NATURAL RESOURCES JOURNAL

Volume 10
Issue 3 *Summer 1970*

Summer 1970

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THE INSTITUTIONAL FRAMEWORK FOR WATER MANAGEMENT IN ENGLAND AND WALES

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The purpose of this article is to outline the institutional framework which has evolved since 1940 to guide water development in England and Wales. Following a description and analysis of existing legislation, sources of success and difficulty are identified.

I
A NATIONAL WATER POLICY

In April 1944, a White Paper was tabled emphasizing the necessity for a national policy capable of accommodating all future reasonable water requirements. It observed the sufficiency of the water supply in this country, but pointed to the existence of a problem of organization and distribution.[1] From this observation, it is evident that in the early 1940's there was an awareness of the difficulty generated from the uneven spatial distribution of water supply and demand. Pursuing the problems associated with areal distribution, the report noted:

> Water is a peculiarly difficult commodity to bring to the consumer. It cannot be compressed or concentrated for distribution. It is bulky, and costs of distribution are relatively high. For these reasons local sources must be used as fully as possible. It is essential to have a sound national pattern of supply and distribution.[2]

Having outlined the necessity for a national policy, the paper identified the defects inherent in the existing system of water management.[3] Regarding central and local organization, the responsibilities of government departments were considered to be ill defined. It was recognized that while water management concerned a multitude of government interests, inadequate delimitation of such interests would inevitably result in overlap and duplication of involvement. This would lead to conflict within and between government organizations. Further difficulties noted were the multiplicity of water supply undertakings (there being over 1,000 in England and Wales at the time), inadequate service for rural areas, an uncoordinated sys-

1. Ministry of Health, Ministry of Agriculture and Fisheries, Secretary of State for Scotland, A National Water Policy, Cmd. No. 6515, at 3 (1944).
2. *Id.*
3. *Id.* at 4-6.

tem of water charges, and unregulated private supply sources of industry and agriculture. Compounding these problems stemming from the uncoordinated nature of the water industry was a deplorable lack of basic meteorological and hydrological data, as well as a lack of information regarding the extent and intensity of pollution in water courses.

To remedy these defects, the White Paper suggested that water resources be allocated on the basis of informed estimates of demand and a planned water economy. In summary, the report stated that:

> . . . a planned water economy means the building up of a body of information as a background against which sensible and speedy decisions can be given as to the best way to meet particular needs and fit them to a long-term policy rather than an attempt to frame a master pian to which all decisions must conform as to a Procrustean bed.[4]

In effect, the report outlined criteria for an optimum decision-making model. These criteria emphasize why plans generally are only made operational at a sub-optimum rather than optimum level. Decisions in water supply programs can rarely be speedy due to the number of interests involved, and implementation is usually slow due to the capital investment and construction period required for large public projects. While a flexible rather than fixed plan is desirable, the nature of sizeable capital projects makes flexibility an elusive objective. Consequently, the White Paper was solid in theory but lacking in applicability.

In relation to the necessity for long-term planning, the report stressed that premature commitment of resources should be avoided. The reason given was the heavy cost of large schemes resulting in the public supporting a debt from development not providing benefits for many years in the future. In addition, caution on long-term commitment was recommended due to changing population patterns, consumption requirements and technological advancement. A project planned for too long a life span might become technically obsolete before investment dividends were recovered. Again, this caveat was theoretically solid, but to become operational, guidance would be required regarding the definition of long and short term planning horizons. Such guidance was unfortunately either not considered or else excluded from the report.

Having established the need for a national policy, the White Paper explained that the first stage required was collection of information related to available sources of water supply as well as present and

4. *Id.* at 7.

future demands. Once such data is collected, an efficient system of management would be required to maximize water allocation. In establishing such a system, three guidelines were considered essential: (1) some level of central control to avoid haphazard and wasteful development; (2) ultimate responsibility for the efficiency and vigor of water supply managgement to fall upon a Minister responsible to Parliament and secondary responsibility on local authorities answerable to their regional electorate; and (3) even though allowance must be made to insure adequate consideration of all interests, sectional aspirations must bow before the national interest. As with earlier provisions of the report, these guidelines were admirable, but not particularly realistic.[5] Couched in vague or undefinable expressions such as "the national interest," many recommendations were not readily applicable. Nevertheless, the basic notions of a centralized coordinating authority and a designed data collection program struck at the root of existing haphazard development procedures and indicated the correct direction for rational planning.

II
WATER ACT OF 1945

On June 15, 1945, Royal Assent was given to an Act which enacted the basic recommendations contained in the White Paper of 1944. Designated the Water Act of 1945, its purpose was to provide for the conservation and use of water resources and water supplies.[6] The responsibility for administering the Act rested with the Minister of Health, whose duties included promoting proper water resource conservation and use; promoting the provision of water supplies in England and Wales; and securing the execution of a national water policy by undertakers subject to his control and direction.[7] To achieve the ambiguous objectives of "conservation" and "proper use," the Act established a central coordinating authority and local advisory water committees. It also included provisions to initiate data collection, reorganize and regroup water undertakings and control discharge of effluent into water courses.

To obtain a degree of centralized control, the Minister of Health would appoint a Central Advisory Water Committee having two principal duties.[8] First, the Committee would advise him or other Ministers concerned in development and utilization of water resources. Second, it would provide a center of expertise to which any govern-

5. *Id.*
6. Water Resources Act of 1945, 9 Geo. 6, c. 49.
7. *Id.* § 1.
8. *Id.* § 2.

ment department concerned with water could send questions related to administration of the Act. While a central authority was thereby established, the opportunity for significant impact upon water development procedures was sharply curtailed by the advisory nature of its terms of reference. With compulsory power excluded from its jurisdiction, the Committee would have little opportunity to see recommendations adopted or utilized by statutory water undertakings.

As a regional counterpart to this Central Advisory Water Committee, the Act also provided for joint advisory water committees.[9] These organizations were comprised of a chairman appointed by the Minister plus representatives from statutory water undertakings and local authorities, whose areas were wholly or partly in the area of the committee. They would be established in areas where the Minister felt more effective conservation and water supplies would be realized. The duties of such organizations would be fourfold: (1) prepare surveys of existing water consumption, demand, availability and potential; (2) prepare estimates of future water requirements; (3) make proposals to meet existing or future water requirements, including joint use of facilities by two or more water undertakings; and (4) provide advisory services to water undertakings and local authorities to achieve coordination of water supply schemes.[10] The scope for the joint advisory committee was considerable, and the trend away from individual entrepreneurship was a desirable step toward eliminating duplication of resources and effort by authorities. The possibility for effective implementation arose from the Minister receiving power to require local undertakings to provide necessary information to the joint committees.[11]

Moving from central and local planning to local water supply organization, the Act included two important provisions. First, for the purposes of water supply, the Minister could define an area comprising districts or parts of districts of local government councils as an areal unit for supply purposes; and concomitantly, constitute a joint water board for such a unit district.[12] These procedures could be initiated by the Minister himself as opposed to having the first step being taken by any of the local authorities. The possibilities for improving water supply services through reduction or elimination of duplication under such a scheme were obviously considerable.

A second, but closely related provision was that the Minister could make an order by multilateral agreement or unilateral compulsion

9. *Id.* § 3.
10. *Id.* § 4.
11. *Id.* §§ 5-7.
12. *Id.* § 8.

providing for: (1) joint furnishing of a water supply by two or more water authorities; (2) creation of a joint committee from two or more water undertakings in order to exercise water supply functions; (3) amalgamation of all or part of two or more water authority undertakings when none of the organizations were a local authority; and (4) transfer to water undertakers part or all of the undertakings of other water supply organizations.[13] This section, like the previous one, was designed to achieve greater effectiveness through regrouping and reorganization of the many small and inefficient water undertakings throughout England and Wales.

To summarize, the Act represented progress towards a national policy, but also left numerous gaps. A central organization had been established to coordinate the activities of the many interested parties associated with water resources development. While certainly a necessary step towards a national policy, this institution could not be viable with an advisory rather than a prescriptive role. The provision for local joint advisory committees and joint water boards was a progressive step as well by recognizing that administration of water supply can realize advantages through scale economies. Such joint organizations also indicated a trend toward acceptance of the concept that maximum social benefits from resource development would be realized from regional rather than local planning. Unfortunately, no criteria were included as to the optimum areal extent for amalgamations among water supply undertakings. A further constructive step in establishment of joint committees was the constitution of membership to include representatives from national government, local government and water undertakings. This move was only a partial step, however, as many other interests such as agriculture, amenities and landowners were inadequately represented on the committees.

III
RIVER BOARDS ACT OF 1948

In 1943, a government report recommended the creation of organizations having comprehensive jurisdiction in regard to rivers or groups of rivers for land drainage, pollution prevention, fisheries, and to a limited extent, navigation.[14] It was suggested that the new organizations, to be known as river boards, would assume responsibility for the land drainage duties of existing catchment boards, for pollution regulation of some 1,600 existing authorities, and for

13. *Id.* § 9.

14. Central Advisory Water Committee, Third Report, Cmd. No. 6465 (1943). The proposals were supported in Cmd. No. 6515, *supra* note 1, discussing a national water policy.

fishery work by fisheries boards. The new river boards would also inherit navigation duties possessed by catchment boards, but would extend their power no further than that regarding navigation.

In recommending these proposals, the report attempted to reduce the range of organizations participating in water management, and to establish a rational basis for the areal extent of authority jurisdiction. The study recognized that as well as drainage, pollution, fisheries and navigation there were other interests such as water supply for domestic, industrial and agricultural use, amenities, and recreation. The relative importance of interests was considered impossible to define for purposes of general policy since

> [i]t is, in fact, impossible to give an order of importance which would apply to every river. The main interest in some cases is definitely water supply, in others it may be industry, in others fisheries, and so on; in some instances there is more than one interest. Moreover, changes in the distribution of population and in the development of industry or other causes may vary the predominating interest from time to time.[15]

This statement recognized, but did not pursue, the fundamental problem that physical, social and economic variation from time to time and place to place raises a considerable obstruction in the path of generalized policy formulation. In addition, the identification of ranges of interest associated with water courses varying temporally and areally should have suggested the difficulty involved in applying multiple-purpose resource use as a general concept for development planning.

Having recognized various interest groups concerned with water policy, the White Paper rather surprisingly submitted that the principal defect of the existing framework was neither overlapping functions nor competing interests, but rather absence of a single organization to coordinate varying river interests and to guarantee adequate consideration of all interests. The result of this situation was considered to be that none of the rivers are "used to the best advantage of all concerned interests."[16] It is essential to recognize that full consideration of all interests is not synonymous with complete accomodation of all claims in a competitive situation. Establishment of authorities based on catchment areas would undoubtedly lead to more effective management, but that they would absolve all conflict should have been clearly a doubtful supposition.

By focusing the power of river boards upon drainage, pollution,

15. *Id.* at 6.
16. *Id.* at 27.

fisheries and navigation, the report felt that the interrelated nature of these aspects would result in a comprehensive approach to management. It was argued that all river interests have some degree of concern with the quantity and quality available in a water source. If a river were to be a satisfactory supply source for domestic, agricultural or industrial users, or for fisheries, quantity and quality would have to be closely regulated. In addition, attention upon quantity and quality would be required if land were to be protected from flooding, irrigation water was supplied in time of drought, adequate amounts of water were provided for consumer abstraction, and if navigation requirements were met.[17]

With attention given to water quantity and quality, it is somewhat surprising that the report considered it unadvisable to give river boards authority to construct conservation reservoirs, fearing that the exercise of such power could interfere with the rights of riparian owners or the statutory powers of other authorities.[18] Having given attention to reconciling various interests associated with river development, it is difficult to understand how the White Paper envisioned that project initiation from an authority possessing a comprehensive regional viewpoint would be more conducive to conflict than initiation from independent undertakings acting in isolation. Opportunity for moving far away from a haphazardly individualistic approach to water development was considerably reduced by such an approach.

Regardless of these criticisms, however, the 1943 proposals were a landmark in water resources management by recommending development on the basis of watershed units. Britain showed herself to be advanced in water development philosophy by advocating watershed control when many other countries continued to follow a more individualistic entrepreneur-like approach to management. As in most government papers trying to satisfy all potential critics, however, the report exhibited a gap between the stages of theoretical and practical planning. The report observed that it was desirable for river boards, when planning projects, to outline the drainage, pollution, fisheries and navigation duties of boards in such a way that the needs and requirements of all interests are adequately safeguarded in proportion to their public value.[19] In transforming these theoretical considerations into practical proposals, it would be discovered that maximization of all values at a given time or place would be impossible. Instead, it would be necessary to achieve a compromise among the competing interests involved. A further complication would quickly

17. *Id.*
18. *Id.* at 37.
19. *Id.* at 31.

arise when interests are valued in terms of their "public value"—a concept operationally undefinable.

It was not until 1948 that the recommendations contained in the White Paper of 1943 were passed into law as the River Boards Act. Receiving Royal Assent on May 28, 1948, the Act was constituted

> . . . to provide for establishing river boards and for conferring on or transferring to such boards functions relating to land drainage, fisheries and river pollution and certain other functions. . . .[20]

The areal extent of the river boards, consisting of areas the drainage of which is controlled by a river or group of rivers, is indicated in Figure 1. It can be seen that boards, responsible to the Minister of Health and the Minister of Agriculture and Fisheries, were established for all areas of England and Wales except the Thames, Lee and London areas, where special conservancy authorities were established.

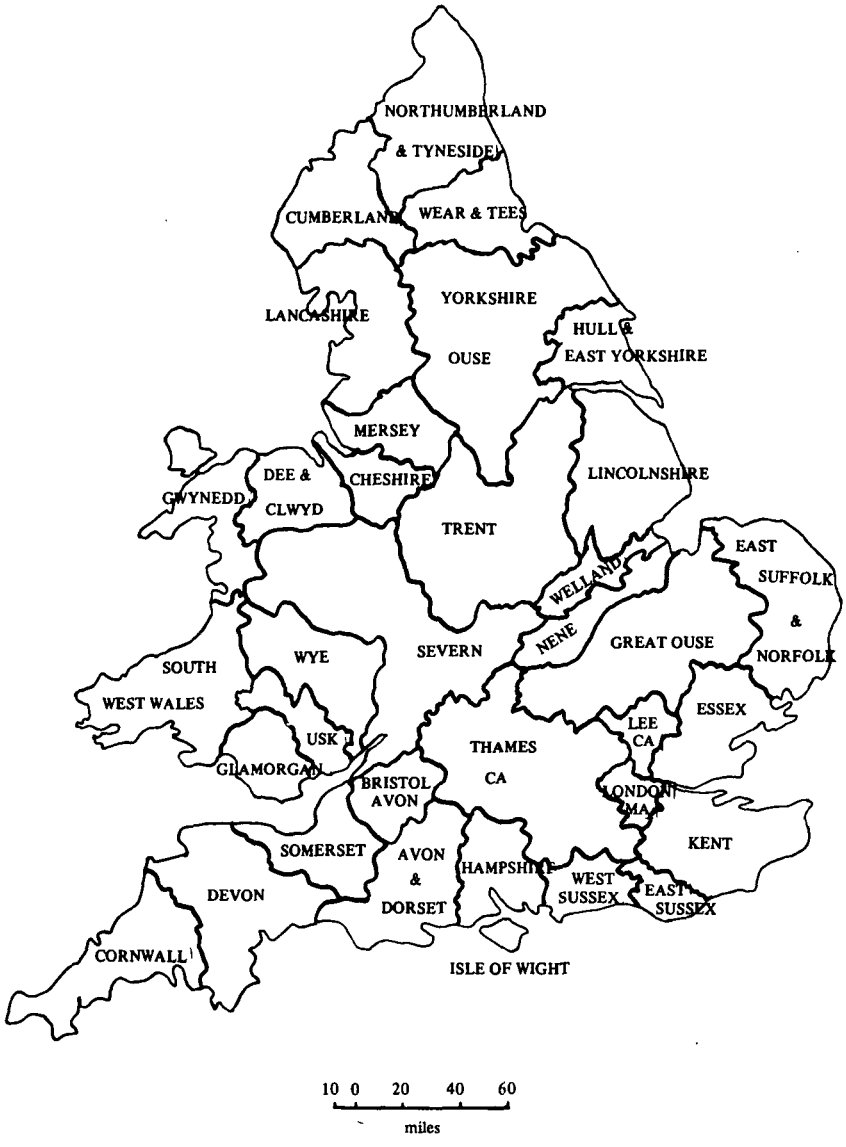
As suggested in the government paper, river boards assumed functions of any catchment board, fishery board, local authority, joint board or joint committee located within the area of the boards. In addition, if it were considered important to improve management effectiveness, the boards could obtain a ministerial order transferring to them the responsibilities of any navigation, conservancy, or harbor authorities in their area.[21] Moreover, the boards were to devise programs to facilitate collection of rainfall and river flow data for ministerial approval. Related to the collection of information, the river boards also received responsibility to determine the quantity of water abstracted from, and the amount of effluent discharged into, the streams in their area of responsibility.

As explained in relation to the White Paper, the establishment of board management on the basis of river basins was a progressive step toward improving water management practices throughout England and Wales. Nevertheless, exclusion of many aspects of water management, such as water supply development, from jurisdiction of the boards provided ample conflict among interested groups. Collection of basic data for water supply and demand patterns was a forward looking provision as well. It is surprising, however, that the terms of reference were restricted to present patterns and did not extend to estimation of future supply and demand developments nor to formulation of proposals to satisfy future needs.

The organization and structure of boards deserves comment because therein lay the hopes to bring together and resolve conflicting

20. River Boards Act of 1948, 12 Geo. 6, c. 32.
21. *Id.* §§ 4, 8.

Figure 1.
AREAS OF RIVER BOARDS
England and Wales



interests associated with river schemes. The Act specified that membership of boards was not to exceed forty people. Of these forty, one member would be appointed by the responsible ministers, not less than three-fifths nor more than two-thirds would be appointed by councils of countries and county boroughs whose area was within the river board area, and the remainder would be appointed by the Minister of Agriculture and Fisheries with a view to assuring representation of drainage board and fishery interests.[22] In special cases, allowance was made to include representatives of the Ministry of Transport and the Coal Board. That important interests were excluded from membership is obvious. Some of the more significant interests unrepresented were those of statutory water undertakings, forestry, recreation, and amenities. The excluded groups naturally were resentful at being excluded from river board councils—not an ideal atmosphere in which to generate trust and confidence for subsequent decision-making on development proposals.

IV
EXTENSION OF THE INSTITUTIONAL FRAMEWORK

Following the Water Act of 1945 and the River Boards Act of 1948, little major innovation occurred in water management administration until the Water Resources Act of 1963. Between 1948 and 1963, however, a number of acts were enacted and several government reports were tabled which undoubtedly affected the form in which the 1963 Act appeared. Consequently, the different acts and reports are considered in chronological order.

In 1948, the Ministry of Housing and Local Government investigated whether gathering grounds owned or controlled by water undertakings should be opened to afforestation, agriculture, and access by the public, and published a report of its investigation.[23]

That this investigation marked a sharp change in water management philosophy is evident from a statement issued by the Ministry of Health in 1939 in which it was stressed that upland water undertakers

> . . . should, wherever reasonably practicable, acquire the whole of the gathering ground above the reservoir, dam or intake, and protect the reservoir or intake by adequate fencing. . . Steps should be taken

22. *Id.* § 2.

23. Ministry of Housing and Local Government, Central Advisory Water Committee, Gathering Grounds Subcommittee, Gathering Grounds: Public Access, Afforestation, Agriculture (1948).

> to secure that drainage from farmyards or houses remaining on the gathering ground does not pollute the source of supply.[24]

To present recommendations regarding access, afforestation and agriculture on gathering grounds, the investigating committee interviewed water undertakings and other interested groups in England and Wales to achieve a consensus regarding the issue.

It was discovered that all interests agreed upon preservation of a pure and wholesome water supply. The point of difference was whether water supply purity would be endangered by modifying existing restrictionist policies applied to catchments. The report noted that isolation of catchment areas had been criticized on two fronts. One argument maintained that the increasing proportion of urban dwellers required improved access to rural countryside; another that the increasing need to raise home food production for national security and foreign exchange reasons dictated an expansion of agricultural land utilization. Little attention was given by the committee to the fact that conflict potential between farmers and recreationists could prove as difficult as differences between water undertakings on one hand and farmers and recreationists on the other.

The committee spent considerable energy evaluating the potential danger of water borne disease arising from pollution. It noted that cholera epidemics in London during 1832, 1849, 1854, and 1866 impressed the nation as to the need for safeguarding water supplies.[25] With the introduction of appropriate measures, however, no further outbreaks occurred in Britain after 1866. The committee concluded that even if human beings were excluded from catchment areas, there was still the likelihood of animal or bird excreta being deposited onto watersheds or into reservoirs. Despite this problem, the committee discovered that there had been no occasion where disease was transmitted from a large reservoir, even where filtration or sterilization was absent. Keeping in mind that water-borne germs could not live indefinitely in water, the committee concluded that the purifying effect of large reservoirs reduced the risk of disease to a minimal level.

Regarding practices of gathering ground access policy, a vast range of procedures was found. Purchases of reservoir watershed land surfaces made by undertakings ranged from none at all, to purchases of

24. Ministry of Health, Memo. 221, Jan. 1939 (Memorandum on the safeguards to be adopted in day to day administration of water undertakings).

25. Ministry of Housing and Local Government, Central Advisory Water Committee, Gathering Grounds Subcommittee, Gathering Grounds: Public Access, Afforestation, Agriculture (1948) at 8.

entire land surfaces. Some undertakings had passed bylaws governing activities on gathering grounds, while some had established restricted zones, and others allowed complete access. In effect, there was a range of practice from complete exclusion to complete access, and a similar situation prevailed for afforestation and agriculture. The range of opinions was as wide as the types of practices. The Burnley Corporation water engineer, for example, explained that ". . . public access to gathering grounds has always been prohibited and this is undoubtedly the best policy from the Undertakers' point of view, and affords the greatest safety to consumers."[26] In contrast, the engineer of Bristol Waterworks Company maintained that "[a]ccess to gathering grounds, under proper control of such matters as rest centres, fire precaution, etc., should not be discouraged."[27]

After comparing the location and nature of gathering grounds where differing policies were in force, it appeared to the committee that part of the differences resulted from local circumstances. Nevertheless, it was felt that the many differences of policy could not entirely be attributed to circumstances, and in fact, the remainder of the explanation seemed to rest upon variations of attitude and opinion regarding the risks involved if access were permitted.

In the face of such diversity of opinion and practice, the committee concluded that while a universal access code could not be formulated, a number of general guidelines could be established, since much of the variability in policy stemmed from differing viewpoints on principle rather than on circumstances alone. As a result, the committee felt that because of the purifying effect of storage in large reservoirs, the possibility of pollution from defecation deposited on a watershed subsequently being washed into reservoirs was slight. Consequently, it felt that emphasis should rest upon protecting the reservoir water itself where the self-purification process occurred. Thus the committee recommended:

> We would therefore entirely prohibit bathing, and only permit boating, fishing or access to the banks under a system of control by the water undertaker sufficiently rigid to exclude the possibility of abuse. Subject to such limitations . . . we can see no justification on grounds of water purity, for prohibiting access by walkers, cyclists, or motorists to the remainder of the gathering ground.[28]

This recommendation represented a marked change in attitude from that expressed during 1939 by the Minister of Health when it was considered advisable to isolate watersheds from public use. Interpre-

26. *Id.* at 13.
27. *Id.*
28. *Id.* at 21.

tation of what constituted a sufficiently rigid control system, however, was likely to result in as much variety of opinion as the committee had noticed in existing procedures.

Regarding farming in reservoir catchments, the view was that subject to protection of reservoirs themselves and immediate tributaries, the greatest possible freedom should be provided for agricultural activities. In fact, the committee contended that the undertakers who are large land-owners should insist upon the most productive use of their land.[29] Related to maximization of land use in catchments, the committee felt it was desirable that land not suitable for agriculture should be afforested for "commercial timber production."[30] Where soil or climatic conditions were not suitable for agriculture, it suggested that afforestation provided the following benefits: (1) productive use of land otherwise left idle; (2) a barrier against the public and animals around reservoir verges; (3) a natural filter retarding the rate of silt and pollution accumulation from surface run-off; and (4) an agent to regulate flow from varying rainfall intensities. The main objection to afforestation was seen as aesthetic. Objections centered around the unnatural appearance of large geometrical blocks of conifers on the landscape, and the way in which views could be obstructed by trees. The committee suggested that these objections could be overcome by consulting local amenity interests and arranging plantations so as to obtain a balance between scienic effects and efficient timber production.[31]

This report on the problem of public access, agriculture and afforestation on gathering grounds can be considered a major landmark in the move toward multiple-purpose use designs of reservoir schemes. The committee regarded preservation of pure water supplies as axiomatic, and all involved interests concurred. Nevertheless, for the first time it was considered that pure water supply and watershed sterilization were not necessarily synonymous.

V
RIVERS (PREVENTION OF POLLUTION) ACTS 1951 TO 1961

Between 1951 and 1961 three acts were passed to control growing water pollution, and, among other things, thereby widened alternative water supply sources. Known collectively as the Rivers (Prevention of Pollution) Acts 1951 to 1961, the three Acts were the Rivers (Prevention of Pollution) Act of 1951, the Clean Rivers (Estuaries and Tidal Waters) Act of 1960, and the Rivers (Prevention of

29. *Id.* at 22.
30. *Id.* at 25.
31. *Id.*

Pollution) Act of 1961. The 1951 Act established the basic framework for pollution regulation, while the 1960 and 1961 Acts extended the initial provisions.

The purpose of the 1951 Act was "to make new provision[s] for maintaining or restoring the wholesomeness of the rivers and other inland coastal waters of England and Wales."[32]

Under this Act, to be enforced by the river boards as well as the Thames and Lee River authorities, an offense was committed if any poisonous, noxious or polluting matter was discharged into a stream.[33] Exceptions to this provision were discharge of effluent into a local authority sewer or sewage disposal works which in turn passed waste into a stream, discharge into a stream where the water course was the only "practicable" place to dispose of effluent, or discharge into a stream after reasonable treatment of waste. The definition of what constituted poisonous, noxious or polluting matter, practicable alternatives, and reasonable treatment was to be determined by the river boards. In addition, no new or altered outlets for discharge of trade or sewage effluent could be installed without river board consent.

The enforcement of this act was necessary if some level of pollution control was to be realized. It was accepted that the diluting and dissipating characteristics of rivers made it practical for effluent to be discharged into water courses up to a certain level before other interests, such as water supply, fisheries or agriculture, were harmed. Thus, while being a recipient for effluent discharge was considered an acceptable river use, control over quantity and composition of waste flushed into rivers was deemed necessary. Under this act, river boards would determine the quantity and frequency of waste discharged into their water sources, as they similarly had identified, under earlier acts, amounts of water abstracted for supply purposes.

The establishment of acceptable levels of effluent in a river was also a necessary but more contentious issue. The Act specified that the polluting characteristics of waste should be established on the basis of temperature and discoloration effect. These are basically physical criteria, in later years summarized as an index of fishery mortality. In other words, effluent was acceptable as long as it did not incur fishery mortality. Once mortality occurred treatment or curtailment of waste would be necessary. Opposition against physical measures for establishment of standards has arisen on the basis that such parameters in no way reflect social costs associated with pollution treatment. While this argument is undoubtedly sound, there is as

32. Rivers (Prevention of Pollution) Act of 1951, 15 & 16 Geo. 6, c. 64.
33. *Id.* § 2, § § 1.

yet no satisfactory way to measure the social costs of pollution. Consequently, a theoretically unsound but operationally possible system is applied for pollution control.

The two subsequent pollution acts increased the scope of the 1951 provisions. In 1960, the Clean Rivers (Estuaries and Tidal Waters) Act extended jurisdiction of pollution regulations to estuaries and coastal waters associated with rivers in board areas.[34] The 1951 Act had specified that new effluent discharge outlets needed board permission. In 1961, the Rivers (Prevention of Pollution) Act provided that waste outlets operating prior to 1951 would also have to receive approval from boards, and if not meeting established standards, be discontinued or modified. It also specified that the river boards should periodically review, and if necessary alter, pollution standards. Any modification of standards would necessitate appropriate changes to waste outlets in order that they conform to altered effluent levels. Attention to water pollution regulation and control is significant for water supply policy in that agitation is arising for the treatment and subsequent re-use of water. It is argued that much of the pressure upon conventional supply sources could be reduced if polluted water were treated and used several times rather than once.

VI
WATER ACT OF 1958

On August 1, 1958, Royal Assent was given to a bill to meet water requirements during periods of drought or prolonged dryness. The act, passed during the dry summer of 1958 sought "to confer powers to meet deficiencies in the supply of water due to exceptional shortage of rain."[35] In this act, the government received power to make an order, not exceeding six months duration, allowing undertakings to meet demand during a period of exceptional shortage by: (1) abstracting water from any specified source; (2) constructing temporary standpipes or water tanks; (3) raising water charges; or (4) suspending obligations as to compensation water, filtration, and other treatment procedures.[36] It is apparent from the nature of the provisions that the measures were intended to be an emergency rather than long-term solution to water supply shortages. Consequently, there are as yet no allowances for a more permanent procedure to meet shortages under existing legislation.

34. Clean Rivers (Estuaries and Tidal Waters) Act of 1960, 9 Eliz. 2, c. 54.
35. Water Act of 1958, 7 Eliz. 2, c. 67.
36. *Id.* § § 1-2.

VII
WATER IN WALES

The transfer of water from Welsh rivers for domestic and industrial consumption in English cities has been a source of conflict since the nineteenth century when Birmingham and Liverpool constructed large impounding works in the Welsh uplands. This source of controversy highlighted the fact that while catchment areas are logical criteria for water management, a need exists for a framework incorporating interbasin water transfers. To investigate difficulties arising from interbasin movement of water in a Welsh-English context, a committee was established in February 1958 to advise the Minister of Housing and Local Government and the Minister for Welsh Affairs on water resources use and conservation in Wales.[37] The committee, which published its findings in 1961, considered three questions: (1) what were the water resources of Wales? (2) what was the exploitable surplus? and (3) how could any surplus be best utilized?

For questions one and two, the committee examined proposed reservoir sites in terms of five criteria: (1) geological feasibility; (2) impact upon agriculture; (3) disturbance to existing settlements; (4) effect on amenities; and (5) cost. On the basis of these criteria, each site was placed into one of four categories: (1) sites to which hardly any objection could be identified; (2) sites to which moderate objection existed; (3) sites to which extreme objection existed; and (4) sites completely unsuitable. No explanation was given as to what constituted mild, moderate, or extreme objection, sites apparently being subjectively classified in terms of the criteria outline above.

Regarding agriculture, the committee concluded that "irrespective of the altitude, the site chosen for a reservoir is likely to be the best farming land in that neighbourhood."[38] Sites considered ideal because of their location in lower reaches of a basin would by definition entail the loss of good agricultural land since those areas benefit most from fluvial silt deposits and are usually most amenable to mechanization. Sites at higher altitudes would result in inundation of valley bottoms depended upon to provide winter feed for stock which could graze on hillsides during summer. Consequently, any reservoir project was considered to entail a loss to agriculture, the question was to determine which sites effected least damage.

37. Ministry of Housing and Local Government and Ministry for Welsh Affairs, Welsh Advisory Water Committee, Report on the Water Resources of Wales, Cmnd. No. 1331 (1961) at 1.

38. *Id.* at 9.

Settlements were also recognized to suffer disruption through reservoir building. Although scattered upland settlements might contain few people, the committee emphasized that tiny rural hamlets often represented the homes of many generations of families, and as a result were steeped in Welsh culture. The existence of family homes, old churches, graveyards, and ancient monuments was seen to represent a tradition which held sacred associations for valley occupants and as a result

> [t]o destroy such a community might be an act of vandalism. The existence of a public attitude in Wales on this subject is a fact which must be recognized. We take the view that, in selecting reservoir sites, proper regard must be paid to the effects on existing homes and on the rural community of which the valley is a part, particularly in areas where the Welsh language is fighting for its existence.[39]

Unfortunately, the committee neglected to specify what constituted "proper regard" for Welsh feelings regarding reservoir projects and therefore, the suggestion while sentimentally adequate, was of little practical value as a guideline. It is obvious that the viewpoint of a statutory water undertaker and a Welsh nationalist as to what represented "proper regard" could be poles apart.

No concrete recommendations relating to the amenities were submitted other than to note that attention must be directed towards accommodating the dual objectives of economic development and natural landscape preservation. This approach resulted in repetition of the obvious, with little indication being given as to how the two objectives could be obtained. Once more, a situation existed where policy objectives were agreed upon, but no adequate system was provided to translate the policy into action.

To determine the exploitable surplus and then its optimum use, estimates of resources and demand were made for different regions in Wales. The committee suggested that before any surplus estimate was submitted, further studies were necessary to determine Welsh regional deficiencies and how such shortages could be met. If after meeting local demands an excess supply was discovered, the committee was of the opinion that

> . . . meeting the deficiency in the South-East zone (central and east Glamorgan, south and central Breconshire, and the greater part of Monmouthshire) must have first priority. The part of the surplus that can be most easily used to meet demands in England is in the basins of the Severn, Wye and Dee. The upper regions of these rivers

39. *Id.*

> can be made to yield far more water than is likely to be needed in the parts of those basins which lie within Wales.[40]

In effect, these recommendations called for local Welsh demands to be met first, then regional Welsh demands through water transfers, and finally, English requirements. In itself the recommendations were adequate, especially from a Welsh viewpoint, but the problem arose in estimating Welsh requirements. No indication was given as to the time horizon for planning, employment rates considered acceptable, nor economic activity anticipated. These variables, plus others such as population shifts, would have to be analyzed before approximations of demand could be derived.

VIII
WATER RESOURCES ACT OF 1963.

The Water Resources Act of 1963 has been the most significant step in improving water management practices in England and Wales. It came into force on April 1, 1965, following publication of a White Paper whose main recommendations were creation of river authorities, in place of river boards, which would comprehensively manage water resources of river basins, and the establishment of a central authority to collect data on a national basis and coordinate river authority activities.[41]

The duties of the Minister of Housing and Local Government specified in the Water Act of 1963 were extended, in formulation of a national water policy, to

> . . . include such measures as he may consider necessary or expedient for augmenting the water resources of areas in England and Wales, for redistributing water resources in any such area or for transferring water resources from one such area to another.[42]

The Minister would implement his responsibilities through new river authorities and a central agency called the Water Resources Board.

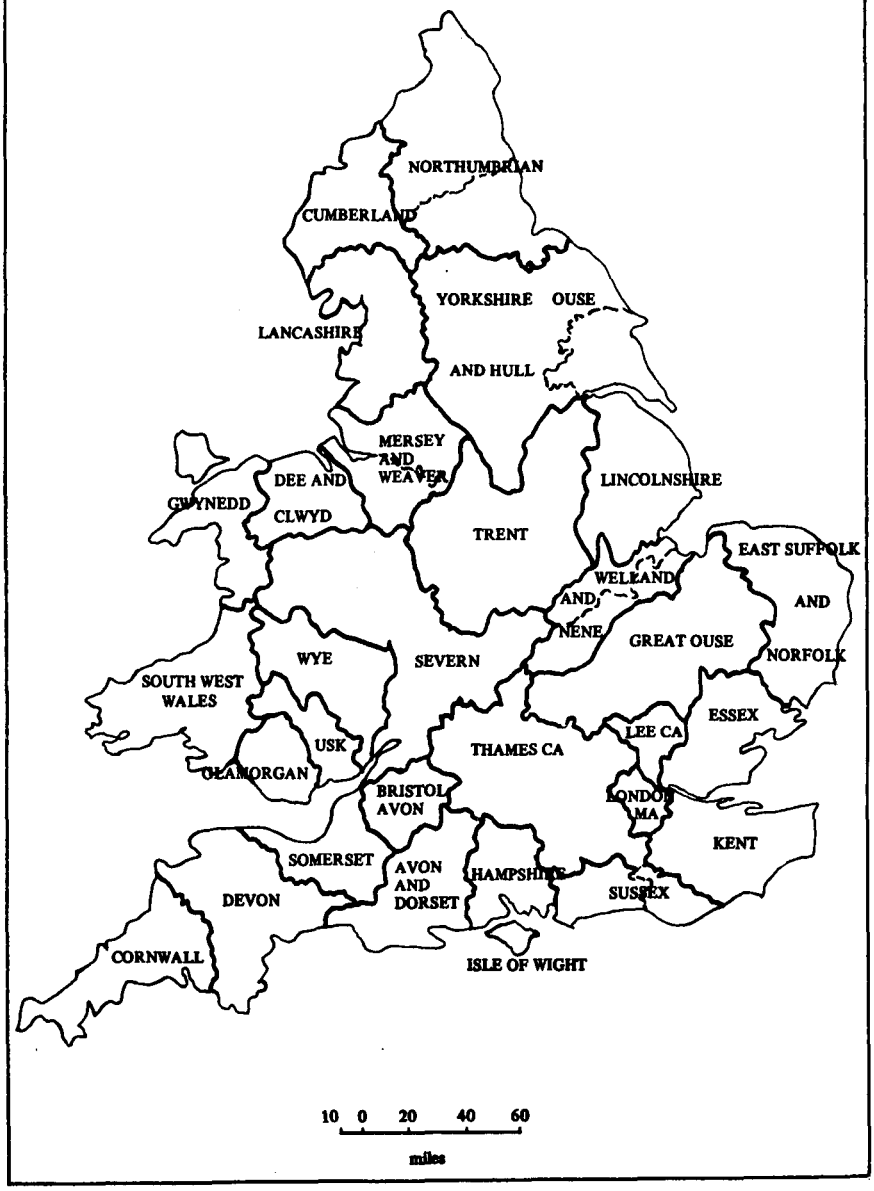
The location of the twenty-seven authorities is shown in Figure 2. The areas of the river authority have been super-imposed upon the river board areas in order to facilitate comparison. It is apparent that authorities are based on catchment areas and that amalgamation of some boards occurred. The river authorities inherited all responsibilities of the river boards, that is to say, land drainage, pollution regulation, fisheries administration, and some navigation duties. In addition, authorities would be responsible to assess present and

40. *Id.* at 21.

41. Ministry of Housing and Local Government and Ministry of Agriculture, Fisheries and Food, Water Conservation: England and Wales, Cmnd. no. 1693 (1962).

42. Water Resources Act 1963, c. 38, § 1, § § 1, para. 9.

Figure 2
AREAS OF RIVER AUTHORITIES
England and Wales



future water resources and requirements in their areas, to introduce hydrometric measurement schemes, to formulate and initiate proposals to satisfy demands, as well as to control abstraction and impoundment of water through a system of licences and charges. A further duty would be to determine minimum acceptable flows in river courses.[43]

Much of this work has been either accomplished or started. Abstractions are now all licenced, and the charging system began on April 1, 1969. Hydrometric schemes have been designed, and currently authorities are installing measuring apparatus, although progress has been retarded by budget reductions. In addition, most authorities have commenced the survey of water resources and future demands.[44] Determination of minimum acceptable flow has proven to be difficult under terms of the Act as no allowance has been made for varying the minimum acceptable level of flow to meet seasonal variations in flow at any given place. Under present circumstances, the minimum flow has to be fixed at a level which satisfies the highest requirements, even though such a need may be either intermittent or occur only once a year. An example would be the level required to accomodate spawning fish which would tend to sterilize water resources for most of the year. It would seem that this weakness will only be overcome by an amendment to the Act.[45]

The membership of river authorities is specified to range between twenty-one and thirty-one members, with additional members to be added by Ministerial order in special circumstances.[46] Regarding representation of interest, a number of members sufficient to constitute a majority would be appointed by the constituent councils in the river authority area. In addition, one or more members would be appointed by the Minister of Agriculture, Fisheries and Food to represent land drainage, fisheries and agriculture. Further, one or more members to represent public water supply and industry other than agriculture would be named by the Minister of Housing and Local Government. The range of interests thus represented is broader than that on the superseded river boards, but still amenity, recreation and aesthetic interests are omitted. This omission is unfortunate, as it has resulted in considerable ill-feeling between river authorities and the unrepresented interest groups.

The centralized organization established under the Act was desig-

43. *Id.* § § 4, 14-20, 23-64.

44. The first report was published in 1968. *See* Trent River Authority, Water Resources: A Preliminary Study (1968).

45. One amendment has already been passed regarding categories of people who might apply for water abstracting licenses. *See* Water Resources Act 1963, c. 35.

46. Such as in areas where the Coal Board or Ministry of Transport had a special interest.

nated the Water Resources Board. The duties of the organization are numerous. First, it was empowered to consider procedures necessary to conserve, redistribute, augment or secure the proper use of water resources either in England and Wales generally, or in regard to a particular river authority area. Second, the Board was to periodically review progress being made in achieving optimum use of water, and from such reviews advise Ministers or river authorities as to what procedural changes were necessary. Third, the Board was to provide advice, upon request, to river authorities regarding implementation of their duties, and also to assist in formulating plans involving inter-authority water transfers. Finally, the Board was to collate and periodically publish information upon which estimates could be made of actual and prospective water requirements in England and Wales, and to participate with other organizations in publishing similar data for Great Britain as a whole.[47]

It can thus be seen that the Water Resources Board should complement the river authorities. Where the authorities were endowed with a function to plan for development within a regional context, the Board was to plan on a national scale and thereby link and coordinate regional planning. To effect this approach of water management, the Board has published several regional studies considering water resources and demands for clusters of river authorities.[48] In addition, it has investigated the feasibility of desalination and barrage proposals as alternative sources of supply for the country.[49]

Regarding structure and organization, the Water Resources Board is composed of eight members appointed by the Minister of Housing and Local Government, at least one of which having "special knowledge or experience of matters relating to the conservation and use of water resources in Wales."[50] Guided by this executive, the Water Resources Board had, by the end of 1968, a complement of 138 positions, 123 of which were actually filled.[51] There is heavy emphasis upon recruitment of engineering personnel, with lesser stress given to fishery and biological experts. Only recently has attention been given to the social and economic aspects of water development projects, and this has taken the form of research contracts with university departments, mainly economics and commerce.

47. Water Resources Act 1963, c. 38 § 12, § § 3.

48. *See generally*, Water Resources Board, Water Supplies in the South East (1965), and Water Resources Board, Interim Report on Water Resources in the North (1967).

49. Water Resources Board, Solway Barrage (1966), Water Resources Board, Morecumbe Bay Barrage (1966), and Water Resources Board, Morecambe Bay and Solway Barrages (1966).

50. Water Resources Act 1963, c. 38, § 13, § § 2.

51. Water Resources Board, Fifth Annual Report for the year ending 30th September 1968, at 48 (1968).

The 1963 Act has thus established a foundation upon which water management policy and practice can evolve. River authorities, organized on the basis of watersheds, provide a point of departure for planning at the regional level. The Water Resources Board should be able to provide innovation and guidance at a national level. With a system of licensing and charges in effect, opportunity exists to regulate and influence the pattern of water supply and consumption throughout England and Wales. This opportunity is further enhanced by the fact that river authorities have the power to implement and operate projects rather than simply providing an advisory service to water undertakings. On the other hand, certain critical weaknesses still exist. The river authorities do not include representation for amenity and recreation enthusiasts, surely an error of judgement in a time of increasing public leisure. The Water Resources Board suffers from a bias towards engineering personnel and the philosophy associated with such training. In addition, this central board has functions which are primarily advisory in nature, which is usually not conducive to action.

IX
EXPANDING THE INSTITUTIONAL FRAMEWORK

As O'Riordan has noted, there are two levels for water resources policy making.[52] At the large-scale or macro-level, attention concentrates upon the relationship between water resource management and the wider objective of obtaining optimum development of a region within the national context. At the small-scale or micro-level, concern focuses upon the coordination and maximization of individual components or functions of a water resources policy program. It is essential, if resources are to be optimally allocated, that decision-makers be aware that water resource planning is simply one of many units involved in regional development, and therefore, any water program should be harmonized with others being implemented.

In England and Wales, considerable progress has been made in improving water management practices at the micro-level as has been shown in the preceeding analysis. Particularly significant aspects have been the introduction, application and acceptance of river basin planning, multiple-purpose resource use, plus regrouping and reorganization of water undertakings. These interrelated measures have gone some distance to alleviate the difficulties created by haphazard and independent water supply development from previous centuries.

52. O'Riordan, A Study in Canadian Multi-Purpose Water Resources Management–What Britain Can Learn, 21 J. Inst. Water Eng'rs. 318 (1967).

Regarding river basin planning, water policy has moved toward the concept of treating development problems of a watershed as part of an interacting unit. With the establishment of river boards in 1948 and constitution of the more comprehensive river authorities in 1963, the implementation of watershed planning has been realized. Foundations for effective planning at the regional level now exist, but there is still absence of an organization to efficiently plan at supra-regional levels. With the uneven spatial and temporal pattern of water supply and demand, it appears that transfers of water from surplus to deficit areas will be necessary. The Water Resources Board as presently constituted can not achieve satisfactory progress, and river authorities with unbalanced representation of interests are not in a position to plan optimum inter-regional water transfers. The imbalance of interest representation makes intra-regional water movements difficult to obtain though planning on a watershed basis has become practical.

The concept of multiple-purpose use of reservoirs is far removed from the attitude expressed in 1939 advocating sterilization of reservoir catchments from public access. In 1966 the Minister of Land and Natural Resources issued a circular to water undertakings in which government support of the multiple-purpose concept was affirmed, and a request was made for existing access and recreation policies to be reviewed.[53] A policy was suggested whereby full access should be allowed at regulating reservoirs. Where water was piped directly from the reservoir for public use, sports requiring power-driven craft would not be permitted; boating and similar sports would be allowed only where water from the reservoir is given full treatment.[54] The recommendations are thus based upon the feeling that activities not harmful to public health should be permitted on and around reservoirs.

This point of view, while a definite improvement, overlooks the fact that activities not harmful to public health can still conflict with one another. Sailing and fishing are not always compatible, nor are rambling and bird-watching. It is necessary to reevaluate thinking on multiple-purpose use, and consider whether combinations of activities at different times at the same place or at different places at the same time might lead to more satisfactory amelioration of conflict which is still rampant.

Less noticeable to the general public than the above trends has

53. Ministry of Land and Natural Resources with Department of Education and Science, Use of Reservoirs and Gathering Grounds for Recreation, Sept. 12, 1966 (Mimeographed, Joint Circular to local authorities).

54. *Id.* at 2.

been the steady regrouping and reorganization of water supply undertakings. In 1959 Gregory reported that over one thousand water undertakings existed in England and Wales.[55] Of this number, he noted that they varied remarkably in size, the population of each ranging from a million or more for the London Metropolitan Water Board, Birmingham, Manchester and Liverpool, to less than 25,000—the latter group representing approximately 80 per cent of the total undertakings. Taking six year intervals, the number of water undertakings in England and Wales declined from 1,030 in September 1956 to 628 in March 1962 to 288 in the spring of 1968.[56]

The reduction of the number of undertakers, with a concomitant improvement in administration and distribution of water supply, has been an undoubted improvement. Nevertheless, problems are beginning to emerge as a result of this trend. With amalgamation and regroupings, water undertakings are reaching a size where it is no longer possible to meet requirements from local sources. Large undertakings are increasingly looking towards areas of surplus rainfall which also support low population densities. However, attempts to move water from rural areas suffering unemployment and depopulation to established industrial urban centers are bound to erupt in conflict, particularly when national transfers are proposed.

It is thus apparent that progress has been made at the micro-level of water policy making even though significant problems remain unsolved. In the future, greater attention must be given to the macro-level of planning to link together proposals for different variables, localities and regions. A wide range of regional variables interact with water for policy planning. That there will be difficulty in designing a satisfactory national water policy is obvious when it is appreciated that many of the objectives for these inter-related elements are devised for different, and often conflicting, ends.

55. Gregory, Climate and Water Supply in Great Britain, 14 Weather 228 (1959).

56. These figures are taken from Ministry of Housing and Local Government and Ministry of Agriculture, Fisheries and Food, Water Conservation: England and Wales, Cmnd. No. 1693, at 3 (1962), and Water Engineers' Handbook 1968 (D. Wilkinson & N. Squires ed. 1968).