RPB chairman at the time being an East Lothian County Councillor). Following the formal taking of samples in August 1973, the Board instituted proceedings. This meant a referral of the matter to the local procurator fiscal, who promptly referred the matter to Crown Counsel. Perhaps not surprisingly, in view of the Government's role in restricting public expenditure, the latter recommended that no action be taken. However, work did begin on the second phase of the works later that year.

A similar set of formal warnings was necessary to effect improvements in Edinburgh's sewage treatment, though in this case public pressure from residents of adversely affected areas also appears significant. The installation of a primary treatment plant for the city's wastes also marks changing attitudes to the estuary.

The City of Edinburgh

As the city expanded during the nineteenth century the Water of Leith was clearly the most convenient terminal for the drainage and

sewage of expanding suburbs so that this, added to the wastes of papermills upstream, rapidly led to the river taking the character of an open sewer. Legislation was brought forward in 1854 but proved ineffective. In 1864 the construction of an intercepting sewer was authorised to divert all discharges to the river between Roseburn and Leith Docks. This was duplicated and extended upstream to Balerno in 1894 at which time a body of Commissioners was established to administer discharges to the sewer. The quantities diverted away from the river by papermills were so large that this scheme included the construction of reservoirs to release compensation water in the headwaters at Harperigg, Threipmuir and Harlaw. These ensured the retention of 27 ml/d of clean water and secured the recovery of the river. Subsequently another of Edinburgh's urban rivers, the Stank Burn, was dealt with in a similar fashion (Figure 11.4).¹⁵

The success of the Water of Leith Sewer set the pattern for subsequent suburban development with parallel, intercepting sewers being laid down to the Pow, Jordan and Braid Burns. It was not until much later, however, that changes were made to the arrangements for the original old town. Until that time the appropriately named Foul Burn led the city's waste to sewage meadows at Craigentiny. In 1922 these were drained by connection to the sea. The meadows had been commended by the Royal Commission on Rivers Pollution Prevention in 1870 but to modern eyes the retention of an open sewer and the irrigation method of treatment into the third decade of the twentieth century seems extraordinary. A City spokesman said at the time, however:¹⁶

'it has to be remembered that this area was comparatively remote from Edinburgh and its suburbs, remote also from Portobello and Leith, and probably few people other than

Figure 11-4

19th Century Development of Edinburgh's Sewers

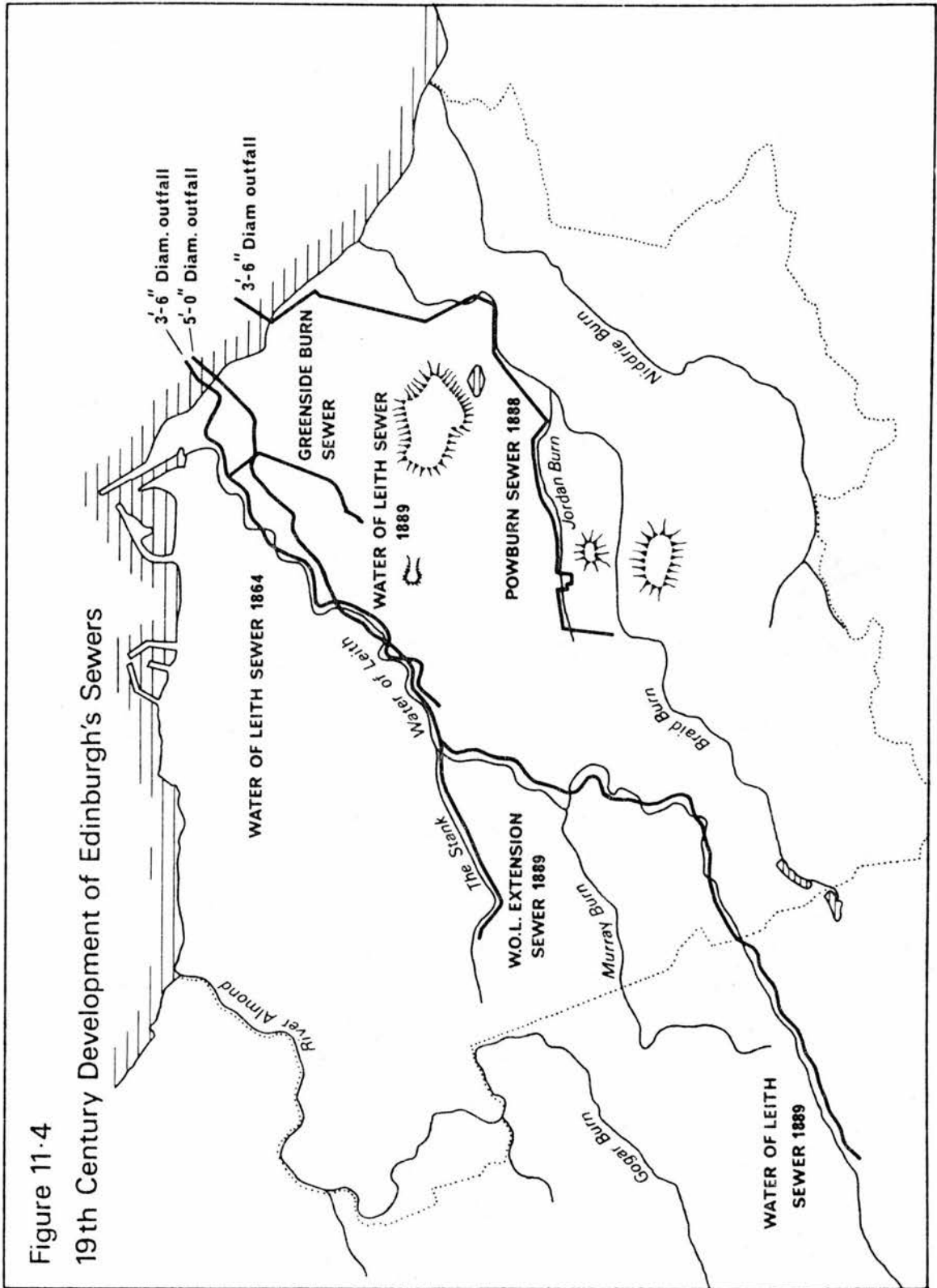
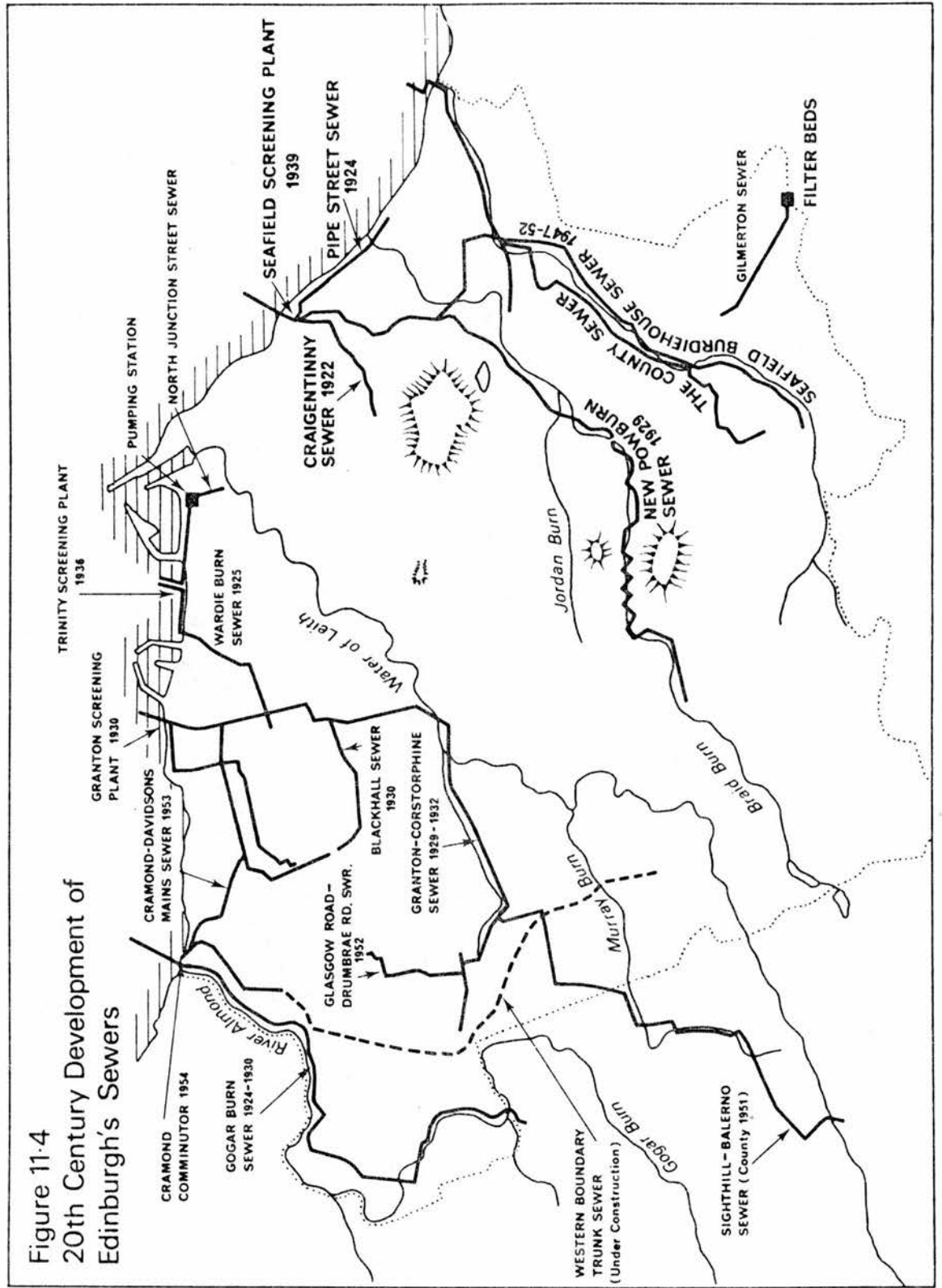


Figure 11.4
20th Century Development of
Edinburgh's Sewers



the residents of Restalrig experienced or realised the conditions which existed. It has to be remembered too that both population and water usage being less than they are today, the manifestation was less in volume.'

The next stage in the development of arrangements for waste disposal began in 1934, when a start was made on grouping the City's sea outfalls and the provision of screening and maceration for their content: a new outfall, clear of Newhaven and Granton harbours, was brought into use in 1935 whilst five previous outfalls were led to Seafield by 1949, the full execution of the latter scheme having been delayed by war. The new Seafield outfall took effluents 455 yards below the tidal mark, its location having been decided after extensive observation of off-shore currents so that,¹⁷

'little, if any, of the sewage discharged has subsequently been traced back to nearby shores. Formerly discharges from the individual sewer outfalls were frequent sources of complaint from Portobello residents and visitors.'

Thus Edinburgh's waste disposal needs had been met by diversion to the sea. Although specific provisions were included in the Rivers (Prevention of Pollution)(Scotland) Act 1951 to control the discharge of new effluents to the tidal waters of the Forth, powers to control existing discharges, such as Edinburgh's outfalls, did not come until 1966 when the Rivers (Prevention of Pollution)(Scotland) 1965 became effective.

The City had to address the problem of sewage treatment for the first time in over one hundred years. The Lothians River Purification Board, responsible for the implementation of the Act, surveyed the situation in advance of it receiving powers of control. In 1965 its

report contained the comment that coastal conditions adjacent to the City were frequently very bad when unfavourable winds and tides carried floating sewage from the outfalls to the shore. The Board concluded that primary treatment at a central point followed by discharge to the estuary through a new and much longer outfall was required. This view was conveyed to Edinburgh Corporation in November 1965. By February 1968 detailed designs were available for such a scheme, the new works and outfall to be at Seafield. The River Purification Board allowed five years for construction but, in the event, ten were required.

The project was delayed partly by a certain reluctance on the part of the City to spend the £11 million or so required but also partly because of Central Government's refusal to grant borrowing permission for such expenditure until 1971 in the light of restrictions on the growth of public expenditure then in force. Both problems were to some extent overcome by the vociferous protests of local people.

Unless some grant-aid was forthcoming from Central Government the scheme would add over thirty pence to Edinburgh's rates. As if this was not bad enough, there were several major capital projects competing for a limited amount of money. There was the Megget water scheme and the City was hosting the Commonwealth Games of 1970, for which a sports stadium and swimming pool of the highest international standards were required. Many saw the construction of a network of urban motorways as the most appropriate solution to existing and future problems of traffic flow whilst others sought to commit the City to

the construction of an opera house, again to the highest international standard, to sustain the credibility of the City's annual festival of music and the arts. Both of the latter projects were finally abandoned in 1976 after a decade of debate on the merits of each whilst these and the sewage works competed with the normal pressure on any City's budget from housing, social work and education. The City was not in a good position to meet such burgeoning demands; scope for further building within the City's boundaries having been all but exhausted and the scope for redeveloping sites in the City centre being somewhat limited because of its unique architectural character, so that rateable values were not expanding at the same rate as demand for new expenditure.

Protests over the lack of action came to a head in 1970. The Chairman of Lothian PRB was quoted as saying: ¹⁸

'Edinburgh has sat on this since 1958. It has been excuse after excuse every time they had come to us. Every other authority in this area has put its house in order, everybody bar Edinburgh. It is a sore point that the smaller members (of the RPB) can bring their house into order and the largest member is just kicking us around'.

Doctors at the City's Eastern General Hospital, adjacent to the affected shoreline, complained of the smell from the shore and accused Edinburgh of: ¹⁹

'powdering its nose Sic, through concern with its annual festival and neglecting to wipe its bottom'.

Mr. Gavin Strang, M.P. for East Edinburgh, was quoted as saying that the next council meeting must decide that a sewage works was their number one priority: ²⁰

'we will have no more talk about new motorways or an opera house'.

In the face of such a barrage of criticism, Councillor Jack Kane,

leader of Edinburgh's ruling Labour Party group, said that he regarded the building of a sewage plant as a first priority for the city and as more important than the proposed urban motorway.²¹

The following year the new Conservative Government lifted restrictions on capital expenditure affecting the project and construction began;²² but because of such delays and conflicting priorities eleven years passed between Lothian RPB forcing plans for improvement and their coming to fruition. Edinburgh's approach to the problem of waste disposal was to diver dirty water directly to the sea and to consider treatment only when legally forced to do so. The size of the works required to treat effluents militated against their construction earlier. Elsewhere in the Forth basin, the story is similar.

Trunk Sewers

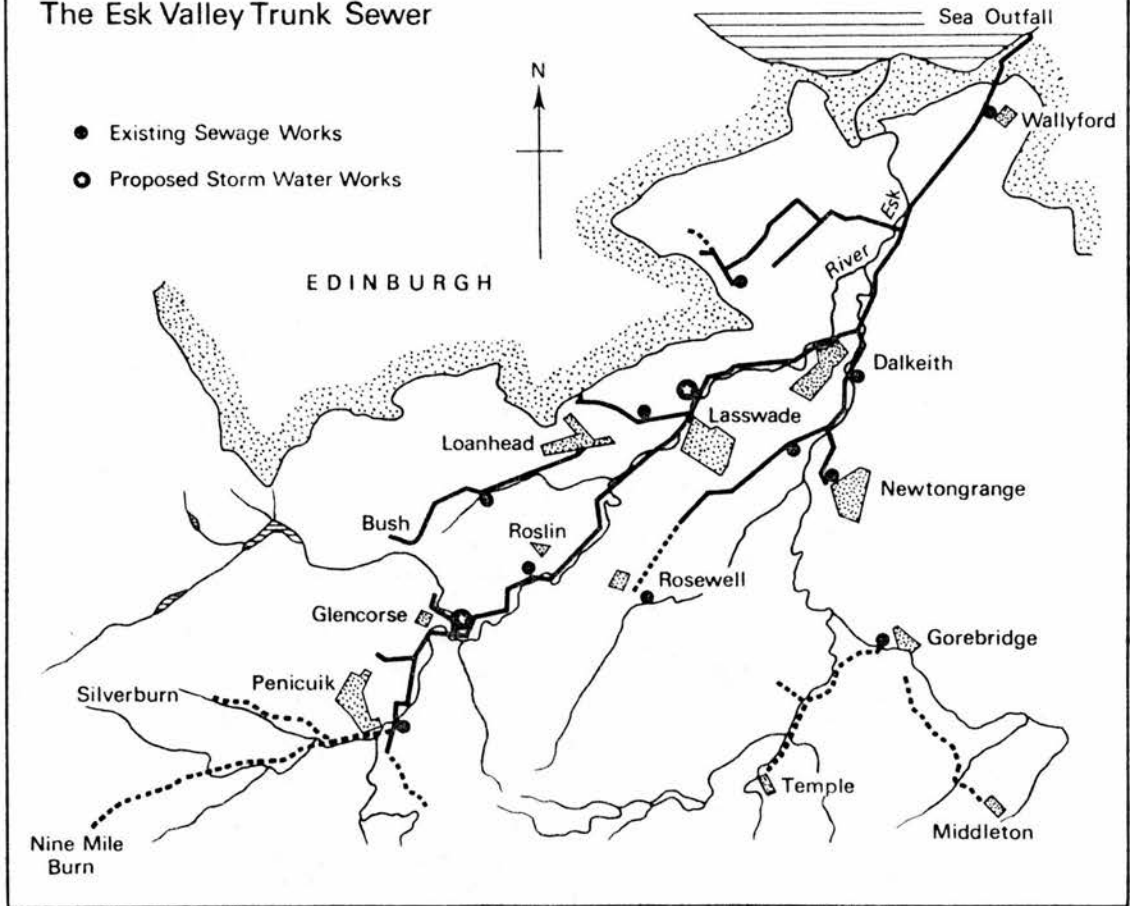
By way of response to increasing pressure from downstream landowners and in the context of the Rivers (Prevention of Pollution) Act 1876, the paper manufacturers of the river North Esk promoted a private Bill in 1878 of a similar nature to arrangements later made for the Water of Leith. It was proposed that the pollution problems of the North Esk would be solved by the institution of a Board of Conservancy Commissioners to construct and supervise the operation of an intercepting sewer running the course of the river from Penicuik to Inveresk.²³ This was opposed by the landowners largely because they would have to share the cost of solving the problem of paper wastes through membership of the proposed Board. They saw the problem as entirely one

for action on the part of the paper manufacturers.

Hence, when the Scottish Advisory Committee on River Pollution Prevention (ACRPP) came to review the state of the river in 1931, the wastes of paper mills and colliery washeries was such that the impact of poor sewage purification could hardly be perceived. Nevertheless, ACRPP urged the County Council, as pollution control authority, to effect improvements, but no action was taken until the Rural Water Supplies and Sewerage (Scotland) Act of 1944 offered the prospect of financial support.

In November 1945 Midlothian County Council convened a meeting of all sewerage authorities in the river basin.²⁴ Consultants were appointed to devise a scheme to relieve the river. They concluded that a scheme acceptable to both the authorities and mill-owners was impracticable and, since the former had no legal obligation to accept responsibility for the disposal of the wastes of the latter, alternative schemes were devised to deal with sewage only. After consultation with DHS, a scheme involving a valley level gravity sewer was adopted (Figure 11.5). This received grant-aid and, throughout the 1950s, the villages and burghs of the Esk basin were connected to the trunk sewer, so disposing of their wastes to the sea. Thus, although the problem of sewage discharge had been eliminated from the Esk by 1964, the essential problem of pollution in the river, the paper effluents, remained untouched and the outfall of the trunk sewer was a source of pollution of tidal water in the estuary at Musselburgh until a treatment plant was provided in 1971.

Figure 11-5
The Esk Valley Trunk Sewer



A similar set of circumstances pertain to the River Leven trunk sewer. Again, the initial proposal for such a project came in 1877 in the form of a private Bill which failed to reach the statute book. ACRPP recommended the revival of the project in 1932 so that Fife County Council opened negotiations with traders with a potential interest in 1933.²⁵

The scheme was not authorised until 1940, and the Local Act of authorisation gives a clue to the reasons for the delay. The County Council was empowered to control waste disposal to the Leven and Ore rivers. Trade effluents were to be received into the trunk sewer by agreement, subject to the discharger paying a share of the cost of the sewers and subject to the effluents complying with general regulations. Agreements between the County and seven existing traders were detailed in the Act.²⁶

Work on the scheme had to be deferred until after the war but the first phase, relieving the lower ten miles of the Leven and including a sea-outfall with screening plant, was complete by 1952,²⁷ and further phases were completed during the 1950s and 1960s with grant-aid, under the 1944 Act.

These case histories illustrate the adverse circumstances in which improvements have been made. The role of vigorous RPBs was clearly counterbalanced by the restricted availability of finance. The nature and pace of change was further hampered by the need to spread expenditure over a reasonable period and by the limited availability of professional design available to smaller authorities.

In many ways local sewerage authorities had to run quite hard to stand still in the face of almost universal pressure resulting from post-war improvements, rising standards of living and consequently rising per-capita consumption of water. The development programmes of successive governments, outlined in Chapter 4, also had their implications for sewage treatment: regional schemes were required to service growth areas.

Perhaps the most fundamental theme to be revealed, however, relates to a changing perception of appropriate waste disposal methods apparently brought about by the initiation of the system of RPBs. ACRPP found it quite acceptable to divert sewage to the sea; as this process continued and the quantities of water-borne wastes involved expanded, it became apparent that control of estuarial waters was necessary but in the light of previous policy, it was also apparent that the expense of so doing would be hideously large. This helps explain the delay in implementing the second phase of the law of pollution control in the 1965 Act.

Policy with regard to the quality of the waters of the Forth estuary is returned to below as if the clear message contained in 'Towards Cleaner Water' that the disposal of wastes to tidal waters remains the outstanding problem of pollution control in Scotland. Before leaving the work of local sewerage authorities, however, attention is now turned to sewerage, information on which has recently been made available albeit on a national scale and in a deliberately obscured form.

Sewerage Systems in Scotland

The excessively frequent operation of storm overflows installed in systems of sewers or at treatment works is an indication of overloading, or inadequate design, or both. In short, it is an indication of the efficiency of the system as installed. As such, attention was drawn to the problem of unsatisfactory storm overflows in the first edition of 'Towards Cleaner Water' (1972), where 163 unsatisfactory elements had been identified in 1968; 100 on sewerage systems, and the remaining 39% indicating overloading at treatment plants.²⁸

By 1975 (the reference date of the second edition) the number of unsatisfactory sewerage overflows had fallen to 87, but the number at works had increased to 45.²⁹ A working party had been appointed to examine the problem in detail and this reported in 1977.³⁰ A questionnaire on the matter had been circulated to local authorities in 1974 and it is entirely characteristic of the service in Scotland that³¹

'in order that the information supplied should be as frank and objective as possible, bearing in mind that some authorities might be reluctant to admit to possessing unsatisfactory overflows, an assurance was given that all information would be treated as confidential and that any particulars ultimately published would be in general terms only and that no indication of origin would be given'.

The extent of the problem was reported in terms of the type of authority. The proportions of outfalls either reported as unsatisfactory or unsurveyed, for each type is shown in Table 11.3.³²

TABLE 11.3: Distribution of unsatisfactory storm overflows by type of authority (1974)

<u>Sewers</u>	<u>% Unsatisfactory</u>	<u>% Unknown</u>
Cities	16	30
Counties	36	25
Large Burghs	26	11
Small Burghs	27	13
 <u>Sewage Works</u>		
Cities	0	0
Counties	10	10
Large Burghs	5	11
Small Burghs	16	2

In all there were 1,683 overflows discharging to inland waters and a further 442 to the sea. If it is assumed that attention had not been drawn to the unsatisfactory operation of those recorded as unknown, the principal problem area with sewers appears to be in the counties whilst the small burghs appear to have experienced most problems at works.

These figures reflect an inadequacy of the institutional structure pertaining to sewerage with the larger authorities (in terms of rateable value - the cities and large burghs) experiencing fewer problems than their weaker counterparts, and complement the views of the Forth RPB quoted above.

Towards Cleaner Water

As with the survey of sewerage overflows, every effort appears to have been made to avoid embarrassment to individual sewerage authorities in the assessment of their performance included in 'Towards Cleaner Water'. Local authorities received questionnaires from SDD, asking for details of their plant and its performance, as a preliminary to the second edition of 'Towards Cleaner Water'. It seems that this was the first occasion on which such an inventory had been made. Details remain unpublished but, instead, the extent to which river inspectors felt discharges to be 'satisfactory' (a concept which remains undefined) was tabulated (table 11.4).³³

In 1975, there were 296 discharges being made without treatment or after only primary treatment, all but 25 to the sea. Only 27 of these were considered satisfactory, indicating that the scant attention paid to short sea-outfalls in the past poses the largest single pollution problem remaining today.

With regard to sewage treatment works, however, 267 of the 654 effluents discharged to all categories of water were thought unsatisfactory, 234 of them to inland waters. Virtually all of these were small, local works treating less than 2500 m³/d, again reflecting a need for regional schemes and the position in the areas of small local authorities. No explanations are given for this poor performance but it seems fair to conclude, in the light of evidence given to the Wheatley Commission (Chapter 10), that many are either overloaded or improperly managed.

Table 11.4 Classification of Discharges of Crude Sewage and Treated Sewage Effluent, 1975.

River Purification Board	% of number of discharges designated 'satisfactory'
Banff, Moray and Nairn	61.8
Dee and Don	26.3
Tay	31.9
Forth	36.4
Lothians	43.9
Tweed	64.8
Solway	66.4
Ayrshire	8.9
Clyde	36.1
All Discharges	42.0

Source: SDD, Towards Cleaner Water 1975, HMSO, 1976, Table 7, p.27.

In 1975 the sewage treatment offered by local authorities was the largest conditioning factor on water quality: over 2 million cubic metres per day of effluent were discharged from over 1200 works as compared with just over 0.5 million cubic metres per day of trade effluents. Despite the extent of river inspectors' dissatisfaction it seems clear that much had been achieved since the institution of RPBs., the operation and policies of which are now considered. An independent review of the boards has been provided by F.H.Hubbard who visited RPBs between September 1967 and May 1968 and held a series of informal interviews.³⁴

River Purification Boards in Practice

He found that, because the prevention of pollution lacked the drama or the vote attracted by other aspects of local government, it had a low priority among councillors' interests and consequently membership of River Purification Boards frequently fell to the 'less experienced newcomer to politics' and those without much political influence. Partly because of this, partly because of the number of different authorities represented and partly because the control of pollution was a relatively small item in any council's annual expenditure, elected members were more likely to support the policies of the River Purification Board than to protect the council they represented. Boards were more likely to be influenced by the views of their constituent local authorities when additional expenditure was being considered, e.g., for new equipment or additional staff, than when more direct matters of policy on preventing pollution were being discussed.³⁵

Only where County Council representatives occupied most of the local authority seats, as in Ayrshire and Aberdeenshire, could the making of policy be dominated by elected members who had the interests of their own authorities in mind. Elsewhere, elected members rarely exercised their potential power to dominate voting on the Board. Occasionally, indeed, board members combined against a small burgh (which was ineligible for representation on the board) to force expenditure which would otherwise not have been forthcoming.

The remaining one third of the Board, appointed by the Secretary of State from nominations invited by SDD from interested parties and the river inspectors, were said to be of a higher calibre than the elected members for a number of reasons. Frequently they had a strong technical background and knew their industries well. For example, the works manager of Scottish Agricultural Industries (a subsidiary of the giant I.C.I.), an experienced industrial chemist, was appointed to the Lothians Board and a chemist from the Distillers Company had similarly been appointed to the Forth Board. As with most elected members, Hubbard found that these representatives of 'interests' did not seek to protect these at meetings of the RPB. Their principal value was said to be 'the opposition they may take with respect to control versus unemployment which is the common threat thrust at boards'. Such an argument was much more likely to impress local authority members who might not have the business acumen to know just how much it would cost to close a factory and re-open elsewhere.

Hubbard described consents and the conditions attached to them as a licensing system rather than the definition of the polluting

offence for a particular discharge. He stressed the extent to which conditions attached to consents were subject to negotiation on a case by case basis and the extent to which River Inspectors were 'highly individualistic' in establishing them. Although the methods used to set conditions included the application of sets of standard criteria and empirical knowledge, an important part of the process was said to be an assessment of the levels that were politically and economically obtainable, an expectation that higher standards were possible in the future, and a concentration on achieving the practicable. As a result, long-term aims remained rather in the background. Hubbard thought that the River Inspectors were anxious to convey the impression that consent conditions resulted from an application of sophisticated methodology rather than empiricism, but he was sceptical about the extent to which this was possible in view of the difficulties of raising finance for local improvements and the largely unpredictable actions of farmers and industrialists.³⁶

In the winter of 1967 the River Purification Boards were very much concerned with the thousands of discharges which had been made the subject of the consent procedure by virtue of the 1965 Act. No Board had managed to deal with all the applications received after the Act while some were concerned at the number of dischargers who had apparently made no application. Meanwhile, applications concerning 'new' discharges continued to arrive and these were being given priority.

Hubbard felt that an unofficial perusal of applications by RPB staff before they were formally presented to the Board for consideration

could be a very important part of the whole process and that the cordiality of relationships between staff and dischargers was paramount in developing the conditions prescribed. He also pointed to the infrequency of appeals against the conditions imposed (seven) and the paucity of prosecutions (five). River Inspectors appear to have agreed with C.P.James of Solway RPB:³⁷

'I find that we can get far more done by persuasion than by taking legal proceedings'

'Our policy is not to wield the big stick over offenders but co-operate with them in solving their problems and advise them'.

Whilst J.I.Waddington of the Tweed RPB had published the view:³⁸

'prosecution is tantamount to a confession of failure as river boards should be able to carry out functions in a spirit of co-operation'.

Hubbard also noted the extent to which consents were potentially an important element in 'development' planning; for example, SDD consulted the Forth and Lothians Boards respectively at an early stage in the planning of new towns at Cumbernauld and Livingston. While the conditions of consent and level of waste treatment could condition the size and scope of developments, in practice it was unlikely that this was ever so, especially with regard to prestige projects promoted by the Government. The position was more likely to correspond with his description of the circumstances of some other industrial developments, that 'local officials and central government, in their enthusiasm to attract industry may conveniently forget an industry's influence on water quality and announce a plan to establish a plant which no pollution officer would likely denounce publicly'.³⁹ One officer who was interviewed had learnt of plans to construct a petro-chemical plant by reading of it in the local press.

Hubbard had to conclude that the extent to which the voices of those concerned with the prevention of pollution might be heard at the planning stage, depended, in fact, on river inspectors keeping 'their ear to the ground' and not on any systematic procedure. In this view, the active inspector kept abreast of plans and developments while travelling through his area and through his contact with planning officers and other development groups needing approvals of one kind or another.

The Town and Country Planning (Scotland) Act 1973 remedied this situation; henceforth RPBs were to be consulted in the preparation of structure plans. This apart, however, a second series of informal interviews in 1975/76 conducted by Coppock and Sewell substantially confirmed Hubbard's synthesis of RPB policy, particularly with respect to the adoption of a strategy of 'purification by persuasion' and the role of the personality of individual river inspectors.

The latter point may be substantiated by referring to the actions of two adjacent RPBs as revealed in their annual reports.

The Lothian and Forth River Purification Boards compared

The areas of these boards both contained approximately 700,000 people, but the Forth RPB area was (before the amalgamation with Lothian in 1975) broadly speaking, twice as large and, whilst its waters received two-thirds of the volume of sewage, they also absorbed more than thirty times as much industrial effluent.

In this light it is surprising to find that the Lothian Board had consistently spent twice as much as the Forth Board and employed twice as many staff, for example, Table 11.5 depicts expenditure and staffing levels for the years 1964 and 1970.⁴¹

TABLE 11.5: Expenditure and Staffing of the Lothian and Forth RPBs.

	<u>1964</u>		<u>1970</u>	
	<u>Expenditure</u>	<u>Staff</u>	<u>Expenditure</u>	<u>Staff</u>
Forth	£10,783	7	£27,734	14
Lothian	£28,171	14	£60,692	27

Clearly these differences are not a reflection of the problems that each faced; instead, they reflect different policies particularly concerning the monitoring of water quality.

The differences in policy are most clearly seen in the development of the staffing structure of each board, shown diagrammatically in Fig.11.6. From the outset, each board had three statutory officers, a river inspector, a clerk and a treasurer and these are not included. Clearly the Lothians Board gave hydrological and biological research a much greater priority than did the neighbouring Forth RPB. The respective chief technical officers remained the same over a substantial part of the Boards' histories and it would seem that the river inspector of Lothians was much more successful than his colleague in Forth in persuading his board of the need for a large research effort. In this he was perhaps helped by the much higher turnover of board members, particularly with regard to the influential

post of chairman and specialist members appointed by the Secretary of State.

In broad terms Covill seems to have interpreted Section 17(1) of the Rivers Act 1951 in a far more liberal manner than the Forth Board:

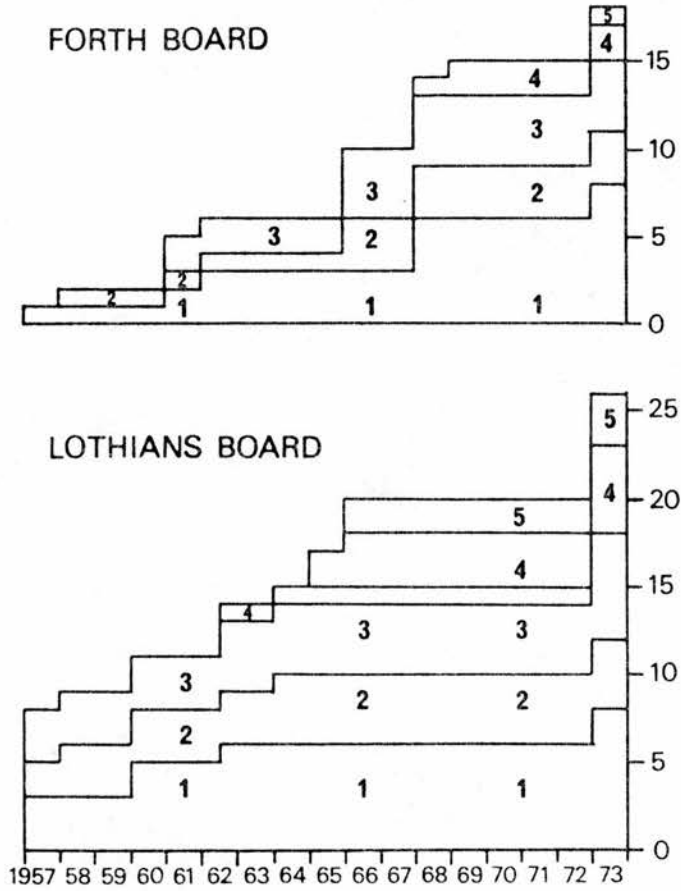
'It shall be the duty of the authorities ... to provide the cleanliness of the rivers and other ... waters ... in their areas, to conserve so far as practicable the water resources of their areas, and to exercise for these purposes the functions conferred on them by this Act.'

Differences in the interpretation of this phrasing are apparent from the earliest years, particularly with regard to two themes; firstly, the hydrological survey of river flow and the estimation of the water resources of each basin, and secondly, with regard to the survey of the tidal waters of the Forth Estuary. The Lothian Board began planning a programme of river gauging in 1957. The Forth Board began to consider the matter in 1961 but no more than preliminary preparations had been made by 1963, when a meeting was held in Edinburgh to discuss the establishment of a national network of gauging stations and possible government assistance. The Forth Board decided to await detailed proposals for their area from a working party especially established for the purpose and took no further action on the matter until 1965 by which time the Lothian Board had installed 12 gauges.

The Lothian Board's concern with the water resources of their area is apparent through the mention in its annual report for 1962 of a 'water use balance sheet', of which Figure 11.7 is an illustrative

Figure 11· 6

A Comparison of Staff Employed by Forth and Lothians River Purification Boards



- 1 Chemists & Laboratory staff
- 2 Secretaries, handymen & river wardens
- 3 Field Inspectors
- 4 Hydrologists
- 5 Biologists

Figure 11.7

HYDROLOGICAL SURVEY
Water Use Balance Sheet

River Tyne Catchment
Schedule 4

Hydrometric Area No. 20

Map Ref. No.	Name	Place	Where Taken	Grid Reference	Water Taken M.G.D.	Water Discharged M.G.D.	Where Discharged	Grid Reference	Remarks
97	Midlothian County Council	Pathhead Sewage Works	—	—	—	0.04	Tyne Water	NT 390645	Sewage Effluent
98	East Lothian County Council	Ormiston Sewage Works	(Tyne Water)	—	—	0.08	Tyne Water	NT 417690	Sewage Effluent
99	M. A. Slight, Esq.	North Mains Farm	(Bellyford Burn)	NT 420690 NT 415698	0.15	—	—	—	Irrigation
100	East Lothian County Council	Pencatland Septic Tanks	Kinchie Burn	NT 438667	—	0.06	Tyne Water	NT 443690	Sewage Effluent
101	Scottish Malt Distillers Ltd.	Glenkinchie Distillery	Stobshiell Reservoir	NT 501622	0.10	0.05	Kinchie Burn	NT 445668	Process Water
102	East Lothian Water Board	(Stobshiell Reservoir)	Lammer Loch	NT 515634	0.50	—	—	—	Loss to Catchment 0.03
103	J. Stevens, Esq.	Begbie Farm	River Tyne	NT 487709	0.15	—	—	—	Irrigation
104	A. J. Thomson, Esq.	Samuelston	River Tyne	NT 493714	0.30	—	—	—	Irrigation
105	W. C. Ritchie, Esq.	(Dovecot Market Garden)	River Tyne	NT 500717	0.15	—	—	—	Irrigation
106	East Lothian Water Board	(Clerkington Market Garden)	River Tyne	NT 505720	—	—	—	—	Loss to Catchment 1.00
107	East Lothian County Council	Hopes Reservoir	Hopes Reservoir	NT 550620	1.00	—	—	—	Sewage Effluent
108	Adam Paterson & Sons Ltd.	Gifford Sewage Works	—	—	—	0.04	Gifford Water	NT 533680	Mill Lade
109	W. B. Morrison & Co.	West Mills	River Tyne	NT 512733	6.00	6.00	River Tyne	NT 518738	Water Wheel
110	Montgomery & Co. Ltd.	(Poldrate Mills)	River Tyne	NT 518740	10.00	10.00	River Tyne	NT 517743	Sewage Effluent
111	Haddington Town Council	Bernaline Mills	—	—	—	0.20	River Tyne	NT 533745	Irrigation
112	J. Robertson, Esq.	Haddington Sewage Works	River Tyne	NT 548752	0.15	—	—	—	Turbine Power
113	Dr. J. C. H. Dunlop	Beanston Farm	River Tyne	NT 548752	10.00	10.00	River Tyne	NT 550753	Irrigation
114	Mrs. N. Wright	Stevenson House	River Tyne	NT 577760	0.15	—	—	—	Irrigation
115	D. McFarlane & Sons	Overhailes Farm	River Tyne	NT 590767	0.15	—	—	—	Sewage Effluent
116	East Lothian Town Council	The Orchard Market Garden	—	—	—	0.05	River Tyne	NT 593774	Irrigation
117	National Trust for Scotland	East Linton Sewage Works	River Tyne	NT 593776	0.30	—	—	—	Water Wheel
118	D. G. Tweedie, Esq.	Houston Mill Market Garden	River Tyne	NT 593778	10.00	10.00	River Tyne	NT 597779	Irrigation
119	W. Hamilton, Esq.	Preston Mill, East Linton	River Tyne	NT 600775	0.30	—	—	—	Irrigation
120	G. B. R. Gray, Esq.	Phantassie Farm	River Tyne	NT 598777	0.30	—	—	—	Irrigation
121	J. M. Cochrane, Esq.	Preston Mains Farm	River Tyne	NT 610783	0.30	—	—	—	Irrigation
121	East Lothian Water Board	The Knowes Farm	River Tyne	NT 663663	1.50	—	—	—	Loss to Catchment 1.50
		Whiteadder Water	Whiteadder Water	TOTAL	41.50	36.52	—	—	—

Water Use Balance Summary

	M.G.D.
Water Taken	41.50
Water Returned	36.52
Deficit	4.98
TOTAL	41.50

Approx. River Dry Weather Flows

	M.G.D.
Saltoun Hall	5
Spilmersford Bridge	7
East Linton	17

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extract. A report was presented in accordance with the methods employed by the Ministry of Local Government in England such that it seems clear that Covill, at least, looked forward to a similar role as was about to fall to river authorities in England and Wales. The conditions reported for the four river basins within the Board's area certainly seemed to demonstrate a case for wider powers. In the Almond, the North Esk and Tyne basins, a reduction in the purification measures was necessary and that cost could be achieved if extra water could be found for the dilution of discharged wastes, such as continuing the discharge of pit wastes after collieries had ceased working or, as was the case for the Water of Leith, by building reservoirs to augment the dry weather flow. It was argued that a policy of river regulation might reduce the cost of several sewage treatment projects then planned.

Covill had publicly expressed this view two years earlier when he pointed out that many rivers in the Central Belt of Scotland were being subsidised by pit waters to a significant extent. As and when these collieries closed this extra flow would be lost.⁴³ Therefore, he argued unless control of abstractions was granted to the river purification boards, the derivation of standards of treatment would become more and more difficult as dilution was reduced and as private abstractors increased for agricultural and industrial purposes. It was possible that some rivers or stretches of rivers could be denuded of water completely.

The control of new discharges to the tidal waters of the Forth enacted in the Rivers Act 1951 finally came in the Firth of Forth

(Prevention of Pollution)(Tidal Waters) Order 1958, which was originally intended to come into effect in March 1959. Both Boards instituted surveys of their respective portions of the estuary in August and September 1958. The Lothians Board took 4,200 samples and these were sent for chemical, bacteriological and biological examination. More modestly, the Forth Board measured temperature, salinity and dissolved oxygen at an unspecified number of points. The different approaches continued until the two boards merged. Both boards purchased survey launches, but the Forth's launch sank at its moorings and was out of commission for the whole of 1962, whilst the Lothians Board began biological survey in addition to chemical, of their part of the estuary in 1964. Representations were made to the Secretary of State to extend the control of the Boards remit and this was successfully achieved by the Firth of Forth (Prevention of Pollution)(Tidal Waters) Order 1972. The Order also extended the Boards jurisdiction over existing discharges to the estuary as authorised by the Rivers Act 1965.

If the Forth Board appears somewhat parsimonious in the extent of its estuarial research it was certainly not inactive in protecting the existing state of the waters. For example, in 1964 the South of Scotland Electricity Board announced plans for a major thermal power station at Longannet. Seventy-two million gallons of cooling water would be discharged. At this point the estuary was approximately two miles wide and opposite the point where effluents from the largest chemical complex in Scotland at Grangemouth were discharged to join the effluents of the Carron paper mills. Added to this were the sewage effluents of the Falkirk and Grangemouth areas,

designated a growth area by the White Paper on development in 1963. Fears were expressed that this massive quantity of relatively hot water would amount to a lethal last straw for salmon passing up and down the Forth.⁴⁴

By 1966 the disposition of heat was being studied in detail by SSEB in conjunction with the University of Strathclyde. A model of the estuary had been constructed to assess the effect of different points of discharge. The full effects of warm water on the concentration of dissolved oxygen could not be modelled but it had been calculated that the increase of temperature should not reduce the minimum oxygen concentration since the discharge would be made at a point in the estuary where concentrations were rising above the minimum level upstream.

If no further action was taken, however, the area of substantial de-oxygenation might be considerably extended and this provided the incentive for several significant improvements. In 1967 a proposal was discussed and approved in principle for the waste of I.C.I.'s plant at Grangemouth to be dumped down a long outfall to a deep water channel.⁴⁵ The discharge was being made to the mouth of the River Carron where it acted as a toxic barrier to the passage of fish and had been mentioned by ACRPP as a significant problem thirty years before. As mentioned above, several local authorities also co-operated in the reconstruction of treatment plant or its provision for the first time. By 1971 the Board could report its belief that the improvement following these schemes would more than match the increased rate of de-oxygenation that an increase in

the temperature of the estuary might engender.

Thus, the policies of the two boards are seen to have differed markedly in a manner not entirely related to the problems that each faced. The emphasis put on research and the use of information so collected to suggest wider measures of water management is entirely consistent with the movement, reviewed in Chapter 9, towards a wider role for the boards. On the other hand, the role adopted by the Forth Board as principal voice arguing for a halt to a decline in Forth salmon stocks illustrates the attitude that eventually prevailed - that RPBs could perform most effectively as semi-autonomous agencies, detached from other facets of water management. Such a conclusion is further sustained when the Forth Board's view as to the further development of the Basin's water resources for purposes of public supply, as recounted in Chapter 8, is recalled.

The policies of both boards at least appear to have been successful in their own terms. By contrast, the Dee and Don River Purification Board engendered some considerable controversy through the application of its policies and this ultimately led to an official condemnation by the Scottish River Purification Advisory Committee. As elsewhere the problems of the particular area that led to this unique event - the lower Don - had a long history. Unlike the Lothian and Forth Board's, however, a District Salmon Fishery Board retained a strong and active interest in seeking solutions and this ultimately led to the Dee and Don RPBs public disgrace.

Pollution of the Lower Don

The condition of the Lower Don had been causing concern for some years but matters came to a head in a series of unusually dry years beginning in 1971. Turing reported in 1949 that:⁴⁷

'it seems likely that the salmon runs up the Don are much less than they should be and that this state of affairs is due largely to pollutions which occur mostly in the lower reaches ...'

Principal problems were the discharge of crude sewage and the effluents of paper mills, and Turing felt that⁴⁸

'the Don appears to be on the border line between a fairly pure and a badly polluted stream dependent on the height of the water. It is urgent that steps should be taken now to minimize the pollution before it gets beyond recovery ... This is a case where a stitch in time may save very serious trouble in the future'.

Twenty years later Aberdeen County Council had begun to lay a series of interceptor sewers leading to a point near Persley Bridge at which it was intended to construct a regional purification works. Work began on the sewers in 1967 but the first phase of the treatment plant was not completed until 1971.

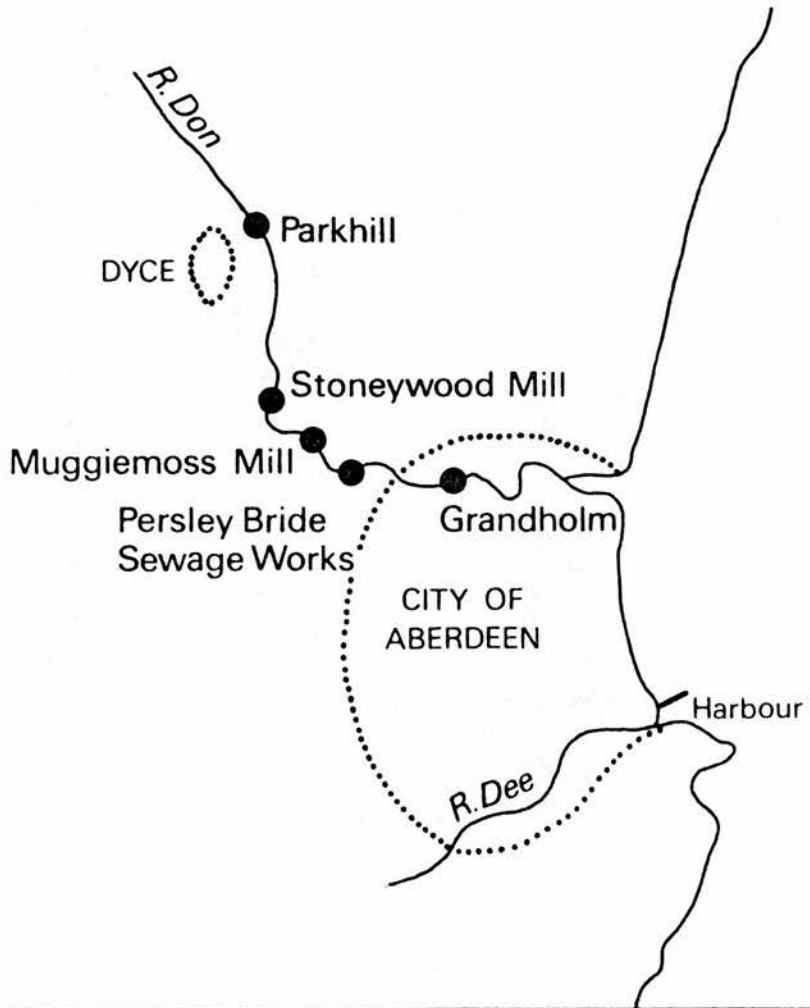
The Don District Salmon Fishing Board was by this time impatient, having kept an eye on *levels* of pollution over the years and having made reports to the Dee and Don RPB when it felt appropriate to no obvious effect. In 1971 it succeeded in drawing the attention of the Secretary of State to the matter and a letter was sent by SDD in May of that year to the RPB, referring to the state of the river, expressing concern and asking for a statement of the Board's policy for further improvement. In June the RPB was quoted in the local press as not

satisfied with the actions taken by two paper mills to control pollution on the lower reaches of the river.⁴⁹ In August a lack of fish was reported and blamed on heavily polluting trade discharges to the river;⁵⁰ and in September, the angling clubs of the area called for stronger action on the part of the RPB.⁵¹ The Board had succeeded in devising a satisfactory solution to two major problems: Lawsons of Dyce, a major meat processor, was about to open a privately constructed trunk sewer to the sea to relieve the Don and it had been agreed that the effluent of Ross Poultry Ltd. would be accommodated by the later phases of the Persley works.

In October 1971 the Don Fishery Board undertook two publicised experiments which seemed to prove that fish could not survive in the Lower Don and that low water was not the sole cause of poor fishing. Industrial effluent was said to be the key factor and Ross Poultry was singled out for particular criticism by the press. The fishery board was, however, somewhat hesitant to take any more overt action in protest. Its members felt that their position as an elite group might well have been counter-productive and that they could not successfully form the nucleus of an effective pressure group. Instead, they attempted to apply pressure by way of their personal contacts, approaching George Sharp, chairman of SRPAC, the Duke of Edinburgh and the Secretary of State.⁵² These contacts probably brought the issue to the attention of SDD and SRPAC in the first place, but it was the Aberdeen and District Angling Association that brought matters to a head.

The association of angling clubs represented the interests of thousands of members and had considerable assets, riparian holdings and

Figure 11.8
Lower Don Locii



expert local knowledge at its disposal, even to the extent of including a professional public relations officer amongst its ranks. As a result, it had real (non-party) political influence through a widespread network of contacts and through access to the local press. In its view, pollution of the Don had progressively worsened since the war, primarily because of new processes adopted by the paper mills of the river. The Association had long been interested in the (persistently delayed) fortunes of the Persley sewage works and other problems of effluent disposal. In its view, the RPB had been 'comparatively ineffectual', having been afraid to prosecute large industrial companies because of the large sums of money which would be required to effect remedial action and the dependence of the area of these firms.⁵³

The RPB's annual report for 1971 (published in May 1972) responded to this barrage of criticism by including figures purporting to show how the level of pollution measured in the river had decreased. But the following month a large-scale fish-kill occurred in the river and this, combined with the effects of another particularly dry summer, brought more vociferous complaints than ever. The angling association was aware of the salmon fishery board's attempts to persuade central government to exert some pressure but saw that these were not succeeding. The Association therefore convened a public meeting which achieved a 'very high turnout' and was followed by the promotion of another, larger, public meeting under the banner of a 'save the Don' campaign nine months later in March 1973. Throughout the remainder of 1972 considerable public interest was aroused through such things as the appearance of the Association's president on local television. The District Salmon Fishery Board re-iterated its claim that salmon were

unable to use the Don because of the RPB's failure to deal with pollution.⁵⁴ In September, three RPB members were reported to have protested vigorously to their colleagues at a meeting of the Board over the discharges from the paper mills, and the delay in connecting the Ross Poultry factory with Persley sewage works.⁵⁵ The angling column of the local newspaper was severely critical of both the RPB and the District Salmon Fishery Board, claiming that there had been no improvement in the Don since 1962.⁵⁶ In October, the latter sent a fish found dead in the Don to the Department of Agriculture and Fisheries' research station at Torreyburn, Aberdeen, and that apparently led to a visit by the Scottish Inspector of Salmon and Freshwater Fisheries, who subsequently described the state of the lower reaches as 'disgraceful' and in the worst state he had ever seen in his career. Meanwhile, a report on the Don was sent to SDD by Professor Wynne-Edwards of the Zoology Department of Aberdeen University, and a member of the Royal Commission on Environmental Pollution. Later in the month, the president of Inverurie Angling Association, a county councillor, kept the controversy alive by writing a letter to the local press condemning the state of the river.⁵⁷ In November, the RPB started proceedings against four riparian proprietors over sewage effluents from their properties, somewhat insensitively including that of Lord Forbes, the chairman of the District Salmon Fishery Board (an action that was unsuccessful as it could not be proved that he had been responsible for the incident).⁵⁸

Further pressure was put on the RPB when it became known that the North-East of Scotland Water Board was considering abstraction from the River Don. This would, of course, further reduce the water

available for dilution and enforce a revision of the standards of effluent treatment required both up and downstream of any abstraction point. The RPB decided to prosecute Ross Poultry Ltd. and sent the case to the procurator fiscal, who apparently replied that an action was unlikely to succeed because the RPB had allowed the alleged offence to take place for some considerable time and the matter went no further.

A public meeting was held in Aberdeen in March 1973, and was said to have been a 'good meeting' at which a 'tremendous amount of public feeling, not just angling' was voiced. On April 3rd, the District Salmon Fishery Board asked Dr. Mills of Edinburgh University's Department of Forestry and Natural Resources (and on frequent occasions a consultant on fishery matters to the Anglers Co-operative Association) to make a study of the Lower Don. A report of the campaign meeting was sent to the leaders of the three main political parties, local MPs took up the issue and one was reported on April 7th to have accused SDD of being negligent. There was, however, no need for questions to be asked in Parliament as SRPAC was commissioned to conduct its inquiry on April 16th.⁵⁹

A sub-committee headed by the Chairman Mr. George Sharp, visited Aberdeen on the 10th and 11th of May. An examination of hydrological records revealed that the dilution water available in the river over the previous two and a half years, and in particular the preceding twelve months, had been exceptionally low and the ability of the river to accept polluting discharges had therefore been much less than normal. In October 1972 the lowest flow ever recorded had occurred, of 67.5 m.g.d. as compared with the long-term average of 420 m.g.d. and

the average flow in the twelve months May 1972 to April 1973 was a mere 33% of the latter figure. In this context, a constant pollution load had produced a deterioration in the condition of the river.⁶⁰

Clearly there was little the RPB could do about the low flow, but the Sub-committee closely examined the four principal discharges into the affected section of the river (Figure 11.8). At Parkhill, upstream of the four outlets, the water was clear and sparkling, with a dissolved oxygen level generally at or about saturation. The river remained in this eminently satisfactory condition for two miles downstream until at Stoneywood it was joined by a lade from a paper mill, the effluent from which contained a substantial load of clay and other pollutants. The quality of the river then deteriorated further as it received fibre-laden effluent from Muggiemoss Paper Mill and then feather, offal and blood from the Ross Poultry works. The effect of these discharges could be clearly seen when BOD level and proportions of suspended solids at Grandholm, five miles downstream, were compared with those at Parkhill. In the lower range of flows, the value for BOD and suspended solids had been raised by about 15 and 20 parts per million respectively. They were still well within the Royal Commission's standard of 20 and 30 parts per million respectively, provided that adequate dilution was available (the Royal Commission having assumed minimum dilution of eight times the volume of the effluent).

The Fishery Board told the Sub-committee that salmon catches in one stretch (belonging to Lord Forbes its chairman) had fallen from 200 in 1959 to 20 and 25 respectively in 1971 and 1972. Whilst SRPAC was aware that salmon catches over the whole of Scotland were

generally down over the same period, severe local pollution on the Don had produced an adverse effect on salmon runs. The Inspector of Salmon Fisheries for Scotland had expressed the view that it was the fibre portion of the effluents from the paper mill that seemed directly detrimental to fish life. A contributory cause of death was de-oxygenation. No clear evidence existed on the state of trout and coarse fisheries, but the Sub-committee accepted Dr. Mill's conclusion that on April 3rd 1973 (when he had conducted his survey) conditions in the Lower Don were such that there was no possibility of it being of any value for angling. This supported the Angling Association's view that, to all intents and purposes, 'the river was now dead'.

Ross Poultry Ltd. were slaughtering some 27,000 birds a day to supply the market for oven-ready poultry. Although the vast bulk of feathers, offal and blood was collected for conversion to protein meal, the firm had been negotiating 'for some time' with the County Council to have wash waters accepted into Persley sewage works; but this request had been refused until such time as the firm installed better screening arrangements for the wash waters.

The Muggiemoss Paper Mill produced large quantities of paper and board. Partial treatment facilities had been installed during the mid-1960s but the Sub-Committee believed that these facilities had been installed more to recover fibres economically than to minimise the polluting effects of the effluent on the river. Even so, about 75% of the discharged solids, said to be about 100 to 150 mg per litre, was fibre, and although a photoelectric monitor had been installed to record fluctuations in solid content, this had proved unreliable so

that neither the company nor the RPB really knew the solid content of the discharges with any certainty.

The Stoneywood Paper Mill was engaged in the production of much higher quality papers and its discharge accordingly contained clay rather than fibres; indeed, solids were said to consist of 95% clay or other mineral matter. Here, too, a monitor to record solids was calibrated incorrectly and reliance had been placed on spot sampling.

The Sub-committee then turned its attention to the total pollution load being placed on the river and collated a series of tables which showed an apparently appreciable reduction in the total quantities of BOD (75% reduction) and suspended solids (80% reduction) discharged from all sources daily to the river between 1957 and 1973. A substantial part of this reduction could be attributed to the removal of Lawsons' effluent direct to the sea. By comparison with the industrial discharges, pollution from domestic sewage was very small, and had never been a significant factor in the overall problem.

The effect of these values of the total load of pollutants on the quality of river water was then calculated for different levels of dilution. Comparison of these theoretical expectations of river water quality with real samples revealed wide discrepancies which could only be explained by a serious error in the RPBs estimation of the pollution load on the river. In fact, the true figures suggested that the pollution load from the main industrial discharges could be twice as high as the value claimed for them. This finding did not surprise the Sub-committee, for it had become clear that neither the quantity nor

the quality of effluents discharged had ever been satisfactorily measured.⁶¹ The measurements by the paper companies were inadequate while the form of consent issued by the RPB apparently did not require the calculation of the mass discharge to the river. Indeed, SRPAC reported that the form of consent agreed between the mills and the RPB had 'never enabled the Board to calculate' the mass discharge, nor was the flow of water in the mill lades known with any certainty.

A more difficult problem was the fact that the pollution load discharged to the river by the mills fluctuated widely owing to irregularities and disturbances in production and the system of occasional samples adopted by both parties was never likely to take account of such fluctuations. In the Sub-committee's view, 'the need for this information could have been seen before now' and it was obviously important that full information on the volume and strength of effluents should be obtained without delay. Apparently the paper companies had claimed that the lades themselves were the points of discharges to the river and not the waste disposal conduits to them, so that all the RPB would legally do was to sample the diluted effluent in the lades rather than the effluent itself. The Sub-committee pointed out that directions could have been given to the companies under Section 18/4 of the 1951 Act, which states that a river purification authority may give directions requiring any person who in their opinion is abstracting water from any stream in the area of the authority in quantities which are substantial in relation to the flow or volume of the stream or is discharging effluents into any such stream to give such information as to the abstraction or discharge at such times and in such form as may be specified in the directions.

Such directions are subject to the right of appeal to the Secretary of State as to their 'reasonableness'.

The Sub-committee examined proposed improvements in some detail and calculated their effect on water quality. It concluded that they were unlikely to be sufficient to result in satisfactory conditions when the level of water in the river was low and were therefore not acceptable as a final solution. The Sub-committee approved the river inspector's target for water quality at Persley Bridge of 4 m.g./litre BOD and 10 mg/litre suspended solids and calculated that, assuming full treatment to Royal Commission Standards of domestic sewage and effluents from the Ross Poultry works, the river could absorb no more than a total of 1.1 tons per day BOD and 2.8 tons per day suspended solids (compared with the actual figures for the two mills in May 1973 of 3.8 and 6.38 tons respectively). The companies plans could, however, serve as the immediate target for effluents from the paper mills although the resulting discharge would be below the Royal Commission Standard for the volumes of effluent expected in 1975. The Sub-committee felt that the mills would have no difficulty in achieving the target figures for suspended solids, but a reduction in BOD might prove much more difficult. Biological treatment at the mills (and at the company's expense) might be necessary.

The alternative solution of constructing a trunk sewer to the sea was also considered. The estimated cost of some £1 million would, however, have to be borne by the paper companies because the local sewerage authorities had already made other arrangements. Since the companies had already invested substantial sums in measures to treat

effluent and since there was no technical obstacle to the further treatment of their effluents in situ, the Sub-committee saw no particular advantages in this solution.

In summary, there was no doubt that at the time of the Sub-committee's visit the quantities of industrial effluents discharged to the lower Don had caused 'the most offensive pollution', particularly at times of low flow, and that the public indignation which it had engendered was certainly justified. There was no doubt that the amenity offered by the river and its fishings had suffered severely in consequence.

Since its inception in 1957, the RPB had succeeded in reducing the burden of pollution borne by the river but these efforts had largely been negated by the well below-average flows of the previous two years. Nevertheless, the consent conditions set by the RPB could never have produced acceptable levels of water quality in the river whenever flows were much below the long-term average. The normal practice of setting conditions in relation to the minimum dilution available in the river had not been followed. The existing consent conditions could not be enforced satisfactorily under the arrangements for sampling then used and without any suitable means of measuring flow in the mill lades. The Board had failed to provide sufficient staff or equipment to deal adequately with the problem of pollution in the lower Don.⁶²

The Sub-committee was disappointed but not surprised that the statements made by representatives of the paper companies concerning the pollution load from their plants did not seem to accord with the

facts. While it accepted that the companies themselves may not have the means of knowing with any degree of accuracy what they were discharging to the river, it stressed that the volumes and strengths of the discharges from these mills should be continuously and accurately measured and recorded at points acceptable to the RPB. Initially the Sub-committee considered that it was of the utmost importance that no time was lost in connecting the Ross Poultry plant to the Persley Works and that the two paper companies undertake as fast as possible their proposals for new works for the treatment of effluent. Further, they recommended that the two paper companies should enter into discussions with the RPB with a view to planning a programme of additional measures designed to meet the target standards by 1975.

An intensive survey of the Lower Don in the summer of 1976 found that, despite low flows, there were few occasions when the river Don was fatal for fish.⁶³

'Had the low flows occurred in 1972, 73 and 74 poor conditions would have lasted much longer. This is most encouraging and is indicative of the general improvement in river quality'.

The Persley Sewage treatment works had proved disappointingly unreliable in operation and a special investigation was mounted after the RPB (reformed in 1975) took the initial steps for a formal prosecution.⁶⁴

The paper mills continued 'to prove the Board's biggest challenge'.⁶⁵ Nevertheless, new effluent balancing tanks had been installed at the Muggiemoss and these had affected a considerable reduction in the suspended solids discharged. A promised reduction in flows had not been achieved and the mill owners had been warned of the Board's

intention of applying stricter standards from 1977. A chain of complaints from the Don District Fishery Board led to RPB staff visiting Stoneywood Mills at an early hour on a succession of Saturdays in 1976, as a result of which action was taken against Messrs. Wiggins Teape Ltd. A report was made to the procurator fiscal. Proceedings came to court in September 1977 and the firm pleaded guilty to three of ten charges; the other seven were dropped; the firm was admonished on one and fined £100 on each of the other two. More generally, the mill had engaged in a series of trial treatments with a mixed degree of success, although the installation of additional pre-treatment plant had proved more beneficial in that a more consistent effluent was produced in 1977.⁶⁶ It seems that the problem of the lower Don might well have been solved by 1979 after five years of intensive monitoring, persuasion and negotiation, so that it is possible to say that the most significant consequence of SRPAC's enquiry was the effect on the local institutions themselves of calling in an outside arbiter. In 1973, the membership of the Salmon Fishery Board changed considerably and the chairman of the Angling Association joined the Board; a new clerk was also appointed. These events are said to have led to a stepping up of the campaign; the old members and the former clerk are said to have been struggling unsuccessfully for so long that they had become disillusioned. There was also an increase in co-operation between the Fishery Board, the RPB and the Angling Association; for example, the Fishery Board instituted a twenty-four hour watch on pollution by its bailiffs and in 1974 a series of four joint meetings was held at which the RPB, Fishery Board, County Council and mills were represented. It is said that these meetings gave the County Council and RPB members a clear idea of the situation for the first time.

In 1974, SRPAC again took a hand in the matter, albeit acting in another capacity, by recommending a merger of the Dee and Don RPB with its more dynamic neighbour, the Banff, Moray and Nairn RPB, to form a new north-east RPB. These recommendations were accepted and in 1975 both the river inspector and the composition of the Board changed. Mr. Weit of Dee and Don retired and Mr. Little of Banff, Moray and Nairn took over. This appointment seems to have been generally welcomed, Mr. Little being described as 'a driving force' and 'used to battling with distilleries'. On the Board, the close group of Aberdeen City and County Councillors was broken up and the new nominees of the regional and district councils are said to be less identified with local authority interests. The President of Inverurie Angling Association became a local authority member and the President of the Aberdeen and District Angling Association became a Secretary of State's appointee. For the first time, it is said, people with a direct interest in the Don were on the RPB and this constituted 'a turning point in the fight against pollution'.

There are six main themes involved in this case history. First, there was a situation of inherent tension, with a river valued for its amenity especially with regard to angling, but also playing an important and long established role as a conduit for effluent for the dominant local industry. Second, the angling community appears to have been simmering with discontent for several years but was galvanized into action only by the accident of a series of particularly low flows, a crisis that engendered a long advocated investigation and subsequent change. Third, the RPB had made some progress, especially with the co-operation of the county council, which dominated the board in respect

of the number of seats allocated to them; the county council had done its duty but lack of supervision limited its impact. Serious flaws emerged in the way in which the law had been applied: information was inadequate and the form of consent conditions proved ill-conceived.

Fourthly, a general point concerning the dangers of decentralized administration may be made. C.P. James in the presidential address noted earlier put the issue succinctly by asking the question: "Are the river purification boards carrying out their duties in a proper manner?". Most (though manifestly not all) were trying to do so, but RPBs had to rely on the advice given to them by their technical officers and the work that a board did and the progress it made depended to a large extent on the calibre of the chief officer. In this light he was surprised that the standards set by RPBs were not queried more often. When he was deciding standards to set, a river inspector had to bear in mind that the discharger had the right of appeal and the inspector had therefore to ensure that the standards could be justified. Even so, as Mr. James pointed out, standards were sometimes accepted with little, if any, question as to their justification. In his own area all consents were negotiated and, in the majority of cases, dischargers had agreed conditions before making a formal application for consent. Nevertheless, he thought that few people were aware of the pressures that a river inspector had to resist. Most members of his board were nominated by local authorities; they paid his salary but were also often committing offences. Industrialists, too, sometimes hinted that if conditions were too strict they might close their operation and move elsewhere.

Fifthly, it seems likely that the power of central authority, as expressed in the ability of the Secretary of State to ask the SRPAC to investigate is sufficient only if the herculean task of getting the process underway can be achieved. Indeed, SRPAC has conducted only one other enquiry of this nature in Ayrshire. Lastly, the arguments for a decentralized administration (cited in Chapter 9 in connection with the initial Act of 1951) seem overwhelmingly for the locationally-specific problem of pollution but significant changes can therefore occur only when a restructuring of the local unit of administration takes place.

Overall, with regard to the detail of improvements with respect to sewage treatment and disposal and the picture of RPB practice given above, it may be argued that partly because of an inadequate structure of sewerage authorities, partly because the powers of RPBs were weak initially and partly because some board members were not very enthusiastic, most of the first generation of river inspectors (many of whom are still in charge) adopted a definite policy of purification by persuasion, relying more on reasoned argument than on the threat of legal proceedings to get improvements underway. There seems general agreement that major improvements could not have been brought about quickly but, in view of the generally low priority given to the sewerage service, this view may well have become a self-fulfilling prophecy.

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34. Hubbard, F.H., *op. cit.*, and see also, Arrangements for Water Pollution Control in Scotland, International Review of Administrative Sciences, 1968, 4, pp. 324 - 340.
35. Hubbard, F.H., *op. cit.*, pp 495-496.
36. Hubbard, F.H., *op. cit.*, p.497.

37. James, C.P., Implications of the Rivers (Prevention of Pollution) (Scotland) Act 1951, Journal of the Institute of Sewage Purification, 1955, 54, p.333.
see also,
James, C.P., Whither Water Pollution Control?, Chairmans Address, Institute of Water Pollution Control (Scottish Branch), 1967.
38. James, *ibid*, discussion (J.I. Waddington), p.334.
39. Hubbard, *op. cit.*, pp 505 - 506.
40. Towards Cleaner Water 1975 contains the following figures: (p.27)

		<u>Lothians</u>	<u>Forth</u>
Population		732,500	665,500
Sewage Effluent	m^3/day	327,913	236,910
Trade Effluent*	m^3/day	6,124	208,065

*Excluding cooling waters

41. Forth River Purification Board, Annual Reports, 1964, p.19; and 1970, p.19; Lothians River Purification Board, Annual Reports, 1964, p. 33; and 1970, p. 24.
42. Lothians River Purification Board, Annual Report,
43. Covill, R.W., River Pollution Prevention in Scotland, Journal of the American Water Works Association, 1960, 52, pp. 3 - 11.
44. Forth River Purification Board, Annual Report, 1966, p.11.
45. Forth River Purification Board, Annual Report, 1970, pp 11-12.
46. DHS, ACRPP, Seventh Report, *op. cit.*, pp. 32 -38.
47. Turing, *op. cit.*, p.22.
48. Turing, *op. cit.*, p.24.
49. Aberdeen Press and Journal, June 21st., 1971.
50. Aberdeen Press and Journal, August 7th, 1971.
51. Aberdeen Press and Journal, September 4th., 1971.
52. Interview with G. Alpine, Clerk to the Don District Salmon Fishery Board.
53. Interview with D. Wilson, President, Aberdeen and District Angling Association.
54. Aberdeen Press and Journal, August 12th., 1972
55. Aberdeen Evening Express, September, 18th., 1972
56. Aberdeen Press and Journal, September 23rd., 1972.

57. Aberdeen Press and Journal, November 9th., 1972.
58. Aberdeen Press and Journal, November 10th., 1972.
59. Scottish Development Department, Pollution in the Lower Don, A Report by the Scottish River Purification Advisory Committee, 1973.
60. SDD, Pollution in the Lower Don, *ibid*, p.2.
61. SDD, Pollution in the Lower Don, *ibid*, p.6.
62. SDD, Pollution in the Lower Don, *ibid*, p.12.
63. North East River Purification Board, Annual Report, 1976, p.25.
64. Fuggle, R.W., Charlton, R.A. and Hutton, J.L., Oxygen Activated Sludge Trials at Persley, Effluent and Water Treatment Journal, 1978, 18, pp. 225 - 234.
65. North East River Purification Board, Annual Report, 1976, p.28.
66. North East River Purification Board, Annual Report, 1977, p.24.
67. James, C.P., (1968), *op cit.*.

CHAPTER 12Further aspects of water management in Scotland

Thus far, chapters have dealt with aspects of water supply and quality, for it is in these respects that the institutional structure of water management in Scotland is best developed and it is with respect to these aspects of water management that most debate and discussion have taken place. In the following chapter the evolution of the institutional framework in England and Wales is briefly considered. This differs markedly from that adopted in Scotland through its emphasis on multi-functional units and integrated policies of management, and it is these wider facets of water management, so important in institutional development south of the border, that are considered here.

In reviewing the Scottish approach to land drainage, flood control and the recreational use of reservoirs there is little to say in the context of a study of evolving institutions, for these facets of *water management* have not attracted any formal administrative structure at the local level. This is in direct contrast to the treatment of these matters in England and Wales. Neither do they appear to have influenced policies with respect to the other aspects of water management to any significant extent. They are therefore briefly reviewed for the sake of completeness towards the end of the chapter.

Other aspects of water management

With approximately 15% of the total run-off of the country passing through them, hydro-electric schemes make use of a substantial part of the water resources of Scotland. Although, in most instances, the effect of such use is merely to alter the pattern of flow downstream, water is sometimes diverted from its natural course and one might expect the integration of policy with respect to this use with the development of sources of supply. That this has not happened and that there have been few notable conflicts of interest in the allocation of water resources between the two is not only a tribute to the extent of available water but also a reflection of different geographical spheres of interest between the large water supply undertakings and the electricity authorities. The chapter therefore begins with a review of contact between the two sets of authorities and an account of the underlying principles of the institutional structure attached to hydro-electricity.

The facet of water management, not so far considered, that has had the greatest influence on policies with respect to supplies and river quality, particularly the latter, has been fisheries. Although only salmon proprietors are represented in an official structure of institutions, the angling lobby has been of great significance both as a constraint on some developments and as a spur to action in preventing pollution. The role of the fishery lobby as a constraint in the planning of future water supplies has already been mentioned in Chapter 8 and its role in prompting action with respect to river purification has been described, in the particular circumstances of

the Lower Don, in the preceding chapter. In this chapter the development of the District Salmon Fishery Boards is traced and the resistance of the salmon proprietors to inclusion in any form of wider grouping, whether with other interests in rivers or with interests in other fish, is described and discussed.

Lastly, some attention is given to the recreational use of reservoirs, which is shown to be of minor importance in Scotland.

Hydro-Electricity in Scotland

With respect to the allocation of water resources between different uses, the Scottish Development Department (SDD) reported in 1973 that: ¹

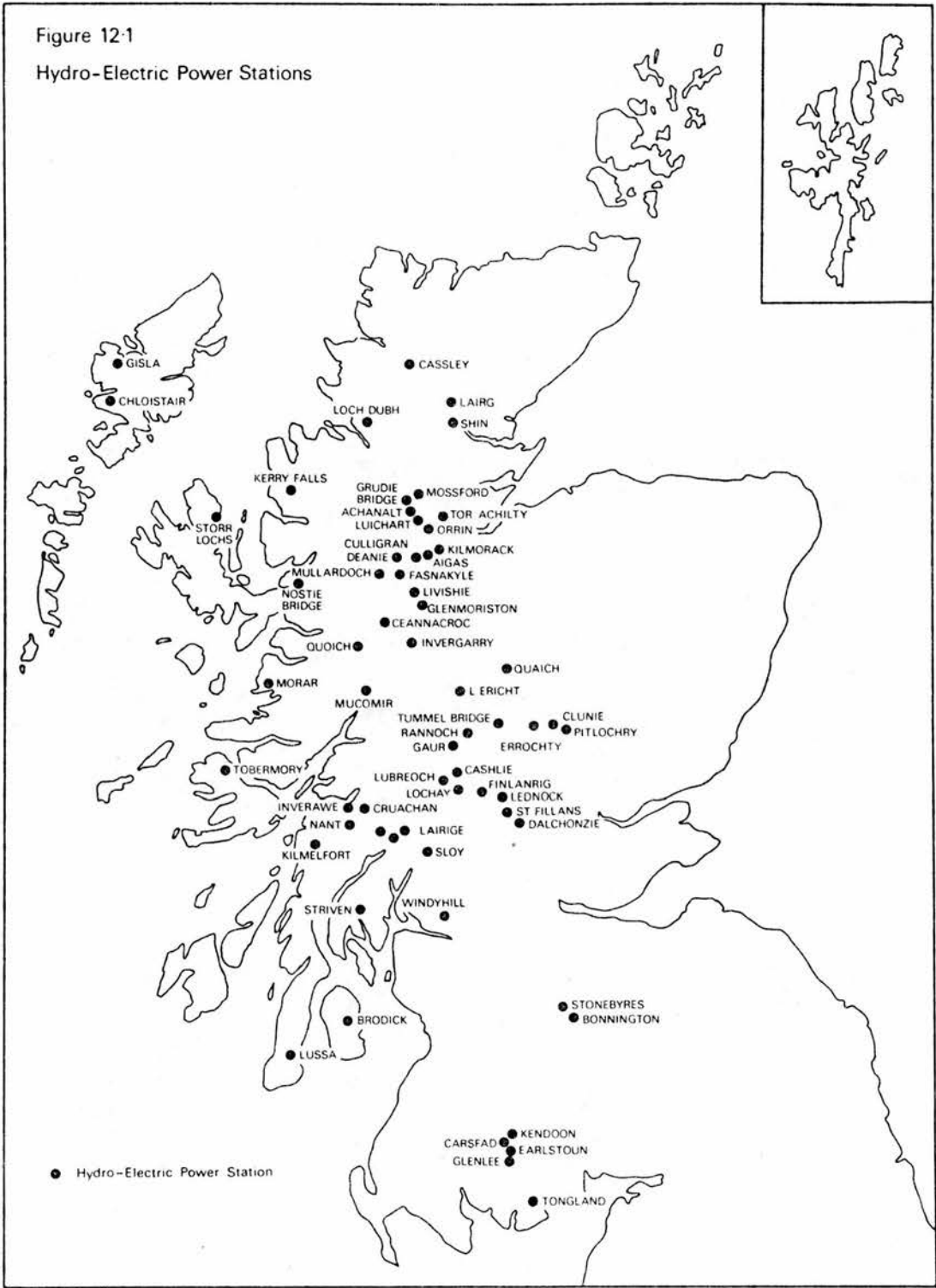
"So far, there has been little or no conflict of interest anywhere in Scotland between hydro-electric and public water supply schemes. The diversion of water from its natural course through turbines generally takes place in relatively unpopulated areas of high rainfall with little effect on the availability of supplies to the local population. In practice too, the loss of catchment area to public water supply schemes has not been of great significance as hydro-electric schemes are generally sited in areas fairly remote from the main centres of population."

Exceptions to the latter point are to be found in the Loch Sloy and Galloway schemes; in the former case, Strathclyde Regional Council receives an agreed daily quantity in compensation for diverted water and, in the latter, special arrangements had to be made enabling an abstraction from the River Doon (see Chapter 7).

The distribution of hydro-electric development is portrayed in Figure 12.1. Various descriptions of individual schemes have appeared

Figure 12-1

Hydro-Electric Power Stations



since the principal thrust of development began in the 1930s. Smith has recently shown how technological change has brought a change of policy in favour of pumped storage schemes so that SDD could report that they understood that no other types of scheme would proceed in the foreseeable future.² Such schemes, of course, have even less effect on other uses than do traditional developments. In the longer term, however, SDD foresaw greater use of the benefits of a regulated flow stemming from existing schemes,³ perhaps most notably, with regard to the Tay (Chapter 8).

With respect to institutional structure only two schemes, both initiated in the 1930s, lie outside the control of the North of Scotland Hydro-Electricity Board (NSHEB), viz. the Galloway scheme and two small stations at the Falls of Clyde. This is not surprising as the Board has a regional purpose, to promote general economic development and to help solve 'the highland problem', a point emphasised by Clegg and Chester in their account of the Board's beginnings, early organisation and operation.⁴ For example, a move to form a single Scottish electricity authority was defeated in 1952 on grounds indicated by the NSHEB chairman:⁵

"... great care must be taken to ensure that the dominant coal and population interests in the South are not given majority rights to suffocate and frustrate the water power developments in the North."

since the Board was:

"... a powerful agency for the economic and social rehabilitation of vast areas and scattered populations North of the Forth."

The origins of the Board stemmed from concern that, while the Highlands were sinking into deepening economic depression, in the inter-war years, the greater part of very valuable resources of water power was running

to waste. Three committees examined the potential of water power, in 1921, 1925 and 1938, and a further Committee on Hydro-Electric Development in Scotland concluded in 1940 that the policies adopted by successive governments had severely discouraged private enterprise; for governments would neither develop the resources themselves nor allow others to do so.⁶ The committee believed the resources could and should be developed, and recommended that a NSHEB should be set up for the purpose; and a board, in fact, was established by virtue of the Hydro-Electric Development (Scotland) Act of 1943.

This recommendation had not met with universal acclaim for the possibility of an extensive programme of water resource development being undertaken in the remoter and more rural parts of the Highlands brought, for the first time, a threat to the salmon stocks of these areas, and the reaction of the fishery interests is noteworthy for its indication of their power and influence (see below).

Before reaching its final conclusions in 1940, the Hydro-Electric Committee had taken evidence from the Association of Scottish District Salmon Fishery Boards (an organisation still based in Edinburgh and devoted to promoting the views of the Boards on any proposed legislation in a cohesive manner) and from five individual boards. The Committee felt that salmon angling would probably be less important after the war than in the past (presumably from the point of view of food supply as opposed to recreation or tourism) but that access by the fish to the spawning grounds was essential for the important commercial netting companies at several river mouths which afforded considerable employment and made an appreciable contribution to the

food supplies of the country. The Committee, therefore, attached great importance to the avoidance of injury to these fishings, to the stock of fish, and to the undertaking of works necessary for their protection, wherever they might be required.⁷

Very large sums had been spent on the construction of salmon passes and other works in connection with the few existing schemes, and to this direct expenditure there had to be added the indirect costs of providing compensation water. In this light the Committee felt that a 'just balance' must be maintained between the expected harm to the fishing and the cost of avoiding it. With the dual objective of relieving the fishing interests of the heavy burden of negotiating the 'appropriate' protective measures and of avoiding unnecessary expenditure, the Committee recommended that a statutory Advisory Council appointed by the Secretary of State should be charged with the duty of determining a balance between conflicting interests and of specifying the protective measures appropriate in each case. It would be the duty of this Council to consult the local fishery interests appointed by each scheme and to adjust the nature and extent of the measures appropriate to the circumstances in each case. Such institutionalised representation was important, for the Committee, impressed by the delay and expense involved in the acquisition of powers for the construction of works and the like, also recommended that 'leisurely and expensive methods' should be superseded by more 'business like and modern' machinery through the allocation of powers of compulsory purchase.

The Committee's recommendations were incorporated in full in

Section Nine of the 1943 Act which also required the Hydro-Electricity Board to 'have regard' to the desirability of preserving the beauty of the scenery.⁸ A statutory 'fishery committee' was established which the NSHEB must consult in preparing any constructional scheme and may consult at any other time, and which may at any time make recommendations to the Board. The NSHEB then sends the recommendations of this committee to the Secretary of State with an indication of whether or not it is prepared to accept them or not. The Secretary of State then resolves any differences before confirming a scheme.

Lea has provided an account of early objections to NSHEB schemes on grounds of their impact on amenity and the landscape⁹ and Mills has reviewed the methods used and discussed some of the problems associated with the installation of fish passes, ladders and in some cases hatcheries, in response to the fishery committee's recommendations.¹⁰ In some instances, after the construction of a scheme, the NSHEB became a member of the District Salmon Fishery Board and partly because of this and partly because of its statutory obligations now claims close and cordial relations with this interest group. In recent years the Board has however, adopted a policy of selling off its fishing rights, giving preference to local organisations. For example, in 1974, fishings below Pitlochry Dam were sold to Pitlochry Angling Club, which in turn was assisted in its purchase by a grant from the Scottish Sports Council.

Today, the NSHEB is concerned increasingly only with the production of electrical power and seems no longer to be an agency that might be expected to have a significant role in the further development of water

resources. Insofar as Central Government has a role to play with respect to the Board's policies, it is the Scottish Economic Planning Department and not SDD or DAFS that now has an interest in its affairs. This allocation divides responsibility for the development of regulated flows created by hydro-electric works between two departments, but in view of the likelihood of only the Tay being developed over the next half-century (as outlined in Chapter 8) this does not seem a serious handicap. NSHEB was clearly more concerned with matters of wider economic development than with water resources in its early years and as the demand for electricity has developed within its area and as technical opinion has changed, there seems little likelihood of present arrangements changing.

There is then little overlap between hydro-electric development and water supplies in Scotland. Instead, the hydro-electric programme is significant for the incorporation of measures of fishery protection, indicating the strength of the fishing proprietors as a pressure group. Further ramifications of this interest are now considered.

Fisheries in Scotland

The dominant fact concerning the role of fishery and angling interests in Scottish water management is that the right to fish in fresh waters is private property. As a result, the influence of fishery interests on water supply and quality control has been characterised by considerations not only of conservation but also of the preservation of existing rights. A full discussion of salmon and trout as a resource, its ecology, conservation and management with

extensive reference to Scotland has been provided by Mills, but two themes are of interest here. The first concerns levels of compensation water as a major constraint upon the development of Scottish water resources; for fishery interests sought and gained significant concessions with regard to compensation water whenever any impoundment was constructed for purposes either of hydro-electricity or water supply. The second concerns water quality control, for it is generally the case that the desire to preserve or improve, existing private properties led the fishery and angling interests in the absence of major water abstraction schemes, to act as the principal pressure group promoting clean rivers. The bulk of this section of this chapter is concerned, therefore, with evolving policy with respect to the conservation of fish stocks whilst at the same time ensuring a freedom from interference in the affairs of the salmon proprietors from any form of public authority.

Compensation Water

The system of compensation water was established through mid-nineteenth century legislation when sufficiently accurate data were not, and could not be made, available. The normal practice was to estimate annual rainfall over catchments for as long as possible, to take 80% of the resulting figure as the reliable yield over a period of three dry years, to deduct 14 to 16 inches as the evaporation loss and then to divide the remainder between water supply and the needs of the river, the most common allocation being two-thirds to water supply and one third to the river.¹² By 1936, when the issue of compensation water in England and Wales was reviewed by a Joint Select Committee

on Water Resources and Supplies, it had long been felt that this approach was unsatisfactory, principally because no account was taken of the wide differences in the character of streams. A 'flashy' stream, where flow came downstream in short periods of flood, was much less valuable to riparian owners than a 'steady' stream where the flow in the dry period was comparatively high. Yet, under the prevailing system the flashy stream received the same compensation flow as the steady stream, so that naturally dry streams frequently increased their flow throughout most of the year.

As a consequence, some landowners and fishery proprietors had the value of their holdings considerably increased at the expense of water consumers. In 1930, there was no suggestion that some sort of 'betterment levy' should be paid; there was far more interest in halting a needless 'waste' of water and improving the utilisation of existing sources through a re-examination of the requirements for compensation water.¹³ Today, this remains an unresolved question worthy of detailed investigation in future. It may be that significant volumes of additional water could be supplied from existing sources if compensation arrangements were sensibly reviewed and prudently re-negotiated to match modern conditions and improved data. Some English water authorities have already made progress in this direction.

Conservation of Fish Stocks.

The legislative basis of conservation of fish stocks stretches back to the Salmon Fisheries (Scotland) Acts of 1862 and 1868. These followed local acts for virtually identical purposes in the Solway Firth

area in 1804 and the Tweed Basin in 1852 and 1857. In both of these cases separate legislation was desirable because the river basins straddle the England/Scotland border, though Scottish legal procedure applies to the English portions of these areas.

In the 18th and 19th centuries, it was recognised that revolutionary changes in both agricultural and industrial practices were making it increasingly difficult to ensure the survival of salmon stocks. In agricultural areas extensive schemes of land drainage had interfered with the natural flow of rivers and industrial effluents elsewhere were causing concentrations of pollutants lethal to migratory fish. Rapid urbanisation led to further interferences with river systems through the abstraction of water, increasingly from headwaters, for both domestic and industrial supplies, and the discharge of sewage and other effluents.

Fishery stocks, especially salmon, were threatened from all sides except in the most remote and rural parts of the country, but there was little that the fishing owners could do to avert these changes or to alleviate their adverse effects; indeed landowners were themselves often promoting industrial development, especially in the Clyde basin. Problems arose not only from the pollution of waters, but also from the despoilation of spawning beds and from the construction of obstructions to the passage of migratory fish.

It had long been seen that the combination of natural mortality and unrestricted fishing could reduce the number of breeding salmon below any safe level and the first line of improved protection came

from a codification of existing legislation and controls aimed at ensuring the survival each year of a sufficient breeding stock to maintain existing numbers. Two forms of control were (and are) used. Methods of fishing which could take a very heavy toll of fish (largely fine mesh nets) were (and are) banned. Secondly, all fishing was (and is) prohibited at certain times, particularly during the breeding season so that the fish could remain undisturbed when spawning. A second line of protection came from provisions in the Acts in the 19th century that made it an offence to discharge liquid or solid matter poisonous or deleterious to salmon into any river containing salmon, though it was an admissible defence that the best practicable means were used. In addition, powers were secured to regulate the construction and design of mill dams and to remove any other (natural) obstructions in the river which prevented or interrupted the free passage of migratory salmon.

The 1862 Act allowed for the setting up of 'District Salmon Fishery Boards' and the 1868 Act established them in detail. Districts were defined so that each separate river system containing salmon had its own board. Each Board consists of three proprietors elected from the roll of those on the upper river and three from those on the lower river, who are usually commercial operators engaged in netting of one form or another. The Chairman is automatically the proprietor with the most valuable fisheries.

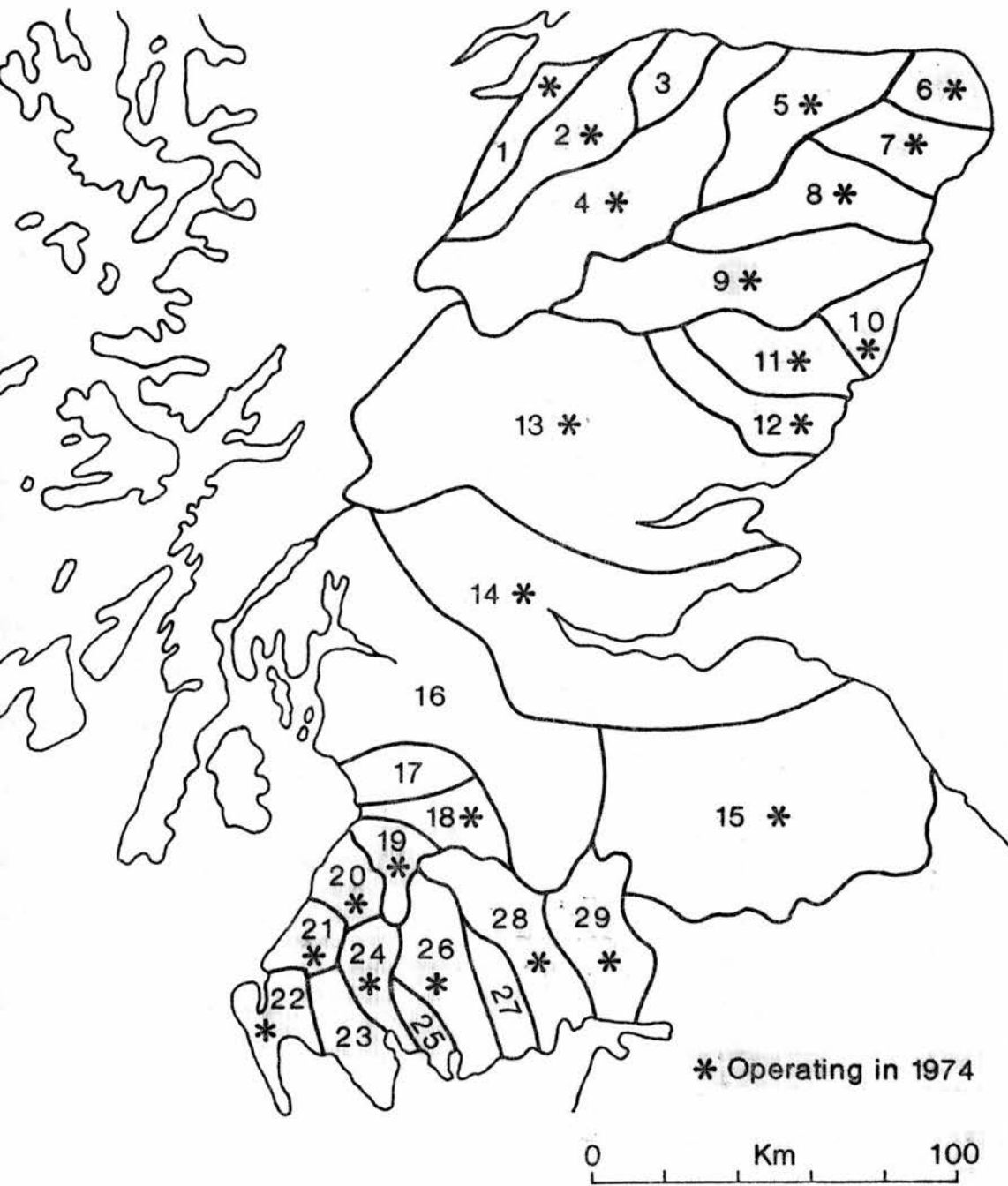
The Boards are essentially co-operatives of owners, by which common action to the mutual good can be undertaken. The Boards do not have any right to manage the fisheries in their area, that right

being retained by individual proprietors, so that any activity undertaken must have the approval of all the owners; but, in practice, few difficulties seem to arise in persuading individual proprietors to co-operate with their neighbours.

The 1868 Act apportioned Scotland into 107 river basins, but Boards existed in only 45 of these in 1965 (see Figure 12.2). There are two reasons for this partial coverage. First, in many river basins, particularly in the industrial west, there are no longer sufficient salmon to protect. Secondly, where there are only two or three major proprietors holding fishing rights, they find it convenient to manage their business without recourse to a formal Board, as does a single proprietor.

The 1862 Act created a number of Commissioners who defined the 107 areas of the 1868 Act, but the Fishery Board (Scotland) Act 1882 transferred a general supervisory duty from these commissioners to the newly-created post of Secretary of State who in turn was empowered to appoint an 'Inspector of the Salmon Fisheries of Scotland'. At first this post was held by an advocate, primarily concerned with the effective working of legislative controls, particularly over poaching, but over the years the emphasis changed, and professional resource managers with a background and interest in scientific research are now normally appointed. In 1937, the Diseases of Fish Act gave the Secretary of State power to control the transfer of fish stocks from one part of the country to another when there was a risk that such transfers would spread disease. The Salmon and Freshwater Fisheries (Protection) (Scotland) Act 1951 further extended the powers of the

Figure 12.2 Non-Highland District Salmon Fishery Boards



DISTRICT SALMON FISHERY BOARDS

1 Nairn	7 Ythan	13 Tay	19 Doon	25 Fleet
2 Findhorn	8 Don	14 Forth	20 Girvan	26 Dee
3 Lossie	9 Dee	15 Tweed	21 Stinchar	27 Urr
4 Spey	10 Bervie	16 Clyde	22 Luce	28 Nith
5 Deveron	11 North Esk	17 Irvine	23 Bladnoch	29 Annan
6 Ugie	12 South Esk	18 Ayr	24 Cree	

Secretary of State by enabling him to authorise the catching of fish for scientific purposes and to encourage research.

In the late 1950s a serious decline in catches of salmon at commercial netting stations stimulated the Secretary of State to appoint a Committee, at first to inquire into the state of commercial netting, but then to review the law relating to salmon and trout fisheries in Scotland as a whole.

This Committee, the Hunter Committee, has already been mentioned in respect of the wider powers of R.P.B.s, (Chapter 10) and reported in August 1965.¹⁴ It drew attention to the sharp contrast between Scottish salmon and trout fisheries. Salmon had long been considered important and fishing had been regulated by law in some detail, with a form of local administration, the District Salmon Fishery Boards; trout fisheries, on the other hand, had rarely been regarded as valuable and, possibly as a result, had received little attention from the legislature. Although rod and line catches of salmon accounted for only 19 per cent of the total catch, the right to fish in that way was of considerable value and the best stretches could command very high prices or rents when sold or leased respectively. Trout, on the other hand, were probably the most common freshwater fish in Scotland and there was a considerable and increasing demand for brown trout fishing, though much of the existing fishing was of poor quality. Where such fisheries had been protected and maintained, however, they too were often valuable assets.

The Hunter Committee described the Salmon Fisheries (Scotland) Acts

of 1862 and 1868 as outdated. The basis of local representation on Salmon Fishery Boards was too narrow and in practice considerable areas had no formal administration at all; the methods of financing the activities of local boards had also proved inadequate in many districts. Furthermore, there was no local administration for trout fisheries, the proprietors of which had no effective legal protection against unauthorised fishing of their waters.

The Hunter Committee took the view that, if Scottish fisheries were to be used to produce the maximum benefit for the country, the methods of controlling the fisheries must be capable of something more positive than just maintaining salmon spawning stocks. Restrictions must therefore be replaced by a system of management capable of dividing the annual run of salmon between the commercial catch on the one hand and the angling stock and breeding stock on the other, in such proportions as were required. It would ensure that the breeding escapement was sufficient without being excessive and would replace the unknown with measured quantities. The system of management envisaged would 'move salmon fishing away from hunting and in the direction of farming'.¹⁵

Management was also required for trout, although different considerations applied. The 'right' number of good-sized trout could be maintained only by relating the productivity of the water to the fish population and the fishing effort. With adequate research, this standard of management could be achieved for trout, simply by protecting and regulating the fisheries in the context of a new administrative framework.

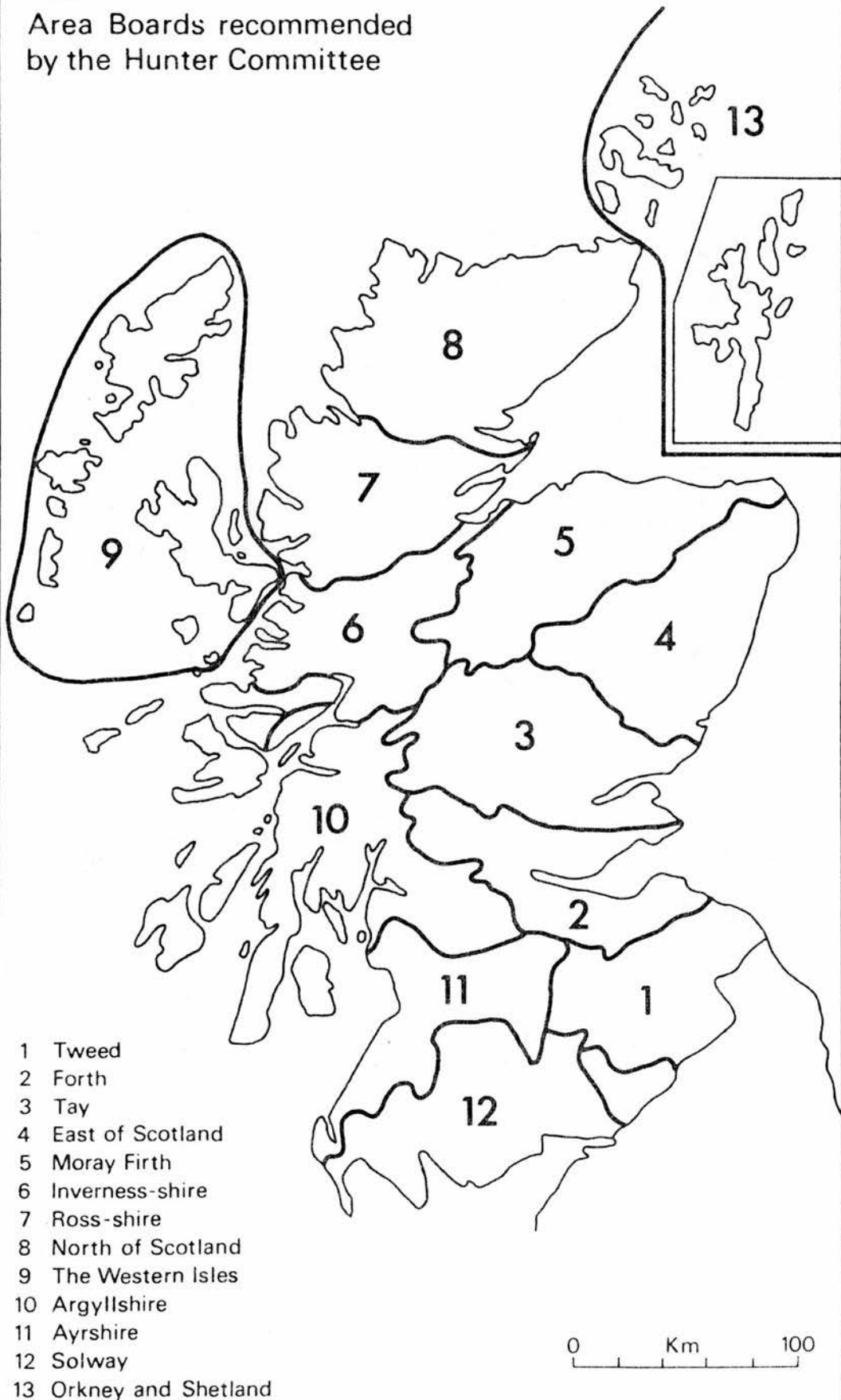
The Committee also made recommendations to secure adequate control of commercial netting salmon; it urged the adoption of the single trap method and the abandonment of all other methods, apart from rod and line. The principal advantage of doing so would be that it would then be possible to count accurately the escapement through each trap at the mouth of each river. The catch at traps would be governed through a system of licences administered by a new system of 'Area Fishery Boards' the pattern of which might be as illustrated in Fig. 12.3.

The Committee's proposals for commercial salmon fishing would leave an escapement large enough to provide good angling further upstream as well as adequate numbers of breeding fish. Full advantage could be taken of this controlled situation only if angling waters were open to visitors. If these were given sufficient access, the Committee was convinced that salmon angling could make a material contribution to the Scottish economy. If persuasion failed and angling beds remained underfished and closed to tourists and local anglers, the new Area Fishery Boards should have powers to apply to the Secretary of State for an 'Access Order' requiring certain water to be opened to the public. The Hunter Committee's basic principle in recommending this course of action was that the public was entitled to a return from proprietors in exchange for increased control of commercial fisheries, since that control would enhance the value of private properties and the public should share in the dividend.

The first objective in respect of trout fishings was to remedy the situation whereby proprietors could not in practice stop

Figure 12.3

Area Boards recommended
by the Hunter Committee



unauthorised fishing on their waters and were therefore unwilling to take steps to improve them. Only then could the objectives of ensuring that more waters were opened legally and effectively to the public be achieved.

The Committee recommended that fishing for brown trout without the appropriate permission should be made a statutory offence. It believed that, to a greater extent than in the case of salmon fisheries, there were proprietors who would be willing to allow reasonable numbers of trout anglers to fish their waters on payment, provided that some organisation existed to exercise control and to make the necessary administrative arrangements. There would be no difficulty where a local angling association already existed, and many associations and hotels already operated as local administrative agencies for a variety of local proprietors. Where there was no angling association or hotel or where local proprietors were 'unco-operative' the Committee recommended that the system of Access Orders should also apply.

The Committee also proposed the formation of a 'Scottish Anglers Trust'. It was not proposed that this would adversely affect the local angling clubs and membership of the Trust would make it easier for local anglers to fish elsewhere. Public bodies which held fishing rights, such as the Department for Agriculture and Fisheries in Scotland, the Forestry Commission and the NSHEB, could lease them to the Trust at nominal rates. Many proprietors, willing to admit the public but unwilling to take on the administrative responsibility of doing so, might also be prepared to grant leases to the Trust at

nominal rents.

The registered owners of trout fishings (including the Anglers Trust) would contribute to the finances of the Area Fishery Boards and would in return get the benefit of protection by the Boards' fishery wardens. Where a proprietor had so little interest in a water that he did not register it, the Trust could put it to use and would pay the charge to the appropriate Area Board. Each Area Board would also keep a register of salmon fisheries.

The Hunter Committee found that, in practice, the District Salmon Fishery Boards were largely concerned with the prevention of poaching and thought that they would be unsuitable agencies for the administration of additional controls over fishing largely because few had the resources to employ the expert staff or consultants without whose skilled advice adequate use could not be made of the additional powers. Moreover, the narrow basis of representation on the Boards as then constituted prevented their being given wider powers which might affect outside interests or the general public.

The Hunter Committee was convinced that separate administrations for salmon and trout would be wasteful and would almost certainly make for 'the worst of possible conflicts of interest'. Area fishery boards would look objectively at different species and methods of fishing and should be sufficiently broadly based to command public confidence and employ professional resource managers. It was envisaged that, in a typical area, the Board might have around twenty members, of whom five might represent such interests as river purification,

water supply, agriculture, manufacturing and/or tourism. The remaining membership would represent proprietors, salmon and trout anglers. The Boards would be financed through the introduction of a system of rod licensing.

Radical changes were therefore proposed, affecting every sector of the angling community, and in this light, it would have been surprising if a full implementation of the Hunter Committee's recommendations had followed swiftly, not least because their enactment would have required a Bill of over one hundred clauses to establish the Area Boards, a Rod Licensing System, an Access Order System, the Scottish Anglers Trust, and to extend effective protection to trout fisheries.

Even so, the action taken on the proposals so far must be regarded as disappointing, and it seems likely that the main reason for this was that the Committee took too little account of the powerful vested interest of the salmon proprietors. All the existing Salmon District Fishery Boards seem to have been anxious to avoid the elements of 'creeping nationalisation' inherent in the proposal to make the single-trap method of commercial netting mandatory and in the system of 'access orders'. The Government was to give protection to trout fishings and an increased revenue base to the reformed Fishery Boards in exchange for increased public access, but the benefits to commercial and other salmon fisheries given in exchange for a new administrative structure were much less easily identifiable than these given to proprietors of trout fishing. The proper calculation of the 'escapement' from single traps would not necessarily end in more fish being available

to either the commercial companies or the sporting syndicates.

But the key objection from the salmon interests concerned what was, in effect, a takeover of the commercial netting stations, with the mandatory abandonment of existing installations in favour of single traps supervised by officers of the area boards. Commercial netting was an industry said to be worth some £6 million per annum and it was this fact that seemed to have received insufficient attention. There was some feeling that the 'trout people' wanted protection of stocks but did not wish to pay for it; similarly, the angling associations were said to want access to more and improved fishings but were not willing to spend money on their development and protection. The main costs of the new administrative structure would ultimately rest on the salmon proprietors who had least to gain from a change. As a result of difficulties such as these, the Hunter Committee's recommendations were not the subject of a White Paper until 1971.¹⁷

The Conservative Government did not accept the Hunter Committee's recommendation that commercial netting in rivers should be permitted only with traps that would allow counts to be taken. The Government believed that trap fisheries would not be economically viable on many rivers, but it was prepared to make provision for trap fishing to be a legal method of catching salmon on rivers where the proprietors were all agreed. It was also prepared to adopt the Committee's recommendation that all commercial net fisheries, both coastal and river should be licensed. In addition, powers would be taken to alter the weekly close-time for nets where this was required.

The concept of access order for salmon fishing was dropped, but the Government accepted the recommendation that fishing for trout without appropriate permission be made illegal. It was then necessary to find a means whereby the protection of trout waters would not result in their being closed to the angling public and which would encourage owners to make more waters generally available to anglers at reasonable cost. The Government proposed to provide statutory protection for trout fishings only where the owner was willing to grant public access on a 'satisfactory' basis and to improve the fishings. It would then be an offence to fish these protected waters without permission. New Area Fishery Boards would supervise and vet the granting of protection on 'satisfactory' conditions.

The Government had concluded that a separate administrative structure for 'the specialised fishery functions' was justified and accepted the Hunter Committee's suggestion of Area Boards, though the number was increased from thirteen to fourteen. The Area Boards, which would be fewer in number and cover larger areas than the District Boards, would have much wider powers than those available to the latter. They would be responsible for salmon, trout and coarse fisheries and would be constituted on a wider basis to represent the fishing interest generally. They would have management functions and control methods of fishing, but their principal new functions would be to administer the issue of rod and net licences and to deal with requests from owners of fishing rights for registration and the list of trout waters to which statutory protection applies.

A Scottish Anglers Trust was to be formed as proposed by the

Hunter Committee, with the duties of administering angling facilities and developing angling in Scotland. Its main function would be to acquire and make available waters on a wider scale than could be achieved by individual angling bodies. Some pump-priming finance would be available from the Government to establish this body but it would eventually be supported by part of the revenue from rod licence and by the proceeds of permits to fish its waters. Putting these, more limited proposals in the White Paper into law however, would have required again a good deal of Parliamentary time and, in view of the fact that the problem of trout fishing was most urgent and least contentious (in that existing interests were least disrupted), a short Trout Bill was eventually introduced in the Session 1975/76, by which time there had been a change of government.¹⁷

Mr. Hugh Brown, Under-Secretary of State for Scotland in the Labour Government, introduced the Salmon and Freshwater Fisheries (Scotland) Bill 1976 by noting that angling was probably the largest participant sport in Scotland with upwards of 180,000 people involved. There were approximately 300 angling clubs and, with increasing demand, the Under-Secretary of State thought it was to them that the public must look to protect and improve the national resource of waters for angling.¹⁸

The Labour Government's proposals for meeting this problem differed from those in the previous Government's White Paper. The legislation proposal in 1971 would have led to piecemeal protection, since this would be given to individual proprietors in exchange for access to their particular fishings. It was now thought that this system would lead to confusion over which stretches of river were controlled and which were - - - -

not, and that there would be a vast administrative burden in keeping track of individual agreements on arrangements for access. It was also thought that piecemeal protection would have precluded any comprehensive plan for the management of a river as a whole.

Instead, the new proposal was to grant protection in exchange for access over whole river systems or recognisable part of river basins. If there were substantial omissions in any area, the concept of giving protection to foster stocking and other developments might be invalidated. Unlimited demands for access could not, of course, be met and it had to be accepted that some restrictions would have to be imposed on the supply of fishing in accordance with existing demand and natural limitations on stocks.

A Scottish Anglers Trust would be established to deal with situations where proprietors were not interested in their fishings but did not particularly wish to keep them to themselves. It could also take over fishings held by public bodies. The Trust would have as its primary aim the development and improvement of fishings, and it could provide the expert management and effort which an individual owner might find unrewarding. In some cases the Trust would have to offer a financial consideration to obtain such fishings and the Government was prepared to provide pump-priming finance for this purpose. Ultimately, however, there was no doubt that angling must be self-supporting and the Trust, in the long term, would have to be self-financing through subscriptions from club and other membership and the income from its activities.

In the absence of a reformed structure of local administration through Area Boards and of a means of finance to support it through a system of rod licences, the administration of the system is to be undertaken by the Department of Agriculture and Fisheries for Scotland.

The provisions thus enacted are, therefore, a mere shadow of the comprehensive management of freshwater fisheries that had been envisaged by the Hunter Committee, which seems to have foundered in the face of opposition from the strongest vested interests in freshwater fisheries, the salmon proprietors. The Hunter Committee's proposals and those of the 1971 White Paper were opposed largely because the salmon proprietors were anxious to avoid any involvement with any new public body, believing that they would inevitably have to surrender some of their rights in exchange for the application of public money. For the same reason they supported the movement to retain RPBs. The Scottish river inspectors seem to believe that they were in a very different position from their English colleagues with regard to the control of fishings because, at least on the east coast and especially in the Tweed and the Tay basins the District Boards were said to be 'very powerful', and interference with 'their first class organisation to satisfy their needs' would provoke considerable opposition. In the west-central area, on the other hand, there may have been a case for the extension of public control over the management of fishings because the problem essentially was one of restoration rather than of conservation.

The significance of the rejection of proposals for the comprehensive management of fisheries is wider than a mere illustration of the power of the proprietors. Comprehensive fisheries management would have

required liaison with those involved in the abstraction of water and with those seeking to control quality. The eschewing of such links is a significant element in the evolution of a different structure of water management in Scotland as compared with England and Wales; but the singular attitude struck by Scottish landowners is not only apparent with regard to fisheries; land drainage has also failed to attract any formalised structure of institutional arrangements at the local level.

Land Drainage and Flood Control

Land drainage is the first function of a river but in Scotland is a matter purely for the land-owners concerned, with little institutional involvement on the part of public authorities.

In 1950 it was estimated that about 5% of the arable area of Scotland (200,000 acres) would benefit from improvements to arterial drainage.¹⁹ Government intervention in such improvement began in England and Wales with the provision of grants under the Land Drainage Act 1918 but the extra pressures of the inter-war agricultural depression soon led to a further examination of the whole problem and the Land Drainage Act 1930 established a series of public drainage boards, replacing the previous consortia of private and traditional interests on the basis of catchment areas and financed by precept on county councils.²⁰ No such developments took place in Scotland but the Land Drainage (Scotland) Act 1930 had empowered DAFS to assist in the design, maintenance and finance of works. The Act was limited in duration to five years but was extended to 1937 in part as a measure for the relief of unemployment.

In all 32 miles of river were treated in Scotland through the provision of flood banks.

Attention was again focussed on the benefits to production that could follow improvements during the 1939-1945 war. The Land Drainage (Scotland) Act 1941 reintroduced the system of grants and other assistance from DAFS. A further 90 miles of river received attention, all but 21 by flood banking.²¹

In 1950 the Duncan Committee reviewed the matter, and concluded that the statutory powers available to DAFS for carrying out large-scale works were unsatisfactory. Amongst their recommendations was the view that there should be one authority responsible for agricultural drainage, the Secretary of State acting through DAFS. "The principal argument in favour of the centralised direction of large scale drainage work is that, under modern conditions, the work requires mechanical equipment and a pool of implements of economic size, with corresponding servicing organisation. In addition, the unification of engineering control enables the experience of previous work to be codified, and has similar advantages of economy. In a relatively small country, such as Scotland, an efficient system cannot be built up on less than the national unit."²²

Many of the Duncan Committee's recommendations were implemented by means of the Land Drainage (Scotland) Act 1958 which firmly established responsibility for drainage, alleviation of flooding and mitigation of erosion with the owners of agricultural land but enabled them to carry out improvements. An order may only be made where a

majority of owners of the land involved agree on its provisions. A 50% grant was offered if schemes met this criterion and the design criteria. Between 1958 and 1975 272 proposals for improvements have been submitted: of these, 52 have been found more suitable for treatment under other legislation, 44 orders have been made, and 172 proposals cancelled because of a failure to agree details amongst all the landowners.²³

Thus far the improvement of agricultural land only has been discussed. In evidence to the Wheatley Commission, DAFS explained that protection from flooding operated on a different basis for urban areas because any suggestion of the extension of works funded from rates had been resisted by local authorities. No rate revenue is received by them from agricultural land.²⁴

From time to time there has been serious flooding in Scotland.²⁵ DAFS has contributed substantial sums to restoration funds and supported preventative schemes. Virtually all of the danger points, particularly on the Spey and Tweed have been identified and protection works completed. For urban areas the Flood Prevention (Scotland) Act 1961 empowered local authorities to prepare schemes and the Secretary of State to authorise them. Since 1975 the relevant authorities have been the Regional Councils and in recent years schemes have been prepared for areas of Perth, Arbroath and Dumfries. Such schemes are grant-aided and powers were also given to undertake more modest works on river courses, largely clearing channels, although in many parts of the country it is normal practice for well known trouble spots to be checked for any congestion at the appropriate time of year.

Generally speaking the concern of water management in water authorities and river purification boards has not been with flood control but rather with the simulation of the beneficial effects of flushes on the biology of river beds after impoundments have regulated flows. For example, the arrangements made in connection with the Loch Lomond scheme of water supply include (at the insistence of Clyde R.P.B.) the release of surges to assist natural scouring of the River Leven.

This limited concern with the first function of rivers is indicative of a limited concern with river management as a whole. In part this reflects the fact that few rivers require management but it is also symptomatic of the nature of Scottish local authorities, many of which were too small and financially too weak to stray from their primary function with respect to water - the guardianship of public health and the avoidance of nuisance.

In view of the intermittent nature of flood hazards the Scottish approach to land drainage appears unlikely to change in the near future, regardless of the reform of local government. A change of policy does seem likely, however, with regard to the use of reservoirs for recreational purposes, the third and last peripheral aspect of Scottish water management considered in this chapter. The principal recreational use of water in Scotland is, of course, angling, the institutional arrangements for which have already been discussed. The recreational use of reservoirs in Scotland is considered only briefly *in contrast to its* importance as a factor in policy-making in England and Wales.

Recreational Use of Reservoirs

The primary purpose of reservoirs is, of course, to store water for supply and therefore there has been a tradition that additional expenditure, necessary to provide recreational opportunities should not be a liability on the water supply service. The reform of local government, however, opens out the possibility of cross-subsidy between the recreation and leisure departments and the water services directorates of the new regional councils.

Many of the older reservoirs were designed without any thought of possible recreational use and are, therefore, said to be unsuited either because they lack treatment facilities or because they are dangerous. This is not surprising, bearing in mind that the demand for recreational activity of the types practicable on reservoirs has only grown to significant proportions in recent years, associated with greater personal mobility allowed by car ownership. It is generally agreed however, that the pressure of demand for such use is considerably less in Scotland than elsewhere, possibly because of greater intervening opportunity, or because most Scottish reservoirs are to be found in uplands where they lack a particularly attractive climate and are prone to either cold prevailing winds or generally cloudy conditions - conditions not conducive to sports involving any degree of immersion unless rubber suits are worn. The Countryside Commission for Scotland has reported that it can identify no major lobby group pressing for increased recreational use.

With regard to new reservoirs, for example, Fife Regional Council's

Castlehill scheme, there has been a tendency to provide full recreational facilities. In these cases, 'full lines of defence' have been installed in anticipation of an expected demand; sterilisation, full treatment and responsible management have all been allowed for. Nor were problems seen in this respect with regard to the largest of the new schemes - Loch Lomond where there was a substantial pre-existing recreational use: superchlorination and subsequent de-chlorination at Balmore pumping station - are an integral part of the scheme's design.

SDD policy is that as much recreational access should be allowed as safety and treatment factors ²⁷ permit, though there is a hint that new EEC regulations, by tightening water quality standards, may increase the treatment requirement. It is also SDD policy that the extra cost of required treatment for recreational purposes cannot be met by central government grants. The water authorities will have to draw on internal sources of finance (such as Recreation and Leisure departments) although grants from the Countryside Commission for Scotland may well be available. Thus recent re-organisation of local government, in this context, made the prospect of recreational facility provision much brighter, for it is now much easier to co-ordinate all the departmental work involved. Lothian Region established a joint committee to examine possible recreational use of Pentland Hill reservoirs with one councillor expressing the view that new water supply projects were so initially expensive anyway, that as much return, in all respects, should accrue to the community as a whole. One aspect of maximising the social return was to spend that little bit extra and create a recreational resource.

Whereas it would seem there is little dispute over what policy should be with regard to new schemes, there is little enthusiasm for greater access to, or use of, the older reservoirs. This generally unsympathetic view does not, of course, apply to compensation reservoirs, where no problem is seen. A unique aspect with regard to reservoirs not used for public water supply occurs in Fife where the department has several redundant reservoirs which it would like to dispose of to other bodies. Apparently, recreational bodies have shown some initial interest in taking them over but quickly lost interest when they realised the full extent of the maintenance costs involved.²⁸ This may say something about levels of demand.

The tradition of keeping people out as 'a first line of defence' (against water contamination) has been criticised on the grounds that the condition of older mains must in certain cases be such that much greater biological pollution is likely to occur there than anywhere else, thus requiring full treatment of water before distribution regardless of what has happened in or on the reservoir. Nevertheless, around a significant proportion of Scottish reservoirs access is restricted to hill-walkers and no recreational activity other than rambling or scenic appreciation is permitted.

Most long-established reservoirs are therefore the sole preserve of either nature reserves, hill walkers or anglers. Angling is, and has been, the preferred recreational activity and, in some cases, an argument against the extension of activity into other fields is the effect that this would have on existing angling groups. These are most easily accommodated because they are generally prepared to

organise appropriate safety practices themselves; they can also be trusted not to contravene the wishes of the water directorate. In a few cases the angling rights on a reservoir have been retained by the original landowners and the water authority have, therefore, less control over practices, unless bye-laws have been specifically drawn up for the purpose. Bye-laws under the 1946 Act are the normal means of controlling use over reservoir surfaces and surrounding areas. The next most preferred use is sailing although this is, as yet, apparently quite rare, presumably because of the remote location of reservoirs in relation to other possible sites.

It appears that, in general, the demand for increased recreational use of reservoirs is nowhere strong enough to justify additional capital expenditure on necessary treatment, though it is expected that demand will increase. There would seem, in addition, to be a view that new schemes would be less politically acceptable if they did not include recreational possibilities, for the norm for new reservoirs seems to be an 'open house' policy with only inter-activity conflicts seen as a problem. Nevertheless there is no statutory requirement for any of the water agencies in Scotland to pay particular regard to the needs of recreationalists.

Thus, the recreational aspect of water management, important in England and Wales, has the connotation of general land-use planning and land management in Scotland as do land drainage, fisheries and hydro-electric development. The principal difference in approach between English and Scottish institutional arrangements concerns this very point: the role that is perceived for water managers in environmental

management generally, including town and country planning and regional planning. In Scotland the particular interests of sound water management are seen as subordinate to the general task, whereas in England, concern over the availability of supplies has led to water management achieving a distinctive status in Regional Water Authorities.

The evolution of such Regional Water Authorities is the subject of the next chapter in which the contrasting roles of land drainage and fisheries also feature in explaining a different pattern of institutional development.

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CHAPTER 13The Evolution of the Structure of Water Administration in England and Wales compared to that in Scotland

In this chapter the developing institutional structure for water management in England and Wales is compared, in its essentials, with the Scottish experience. This chapter is intended to act as a prelude to the concluding chapter, putting water management in Scotland into perspective by seeking an answer to the question: why have different administrative systems emerged in adjacent parts of the same country? It is not the intention to trace the evolution of the approach adopted in England and Wales in detail, a task which has already been undertaken by Smith,¹ Craine,² Mitchell,³ Porter,⁴ Barr⁵ and Okun.⁶

Two themes emerge in a comparative study of the administration of water resources within Great Britain: first and foremost, a greatly differing emphasis on multi-functionalism and the benefits of integrated management stemming from a greater dependence on a wide variety of sources in England and Wales; and secondly, a distinctly stronger role on the part of Central Authority in England and Wales stemming from a rather different, closer relationship that has emerged between the Scottish Office and local authorities in Scotland than would have been, and is, possible south of the border. The principal differences have emerged since 1929 although it is important to remember that fisheries and land drainage had, attracted by the beginning of this period, a much more sophisticated institutional structure in England and Wales than in Scotland.

Differences in Existence Prior to 1933

The original institutional structure that emerged in England and Wales in the mid-19th century for salmon fisheries did so on the same lines as in Scotland (Chapter 12). In 1878 and 1884, however, Freshwater Fishery Acts, applying only to England and Wales, established a system of institutions, similar to District Salmon Fishery Boards for trout and coarse fishing. The latter were merged with those superintending salmon by virtue of the Salmon and Freshwater Fisheries Act of 1923. Hence, when water undertakings began to take an increasing interest in river waters as a source of supply from the early 1920s, the angling fraternity were strongly represented all over the country in a pattern of institutions, based on whole river basins, which had no equivalent in Scotland.

Similarly, the general system of Catchment Boards, established in England and Wales by virtue of the Land Drainage Act 1930 to co-ordinate the activities of those with an interest in land drainage, had no equivalent. Hence a second form of institutionalised interest was lacking in Scotland and to this a third can be added. Conservancy Boards were established to co-ordinate a wide range of water management functions in the Thames and Lee river basins by local Act of Parliament as early as 1857 and 1868 and in Northern England river boards were established to administer the Control of Pollution Act of 1876 over the whole of the Mersey, Irwell, Ribble and West Yorkshire basins. Although similar bodies were suggested for some Scottish rivers, particularly the North Esk and Water of Leith in the Forth Basin, no working examples of such relatively sophisticated administrative forms

were obvious as precedents in later developments in Scotland.

The dominant difference between the two parts of the country that had developed before 1930, however, concerns the much greater variety of sources developed for purposes of providing piped water supplies. A survey of the domestic water supplies of England and Wales in 1914 revealed that 139 water undertakings were dependent on rivers, to a significant extent, particularly the Thames, Severn, Derwent and Tees, whilst a further 495 relied on underground sources to a significant extent, including major urban areas as Nottingham, Croydon, Wolverhampton, Hull and Southampton.⁷ Clearly, the almost universal reliance of Scottish undertakings on upland catchments, unpolluted and sparsely populated, greatly simplified the task of water management.

Different responses to the Drought of 1934

As outlined in Chapter 4, the drought of 1934 revealed the failings of water supplies in Great Britain. In Scotland, the task of enquiring into the lessons that may be learnt from such an event fell to a sub-committee of a Committee on the Health Services as a whole.⁸ In England and Wales there already existed a standing Advisory Committee on Water which had been established in 1923. It consisted almost entirely of representatives of water undertakers and, in the aftermath of the drought, this bias was severely criticised in Parliament. By way of response, the Government established the Central Water Advisory Committee (CWAC) in 1937 with a wider representation of interests in water.⁹

CAWC reported on three occasions; first in 1938,¹⁰ on the general planning of water resources and supplies; secondly in 1939¹¹ on administrative matters and on demand for water from industry and agriculture; and lastly, in 1943.¹² This last report formed the basis of the White Paper, 'A National Water Policy' of 1944.

As in Scotland, the multiplicity of water undertakers in England and Wales, varying greatly in size and resources, was identified as a major source of weakness, as was the poverty of exact information concerning surface and underground resources, and the need to extend piped water supplies to many rural localities. Accordingly, the powers of the Minister were to be enhanced by placing on him a statutory duty of promoting the provision of adequate water supplies and the conservation of water resources. Central planning of water policy was to be a function of the Health ministers in both Scotland and in England and Wales. In the latter countries, however, surveys of bulk needs of large areas were to be carried out at the regional level by Regional Advisory Committees and not by central authority itself. The Ministry of Health would instead concentrate on surveying the efficiency of authorities. Hence, from the beginning of the post-war era, central authority in England and Wales was to have a more distant relationship with local water undertakings than did the Scottish Office.

'Looking to the smaller task involved, as compared with that¹³ in England and Wales, it should be possible in Scotland to ascertain whether joint action among water undertakers is desirable for the rationalisation of water supplies and the planning of new sources, without the appointment of regional advisory water committees'.

With respect to the existing institutions connected with the rivers

of England and Wales, CAWC had recommended the establishment of River Boards for the comprehensive management of existing functions. The new boards would have no responsibility for water supply but would have the right to be heard on any application for any new scheme of abstraction.

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'The task of the River Boards would be primarily to control rivers in the general interest, and they would have the particular duty of gauging the flow of rivers and maintaining records.'

Hence, with the establishment of these boards in 1948, the basis of a multifunctional and integrated approach to water management was laid down in England and Wales in a way that it was not in Scotland.

The provisions of the Rural Water Supply Acts (of 1944) and general Water Acts (of 1945 and 1946) that followed the white paper were essentially the same, with the existing pattern of water supply undertakings and sewerage authorities continuing unchanged but with a clear imperative of co-operation, if necessary imposed by compulsion by central authority, applying in both countries.

Compulsory Rationalisation of Water Supply undertakers in England and Wales

As one small water authority after another ran into difficulties responding to a post-war expansion of demand, amalgamations were increasingly seen as a necessary concomitant of securing additional supplies. Amalgamations were resisted and in the early days fought bitterly because of local pride and the impact of combinations on local rates. Nevertheless, the number of water Undertakers in England and

Wales was reduced from 1186 in 1945 to 1030 in 1956, 260 in 1968 and 187 in 1974.¹⁵ No such reduction took place in Scotland although the larger English administrations shared with the water boards, created eventually by the Water (Scotland) Act of 1967, the advantages flowing from a better financial basis, pooling of existing surpluses and the creation of management units better suited to the task of dealing with a demand which was being redistributed through suburban housing development, the growth of industrial estates and a general process of decentralisation from the former urban cores.

Meanwhile, the significance of the River Boards for water supplies was developing, albeit in the sphere of data collection. The Rivers (Prevention of Pollution) Acts of 1951 and 1961 gave the opportunity to control water quality. The latter extended control to all discharges in England and Wales some five years before the full system of control could be implemented in Scotland, thus reflecting the institutional heritage of its implementing authorities, the River Boards, themselves established well before the 1951 Act whilst their Scottish equivalents with respect to pollution control, the river purification boards, were only being established between 1954 and 1960. Full control over the discharge of effluents to rivers and to aquifers brought with it greater possibilities for their use as sources of water and for rivers as aqueducts in the process of inter- and intra-basin transfers of water; but it also introduced a new conflicting interest in the allocation of the water resources of a basin - water for dilution to maintain minimum dry-flows.

The Water Resources Act 1963

In the wake of a drought in 1959 and in the face of rapidly rising rates of demand for water, CAWC was once again called upon to review the administration of water resources in England and Wales. The Proudman Committee, reporting in 1962, drew attention to an urgent need for national planning and proposed that the River Boards should be replaced by river authorities with additional responsibility for water conservation in their respective basins.¹⁶ They were not to become water undertakings but were to assess the water resources in detail, execute water development works utilising these to an optimum extent and license all abstractions from rivers. Clearly, the concept of Regional Advisory Committees contained in the CAWC report of 1943 had failed and what was now required was regional executives to allocate water resources. The mechanism for so doing would be abstraction licenses giving the river authorities control over what went out of a river as well as what went into it in the form of consent to discharge effluents. Only the river authority could collate the picture of competing water supply undertakers and other interests in the basin and it would ensure optimal developments by undertaking them on its own account, acting, as it were, as a water wholesaler for the other interests.

In the absence of any formal institutional structure for fish other than salmon as for land drainage, and with the system for controlling pollution in an embryonic state, no equivalent reforms were produced in Scotland but competition for increasing scarce major new sources of water supply did, at around the same time, engender the

promulgation of the concept of a water wholesaler to develop major new sources optimally, the Central Scotland Water Development Boards (CSWDB).

The Proudman Committee also recommended the establishment of a national executive body to co-ordinate allocation by the river authorities. The government accepted the proposals with the exception of the latter and the Water Resources Act of 1963 established the river authorities (see Figure 13.1) and an advisory Water Resources Board which lacked any power to execute projects on its own initiative.

The new administrative structure attracted considerable critical acclaim, especially in North America. In particular, Craine eulogised the ability of the new structure to accommodate within a single entity the gathering of intelligence, planning future projects and regulation of existing use; the apparent ability to accommodate all externalities and interdependence; the apparent ability to express all relevant interests in water allocation; and the new structure's flexibility to adapt to local circumstances.¹⁷

Such praise was, however, rapidly seen to be precipitative. A new administrative structure did not necessarily mean new staff and new thinking. Local political pressures ensured in many instances that the changes made for abstraction licences and other sources of revenue yielded insufficient sums to construct optimal new developments. A crucial flaw in the wording of the Act meant that schemes promoted by River Authorities were obliged to follow the full Parliamentary procedure of authorisation by local Act. In the context of increasing

Figure 13.1

River Authorities in England & Wales



competition for water and land resources, it seemed that nowhere in England or Wales could a new reservoir be built without sustained opposition and ensuing public enquiry, and in this context the River Authorities frequently appeared to add merely a fifth wheel to the coach.

The Water Resources Board

This is not to say that their activities with respect to the assessment of resources were of no value. The Water Resources Board was able to collate and use this information to great effect. A desk study of present and possible future water supplies in South East England was produced in 1966.¹⁸ Other reports followed on other parts of the country culminating in a review of the options for England and Wales in 1973.¹⁹ This formed the stimulus for the study 'Water for Central Scotland' considered in Chapter 8 with SDD's 'Measure of Plenty'²⁰ acting as a basis for planning in the same way as water resource assessments were used by the River Authorities in England and Wales.

But the significance of the studies by the Water Resources Board for the evolution of institutional structure lies not only in the recognition, implicit in its review of future options, of the role that interbasin transfer may have to play in the future supply of England and Wales, but also in the fact that at a relatively early stage it was recognised that water quality was the crucial factor in implementing such plans.

Although not part of its remit, the Water Resources Board

recognised the 1400 or so sewerage authorities as a key problem in the future supply of water. A working party (the Jeger Committee) was established to outline problems of sewerage disposal and this reported in 1969.²¹

The Committee concluded that larger sewerage authorities were required; that it was essential that disposal of wastewater should be considered together with water conservation and control of river quality; that to ensure the effective management of treatment works there should be more co-ordination between planning authorities and treatment authorities on the implications of new development in terms of waste disposal and that there should be a system of control, analogous to that applying to rivers, governing the discharge of wastes to sewers.

In Scotland, the Wheatley Commission also heard evidence of the harmful effects of there being too many sewerage authorities too small to administer their duties properly (Chapter 10).²² This was a problem similar to that in England and Wales, but without the compelling urgency of action being necessary to secure supplies of water in future.

Local Government Reform

The problems of sewage treatment were intimately related to the existing structure of local government in both parts of the country. In Scotland SDD saw the solution in terms of local government reform. Water and sewerage were seen as essential components of structure planning and as constraints and conditioning factors on development.

In England and Wales the same arguments applied but on the other hand, it was also becoming increasingly apparent that a key aspect of water resources management was the need to bring matters of water supply, sewerage, water quality improvement and control under the same roof. These functions were already partially integrated within the river authorities, the Water Resources Board had cast their outline of long term options in the frame of regional groupings of river basins (and hence river authorities) and so hydrological units appeared most appropriate for water management. Such units did not, of course, match those thought most appropriate for a revised structure of local government, even if the original Radcliffe Maude proposals²³ precluded any possibility of including whole river basins within top tier authorities as had proved broadly possible in Scotland. Certainly, the final, fragmented pattern of local authorities that emerged had no meaning for water management.

Whether water supplies and sewage treatment remained a function essentially entrusted to local authorities or not (albeit in the former case, by this time, in combination with others) it was certain once the decision to refashion local government had been taken, that changes in the administration of water supplies, sewerage and sewage treatment were inevitable. The reform of local government was enacted in 1972 and changes in the water services had to follow suit. The water sources were to come out of local government in England and Wales because the balance of advantage lay that way.

Arguments for the removal of water and sewerage included first and foremost, the advantages of integrated management of all aspects of the

water cycle; the sweeping rationalisation of sewage treatment that would follow; the further reduction in the number of water supply undertakings that was made possible; the greater opportunity for cross-subsidy both in terms of rate revenue and of water; and the removal of political constraints on expenditure on the water services which had always suffered in competition with more vote-worthy projects. On the other hand, the link between planning controls over the location of new demands on the water services and those responsible for their provision would be broken. Local democratic control over the level of water (and sewerage) rates would be lost and the size of hydrological unit envisaged suggested that there would be great difficulty in ensuring adequate representation of local authorities on the managing bodies of any new water authorities.

In Scotland, the balance of advantage swung against the establishment of a separate structure of water administration on the basis of similar arguments. The advantages of integrated management of all aspects of the water cycle were not apparent, given the virtual absence of a functional link between the availability of water supplies in future and other water-related activities. A sweeping rationalisation of the sewerage service and of water undertakings would follow the transfer of authority to the seven regional councils originally envisaged (the Borders and Fife Regional Councils being added to the original pattern later, see Chapter 6). The new structure was to be more powerful, particularly with respect to development planning and for this to come about two things were necessary: water and sewerage had to be retained as essential infrastructural services; and local democratic control was to come to the

fore with an end to local jealousies and conflict between spending authorities raising revenue independently of each other from the same body of ratepayers.

Regional Water Authorities

In England and Wales, once again CAWG was invited to make proposals on the best form of water administration. In its view the problems were inflexibility in the use of resources, a frustrating division of responsibilities between river authorities and water supply undertakings with respect to the development of new sources of supply (with different perceptions of the scale of the problems they were intended to solve which on occasion broke into open conflict), and inadequate levels of wastewater treatment. These could be overcome by a structure of 10 to 15 all-purpose authorities presenting a single rate (to cover water sewerage and river management) to the public.

The Water Act of 1973 established a pattern of 10 regional water authorities (RWAs) (see Figure 13.2), the main duties of which would be to provide water supplies and reclaim or appropriately dispose of waste waters, whilst at the same time fully taking into account the needs of navigation, recreation, land drainage, fisheries and the conservation of wildlife and amenity. Or, in other words, a structure of administration was established that effectively internalised all the externalities likely to affect the future availability of water supplies. Meanwhile in Scotland a structure of administration was simultaneously established that effectively internalised all the externalities likely to affect the future smooth running of a system

Figure 13.2

Water Authority Boundaries



of development planning decentralised from the Scottish Office.

With respect to the role of Central government in water management in England and Wales, the Water Resources Board was disbanded, its essential task of outlining the national position and options for future development having been realised. Instead, a National Water Council, numbering within its membership the Chairmen of the ten Regional Authorities, would superintend the national interest in water management. Central government would continue its role of ensuring efficiency though rather more in financial terms than previously.

Since the whole concept of local government reform in Scotland revolved around decentralising decisions, no equivalent emerged in Scotland where the officers of the Scottish Office continue to guide events through the operation of an invisible hand, but nevertheless it was hoped (whether or not that hope has been realised) that intervention would not be quite so necessary as in the past. The remaining parts of the structure of water management in Scotland survived the re-organisations of 1975 virtually unscathed with a rationalised pattern of river purification boards continuing their role as watchdogs over water quality and the CSWDB continuing to act, in a sense like the original conception of an English River Authority, as co-ordinator of joint projects to develop new sources of water.

In addition to the National Water Council and the Directorate of Water within the Department of the Environment (DOE), four national institutions emerged after the Water Act of 1973. The Water Data Unit

and Water Research Centre are self explanatory in function and service the Scottish authorities as well as the RWAS. The Water Space Amenity Commission was established to give a national perspective to the work of RWAS with respect to their new statutory obligations with respect to recreational use of water, by which they were required to promote the best recreational use of the land and water they controlled. The Central Water Planning Unit was to continue the work of the Water Resources Board in formulating general policies concerning reservoirs, inter-regional schemes and the use of non conventional ways of augmenting resources so that the proposals of individual RWAS may be put in their proper context. The demise of this body, however, has recently been announced with the transfer of its functions once more to within the Department of the Environment. Hence given that data collection and research have been institutionalised to serve the whole of Great Britain, that the National Water Council has certain functions with respect to staff training similarly exercised on behalf of the industry in both countries, and that the Directors of the water and sewerage in the Regional Councils have formed themselves into SADWAS, the Scottish Association of Directors of Water and Sewerage, to give themselves a national forum, the only outstanding difference between central authority north and south of the Border lies in the field of recreation, the limited need for formal recognition of which by means of an institutional structure in Scotland has already been discussed (in Chapter 12).

Conclusions

It is apparent from this account that differences in the emphasis

on integrated management and on the role of central authority are indeed central to the different evolution of water management in Scotland as compared with England and Wales. In Scotland, demand for water grew at a similar rate to that experienced south of the Border for similar reasons. However, the ratio of resources to population was such that there has been no need to seek integrated units of management with water quality control or with sewage treatment. Instead the Scots have been more interested in improving the ability of decentralised authorities to cope with urban renewal and policies to foster economic growth which prominently featured the notion of regional growth poles and hence required the integration of regional planning with the provision of regional infrastructure.

That the emphasis should be cast in this direction should be no surprise for the central Authority responsible for the water services, the Scottish Development Department, was deliberately cast in the same mould in 1962. Because of the small size and financial weakness of many local authorities prior to local government reform, and the much smaller population in Scotland, the Scottish Office has traditionally been much closer to the day-to-day activity of local authorities than the corresponding ministries in England. Because of the greatly reduced dimension of problems, functions of resource assessment and allocation, which were decentralised in England to regional advisory committees and then to river authorities, were retained by the Scottish Office. The dual role of day-to-day involvement and of planning for the future, whilst all the time acting as agent of H.M. Treasury, guardian of public standards and arbiter of public complaints and representations, compromised the Scottish Office in effecting

radical reforms. Therefore the evolution of Scottish structure of water management involves far fewer radical changes of policy than in England and Wales, largely for institutional reasons, in response to the problems as well as the different scale of the problems themselves.

Overall, with the evolution of a more sophisticated and involved role for professional staff south of the Border, it is easy to see where many of the periodic calls for institutional reform in Scotland made by professional water engineers and water quality managers came from. It is understandable that the professionals would wish to see new concepts being applied in England affect their own career and working practice. But it is equally understandable in the context of the different dimension of integration that emerged and different centre-local relationships that had been forged in Scotland why they went unheeded.

This chapter thus sheds some light on the evolution of Scottish water management by revealing, in comparison with England and Wales, the key assumptions underlying developments. In addition, it has performed the supplementary function of providing a chronological summary of events in Scotland by way of introduction to the concluding chapter, the structure of which relates back to the introductory chapters and hence approaches the issues raised in a systematic rather than chronological manner.

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CHAPTER 14

Conclusions

The past half century has witnessed several important changes in the institutional structure of Scottish water management which has evolved in response to changing needs and the existence of internal and external stress. Unlike in England and Wales, virtually all stresses making for change have occurred outwith the direct sphere of water management and therefore much of the evolutionary sequence is cast in terms of broader social and economic policies. Water management in Scotland began as a function of local authorities and essentially remains so although two themes permeate the process of change, viz., a broadening of spatial perspectives to internalise the external factors perceived to be relevant, and secondly, an increasingly strong co-ordinating role for central authorities.

The characteristic feature of Scottish water management is the limited extent to which the spill-over effects of management actions in different sectors of the hydrological cycle have not been of major importance, in contrast to experience in England and Wales, a contrast that was highlighted in the previous chapter. In this chapter the main conclusions are briefly summarised and a return is made to the themes introduced in Chapter 1, viz., the allocation of responsibilities within and between various levels of government, the selection of an appropriate areal unit for the management of water resources and the identification of factors in the nature and pace of change as the institutional frameworks responded to new problems and changing social values. Each of these questions is addressed in turn: each aspect of management is first

considered, then the extent to which policies in each influenced others.

The identification of factors in the nature and pace of change is followed by a brief discussion of the overall validity of the study and a brief review of the strategy of research applied. Finally, the chapter concludes with some discussion of avenues of future research that might profitably be undertaken. It is important to remember that there has rarely been any doubt over what to do in terms of the goals of the various aspects of management but rather over how to do it, that is, the most practicable way of achieving those goals. Much of the story of Scottish water management is not concerned with the derivation of new policies but rather of implementing existing policies through an institutional structure that was appropriate for the prevailing circumstances at the time.

Principal Conclusions

The principal conclusions of this study are:

- 1.. Problems of water management in Scotland have stemmed from legal and administrative problems of institutional structure, and changing perceptions of problems have resulted in a changing structure.
2. Differences between the types of authority which first undertook the provision of water services in the nineteenth century lay at the root of many of the difficulties encountered during the period under consideration.
3. Until the formation of the Scottish Development Department in 1962,

central authorities were remarkably restrained in their role because of conflicting duties and constitutional constraints.

4. Hesitancy in closing the circle of pollution control has hampered the work of River Purification Boards which, in the absence of a significant inter-relationship between effluent disposal and the availability of water supplies, are institutionalised ginger groups.
5. Greater and speedier improvements in the extent and severity of river pollution have not been possible because of institutional barriers, a low priority in capital spending and a policy of 'purification by persuasion' initially adopted when the powers of river inspectors were weak.
6. The wider aspects of water management (land drainage, flood control, fisheries and recreational management) have not featured prominently in institutional arrangements.
7. A different perception of the appropriate externalities to internalise within a structure of management and a different relationship between central and local government, together with a much more favourable ratio of resources to demands made upon them North of the Border, distinguishes water management in Scotland from that of England and Wales.
8. Wider social and economic goals are crucial to the explanation of the evolution of the present institutional structure.
9. A desire to maximise the representation of existing institutionalised interest groups has shaped the areal and administrative patterns of the structural changes made.
10. The balance of power between institutionalised interest groups and the availability of finance have been major factors conditioning

the nature and pace of change, both positively and negatively.

The Allocation of responsibilities within and between various levels of government

a) Water Supplies

Unlike England and Wales, where 28 companies continue to provide about 20% of the water supply, albeit in a manner completely circumscribed by a structure of public administration, private initiatives have been insignificant in the provision of water supplies in Scotland. The goals of the service from the earliest times have been to provide a wholesome supply to all as a matter of right. The differential evolution of local authorities to undertake this task, however, combined to ensure several things. First, proper domestic supplies were not a feature of the whole country until the mid 1960s and even then, only as a result of the intervention of central authority by means of rural grants and regional plans. Secondly, the differential ability of different types of local authority to secure differing degrees of efficiency in resource development inevitably accumulated into the picture of wasteful duplication and sub optimal development first revealed by the Committee on Scottish Health Services in the 1930s, reaffirmed by the Scottish Water Advisory Committee in the 1960s and not eradicated until the creation of the ad hoc regional water boards removed the barriers of divided control between town and country authorities in the early 1970s.

Thirdly, although the reform of local government in 1929 established the County Council as a viable unit of rural administration,

the withdrawal of functions other than those related to water (such as education) from the small burghs appears to have poisoned the atmosphere between counties and burghs to such an extent that the joint administrative action that was the obvious solution to problems of water supply revealed in the 1930s proved impossible to achieve in the majority of cases even where central authority had clearly pointed to its engineering viability in the advisory regional plans produced by the Department of Health for Scotland.

There was little that could be done about this differential ability until central authority was empowered to allocate financial assistance and this was not possible until an administrative structure at the centre existed to undertake the task. This did not develop until the war years at which time the information to determine and evaluate projects worthy of assistance also became available. As to intervention with a view to 'knocking together the heads' of adjacent local authorities disinclined to co-operate, Central authority was constrained in Scotland because of unique constitutional factors outlined below. For the moment suffice it to say that Central government resolved the problem of enforcing co-operation only by applying its ultimate sanction of legislation in the form of the Water (Scotland) Act 1967 and that this was done only when a top priority political programme, the plans for economic growth and development which emerged from the Scottish Development Department in the 1960s, was clearly threatened.

Not only was water required for new housing development but more importantly, from 1930 provision of water for industrial development

put pressure on the water supply service. Increasingly, a major new development might require the same supply as a small town. This was rarely felt in terms of the availability of potential resources for development; rather it was of the financial ability of the water authority to make water available on time. In the highly fragmented structure that existed prior to local government reform in 1975, very few water authorities could cope with this challenge and hence the Central Scotland Water Development Board (CSWDB) emerged as an unique institution characterising Scottish water management. The CSWDB was conceived to finance the Loch Lomond scheme, and provides the mechanism whereby the uncertain costs of optimum resource development may be accommodated by a group of participating authorities. Water is not paid for until it is allocated and therefore no participating member bears the cost of holding large reserves against the event of a major new industry requiring a significant supply. The cost of resources is allowed to accumulate until allocated. By this means, many of the institutional barriers to optimum development of resources have been removed at last, after years of various authorities being unwilling, or unable to afford to participate in joint projects with no certainty of any ultimately beneficial return. Since optimum scales of development now seem to be of a size only justifiable by it, and since the essential idea is to be able to cope with all major new industrial initiatives, the CSWDB must be multi-regional in nature. Since it is so, the Board provides the best mechanism for the separation of planning water resources from the other duties of Central Government. It may be argued that several of the plans produced by the Department of Health for Scotland failed to gain voluntary acceptance, such as the Ayrshire plan or indeed the Loch Lomond scheme itself because they were

inevitably perceived along and mixed in, with Central Government's policies as a whole. The CSWDB has the crucial advantage of being a single purpose body one step removed from day to day political events, composed as it is of nominees of its constituent authorities. Outside the central area either the path of future development is so obvious or the likelihood of major industrial development so small that it seems unlikely that the retained powers under the Water (Scotland) Act 1967 either to create a further water development board for another part of the country or to extend the boundaries of the existing one seem unlikely to be used.

Stress in the form of the programming of post-war rehousing, including its emphasis on overspill housing and the decanting of population from the old urban cores, and in the form of industrial growth centres ensured the allocation of water supply as a function to ever broader spatial units: county-wide units of management replaced special water supply districts, in turn to be replaced by regional water boards, themselves supplanted by large regional councils, in most cases, specifically designed to cope with the needs of regional development and redevelopment whilst the CSWDB now exists to cater for national planning needs insofar as they are likely to arise.

As to the balance of power between Central and local authorities, Central Government was remarkably restrained in its role until the period 1965-1975. This was partly because major policies did not appear to be threatened until then, and partly because of its impossible position of having to exhort action involving public expenditure whilst at the same time having to enforce restraint in the overall level of

spending. There were also four constitutional constraints on Central Government's powers to enforce its view; first, ministers could not possibly deal with all matters personally; second, the ultimate sanction of enforcing central government's view by promoting legislation could rarely be used because of a severe shortage of Parliamentary time for purely Scottish Bills; thirdly, much of Scottish government is therefore necessarily conducted through processes of non-Parliamentary law making (such as statutory instruments, regulations and 'guidelines' issued by the Secretary of State), which provides extensive opportunities for appeal, challenge and ultimate reference to Parliament; once underway, appeal procedures are very time-consuming, especially if they involve a public enquiry, so that considerable care seems to be taken to avoid disputes by testing opinions well in advance of official proposals. Lastly, the making of decisions by civil servants has also encouraged a consensus-creating consultative approach on their part; the only exception to the prevailing constraints on Parliamentary time was the Water (Scotland) Act 1967, necessary to implement SWAC's recommendations of 1966 which in turn were necessary for the implementation of the government's programme for growth and development. Indeed, the creation of the Scottish Development Department (SDD) in 1962 marks a watershed in Central-local relations; SDD which was the result of a political imperative following poor election results in 1959, was created to move central government policies onto the offensive in the interests of the top priority political programme in Scotland, but it should not be forgotten that SDD's policy on the administration of water supplies was a direct derivation of one advocated thirty years before and officially adopted almost twenty years earlier (in 1944).

The gradually increasing role of central authority in water management in Scotland is most clearly seen with respect to water supplies. Beginning as the impartial chairmen of committees enquiring into the possibilities of joint action by local authorities, those in central authority who were concerned with water supplies, first extended their role through the gathering of information about supplies and resources and then sought to apply their findings by the use of regional reports, grant aid and control over the process of authorising new schemes by means of an Order by the Secretary of State. At each stage actions were guided by wider policy goals, at first public health and equality of access to wholesome and regular supplies; water as a symbol of civilised living. The post-war rehousing programme then came to the fore and water ultimately took on a new significance as a key factor in the attraction of new employment and regional economic growth. The influence of central government expanded in direct ratio with the changing perception of water supplies from the basis of public health to a constraint on regional development. A similar theme underlies the reorganisation of the structure of local government as a whole.

Finally, for groups involved in water supplies: professional water managers at the local level; local politicians; professional water engineers in central government; and those with vested interest in the promotion of new schemes of supply. Notably absent are national politicians, the public in general and major water consumers.

At no stage has water supply per se attracted any major political attention although the Institution of Water Engineers had Parliamentary spokesmen when the proposal to allocate water supplies to the new

regional councils came before Parliament in 1973. Neither has there ever been major controversy over any proposed water scheme in Scotland involving public interest groups as opposed to the vested interest group of salmon anglers. Although it is true that yachtsmen and the like were concerned over the implications of the use of Loch Lomond as a major source of water supply, it is a tribute to the extensive nature of Scottish water resources and to the skill of Scottish water engineers in identifying potential conflicts and designing around them (as is apparent in the extensive care taken with respect to environmental impact assessment in Cuthbertson's review of future sources for central Scotland discussed in Chapter 8) that no major controversies have arisen. Similarly, Scottish water managers appear to have been so responsible in the execution of their duties that there never appears to have been any question of protest from major water consuming industries in Scotland nor any pressure for representation on their part on decision-making bodies. No doubt the relatively low cost of Scottish water supplies helped considerably in this respect.

The most influential group in this period has undoubtedly been the water engineers within Central government, despite coming to prominence relatively late. Most major improvements over the last forty years may be ascribed to them. This is partly because so many of the 210 or so water authorities in existence before the 1967 Act had no professional staff solely devoted to water supply provision. Indeed, the extension of day to day professional management to every part of Scotland is generally agreed to be a factor in the success of the ad hoc regional water boards which was at least as important as the single purpose nature of these authorities and an essential complement of

'source to tap' units of administration. It seems clear that the absence of professional staff in too many authorities too small to employ their services was a major factor in creating problems of water supply in a country with such large resources that no problems should have occurred.

Local politicians appear to have been drawn to the water service only when there was reason to be proud (such as when rates were low and those of neighbouring authorities were high) or when there were crises. In normal times only a few local politicians appear to have taken any specific interest in the water service only in a few of the larger authorities where professional managers existed to stimulate their interest.

The creation of ad hoc boards for water supply brought professional and single-purpose management that could requisition funds and was free of the need to compete for finance. Working in close co-operation with Central Government, such authorities were highly successful, with relatively simple measures quickly eliminating the backlog of work which had formerly been impossible because of piecemeal administration. This form of administration appears to have given the professional water engineers the opportunity to show what they could do. The members of local authorities nominated to the boards appear to have developed a knowledge and enthusiasm for the service that was previously unknown. But such a system, particularly of finance, ran counter to the Wheatley Commission's views of local democracy and of water as 'a tool of planning' so that it was disbanded when general local government reform removed most of the problems of discordant

boundaries.

In the reformed structure, many of the chairmen of the new controlling committees were previously chairmen of water boards, and the directors of the new departments had similarly been leading officials in those boards. Corporate management is meant to be the cornerstone of the new structure of local government, and water matters and proposals have to bear examination in processes of financial planning for the authority as a whole and the decisions on priorities made by regional policy and resources committees. It is too early to say what, if any, effects will follow from such a change.

As to vested interest groups, these have been two-fold, viz., professional consultants and fishery proprietors. Professional consultants have played an important role in linking the needs of local water authorities with the views of the central government and potential objectors. To an important extent they have determined the detailed pattern of water resource development in Scotland by influencing the actions of otherwise ^{well} informed local authorities. Perhaps there have been cases where the interest of the consultant rather than that of optimal resource development have prevailed but no evidence has been found. However, in the case of Ayrshire considered in Chapter 7, it is clear that they were very influential and sometimes found themselves acting for clients with opposing views, although it will be recalled that a recommendation in line with government policy was eventually forthcoming.

The dominant interest groups are fishery proprietors and

freshwater fishermen. There are large numbers of the latter organised into angling clubs and associations, while the former hold extensive legal rights and powers of appeal. Angling groups have exercised power through weight of numbers, whereas the fishery proprietors exercised their influence both through their rights of property and the importance of salmon angling to rural and estate economies. Pressure from this quarter has shaped the pattern of resources development but the exact extent of this influence and its implications for optimum resource developments is an aspect of Scottish water management requiring further study, as indeed is the possibility of sub-optimal developments having occurred through the acceptance of the advice of consultants who, for reasons of their own, may have held a limited view of the resources potentially available.

b) Sewerage and sewage treatment

These aspects of water management proved most difficult to investigate for two reasons. First, as noted in Chapter 11, such information as is available in published form and concerned with the national picture has been deliberately manipulated so as to obscure the relationship between the responsible authorities and deficiencies and problems in providing an adequate service. Secondly, these services have never, since the 1930s, attracted the attention of an official enquiry, which in itself says something of their ranking in national priorities, the more so as the information that is available in the annual reports of River Purification Boards (RPBs), the report of the committee on sewerage storm overflows and in the two editions of 'Towards Cleaner Water' makes it clear that those services are not

without their problems. Fortunately, with respect to the aims of the study concerning institutional structure and the allocation of functions, it is in these spheres that least change has occurred.

The early pattern of development appears similar to that of water supplies, with the function of sewerage and treatment being allocated to local authorities with different capacities (particularly urban as opposed to rural) to sustain the goal of providing a service to all. The extension of main drainage to rural areas appears to have paralleled the extension of piped water supplies although experience around the country appears to have varied with, for example, main drains being installed simultaneously with water mains in Wigtonshire but several years elapsing between the two events in rural Caithness.¹ The situation with respect to adequate sewage treatment seems to have varied even more, complicated by the heavy reliance of tidal water discharges of untreated sewage as a means of disposal by large and small authorities alike.

Sewerage and sewage treatment were unaffected by the reform of local government in 1929 and there was no equivalent of the Water (Scotland) Act of 1967. The only major institutional changes were therefore the abolition of special drainage districts and the creation of regional councils in 1975. In most areas the highly fragmented pattern of authorities militated against the adoption of regional strategies of sewage disposal, until the external pressure of coping with government 'growth centres' appeared in the 1960s. Here and there, however, where an energetic county council merged its special drainage districts of its own volition in the 1930s, e.g., Midlothian, Fife,

Ayrshire and Lanarkshire, significant improvements seem to have followed albeit very slowly, whether in the last example in sewage treatment (notwithstanding the substantial assistance afforded by the Commissioner for Special Areas in Scotland) or in the form of trunk sewers draining regional wastes to the sea.

Central government appears to have taken very little interest in the services until needs of the growth centre philosophy (adding an impossible additional burden to the task of coping with rising levels of waste water discharged per capita and reflecting higher standards of living and the success of the post-war housing programme) and the need to do something in anticipation of the Rivers (Prevention of Pollution) (Scotland) Act 1965 (extending the remit of RPBs to all discharges of sewage and effluent) stimulated a greatly increased level of permitted expenditure from the mid 1960s. Sewerage and sewage treatment have never received any special institutional recognition within the Scottish Office. The Office of the Chief Engineer has always dealt with both clean and dirty water, and although some incumbents of the post have been by training primarily drainage engineers, the maxim that whilst people could do without adequate sewage treatment, they could not do without a wholesome water supply seems to have been consistently applied over the years.

While it is true that the worst excesses revealed by the Scottish Advisory Committee on River Pollution Prevention had largely been overcome by 1940, the lack of a comprehensive structure of administration for their services was the source of many difficulties. Each of the 234 local authorities that existed immediately prior to regional

councils took over had responsibility for sewage and sewage treatment. Of the cities, only Glasgow had a department specifically concerned with drainage, though paradoxically and in the post-war years, many of the county authorities which had any small and scattered communities to cater for, employed specialist engineers because they could afford to do so, while the burghs and cities, the major sources of waste waters, either could not afford to employ such specialist staff or decided not to do so. The functions were frequently allocated as two of many to burgh surveyors or burgh engineers whose primary concern was with roads. Officers with a professional qualification in sewage purification or the biochemistry of effluent control appear to have been very rare indeed.

Reform came, not as an end in itself, nor as an essential adjunct of regional policy, but as a consequence of the reform of local government. Even now there are only two directors of sewerage in Scotland, in Strathclyde and Lothian Region respectively. Elsewhere, most senior management positions are joint appointments with the water supply service and nearly all staff have an engineering background (in preference to chemists or biologists).

The duties of sewerage authorities were not codified into a form appropriate to the needs of the 20th century until 1973, by when five local authorities were aware of impending reorganisation and little appears to have been done until 1975 to align institutional structures with the duties they were to perform. Part II of the Sewerage (Scotland) Act 1968 made provision for a system of trace effluent controls that had first been recommended in specific terms 14 years before and called

for in general terms 18 years before then, but both parts of the Act (Part I modernised the law with respect to the provision of sewerage) were delayed because of the extra expenditure their implementation would require of local authorities. Because of the lack of a coherent institutional structure and because of the expectation of reorganisation, no decisions of either policy or the administrative arrangements that would be necessary to deal with controls over industrial effluents in the way intended in Part II of the Act had emerged by 1977.

There can be no doubt that hesitancy in closing the circle of pollution control in this manner has hampered the work of RPBs and caused uncertainty amongst sewage treatment authorities themselves. It is indicative of the prevailing lack of any concerted policy on sewage treatment that has characterised the actions of central government. Except for the imposition from time to time of restrictions of varying severity of levels of capital expenditure there would appear to have been little or no centre-local relations in this sphere. Restrictions on capital expenditure on sewage treatment have been doubly damaging because the provision of sewers is a statutory requirement and hence an unavoidable expense in developing areas. In many places at many times money has been permitted only to be spent to service new developments, thus increasing the extent to which existing treatment works were overloaded and the difficulty of clearing the backlog of necessary works of improvement. As the figures quoted for improvements in the Clyde Basin in Chapter 11 showed, there appears to have been no lack of will on the part of most local authorities since the institutionalised pressure of the RPBs appeared on the scene but, in the context of a low level of spending, progress was inevitably slow,

especially since local sewage authorities had to run quite hard to stand still in the face of rising per capita consumption of water and the increasingly complex industrial wastes that were being ever frequently diverted to local authority works under the influence of RPB policy.

The groups involved appear to have been the same as for water supply, with representatives of local engineers and politicians and central government engineers coming to the fore only rarely, intermittently and in limited numbers. Attention was drawn to the role of consultants in Chapter 11 although in that context as a factor in delay, other work, drawing their attention elsewhere (presumably to more prestigious projects of water supply) caused delay in the design of improvements.

c) River Pollution Prevention

The prevention of river pollution differs from water supply, sewerage and sewage treatment in that an effective administrative structure emerged for the first time during the period under consideration. The River Purification Boards (RPBs) are institutions unique to Scotland, lacking the pedigree of fishery committees and land drainage boards that provided precedents in England and Wales. As public regulatory bodies the only similarity between them and pre-existing district salmon fishery boards lies in their control of whole river basins. The Rivers (Prevention of Pollution) (Scotland) Act 1951 authorised the creation of ten RPBs, very largely implementing recommendations of the Scottish Advisory Committee on River Pollution

Prevention published 15 years before. Responsibility for river quality had previously lain with local authorities (large burghs and counties, including the cities) but despite control of pollution being one of the functions that had been administered on a county-wide basis rather than by means of special districts, the code of controls in force before 1951 and its administration was generally agreed to have been ineffective. Local authorities continued to administer the new code in these areas where the establishment of RPBs were not felt to be worthwhile (chiefly in the Highlands and Islands).

Of particular interest is the internal composition of the RPBs for they contain representatives of vested interests, with local authorities (which have a majority of seats) and others appointed by the Secretary of State to represent industry, farming and fisheries. The structure of boards is thus essentially one in which those responsible for polluting rivers regulate each other. Rather like an arch, lateral pressure is applied by each block helping to bear the overall load. The analogy can be carried further, as shown in the admittedly unique case of the Lower Don in Chapter 11; if one block is unwilling to perform its proper role the whole system collapses.

It is an indication of the priority given to the whole matter of policing the actions of local sewerage authorities that the 1951 Act provided that the exact composition of each RPB should be agreed by the local authorities in its area and, perhaps as a result, the first boards were not operating until 1954 and the ninth not until 1960, while the tenth was never formed. The Act also provided for the appointment of specialists in pollution control matters as chief

technical officers or river inspectors and specifically stipulated that such officers should not hold any other office (such as the environmental health officer for any constituent authority). In the early years the river inspector was often the only member of staff and, while others such as chemical analysts for laboratory work, hydrologists and biologists were gradually added, it seems clear that most boards never intended to formulate the bye-laws to control existing discharges that were envisaged in the Act.

As the only people with a full-time vested interest in the prevention of pollution, river inspectors appear to have exercised a good deal of personal influence. But partly because their powers were weak initially and partly because of a certain lack of enthusiasm on the part of some board members, most of the first generation of river inspectors (many of whom are still in charge) adopted a definite policy of purification by persuasion, relying more on reasoned argument than the threat of legal proceedings to get improvements underway. Because of institutional barriers and a low priority in capital spending, major improvements could not have been brought about quickly, but in the light of the very same factors, this view may well have become a self-fulfilling prophecy.

Nevertheless, the existence of independent river inspectors lies at the core of the whole system and their influence seems to have been instrumental in securing the withdrawal of a clause in the Local Government (Scotland) Bill that would (following the recommendation of the Wheatley Commission) have disbanded the RPBs and made the prevention of river pollution a direct responsibility of the new regional

authorities. The Wheatley Commission saw the irony of having a set of institutions called river purification authorities but with no executive powers to purify anything, merely regulate the actions of others. The river inspectors, on the other hand, argued that work on the prevention of river pollution would suffer from a lack of priority in the allocation of funds within a multi-purpose local authority, and many inspectors took the view that the loss of RPBs as ginger groups might mean a further reduction in the priority given to improvements in sewage treatment. As local sewerage authorities were themselves responsible for the bulk of pollution in rivers, the fear was expressed that violations of the pollution code would be covered up within departments and, whether or not this was likely, many people felt that arrangements involving the simultaneous management of sewage treatment and pollution control would not, and could not, command public confidence.

The Local Government (Scotland) Act 1973 did bring a rationalisation of RPBs, reducing their number to seven (including one for the Highland Region) and altering their composition, with a third of the seats going to representatives of the new regional councils, a third to district councillors, and a third to the Secretary of State's nominees, though (as a result of a last minute amendment) the district councils have no responsibility for the board's finances, no vested interest in the costs of controlling river pollution and appear, for the first time, to form a group of elected members who act as guardians of amenity.

As to central government's involvement, although appeals over the standards of treatment required by RPBs to the Secretary of State have rarely been made, this does not negate the significance of the procedure.

The possibility of challenge has reinforced the tendency for RPBs to be 'reasonable' and to rely on negotiation and persuasion when setting standards. Otherwise central authority appears to have been hesitant in its interventions in this sphere, particularly in view of its ultimate control over the pace of possible progress through control over the level of permissible public expenditure. Several facts all seem to confirm a somewhat hesitant stance on the part of Central Government, viz. the 1951 Act entered Parliament as a private members Bill; the tenth RPB (controlling the Angus Esks) was never established; and controls over new discharges to tidal waters were delayed. There was a lapse between existing discharges becoming the subject of controls in 1965 in Scotland while the same extension of control took place in England and Wales in 1961; the circumstances surrounding the Clyde River Purification Board Act of 1972; and the delay of twenty years in implementing the Hill-Watson Committee's recommendations concerning trade effluents.

d) Further aspects of water management

The main interest here is the absence of any allocation of these functions to public authorities of a decentralised kind. It is true that the district salmon fishery boards form a pattern of local institutions but these are private, autonomous bodies. It remains equally true that the wider aspects of water management, land drainage, flood control and fishery management have not featured prominently in institutional developments for water management. In the sections that follow it is therefore appropriate to consider only water supply, sewerage, sewage treatment and the prevention of river pollution.

e) The inter-relationship of functions

Sources of surface water are abundant in Scotland, especially when measured in terms of consumption; a relatively high consumption of 88 gallons per head per day is dwarfed by the 8,800 gallons per head per day potentially available.² Industry and population are highly concentrated so that the management of water supplies has been largely unaffected by pollution; hydro-electric developments rarely conflict with water supply; and, except in West-Central Scotland, significant stocks of salmon survive in the rivers.

As a result, suggestions that water resources should be managed in a co-ordinated manner have not been accepted. In 1960, Gilbert Little, a prominent Scottish water engineer, had urged the creation of a 'central co-ordinating committee' to apportion resources between different uses;³ in 1965, Ian Waddington, a leading river inspector, argued that the co-ordinated management of river basins, on the model of developments in England and Wales,⁴ would be beneficial; and in 1969, the Wheatley Commission stated that the joint management of water supply, sewerage, sewage treatment and river purification would be advantageous in the context of regional local authorities devoted to development planning. Each of these suggestions failed to gain support because each ran counter to the pattern of established interests at the time: Gilbert Little's proposal failed to take account of the desire of local politicians to retain control and resist the intrusion of central authorities, particularly in the form of ad hoc bodies: Ian Waddington's claim failed to take into account the resistance of salmon and other riparian proprietors to public involvement in their

affairs and the fact that such a move at that time would probably have hindered Central Government's policy with respect to water supply rather than fostered it, as in England and Wales (see below); and the Wheatley Commission failed to take into account the practical realities of pollution control which seem to require an independent agency to monitor the performance of local sewage authorities.

The two central themes governing the institutionalised inter-relationship between functions have already been mentioned in Chapter 13, viz., an interpretation of multifunctionalism that links the provision of water services with other infrastructure and regional planning, with consequently different externalities to internalise compared with those in England and Wales, and a different relationship between central and local government. The force of these factors is most clearly seen with respect to the relationship between water quality and water supply. The suggestion that the role of RPBs should be extended along the lines of that of the English river authorities, made in the mid 1960s, ran counter to central government's dominating concern with water, which was to provide new supplies for development. The mechanism for so doing had long been recognised to be regional administrative units. As was shown in Chapters 4, 6 and 7, this relatively limited move caused sufficient controversy to enforce legislation. The additional complication of extending powers of integrative control to the RPBs would have undoubtedly further extended delays in the implementation of a long overdue policy.

Similarly, a reorganisation of sewerage authorities would have added unnecessary complications and, in turn, the inadequate

institutional structure of this service limited the extent to which progress could be made by RPBs in their primary role. In addition, 'development' brought pressure to provide sewers which, in turn, may have drawn funds from improvements in sewage treatment (there are no official figures available). Hence the retention of RPBs as an institutionalised pressure group, outside the mainstream of local administration, was necessary and, in turn, the role of the angling and fishery interests as a controlling pressure group over the activities of the RPBs continued and was most clearly seen in the case of the Lower Don.

Hence a picture emerges, in the context of the social and economic goals of the last two decades, of policy and institutions concerning water supply and sewerage converging. Because this left little finance for sewage treatment, river pollution prevention and fishery groups retained their role as institutionalised and informal ginger groups respectively.

f) Scottish arrangements compared with those elsewhere

In this light, many of the generalisations concerning institutional arrangements for water management (referred to in Chapter 1) do not apply to Scotland. The dominating institutional arrangement to emerge was that of the Scottish Development Department, with its very specific commitment to a programme of high priority for executive action in spheres much wider than water management - in effect, economic and social engineering. This, in combination with the ratio of resources to population, has resulted in no apparent need to consider the river

basin as the basic must of water resources management. Rather, in Cunha's terms, the need to consider the requirements of land use planning and the conditions imposed by de facto situations (pragmatism in implementing development proposals) has figured prominently.⁵

Thus, when the derivation of administrative areas is considered, it is factors of public representation and local politics that should attract attention rather than the physical characteristics of water resources, for it has been externalities such as institutional barriers to progress, local jealousies and differential financial abilities that have required internalising the process of institutional reform rather than hydrological spill-over effects.

Administrative Areas

Much of the potential conflict between possible areas of administration based on physiographic features and units based on the historical evolution of communities has been resolved in Scotland because county boundaries in many instances follow the line of watersheds and because the county emerged as the basic unit of administration for rural areas as a result of the reform of local government in 1929. It is true that conflict between the two principles came to the fore when proposals for new regional authorities were advanced by the Wheatley Commission, particularly through the proposed partition of Fife between the Forth and Tay estuaries. The Commission did not, however, have such a physiographic division in mind when formulating proposals. Instead, in its view, the North of Fife was best administered as part

of the City-region of Dundee whilst the Southern part was seen as within the sphere of influence of Edinburgh. The people of Fife, however, saw things differently and although the implications for water supply of a partition was used as an argument in the debate following publication of the proposals it seems fair to conclude that the feeling of community amongst the people of Fife, perhaps enforced by a degree of antipathy to the citizens of Edinburgh and of Dundee, was the determining factor in the change made to the original pattern by granting regional status to Fife. Elsewhere, one has only to look at the degree to which the reformed pattern of river purification boards after 1975 matches the pattern of boundaries of the 9 mainland regional councils to see the relative ease with which community-based units of administration may be matched with river basins in Scotland.

The crucial determinants of areas of administration has been a mutual feeling of community interests, and the most damaging effect of this has been the division between town and country. It was this that engendered the creation of the RPBs, as much as the obvious advantages of having one administrative agency controlling water quality from source to sea. It was this that hampered the evolution of efficient schemes of regional drainage and sewage treatment and it was this that created the fragmented pattern of wasteful duplication in the development and distribution of water supplies.

The significance of the division between town and country lay in local jealousies, a proliferation of partial perceptions of the problems to be faced and the solutions to solve them, and in the varying financial implications of joint action. The lessons of history referred

to by a minority of the first committee of investigation into water-related matters in the 1930s lay in these respects and many of the historical problems of water management lie in the failure to tackle them for a further forty years through the reform of local government as a whole (although in fairness it appears to be true that a feeling of community between town and country gained no manifestation in reality until the effects of the post-war housing programme and the procedures of town and country planning came to be felt).

With respect to the questions concerning the derivation of administrative areas which were raised in Chapter 1 it is clear that at no stage has any quantitative standard been applied to the drawing of the boundaries of water-related administrations in Scotland, although the concepts of a minimum population to serve and a financial base on which to draw to support professional expertise have clearly been important in the emergence of the ad hoc regional water boards and the Regional Councils. The subsequent merger of the Ayrshire RPB and Dee and Don RPB with stronger neighbours seems to support the view that a minimum size of grouping to justify an appropriate staffing was not a concept of sufficient importance to over-rule considerations of the need to represent local interest groups when the original pattern of RPBs was being formulated.

Similarly, as has been shown with respect to Ayrshire and in the cases of Edinburgh and West Lothian, the need to ensure adequate representation in the light of the requisitioning that was to take place appears to have been the dominating principle in drawing the boundaries of the regional water boards and in the emergence of the

supra-regional CSWDB, [REDACTED]

[REDACTED] an areal unit which compares favourably with the present day regional water authorities in England and Wales.

Democratic control has predominated over technical efficiency and only where inefficiencies threatened the longer term interests of communities, with respect to economic growth and rising standards of living, was institutional action taken for primarily technical reasons. But in this service the origins of schemes of supply, with their early emphasis on inter-basin transfer and interlocking sewers distributed in different directions from the same upland catchment areas (for example the Renfrew Heights, the Campsies, the Pentlands and the Lammermuirs), meant that technical efficiency did not rely on the grouping of river basins, but rather of shared sources and distribution pathways so that the weighting given to physiographic factors could be relatively slight. The absence of any conditioning inter-relationship between water supplies and water quality then ensured that the building blocks of pre-existing units of administration dominated all subsequent decisions with respect to areal units for water management in Scotland. Hence, when the nature and pace of changes is considered, forces preserving the status of the initial institutions of local government are as important and perhaps more important than factors promoting change.

Factors influencing the nature and pace of change

Changes have emerged slowly, gradually and apparently along the lines of Lindblom's model of decision making, 'disjointed

incrementalism'. They appear to have been influenced by four specific themes:

- 1) changes in the pattern of demand for water services which themselves occurred slowly and gradually, with developments in the water services following others;
- 2) the availability of finance;
- 3) the balance of power between the various groups involved in any one context; and
- 4) the limited ability of central authorities to form a view and then impose it on unwilling local councils.

The latter two have already been discussed in the context of institutional design.

Changes in the demand for water

Although the availability of water and sewerage affects housing and industrial development, policies concerning the former have developed in response to the needs of the latter. While growth of population has been a factor in the increasing demand for water, rising standards of living have been more important and changes associated with such increases occurred relatively slowly and gradually within the confines of the area of responsibility of individual authorities. Industrial development could and did bring sharp increases in demand but, in the main, the larger authorities managed to maintain their ability to develop further resources as required. Only a few authorities could not cope and the essential difficulty in water supply administration lay in bringing together the viewpoints of self-satisfied authorities with those authorities, often in close juxta-

position, experiencing crises. Whilst increases in industrial demand or potential increases provided a potent force for change, this was virtually universally counterbalanced by the existence of adjacent authorities, at different places and at different times, which saw no need to change because they had adequate resources, often by virtue of a historical legacy rather than any action on their own account.

Meanwhile an interest in amenity, leisure and recreation has also developed gradually as one manifestation of generally rising standards of living. In the absence of any widespread need to abstract significant quantities of water for public supplies from rivers flowing through anything other than a thinly populated and non-industrialised basins (both in the past and, apparently, in future), rivers hence continued to serve as carriers of effluent in many areas and the growing demand for angling and recreation has generally been accommodated in others. Nevertheless, an increasing desire to enhance the environment in general has encouraged some responses to demand for the improvement of traditionally polluted waters in the urban and industrial areas. But the ethereal nature of this pressure for change has proved no match for the very strong financial forces tending to preserve the status quo.

2) The availability of finance

The total of public expenditure and the share allocated to the water services have limited the extent to which progress could be made quickly with regard to sewage treatment and river purification while the effect of individual projects and developments on local rates has

had a similar impact, again especially in sewage treatment but also in water supply before the advent of regional management.

The principle that there should be no public expenditure without control by elected members has not only shaped the areal units of administration that emerged, but also helped to explain the existence and role of conflict resolution of the advisory bodies, the Scottish Water Advisory Committee and the Scottish River Purification Advisory Committee, and why the views of professional water engineers and river inspectors (as represented by their respective Institutes) have been consistently *ignored*. It has helped to ensure that control of the water services has remained in political hands, although there seems general agreement that the problems of the water services are apolitical and that the contribution of elected members to the making of technical decisions has been limited.

The opposition of private riparian interests to an extension of public involvement in rivers, as seen particularly in the opposition to the ill-fated Hunter Committee's proposals concerning fishery management, stemmed from a belief that demands for positive control would inevitably follow.

Priorities in public expenditure have determined the extent to which administrative changes were thought appropriate. Water supply has generally received more support than sewerage while expenditure on equipment for river management has been small; for example, the construction of a satisfactory network of gauging stations was not begun until government grants were made available for the purpose.

Within the water services, priority appears to have been given to schemes servicing growth areas and the new towns, while with respect to dirty water priority has been given to sewerage rather than to sewage treatment and, within the latter, to discharges into inland waters; only in recent years has attention turned towards the treatment of effluents discharged to estuaries. Government grants have played a key role in overcoming many local difficulties where the effect of developments on the level of local rates often hindered the initiation of new projects and obstructed efforts to bring about a more rational administrative structure.

It may be concluded that the view of Sewell (Chapter 1) concerning important challenges to any institution structure for water management is broadly applicable to Scotland. These were an increasing complexity of problems, shifts in social goals and values, and the competition for investment funds which has just been discussed. Problems of water supply became increasingly complex as suburban housing became the norm, as city centres were reconstructed, overspill programmes adopted and as new industrial demands developed equivalent to the domestic demand of a small town. With respect to waste disposal, the advent of RPBs and their understandable determination to make some progress by encouraging the diversion of trade effluents to local authority sewers, with the ultimate intention of treatment after mixing with domestic waters, considerably complicated the task of providing and rebuilding sewage treatment works.

But there can be little doubt that the most potent factor promoting change was that of changing social goals and values. This took the

physical form of council housing, industrial estates, new towns and city centre redevelopment, but these were (and are) the manifestations of the more affluent, more caring and sharing society that emerged after the war, or as Adams has dubbed it 'the planned community'.⁶ These broader social trends ultimately, and inevitably led to the merger of town and country in units of administration reflecting city-regions rather more than anything else, and with that (as has already been extensively argued, the major institutional difficulty that dogged the provision of water services, whether in Lanarkshire at the turn of the century or with respect to the Loch Lomond scheme) county-burgh conflict disappeared.

Overall it also seems fair to conclude that policies, particularly with respect to institutional structure, emerged in a fashion consistent with Lindblom's model of decision making which he formally termed 'disjointed incrementation' but also referred to^{as} a 'science of muddling through'. This situation stems largely from the influence of local politicians, if not their continuous, sustained and informed involvement. Had the counsel of professional water managers been available and prevailed, perhaps a picture more akin to the rationalist approach (briefly outlined in Chapter 1) might have emerged. Instead, over the period under consideration, there have been differences over aims and objectives, crucial deficiencies in the availability of information and a shortage of skill in many areas to interpret what was to hand. All of these factors are preconditions of a reliance on precedent, producing small increments of change that have minimised conflict over their likely effects as perceived by the various parties involved.

'Disjoints' have occurred both because successful practice elsewhere, in this case primarily in England and Wales, has been translated to the Scottish scene, and when a new interest group came to dominate the decision-making arena. The law and institutional structure with respect to pollution control in Scotland must be comparable with that of England and Wales lest terms of trade between firms within Great Britain become unbalanced and, of course, in the interests of equality of opportunity within the country. Major innovations in this sphere may therefore be seen as a necessary extension of English practice to Scotland even although the context of pollution control differs markedly with respect to its linkage with water supply, fisheries and the ratio of available diluting water to effluents produced. The creation and subsequent influence of the Scottish Development Department is an outstanding example of radical changes following the appearance of a major new interest group, although its impact did not come through the addition of new people or new policies but rather because of a new political power in the context of regional planning.

Whether or not events appear to have followed a pattern of disjointed incrementation makes no difference to the evolution of arrangements for the management of water resources in Scotland, but the conceptual framework provided by Lindblom did provide several useful insights in the process of researching its evolution, a topic to which attention is now directed before possible avenues of future research are considered.

A Discussion of the research methodology applied

Although this study is entirely based on a reading of the documentary sources listed at the end of this volume, the strategy of research adopted involved the informal and non-structural interview of more than forty individuals involved in the day-to-day management of Scottish water resources. (A full list is provided in Appendix C). Interviews took place throughout 1975 and into 1976 in the context of a pilot study of Scottish water management under the general direction of Professors W.R.D.Sewell, University of Victoria, and J.T.Coppock, University of Edinburgh, with the author as research assistant and the financial support of the Social Science Research Council.

The question schedule used to prompt discussion when required is reproduced as Appendix D. Rationalist concepts of decision-making as well as those consistent with Lindblom's view prompted several questions, but it soon became apparent that the economic approach to water resources management was not a common currency amongst practitioners although most professionals were aware of practice in England and Wales and elsewhere with respect to charging for domestic water by metering and trade effluent charges.

The value of such interviews was twofold: first, cumulatively they were of great assistance in interpreting 'between the lines' of the available literature, particularly the somewhat bland official publications that are available. Secondly, several important clues as to conflicts and objectives which do not feature in the official, published literature were gained. A pregnant pause here or a shuffling

of feet there, led the author to further discussions and archive research that, in turn, eventually led to such case studies as Ayrshire's water supply and pollution on the Lower Don. The literature of water management in Scotland yielded the pieces of the jig-saw but the informal interviews provided the pattern printed upon them, allowing their piecing together.

The immediate aftermath of local government reform was a particularly favourable time to conduct such an exercise so that it cannot be guaranteed that a similar approach elsewhere and concerning a different aspect of resources management would yield as much. In the mid 1970s professional water managers were confident that the structure of institutions in which they worked was right. Of course, this is not surprising; in the main the men involved had successfully survived the process of reorganisation, frequently having been significantly promoted in status. Reorganisation had also put an end to any controversy and in the absence of any live debate, men were prepared to reflect on past events in a balanced manner and with the concept of a future of sustained progress ahead of them in mind, insufficient time having passed for any deficiencies to have become apparent in the new structure.

An essential prerequisite of such an approach is to be well informed prior to the interview lest valuable time be spent establishing well-known facts rather than their interpretive value for the overall picture. The process of being well informed is iterative and hence second and third interviews were of particular value. Of course, perceptions of events varied and it was tempting to examine the degree

and significance of such variation; but this would have precluded the continued uncovering of the significance of one development as opposed to another. The role of the perception of officials, however, remains one of several potential avenues of future research to which attention is now turned.

Potential avenues of further research

A deficiency of the present study lies in the almost total absence of any sort of evaluation of the effectiveness of the institutional structure that has evolved. The essential criterion of such evaluation might be 'does it do what it is supposed to do?' The question of evaluation has not been tackled, not because of any difficulty in amplifying criteria on which degrees of success may be assessed, but rather because of deficiencies in the availability of information necessary for measurement. In any event, it may be argued that, in the present institutional hiatus following the referendum on devolution and the apparent collapse of any prospect of a Scottish Assembly being established, it is difficult to see what the value of any overall assessment might be. Had the Assembly been formed, there may have been a useful role to play, in the light of its proposed powers to amend the structure of local government, in re-examining the case for a national water supply authority or autonomous regional water authorities loosely based on the English model. But in the absence of any realistic likelihood of major institutional change in the near future, research effort might be more usefully directed in much more specific directions.

With regard to water supplies and resource developments for that purpose and in the context of the very limited growth in the demand for water currently being experienced, it would seem useful to conduct an evaluation of the extent to which existing resource developments make full use of what has already been made available, with a view to limiting new capital investment to an absolute minimum.

Specifically, such enquiries might take two forms; first, existing arrangements with respect to compensation water might be reviewed with the aim of establishing the extent to which the present volumes released are really required. Secondly, existing impoundments providing a direct gravity supply might be systematically re-examined to determine the extent to which their conversion to a role of river regulation might provide more water at a reduced price. With respect to water supplies there seems scope for studies designed to reveal the extent to which there is scope to get more water from existing assets and determine the spatial distribution of that potential.

With respect to water quality, the cycle of pollution control does not appear to have been closed, (at the time of writing) with respect to a comprehensive system of trade effluent control (discharged to local authority sewers for treatment at local authority sewage treatment works). Some research is required into the extent to which controlling the blend of waste waters reaching sewage treatment works might enable a radical improvement in their performance at little extra cost or enable them to deal with significantly greater volumes of waste with no deterioration in the existing quality of effluent produced. Again the aim would be to investigate the possibilities of

achieving better value for money through the application of carefully considered and specific managerial action and, as such, both this avenue and those suggested with respect to water supplies in practice refer to making the present institutional structure work more effectively.

With respect to the institutional structure itself, two lines of research might prove fruitful. The role of elected representatives in water management is enshrined in the present institutional arrangements but little or nothing is known of the characteristics and perceptions of these people. In the past, the ability of local councils to deal adequately with technical matters has been criticised by the professional associations of water managers. Some research into the perceptions and understanding of local representatives might prove useful to water management or central government in seeking to improve the quality of decision making. A recurring theme in the present study has been the extent to which 'the lessons of history' seem to have been persistently ignored by each new generation of decision makers. Some research into elected members awareness of past problems and the solutions applied, successfully or not, might well ensure that the same mistakes are not made again.

Finally, the institutional structure of water management in Scotland is markedly simpler than that in England and Wales, so much so that the question arises whether or not the sophistication of the Regional Water Authorities is really necessary over the whole country or whether a simpler allocation of functions along Scottish lines may be appropriate to at least Wales and the North of England. Does

Yorkshire really require the same institutional arrangements that seem suitable for the Thames, bearing in mind that Scotland clearly does not?

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APPENDIX A : Sources developed to supply Central Scotland since 19501. Impoundments

1. 1951 Daer Scheme by Daer Water Board (28 m.g.d.)
2. 1958 Turret Scheme by Loch Turret Water Board (19 m.g.d.)
3. 1961 West Water by the West Lothian Water Board (6 m.g.d.)
4. 1963 Fruid Scheme by Edinburgh Corporation (13 m.g.d.)
5. 1964 Whiteadder Scheme by East Lothian Water Board (7 m.g.d.)
6. 1968 Loch Bradan Scheme by Ayrshire County Council (18 m.g.d.)
7. 1969 Spallander Scheme by Ayrshire Water Board (4 m.g.d.)
8. 1972 Corsehouse Scheme by Ayrshire Water Board (1 m.g.d.)
9. 1973 Castlehill (Glendevon) Scheme by Fife and Kinross Water Board (7 m.g.d.)
10. 1974 Megget Scheme by South-East of Scotland Water Board (45 m.g.d.)

2. River Abstractions

1. 1950 Kinneswood abstraction by Kinross County Council (less than 0.5 m.g.d.)
2. 1954 Much Water abstraction by Ayrshire County Council (0.5 m.g.d.)
3. 1956 Linhouse Water abstraction by West Lothian County Council (0.8 m.g.d.)
4. 1958 Glen Franka abstraction by Lanark County Council (less than 0.5 m.g.d.)
5. 1958 River Garnock abstraction by the Irvine and District Water Board (4 m.g.d.)
6. 1960 Greeto abstraction by Ayrshire County Council (0.2 m.g.d.)
7. 1960 Surge Burn and Kings Burn abstractions by Ayrshire County Council (0.7 m.g.d.)
8. 1960 Baddingsgill Burn abstraction by West Lothian Water Board (Temporary 6 m.g.d.)

9. 1960 Linhouse Water abstraction by West Lothian Water Board (0.8 m.g.d.)
10. 1961 North Medwyn Water abstraction by West Lothian Water Board (3.5 m.g.d.)
11. 1965 Greenfield abstraction by Renfrew County Council (6 m.g.d.)
12. 1965 River Almond abstraction by West Lothian Water Board (2 m.g.d.)
13. 1967 Hareshawmuir abstraction by Kilmarnock Town Council (2.3 m.g.d.)
14. 1968 Water of Girvan abstraction by Ayrshire County Council (1 m.g.d.)
15. 1970 Belister Burn abstraction by Ayrshire County Council (0.1 m.g.d.)

3. Conjunctive Use

1. 1951 Kilmarnock Town Council, new dam at Loch Goin
2. 1954 Glasgow Corporation pumping from R. Finglas to Loch Katrine
3. 1954 Renfrew County Council pumping from R. Calder to Kain reservoir.
4. 1956 Dunbarton County Council abstracts from Loch Lomond.
5. 1960 Paisley Corporation pumping from R. Garnock to Rawbank reservoir.
6. 1960 Edinburgh Corporation converts Edgelaw reservoir from use for compensation water to purposes of direct supply.
7. 1961 Renfrew County Council redevelops Loch Long
8. 1962 Girvan Town Council redevelops former Ministry of Aviation source at Penwhapple.
9. 1963 Paisley Corporation pumps from R. Greeto and Gogo to Camphill.
10. 1964 Edinburgh Corporation takes bulk supply from the British Waterways Board reservoir at Cobbinshaw.
11. 1964 Ayrshire County Council purchases supplies from the South of Scotland Electricity Board's Loch Doon storage.
12. 1966 Dunbarton County Council purchases supplies from the North of Scotland Hydro Electricity Board's Loch Sloy storage.
13. 1967 Ayrshire County Council increases supply from Loch Doon
14. 1967 Loch Lomond scheme authorised. (Central Scotland Water Development Board)

APPENDIX B: Summary of the technical background to Edinburgh's dispute with SDD over the Loch Lomond Scheme

1. Cuthbertsons were commissioned to investigate possible sources of additional water for Edinburgh and Midlothian in July 1962. The new source would not be required until the Fruid reservoir then at an advanced stage of planning was fully committed. The Loch Lomond scheme was specified as an option to be considered.
2. Cuthbertsons calculated that, on the basis of trends in demand then current, the new supply would be required around 1977 and suggested that the City should think in terms of a source like the Talla reservoir, that is to say, capable of meeting future demands for seventy years or more albeit the ultimate yield of 30 to 40 mgd should be made available in stages of 10 to 15 mgd.¹
3. The Tweed Basin was the obvious place to look for this. The development of a second large aqueduct from this direction would also afford relief to the existing trunk mains should they require maintenance.
4. Cuthbertsons identified Megget Water, immediately across the watershed from the existing Talla reservoir as the best possible source.
5. Cuthbertsons do not appear to have favoured the concept of the Loch Lomond scheme:²

'the reliability of a pumping scheme over such a distance cannot be compared with that of a gravity supply scheme and substantial terminal reservoir storage would be required in the Corporation's area of supply to cover possible interruptions in supply.'

and further:

'to develop Loch Lomond, having an average discharge of about 670 mgd, and to set aside further development of the Tweed River Basin, having an average discharge of

1850 mgd, would in our opinion tend to create an imbalance in the development of the water resources of Central and South Eastern Scotland. Such a course might, in the long run, be against Scottish interests. The water resources of North-Eastern England are no longer unlimited in relation to the pressure of industrial demands there, and it may not be long before demand will be made on the resources of the River Tweed by that area.'

6. Nevertheless, Cuthbertsons costed a supply of 30 mgd from Loch Lomond. This compared with preliminary costings for Megget water as follows: (Cost per 1000 gallons)³

	<u>1st Phase (15 mgd)</u>	<u>2nd Phase (15 mgd)</u>
Loch Lomond	£22.5	£21.6
Megget	£10.40	£13.60

On this basis Loch Lomond was no longer considered as an option for the future supply of Edinburgh.

7. The position changed, however, when SWAC proposed that Edinburgh should merge with the West Lothian Water Board. In the light of the major industrial developments that seemed likely, the Board had agreed to commit themselves to a reservation of 17 mgd in the Loch Lomond scheme instead of proceeding with the construction of a reservoir on the North Medwin Water to supply $6\frac{1}{2}$ mgd. The Board's existing sources would be exhausted at some time between 1968 and 1971, depending on the nature and pace of new development. The Board therefore urgently required new sources of supply.
8. Cuthbertsons suggested that West Lothian's needs, particularly those of Livingston New Town, could be met from Megget by pumping water across the Pentlands from Glencorse to Morton. It was already planned that Glencorse would act as a balancing reservoir for Megget water.

9. Cuthbertsons then compared the cost of supplying the new town by this means with the estimates for the Loch Lomond scheme.

4

Comparative Costs of supplying expected growth in demand in West Lothian

Loch Lomond Water (11 mgd from a total of 32 mgd in 1983) 13.9p/000 gals
 Tweed Water (based on 11 mgd in 1983) 14.0p/000 gals

Both of these figures, of course, were much higher in the earlier years (the same capital charges being spread over fewer thousand gallons required) but the balance was very much in favour of the Tweed for the earlier years (when the Livingston supply would be provided from the Fruid reservoir) viz.

5

Comparative Cost of Loch Lomond and Tweed water

	<u>1970</u>	<u>1973</u>	<u>1983</u>	<u>Cost/000 gals.</u>
Loch Lomond	48.9d	28.2d	13.9d	
Tweed	21.7d	24.6d	14.0d	

The projected costs assumed constant electricity charges for pumping. Any increase in these charges would affect the schemes differently, the Tweed supply involving considerably less pumping against the head, viz.

6

Increase in power costs by 1983	25%	50%
Loch Lomond Cost/000 gals	14.8	15.8
Tweed	14.2	14.4

Not only did the Tweed scheme thus offer a short-term financial advantage but it also had long-term advantages depending on the view taken as to the likelihood of substantial increases in energy costs. The Corporation accordingly offered to take over the supply of Livingston. As recounted in Chapter 5 above, the offer was not

taken up and Edinburgh embarked on its sustained opposition to the financial implications of a merger with West Lothian.

10. Later, it was clear that regional amalgamation was to become a reality and that the area between Edinburgh and Livingston, 'the Calders', was likely to experience substantial growth (requiring something of the order of an additional 7 mgd over the next ten years). West Lothian's needs (excluding this latter area, largely in Midlothian) were covered by the Loch Lomond scheme until 1982. East Lothian was in a similar position (largely because of the Whiteadder Reservoir, then under construction). On the new basis of planning Edinburgh and Midlothian would require around 47.5 mgd plus safety margin of 3 mgd (as opposed to the 4 mgd previously recommended) and around 7 mgd for the Calders: 57.5 mgd as compared with the 45 mgd firmly available. A new scheme with a yield of only 15 mgd would therefore satisfy the demand for Edinburgh and Midlothian for around fifteen years and could not help in the supply of other parts of the Lothians such as the Western part of East Lothian after 1982. In this light the Megget scheme was the only viable option. The possibility that the Calders might be supplied from Loch Lomond was considered, but it was not clear what influence the proposed South-East of Scotland grouping would be able to exercise over the allocation of Loch Lomond supplies and it was likely that other consumers to the west of Livingston would wish to stake a strong claim on available water from that source.

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4. Edinburgh Corporation, September 1963, *ibid*, p.4.
5. Edinburgh Corporation, September 1963, *ibid*, Table 1 between pages 4 and 5.
6. Edinburgh Corporation, September 1963, *ibid*, p.5.

Appendix C: Those interviewed by the author

An asterix indicates a second or subsequent visit.

Central Government Officials

J.W.Shiell ****	Chief Engineer (retired 1976), Scottish Development Department, (SDD) Edinburgh
S.A.Agnew	Chief Engineer, SDD, Edinburgh
J.Kerr*	Assistant Secretary, Water, Sewerage and Pollution Division, SDD, Edinburgh
J.E.Stark*	Former Assistant Secretary, Water, Sewerage and Pollution Division, SDD, and Secretary, the Scottish Water Association Limited, Edinburgh
T.Rarrity, L.J.Fotheringham	Principal officers, Water, Sewerage and Pollution Division, SDD, Edinburgh
A.T.Brooke	Assistant Secretary, Land Drainage Division, Department of Agriculture and Fisheries in Scotland, (DAFS), Edinburgh
D.G.S.Ward	Assistant Secretary, Freshwater Fisheries Division, (DAFS), Edinburgh
D.A.Leitch	Assistant Secretary, Research, Education and Advisory Service Division, (DAFS), Edinburgh
J.Brownlie	Principal Officer, Pollution Section, Research, Education and Advisory Service Division, (DAFS), Edinburgh

The Central Scotland Water Development Board

A.Fraser	Chief Engineer, Balfroun by Torrance
R.H.Cuthbertson*	Senior Partner, R.H.Cuthbertson and Partners, Consulting engineers to the CSWDB (and others), Edinburgh

Central Advisory Committees

Sir George Sharp	Chairman, the Scottish River Purification Advisory Committee, former member of the Scottish Water Advisory Committee, Convenor of the Convention of Scottish Local Authorities, Convenor of Fife Regional Council, Chairman of Forth River Purification Board and former member of the Fife and Kinross Water Board, Glenrothes, Fife
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Regional Councils: Water and Sewerage Committee Chairmen

W.Patterson Strathclyde Regional Council, Glasgow

Regional Councils: Directors of Water and Sewerage

T.A.Brownlie Director of Drainage, Lothian Regional Council,
Edinburgh

R.J.Cameron Stobie Director of Engineering, Fife Regional Council,
Glenrothes, Fife

W.T.Devenay Director of Water, Strathclyde Regional Council,
Glasgow

J.Crichton* Deputy Director of Water, Strathclyde Regional
Council, Glasgow

L.H.Deaton Director of Water and Sewerage, Borders Regional
Council, Melrose

R.Lea Deputy Director of Sewerage, Strathclyde
Regional Council, Glasgow

G.Little Former Director of the Lower Clyde Water Board,
(retired 1975), Crieff

J.A.N.McGeoch Director of Water Services, Tayside Regional
Council, Dundee

J.P.Williamson Director of Water Services, Lothian Regional
Council, Edinburgh

J.M.Merryweather Deputy Director of Water Services, Lothian
Regional Council, Edinburgh

J.T.Robertson Director of Water and Drainage Services,
Central Regional Council, Stirling

River Purification Boards (RPBs)

D.M.Wardley Chairman, Clyde River Purification Board

W.F.Collett* Director, Forth RPB, Edinburgh

G.M.Woodward Deputy Director, Forth RPB, and formerly
Director, Lothians RPB, Edinburgh

G.A.Haig Chief District Inspector, Forth RPB, Edinburgh

J.C.Currie Director, Tweed RPB, Galashiels

D.Hammerton** Director, Clyde RPB, East Kilbride

J.A.Rangley Director, Tay RPB, Perth

District Salmon Fishery Boards (DSFBs)

C.Fordyce-Burke Superintendent, Forth DSFB, Doune

J.R.C.Proudlock Superintendent, Tweed Fishery Commissioners,
Wooperton, Northumberland

J.M.Thomson Chairman, Tay DSFB, Managing Director of the
Tay Salmon Fisheries Company Ltd., Perth

Others

M.M.Crowe Chairman, Strathmore Angling Improvement
Association, Dundee

J.S.McGrath Assistant Archivist, Strathclyde Regional
Archives, Ayr

S.Wyllie Assistant Secretary, The North of Scotland
Hydro-Electricity Board, Edinburgh

Appendix D.Scottish Water Management: Question Schedule

1. What are the major problems and issues facing Scottish water management?
 - how have these problems changed over the past thirty years?
 - how are conflicts amongst uses resolved?
2. What kinds of strategies have been adopted with respect to the following problems in Scotland?
 - domestic and industrial water supply
 - management of water quality
 - land drainage
3. Have there been any important shifts in the kinds of strategies adopted over the last thirty years?
4. What attempts have been made to deal with water supply problems by:-
 - raising the price of water
 - re-cycling
 - water quality improvement
 - reduction of leakage
5. What kinds of strategies might be used in water quality management? such as:-
 - negotiations between agency and polluters (formal/informal)
 - the 'punitive approach', regulations and sanctions (fines etc.)
 - grants and subsidies; water purification incentives, tax relief etc. to facilitate process changes, re-cycling etc. Applicable at various points in the production system
 - effluent discharge charges, (varying scale according to nature and extent)
6. Is benefit-cost analysis used in the evaluation of alternatives?

7. What is the basis of the standards adopted for water quality management?
 - are they realistic?
 - are they being attained?
8. What is the structure of water administration?
 - a) How many agencies are responsible for water management at the national level?
 - b) What is the range of functions performed by the various agencies?
 - data collection
 - research
 - planning
 - regulation
 - provision of financial assistance
 - construction
 - operation of facilities
 - c) What specific kind of information are collected?
 - d) Are there any regulations re. flood plain residential development?
 - a code of practice in giving planning consent to such developments?
 - e) Why are River Purification Boards separate from other water functions?
9. What is the process of decision making in this agency?
 - a) Cues for action, internal/external, pressure groups etc.
 - b) What is the relationship of various divisions of the agency to the process?
 - c) What are the relationships between agency staff and the board/committee?
 - d) What are the relationships between the board/committee and other decision makers?
10. What are the relationships between this agency and others at the same level of administration and/or higher levels?
 - a) What forms of communication - and how often - regular meetings?
formal/informal

- (b) How are differing policies or points of view between agencies reconciled?
- (c) What is the specific role of the SDD?
- (d) What are the relationships of SDD to other agencies at the national, regional and local level?
- (e) (FOR WATER SUPPLY AGENCIES)
 What is your relationship with - similar agencies?
 - the CSWDB?
 - the SWAC?
 - the RPBs?
 - the sewerage department?
 - the Director of Leisure
 and Recreation?
 - structure planners?
- (f) (FOR RPBs ONLY)
 What is your relationship with - similar agencies?
 - the SRPAC?
 - supply agencies?
 - sewerage authorities?
 - the Director of Leisure
 and Recreation?
 - structure planners?
 - the industrial pollution
 inspectorate?
 - flood warning systems?
- What contact do you have with various pressure groups such as anglers or environmentalists?
- (g) What are your relationships at the national level
- with SDD?
 - with DAFS?
 - with Environmental Health Officers?
 - with the Countryside Commission?
 - with the British Waterways Board?
 - with the National Water Council?
 - with the Forestry Commission?
 - with HEP authorities?

11. What is the nature and role of planning?
 - a) How is planning defined?
 - b) How comprehensive is it?
 - c) What is the time horizon?
 - d) What is the data base?
 - e) Do principles underlying the planning come from within the agency or from other agencies such as the SDD?
 - f) What is the role of consultants?
12. What was the rationale for and the likely consequences of re-organisation of water management in Scotland, 1975?
 - a) Was re-organisation necessary?
 - b) What alternatives were considered?
 - c) Why was this one selected?
 - d) What effect is re-organisation likely to have?
 - on efficiency?
 - on the cost of services?
 - on relationships with other agencies?
13. Miscellaneous Questions:
 - a) To what extent has legislation fulfilled the intentions of those who framed it?
 - b) To what extent has the response to different problems been conditioned by Scottish geography?
 - c) To what extent should the public be involved in public policy making?

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