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The Tragedy of the Rivers: Building Authority over the British Water Environment

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THE TRAGEDY OF THE RIVERS: BUILDING AUTHORITY OVER
THE BRITISH WATER ENVIRONMENT

by

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"The Tragedy of the Rivers: Building Authority over the British Water Environment" examines the problem of rivers as common public resources in modern Britain. Viewed historically, the enduring problem of environmental pollution control in Britain has been the establishment of regulating authority over aspects of nature that are regarded simultaneously as economic resources, public utilities, and public amenities. Legislators, subject to pressure from industrial polluters, political parties, and advocates for environmental quality, sought at different times to locate authority at local, regional, national and extra-national levels. Each effort failed to resolve the issue of authority over the environment, because administrative solutions merely shifted the pollution elsewhere. The administrative solution of nationally directed, regionally administered multipurpose agencies ultimately failed as they were undermined by internal conflicts of interest fueled by competing popular conceptions of river water as a natural economic resource, a common commodity, or as an amenity for recreation and leisure.

Three themes are evident from the study. The first was the struggle to define the appropriate level at which authority over the environment was vested. The second concerned the structural composition of institutions that were both regulator and polluter. The British experience suggests that the multi-purpose structural arrangement of the regional water authorities, who were both regulator and polluter, could not effectively function to protect the river common. The third was how to use scientific and technical knowledge. Advocates for one position or another have used scientific and technical knowledge as a neutral "authority" to demonstrate the correctness of their position. However, there has been a gradual
recognition that such knowledge is tentative, dependent upon conditions and subject to change, which in one sense redefines the “authority” of this resource. Lastly, natural ecosystems, such as river basins or watersheds, provided a geographical and natural framework for regulatory control especially with regard to integrated resource management and pollution control. The British experience in the 1970s suggests that while the proper decision in regards to geographic size was ultimately made, the authorities created lacked the necessary legislative powers to match their river systems. This remained a challenge for the future.

The work is based upon primary materials gathered from the British Library, Public Record Office, Thames Water PLC, the Port of London Authority, and the archives of the City of London and the GLC. Contemporary materials include newspaper accounts, letters and conference proceedings on related subjects and interviews with government officials, related water and sanitary engineers, and pollution control officers. Relevant secondary literature was also utilized.
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CHAPTER I

INTRODUCTION

"The Tragedy of the River: Building Authority over the British Water Environment" examines the problem of rivers as common public resources in modern Britain. Viewed historically, the enduring problem of environmental pollution control in Britain has been the establishment of regulating authority over aspects of nature that are regarded simultaneously as economic resources, public utilities, and public amenities. Legislators, subject to pressure from industrial polluters, political parties, and advocates for environmental quality, sought at different times to locate authority at local, regional, national and extra-national levels. Each level represented an attempt to reconcile economic and political interests with the need for strong, clear regulation of the common water environment. Along the way, legislators discovered that the riverine watershed was the most natural and most effective area for regulation; that multi-purpose agencies combining water supply with pollution control were always undermined by conflicts of interest; and that pro-actively controlling pollution at its specific sources is more effective than passively adjusting pollution discharge regulations to constantly shifting levels of environmental water quality.

Coinciding with the "final" administrative decision to create regional water authorities, Britain's entrance into the European Community (EC) [today the European Union or EU] in 1973 also impacted British pollution control as the nation became subject to EU environmental directives and policies. The EU has become the most effective level of environmental authority so far. Even though it has not "solved" the problem of pollution, it represents the most successful arena for resolving the many inevitable conflicts inherent in environmental policy. Although Britain's adherence to EU directives has often been reluctant and dilatory, it has led to improved water quality in many areas of British life, including the revival of the Thames River from lifeless sludge to a vital waterway.
The Thames Valley offers a representative yet complex example of environmental control. While there are other British rivers with more serious pollution problems, the Thames has historically been managed by a complex group of national, regional, and local governmental agencies making it unique in terms of defining authority over the environment via institution building. One player in the region, The City Corporation of London, historically gained exemptions from national pollution control legislation due to its archaic system of political rights deriving from its position as the national political capital and financial center of the nation. This illustrates just one example of why the Thames river basin offers an opportunity to examine the British search for water pollution control on several levels of authority simultaneously.

Three themes are evident in the study of the Thames. The first is the historical struggle to define the appropriate level at which authority over the environment was vested. The second concerns the structural composition of institutions that were both regulator and polluter. The third is how scientific and technical knowledge was used. The British experience suggests that the multi-purpose structural arrangement of the regional water authorities, which were both regulator and polluter, could not effectively function to protect the river common. Advocates for one position or another used scientific and technical knowledge as a supposedly neutral “authority” to demonstrate the correctness of their position. However, there has been a gradual recognition that such knowledge is tentative, dependent upon conditions and subject to change, which in one sense redefines the “authority” of this resource. Lastly, natural ecosystems, such as river basins or watersheds, provided a geographical and natural framework for regulatory control especially with regard to integrated resource management and pollution control. The British experience in the 1970s suggests that while the proper decision in regards to geographic size was ultimately made, the authorities created lacked the necessary legislative powers to match their river systems. This remained a challenge for the future.

Two interrelated yet separate ideas underlie this study. The first is the idea of the common as expressed by ecologist Garrett Hardin. His now classic essay “The Tragedy of
the Commons," published in the December 1968 issue of Science, focused on the interconnectedness of economic activity and environmental quality, and lamented the failure of society to develop institutions or mechanisms for managing human ecology. As Hardin made clear, the "tragedy of the commons" derived from the absence of any set of institutions or social mechanisms to control the use of natural resources. The consequence of unrestricted entry was overuse, and ultimately, the destruction of the common. Using the example of grazing cattle on common lands, he showed it was to each person's advantage to increase the number of cattle they grazed, even though it was to the disadvantage of the common as a natural resource. As a result, there was always an incentive to ruin the common by overuse, and not always an incentive for the community as a whole to prevent it through regulation.

The term "common" is applicable to any natural resource, such as water, air or land. Hardin viewed the pollution problem in relation to the systemic growth of world population, which he believed would outstrip the carrying capacity of the planet. In this model, Earth is the ultimate common, and the tragedy derives from the freedom to breed and pollute. Hardin's proposed solution was the development of "mutual coercion" mechanisms agreed upon by the community. However, this left three practical yet difficult questions unanswered. Could current political systems obtain the public support and cooperation needed to establish effective systems of mutual coercion? Given the influences that could be brought to bear against the establishment of such systems by the parties who would be most affected, a positive answer to the question was very much in doubt and remains so today. Secondly, if such systems could be established, what forms should the coercion take? If absence of regulatory mechanisms produced destruction of the common, what types of institutions or regulation could effectively avert the tragedy?

The British experience with water pollution demonstrates the validity of Hardin's argument. Rivers historically served a variety of purposes, chief among them as the major source of the population's drinking water and the most expedient place for dumping of wastes. The "tragedy of the river" in this study is its overuse by society, particularly as a
place to put wastes, resulting in the destruction of its natural carrying capacities and its usefulness for other industrial and amenity purposes. River pollution negatively affects a river's natural ecological balance, subsequently hampering its usefulness as a common resource. Attempts to regulate river pollution led British society to explore the larger question of whether it was possible to find means of mutual coercion to protect the natural resource upon which they all depended. The historical record shows that while British political institutions could legislate for the specific problem of river pollution, the institutions they built lacked the powers necessary to effectively act on behalf of the common. This led British government in a continuous search to build an effective institutional and regulatory framework. This study surveys that search with a concentration on the 1970's, when the traditional institutional approach in Britain was radically altered in favor of a national approach, which in turn was challenged by the concurrent development of a common European Community environmental policy.

The second idea underlying this study is how societies wrestle with the problems of pollution control. A useful model exploring these practical considerations is Joel Tarr's The Search for the Ultimate Sink, examining cities as unique ecosystems. An often-cited essay in the historical literature on pollution, it analyzes a number of shortsighted "solutions" to waste-disposal problems. To remove human wastes from cities, sewer systems were built, but these only removed the problem from one geographic area to another, shifting epidemic diseases downstream from one population to another. To reduce concentrations of air pollution, higher smokestacks were built, which produced acid rain in far-off places. To comply with river pollution regulations, industries dumped hazardous wastes on land, which soon polluted underground aquifers. Tarr concludes that the most common means of disposing of wastes merely transfers the problem from one place to another and often from one medium to another.

Tarr argues that the repeated shortsightedness of decision-makers in both government and industry was due to a variety of economic, political, scientific, and cultural factors that worked against a holistic approach to pollution control. Common examples
included business leaders who almost always chose the least expensive "sink" for wastes, and government officials who generally were spurred to action only by crisis, and sought quick fixes even when experts warned of later problems. Science often proved inadequate, but the widely shared faith in the efficacy of technological solutions encouraged shortsighted problem solving. Government and industry often applied technological solutions based on faulty data, merely shifting the problems someplace else.

The history of British river pollution lends itself to an application of Tarr's thesis, and this study is an extension of its principles to the arena of policy formation. Direct discharges of pollutants from industry and cities led to the destruction of river ecosystems, thereby threatening the common resource. The technological solution of sewer systems led to the discharge of massive amounts of untreated sewage into British rivers. The need to remove wastes from the urban environment led local officials to seek the cheapest and most convenient method of waste disposal, often the local stream or river. In Britain, as elsewhere, this merely transferred the problem from the urban (e.g. land) to the river (e.g. aquatic) environment with subsequent effects downstream. As these consequences became clear, policy-makers sought other solutions, subsequently placing them on a search for the ultimate regulatory authority.

Authority can be defined in a number of ways. It may be moral, such as a minister has over a congregation; legal, as defined by legislation with powers to sanction those who break the norm; or expert, often based on scientific principles and rational thinking. For this study "authority" may be characterized as (a) an agency delegated powers to set standards of behavior, regulate, discipline, and advice; (b) recognized by its constituents (e.g. government ministers, water users, and the public) as legitimate and effective, and therefore (c) deemed worth influencing by interested parties (e.g. industry, politicians, activists). It is generally held that a clearly defined authority makes politics "work" better. In Britain, the tradition of "responsible" (e.g. local) government meant that authority should not only be clearly defined, but also responsive to its constituencies. This contrasts sharply with other societies where authority is based on military or religious sanctions. The story of British river
pollution is largely the story of the search for the proper authority to solve the problem of excessive water pollution. Over time a number of "solutions" were attempted through the creation of various "authorities," operating at different levels, who were charged with responsibility for managing river pollution.

"The Tragedy of the River" is about water, its contamination by human activities, and the search to find the appropriate institutional authority for pollution control. Its focus is Britain but its features apply to many other countries. Water and its cleanliness are universal concerns, and the search for the proper authority for pollution control is common to most nations. Water has always been a controversial issue. Its multiple uses consistently put different groups at odds with each other. Water's utility (e.g. for drinking, washing, flushing wastes, agricultural irrigation and industrial purposes) created conflicts within both the private and public spheres, resulting in pollution at such levels that it became necessary to create public authorities to control water and its uses.

Water pollution was a problem in England long before the advent of the Industrial Revolution and the rise of modern urbanization. Even though medieval towns and cities lacked the population of modern urban centers, the command over modern chemistry to subtly pollute water with unseen substances, and the technical knowledge and means to produce large-scale industrial wastes, they were nonetheless able to pollute their environment through careless disposal methods.

Since the nineteenth century pollution of waterways has significantly increased, due to a variety of factors including overall population growth, the development of large urban centers that dumped wastes into rivers, and the creation of large-scale industries that used and contaminated water through a variety of processes. Pollution reached such levels that public demand for change spurred local and national governments to respond. While initial responses were laudable, they were also largely ineffective in solving the problem. The question of how pollution could and should be controlled remains a matter of public debate to this day.
During the decades after the Second World War several interrelated factors came together to move environmental issues towards the center of the political agenda in Britain. The 1960's witnessed the transformation and eventual splintering of the conservation movement as its utilitarian foundations became challenged by newer, more aggressive environmental groups.³ By 1970 there was increasingly vocal insistence from some of these groups that large structural changes were required if the world was to survive into the next millennium. The concerns of experts and environmental groups engendered a mass movement that swept the industrialized world. Nature and natural resources were no longer the sole focus of debate; the new movement reached beyond these issues to address the structural problems of humanity, ranging from overpopulation and pollution to the costs of technology and economic growth, challenging the very nature of the capitalist system.

Many of the established conservation and wildlife protection organizations operating within the slower, more conservative models of the 1950s were bypassed by new organizations and were left to respond as best they could.⁴ The new movement was more dynamic, broad-based, and responsive to its popular constituencies, winning much wider support. While some of the older organizations welcomed the new militancy and moved with the times, a whole new community of environmental organizations formed,⁵ including Friends of the Earth, Greenpeace, and more recently Earth First and the Ecology Party. These groups were fundamentally different from their precursors in terms of their ideological underpinnings and activities.

Philip Lowe and Jane Goyder, in Environmental Groups in Politics⁶ argued that traditional organizations were formed during three periods; the 1880s to the turn of the century; the inter-war years; and from the late 1950s to the early 1960s. These groups are considered "traditional" in that they followed the pattern of Victorian era reform whereby they examined "problems" and attempted to work with government to effect solutions. The first period saw the formation of groups such as the Selborne Society, the Royal Society for the Protection of Birds, the Coal Smoke Abatement Society (now the National Society for Clean Air), the National Trust, the Metropolitan and Public Gardens Association, the Garden Cities
Association (now the Town and Country Planning Association), the Camping Club, and the Society for the Preservation of Wild Fauna of the Empire (now the Fauna and Flora Preservation Society). The inter-war period produced the Ancient Monuments Society, the Rambler’s Association, the Council for the Preservation of Rural England, the National Trust for Scotland, the Pure Rivers Society and the Central Council for River Protection. The late 1950s and early 1960s saw the formation of the Civic Trust, the Council for Nature, the Victorian Society, the Noise Abatement Society, and the British Trust for Conservation Volunteers.

Lowe and Goyder suggest that two sets of factors underlie the episodic development of these organizations—one internal and one external. The internal factor relates to the aging of voluntary organizations and their associations with different generations. For example, groups formed during the Victorian period typically had elitist structures that vested control in a few individuals who were leading figures in social, political, or literary life. Their founders and supporters were mainly upper class and their strength lay in the personal influence and patronage of their members. During the inter-war years, the growth of new groups reflected the growth of suburban life and a widening of the social base. Many groups formed in this period featured decentralized structures and attempted to harness interest in the countryside as a way to influence the growing regulatory powers of local government. The era of the late 1950s and the early 1960s saw a further widening of the social base of these groups, with control of both national and local organizations in the hands of the professional and managerial classes, though often with broader lower middle class support.

Internal structural changes in the operation of state power also influenced how these organizations functioned. Historically, the expansion of government controls shifted the target for pressure. For example, Victorian groups were generally concerned with influencing or constraining the behavior of individuals or private organizations. They primarily employed persuasion, legal restraints in the courts where necessary, and appeals to parliament when existing law failed to cover a particular abuse. With the growth of state power, the focus of action shifted to government. Groups formed in the inter-war period promoted employment of
state regulatory powers, particularly in regard to land-use planning, pollution control and the loss of natural or historical features. In turn, the expansion of such powers, administered locally, stimulated the formation of groups to monitor and influence their use.

A particular configuration of groups tends to prevail until such time as a new generation perceives new problems or old problems from new perspectives and creates its own institutional structures projecting their style and identity. This is furthered by a natural aging process wherein groups lose their initial zeal and settle into roles as guardians of environmental reforms already secured.

The external set of factors advanced by Goyder and Lowe suggest that episodic growth of environmental groups is linked to phases in the world business cycle, especially towards the end of periods of economic expansion. They argue that environmental groups arose as more people began to assess the costs of economic growth and accepted non-material values. They point out the irony that environmental values are most often espoused by those individuals for whom economic prosperity has furnished the means to both choose and more fully appreciate their surroundings. Older groups often blurred the line between definitions of preservation and conservation and viewed them concurrently. Their tactics relied on private negotiations with public officials and the use of persuasion. This was due both to their traditional development and to their funding structure, which often relied on direct government support. While some attempted to adapt to the development of the new, broader, more aggressive environmental movement (such as the Council for the Protection of Rural England's (CPRE) adoption of the use of mass media tactics to shape debate) many activities of new organizations, such as direct lobbying, political activism, and the mobilization of public opinion, threatened their charitable status, and thus their very existence. As a result, while many traditional organizations became more active, they did so largely within the confines of their structure and membership. For many of their members in the 1970s, this was insufficient and they chose to leave and form new environmental organizations that were fundamentally different from those of the past.
One of the most important differences between these sets of groups was philosophical orientation. Traditional conservation organizations were primarily utilitarian, focused on the rational management of natural resources. Preservationists were largely moral crusaders focused on the non-human environment. The new environmentalists focused on humanity and the natural environment it inhabited. Issues that concerned these three types of groups were related but different. For conservationists, the issue was responsible use of nature; for preservationists, it was wildlife and the protection of habitats; for the new environmentalists, it was human survival itself.

The new environmentalists were more active and politically oriented than previous groups. Borrowing tactics from previous mass social movements, such as public demonstrations and rallies, they attempted to directly impact public opinion to produce change. From an alarmist viewpoint, they argued that modern industrial society would ultimately implode, destroying modern civilization, and fundamental changes in societal values and institutions were necessary if catastrophic events were to be avoided. In contrast, preservationists largely pursued charitable aims, such as buying land to place in reserves, while conservationists used economic arguments to advance their aims. The new environmentalists are rightly viewed as part of the wider social movement that transformed most industrial societies during the 1960s. They were anti-establishment and reactive, responding more to events than to the scientific evidence that motivated preservationists and conservationists. The necessary condition for action was not scientific certainty but merely evidence of environmental mismanagement. New environmentalists were more radical than their predecessors and ultimately more influential politically because they were willing to engage in confrontational methods and tactics, which at times goaded governments into action.

The new movement, like its predecessors, was not homogeneous. It has been described as an accumulation of individuals and organizations with similar tendencies and goals but different methods. Unlike their predecessors, who often attempted to influence policy with scientific evidence, the new environmentalists were anarchistic, less oriented
towards systems analysis, and more humanist. John McCormick describes the movement as containing elements of evangelism, social reform, political reform and ecological science. The new movement's structure, style, and tactics pushed environmental issues to the forefront of the British political agenda as it did elsewhere in the industrialized world.

Contributing to the dynamic of this movement was a series of environmental incidents that crystallized the public's environmental fears. For example, in 1952 between December 5th and 10th winter smog in London killed 445 people outright and over 4,000 more from long-term respiratory problems, and was directly responsible for the passage of the 1965 Clean Air Act. A fire at the Windscale nuclear plant in northern England in October 1957, caused by an overheated reactor, released a small amount of radioactivity. While contamination was limited, danger of a similar occurrence with more hazardous results was clearly demonstrated. Popular reaction to these events was muted at the time, as a clear understanding of linkages between pollution and public health was not readily apparent to the general population. Within a decade that situation changed.

A series of similar accidents in the mid-1960s, sensationalized in the press, had a greater political impact due to heightened public sensitivity to the environment. One of the first was the Aberfan disaster in October 1966, when a mining waste heap above the village in South Wales collapsed, killing 144 people, 116 of them children. Stanley Johnson argued that Aberfan represented a turning point because it demonstrated the implications of pollution and changed how people (particularly politicians and governmental officials) thought about the issue. Another accident was the wreck of the tanker Torrey Canyon, which ran aground off the coast of Cornwall in March 1967, spilling approximately 875,000 barrels of crude oil into the sea and polluting hundreds of miles of coastline. The government attempted to use untested detergents to break up the oil but this effort failed and caused further ecosystem damage. The accident illustrated both the costs of pollution and the fragility of the marine ecosystem. More importantly, the disaster demonstrated that government was unprepared to deal with such accidents, and that gaps existed in the organization of scientific research and advice to government. The weak governmental response ultimately led to formation of the
Royal Commission on Environmental Pollution (RCEP) in 1969. The accident also contributed to signing of the 1969 Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties and the Convention on Civil Liability for Oil Pollution Damage.

Another factor contributing to the new environmental movement was the 1972 United Nations Conference on the Human Environment, held in Stockholm, Sweden June 5-16. The conference was attended by representatives of 113 countries, 19 intergovernmental agencies, and 400 other intergovernmental and non-governmental organizations. Notable for their absence were the Eastern European countries (save Romania) who boycotted the conference over the voting status of East Germany. However, all of them had participated in the preparatory discussions. The conference was a landmark event in the growth of international environmentalism. John McCormick describes it as "the first occasion on which the political, social, and economic problems of the global environment were discussed at an international forum with a view to actually taking corrective action." The conference heightened world interest in the condition of the physical environment and led directly to establishment of the United Nations Environment Program. Britain, as a participant and signator of the Conference Report, committed itself to taking action on environmental issues. The government's willingness to work on behalf of international environmental issues also committed it, by association, to action at home. Environmental groups never let subsequent governments, or the public, forget the commitments made in 1972. The Conference Report contained a series of recommendations toward which governments might strive, as well as a goal against which their effectiveness was judged.

Britain's entry into the European Community (EC) in 1973 also contributed to the changing socio-political climate and ultimately provided the platform for final transference of authority from national government to the supranational structure of the EC. Britain's decision to join the EC made it liable for all existing legislative and executive decisions concerning the environment. Britain and the EC would clash over several structural and administrative issues relating to pollution control. These clashes were largely due to differences between
Britain's traditional pollution control structure and practices, which were largely based on consultation and voluntary compliance, and the more coercive and legalistic structures and practices followed to varying degrees by the remainder of the community.

British politicians and administrators were largely unprepared for the development of modern environmental consciousness and the new environmental movement of the 1970s. They were more comfortable within the loose, permissive, administrative structure of pollution control that sought to quietly negotiate improvements with those interests who would have to bear the costs of implementation. British practicality led the government to reason that more could be accomplished by working closely with business to improve conditions than by demands that would poison those relationships. The new environmental groups challenged this traditional administrative arrangement and demanded fundamental reforms, including an end to secrecy regarding the production of pollution that shielded many polluters in the past. While successive governments defended themselves by pointing to several pieces of environmental legislation, they were unable to answer the environmentalists' central charge that these legislative instruments not only did not go far enough in controlling pollution, but were also administered and controlled by the polluters themselves. In the view of environmentalists, British government was not serious about pollution control. They pointed to the polluted condition of rivers and streams and lack of regulatory rigor as evidence.

The development of British pollution control institutions has its own history and themes separate from that of environmental groups. If one word could describe the evolution of British water pollution control it would be "centralization". This concept was applied repeatedly to determine the level of authority at which the environment was regulated. The transfer of regulatory authority from local to regional to national to extra-national levels created ever-greater centralization of the policy process and offered greater opportunities for improved water pollution control. However, the transfers only heightened and highlighted internal contradictions present within the British system.

Centralization, and its countercurrents, are themes that run throughout modern British environmental history. Chapter II examines 19th century pollution in the Thames.
Valley and the first national response through legislation in 1876. It provides an overview of the development of local control over the environment, and examines the role and problems of science and technology in defining water quality. It shows how local authority traditionalism defeated initial centralization efforts and how this result hampered pollution management efforts through location of authority over the environment at the local level. Authorities charged with protecting the river, such as the Thames Conservancy, the Port of London Authority (PLA), the London County Council (LCC) and the Greater London Council (GLC) all failed due to lack of central government support and their limited size and resources. Central government resolved that pollution control was best left in the hands of local agencies capable of responding to local needs. However, the regulatory agencies' jurisdictions were not large enough to match the ecological framework of the river system. As a result, pollution control efforts focused solving immediate problems, such as spills, instead of systematic problems such as the dumping of sewage or industrial wastes into rivers.

A structural problem within the authorities, that undermined their pollution control priorities, was their dual role as polluter and regulator. They found it difficult to improve conditions when they lacked the financial powers to make capital investments in pollution treatment essential to bringing about such improvements. Decisions were often made in terms of the best financial interests of the local community, which tended to work against the whole system (i.e. depletion of the common and the transference of pollution downstream). Cold financial calculation led communities to invest in water treatment facilities or construct elaborate projects to bring untainted water to the community instead of constructing waste treatment facilities that would capture the majority of pollutants from entering the river or stream to begin with.

Chapter III examines 20th century Thames pollution and the evolving structure of water pollution control authorities up to the 1970s. The movement towards centralization in size is clearly evident from legislative history, which shows a progression of pollution control from the local (1876 Rivers Pollution Prevention Act) to the regional level (1948 River Boards Act 1951 Rivers [Prevention of Pollution] Act; and 1963 Water Resources Act). The shift to
national control would come later, beginning during the 1970s (1973 Water Act; 1989 Water Act; and 1991 Water Resources Act). Centralization of water authorities' size and complexity, which mimicked similar developments across society, ultimately led to questions regarding the structure of local government. Reorganization of local government set precedents that enabled eventual creation of a centralized system of water pollution control in the 1970s.

Chapter IV addresses governmental re-organization in the 1960s and early 1970s that made centralization of water pollution control functions possible. The new administrative system shifted pollution control management to central government, while retaining regional authority administration. The new comprehensive regulatory agencies were charged with management of the entire hydrological cycle of water within their particular river basin. For the first time regulatory agencies were large enough to effectively manage water pollution. The centralized system of government made Regional Water Authorities (RWAs) appear promising as new pollution control authorities.

Chapter V discusses the Water Act of 1973. Legislative history shows that roots of the new integrated system derived both from the need to centralize functional control over water and government reorganization at the local and national level. Parliamentary debates shifted focus away from questions of administrative machinery to those of political philosophy, and away from the idea of using ecological frameworks (i.e. river systems) as a basis for authority. However, ecologists and water specialists called on the government to recognize that pollution controls should be vested at a level that conformed to ecological principles. Their view ultimately prevailed. The Regional Water Authorities (RWAs), created in 1973, were based on such principles. They operated over the geographic area of an entire watershed, controlling the entire hydrological cycle. The RWAs represented the first time the "environment" (river systems) was autonomously recognized as having some role in determining the proper unit of "authority." By placing the river system as the unit of authority, the environment was granted autonomous authority of its own, by virtue of ecological "laws"
which humans had to respect instead of demanding nature conform to human social organization.

Chapter VI looks at the Control of Pollution Act 1974, which contained specific measures that effectively transferred pollution control to the central government. Whereas the 1973 Water Act established the administrative structure of pollution control, the 1974 COPA determined where administrative power to set pollution levels was placed. In regard to water pollution the COPA based control over regional watershed authorities under the aegis of the Department of the Environment, with local implementation of pollution control allowing for flexible response. It failed for a number of reasons, but largely because the economic crisis in Britain in the mid-1970s left it under-funded. The Regional Water Authorities were unable to invest in pollution treatment and so remained the largest and most public polluters in their regions, undermining public confidence in their ability to regulate others in the community. The structural contradiction of regulator as polluter posed an obvious question. If the regulator polluted, why should anyone else follow a different set of standards? Coupled to this was the role of scientific and technical procedures and information in determining water quality standards. "Scientific" standards were becoming recognized as evolutionary and related to costs, not as objective authorities to which each side might appeal as they had done in the 19th century.20

Chapter VII examines the impact of the European Community (EC) on British water pollution control. Britain's successful effort to join the EC had unforeseen consequences for the British water environment. The development of an independent EC environmental policy in 1973 had immediate consequences for Britain as some aspects of water pollution control were shifted from the national to the supranational level. The extra-national character of the organization meant that a common policy for the environment would be formulated at the supranational level with each nation responsible for implementation within its own structures. No sooner had British central government gained authority over pollution control than it was lost to the supranational bodies of the EC. Whether this was the appropriate place to vest pollution control authority remains an open question and continues to be subject of debate.
between Britain and the EC (primarily surrounding how to set and achieve water quality standards). Differences between the EC's and Britain's administrative systems regarding water pollution standards led to confusion in reporting and hampered the implementation of some water quality directives. Thus, Britain's membership in the EC shifted, but did not resolve, the question of authority over the environment, particularly the tension between central and local authorities and the tension between regulators and users.

Until recently, the history of pollution was treated in political, social, or economic terms, but rarely dealt with environmentally. Literature on British environmental history is sparse but growing. Many of the works are fragmented across academic disciplines. One economic history is B.W. Clapp's *An Environmental History of Britain Since the Industrial Revolution.*[^21] Clapp's work provides an overview of environmental conditions in Britain and discusses initial attempts at remediation. In contrast, Lawrence Breeze's *The British Experience with River Pollution, 1865-1876*[^22] examines water pollution and the conditions which led to appointment of two Royal Commissions (1865 & 1868) to study the problem and make recommendations that would not hamper trade or the public health. It offers a review of the scientific and political context of river pollution in the nineteenth century, providing insight into the contents of the Royal Commission reports and affording a cursory look at how the press and Parliament addressed the issue of river pollution. David Kinnersley's *Coming Clean*[^23] examines British water systems in the 1980s and 1990s with an emphasis on river pollution and the legislative privatization of water services. As a former member of the British bureaucracy, Kinnersley presents a unique insider's view of the complexities facing government at the end of the twentieth century.

Stanley Johnson's *The Politics of Environment: The British Experience*[^24] offers a parochial examination of the way in which Britain perceived the “environmental problem” and the way in which it dealt with the problem through the legislative processes of the 1960s and early 1970s. It takes as its standpoint that the record of the sixties was not irrelevant to the requirements of the future and that the planning machinery that evolved in this period served Britain well as the “environmental question" evolved in British political life. Johnson concludes

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[^21]: B.W. Clapp's *An Environmental History of Britain Since the Industrial Revolution.*
[^22]: Lawrence Breeze's *The British Experience with River Pollution, 1865-1876.*
[^23]: David Kinnersley's *Coming Clean.*

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that by 1972, Britain had produced a magnificent planning machine but the machine by itself was not, and never could be, equal to the task of planning for the environment. Put simply, environmental planning in Britain in the 1970s and 1980s would require a massive investment in public transport; ruthless curtailment of the exponential growth of car and truck use; and a massive injection of resources into social capital such as housing, new sewage systems, water pollution control systems, family planning and birth control systems. While Johnson published no further works on the subject, other researchers who examined later decades suggest that the machinery built, while adequate in some areas, was inadequate in others. My own work suggests that the machinery of water pollution control was inadequate to the task.

Philip Lowe and Jane Goyder, Environmental Groups in Politics provides a contemporary account of British national environmental groups, their organization and operation within the political sphere. The latter section of the work provides case studies of the organization and operation of five groups; the Henley Society, Friends of the Earth, the National Trust, the Royal Society for Nature Conservation and the European Environmental Bureau. Whereas Johnson features the bureaucracy, and Lowe and Goyder the pressure groups, Mike Robinson's The Greening of British Party Politics focuses on the major political parties, including the party of government during the 1970s and 1980s. His work seeks to move beyond party rhetoric, offering explanations for how and why they responded to the challenge of the environment. Based on interviews with Members of Parliament, ministerial advisors, opposition spokesmen, party strategists, policy makers, trade union leaders, pressure group leaders and prospective parliamentary candidates, the work provides an inside view of the attitudes of leading party politicians towards this policy sector. It largely shows how both major parties sought to co-opt the environmental movement for their own partisan political purposes. In doing so, the major parties undercut new parties, like the Greens, who were attempting to establish themselves within the British political system. However, neither party was willing to entirely embrace the radical economic philosophy of the Greens, but simply employed environmental rhetoric for their own ends.
Johnson concludes that while the major parties co-opted the rhetoric they did not become "green." New issues and new ideas were chosen to fit established structures of party thought and action, and the reasons why party politicians respond to the challenge of the environmental movement have as much to do with the intricacies of politicking and the desire for political power, as with genuine environmental concern. Any concern for the environment is inevitably colored by sets of motivations specific to individuals and party ideologies. As such, the "greenness" of the Conservative is different from that advocated by the Labour Party and vice versa.

The idea of ecological interdependence, central to "green" thinking, is largely missing from the major parties. While it is recognized that environmental matters impinge upon all policy sectors and all stages of policy making – a point demonstrated by creation of the Department of Environment, the major parties still treat the environment as one issue among many others, and any attempt at holistic thinking is immediately chocked by a systems of departments and shadow departments where competition always seems to have the edge over co-ordination.

Behind the idea of interdependence is the notion of equity. The major political parties are still chained to the idea that natural ecosystems exist primarily as a resource for human exploitation. Although, as a review of environmental policy demonstrates, the parties have begun to address issues of resource planning, future energy policy, recycling and the concept of sustainability. The sacred cow of economic growth has not been sacrificed, nor is it likely to be sacrificed in the future. How else are nations to pay for the promises of a cleaner future except with a growing economy?

Through examination of the Conservative and Labour platforms and major political tracks on the environment it becomes clearly evident that each party wants to appear "greener" than the other to the electorate, and when necessary they make common cause to pass legislation to give the appearance of working on this critical issue. However, neither party is willing to forgo the capitalist economic principles underlying tenants of economic growth on which the major elections of the last fifty years were fought. Which party will bring
more prosperity to which segments of the electorate remains the overriding concern of both parties while environmental issues take a secondary position in regard to policy decisions. While both parties are "greener" in their rhetoric, and have increased the amount of time spent on this issue, it has not permeated their political thinking. Debates surrounding governmental reorganization in the 1960s and the passage of the 1973 Water Act and the 1974 Control of Pollution Act, and their subsequent implementation support this conclusion.

Most of the literature on the Thames River is heavily weighted towards anecdotes, boats and riverside rambles. However, there is a growing body of literature that examines environmental problems during the nineteenth and twentieth centuries. Two early works are Jeffery Harrison and Peter Grant's *The Thames Transformed* and Alwyne Wheeler's *The Tidal Thames: The History of a River and its Fishes*. Both works concentrate on the effects of environmental pollution which threatened Thames ecosystems. Harrison and Grant look at wildfowl conservation efforts in the 1950's and early 1960's, and Wheeler documents the decline in numerous fish species during the same period. Both examine conservation efforts to raise public awareness of the pollution problem and their efforts to pressure government to find solutions. However, neither work examines groups outside of the conservation circle that identified problems with Thames pollution, nor the agencies involved in the negotiation and subsequent action that produced legislation.

Bill Luckin's *Pollution and Control: A Social History of the Thames in the Nineteenth Century* examines pollution as a means of linking social and political history, historical demography and the social history of disease. As such it offers an instructive initial use of a sociological perspective. One work that goes further is Christopher Hamlin's *A Science of Impurity: Water Analysis in Nineteenth Century Britain*. Hamlin's work focuses on water quality, how it was analyzed, and the analysts themselves. Much of 19th century controversy centered around the definition of clean water. Many groups were involved in the process of definition, but the two most important were chemists and biologists, who had different methods of ascertaining water quality. Hamlin's work is valuable because it points out that science and technology provided convenient vocabularies and discourses for both sides in
the water quality debate in the 1840s, but these alone could not solve the problem. Solutions couched in scientific and technical terms were in fact socio-political decisions, not scientific ones. The scientists were unable to say exactly what pure water was or how to demonstrate purity in a way that satisfied both sides. To some extent this is still the case today. Hamlin's work points out that technical issues dissolve into socio-political ones, and that study of the groups involved in the process is a better approach to policy analysis than study of the technical or scientific arguments.


"The Tragedy of the River" shows that the key issue in British water pollution control was and is, establishment of regulating authority over aspects of nature that have simultaneous uses for consumers. Balancing these uses led to the search for the ultimate authority over water pollution. First established in the 19th century at the local level, authority over pollution control structures evolved to regional, national and supranational levels. Efforts to "solve" the pollution question shifted but did not resolve the issue of authority over the environment. Part of the problem stems from waters' multiple uses and subsequent popular conceptions. Part of the problem is systemic: society sought to gain control over a natural resource, namely rivers, which operate under their own principles. Both "environment" and "authority" are problematic, even more so when linked together. Popular conceptions of the "environment" influenced the level and meaning of "authority" as society attempted to save the common resource of the river for continued multiple uses, a problem that continues in many societies today.
4. Comparisons of traditional conservation and protection organization to those of the new environmental organizations indicate a generational shift, which was largely responsible for their new orientations.
6. Philip Lowe and Jane Goyder, Environmental Groups in Politics (London: Allen and Unwin, 1983), 17-18. The work provides a contemporary account of British national environmental groups, their organization and operation within the political sphere. The latter section of the work provides case studies of the organization and operation of five of these groups; the Henley Society, Friends of the Earth, the National Trust, the Royal Society for Nature Conservation and the European Environmental Bureau.
7. Ibid., 23-27.
15. Ibid.
17. The establishment of Royal Commissions to study difficult problems is a traditional course of action for British government. Similar Commissions were appointed in 1865 and again in 1868 to deal specifically with water pollution control.
18. McCormick, Reclaiming Paradise, 89.
1865-1876 (New York: Peter Lang, 1993).

CHAPTER II

ASPECTS OF BRITISH POLLUTION CONTROL IN THE NINETEENTH AND TWENTIETH CENTURIES

Industrial and urban development in the 19th century transformed Britain, her landscape and people. During the century Britain would become an industrial nation and would concentrate her population into new cities and develop an urban character. Industrial expansion and urbanization created ever-increasing amounts of wastes. The wastes were believed to be the source of public health problems, specifically epidemic diseases such as cholera. Water pollution was a continuing source of public concern, which eventually led to adoption of the first national legislation in 1876. This chapter discusses the historical developments that led to the legislation, the historical significance of its provisions and the related issue of water quality that underwent concurrent development. The century witnessed enlargement of the franchise three times and the further development of local government and local controls over the environment. The 1876 Act confirmed local governments' position as the provider of pollution controls. However, neither the Act nor other local controls produced any large reductions in pollution.

Water Pollution in the Thames Valley

The Thames Valley drains a hydrological area of approximately 5,150 square miles. Rising near Cirencester in Gloucestershire, on the southern slopes of the Cotswolds, it flows some two hundred miles to the North Sea. The Thames receives the waters of several tributaries and drains much of south central England. The region is unevenly industrialized, with concentrations in the middle and lower reaches of the region. The Thames has historically served as a major artery into the heart of England from the Continent and North Sea. London, with its port and tideway, is the largest transport/exchange area in Britain. Its major concentrations of financial, commercial, and governmental power dominate the nation and have historically served as a beacon leading to ever-greater concentrations of people.
Map 3

The Upper Thames River Valley
London is situated on the lower half of the river, which from Teddington Weir to the North Sea (approximately 151.5 kilometers\(^2\)) is a tidal estuary.\(^3\)

Twice daily the tidal action on the lower Thames carries saltwater upriver from the North Sea. Incoming tides slow the river's current and prevent polluting matter from being directly flushed out to sea. At ebb tide the reverse is true: the river's current increases, moving pollutants downstream and out to sea. If the tidal action flushed the river from Teddington Weir to the sea, the river would be cleansed twice daily. But the movement is incremental, taking several cycles to complete; each day what is put into the river moves downstream, but then returns part way on the tide.

Water pollution has the longest and most extensive history of any pollution problem in Britain. London's sheer size, location in the lower Thames valley, and its role as the administrative hub of the nation consistently made it the center of water controversies throughout British history. Visible contamination of drinking water supplies along the Thames valley at Oxford, Kingston, and London appeared as early as the mid-nineteenth century. Pollution only increased throughout the nineteenth and twentieth centuries and industrialization and urbanization further concentrated people and pollutants. By the middle of the nineteenth century many portions of the Thames were unusable as a source of drinking water, fishing, or swimming. As early as 1852 water companies were forbidden from taking drinking water supplies from the lower Thames and were required to move their intakes above Teddington Weir so the tidal action of the river would not affect supplies.\(^4\) In this instance the problem of contaminated drinking water supplies led to the simple and cheap technical solution of moving intakes to a "safer" location instead of addressing the source of the contamination.

Three major societal processes—industrialization, urbanization, and natural resource exploitation—are responsible for the pollution problem. While activities such as mining caused destruction of other rivers, most notably the Severn, urbanization and industrialization were primary offenders in the Thames valley. By the middle of the nineteenth century, municipal and industrial effluents ruined numerous drinking water sources, destroyed fish
population and habitats, and raised costs for many water-using industries who required clean water, such as paper manufacturers. Sanitarians in the public health movement, scientists, and engineers became increasingly convinced that water pollution was related to epidemic diseases such as cholera and typhoid. In the mid-nineteenth century they launched public campaigns to improve water supplies and construct municipal sewerage systems as a means to protect public health.

Beginning in the 1840s and continuing throughout the remainder of the century, the public health movement, composed of a diverse and sometimes competing group of governmental reformers, doctors, engineers and chemists, helped to build sewerage systems throughout Britain. This process began in London, as the problems of urban pollution there were the first to attract national attention and response. London in many cases served as a model replicated elsewhere in the nation and throughout the world. Rivers historically served as the most convenient and affordable means of disposal, and many believed water's self-purifying capacity justified their use. While rivers do purify themselves to a limited degree, due to dilution and absorption of oxygen, as cities began to dispose of millions of tons of untreated sewage in rivers and streams their natural abilities were simply overwhelmed. As those downstream began to suffer the effects of pollution, as their drinking water supplies became contaminated, the health impact of disposal practices were apparent. The wastes of one community became a direct health hazard to another. Ironically, the use of sewerage system technology designed to improve local health conditions and eliminate public nuisances, had devastating effects on both the environment and human health.

Recognizing, after careful scientific study, the relationship between clean water and public health, and from the advent of bacteriology in the late nineteenth century, which changed human understanding of disease, many cities passed regulations to address these problems. Their solutions were illustrative. The adoption of water filtration and chlorination helped to reduce most threats. However, the focus on filtration to ensure the safety of drinking water did not address the fundamental problem that rivers were being used as large sewers to remove wastes from the local environment. Lawrence E. Breeze and Bill Luckin
examined early legislative efforts to remedy river pollution. In the process of constructing sewerage systems and examining their impacts, major technological and policy choices, large-scale institutional developments, and societal changes occurred.

Water was adopted as the preferred transport system for waste removal by the public health movement during the Victorian period. Its dual focus on clean water supplies and adequate sewage disposal meant a transfer of wastes from land disposal to river disposal as cities adopted sewerage systems into their infrastructures. This is what occurred in London, and is an example of Tarr's thesis that the adoption of new technologies to solve one pollution problem merely transfers the problem to others and to other environmental medium. While this explanation is valid, as seen in London, it does little to improve our understanding of the causes of the breakdown of the previous land based system, or the costs of that breakdown to society.

Deplorable conditions in London and Manchester led utilitarian reformers such as Edwin Chadwick to examine the state of towns and health in Britain. The impact of industrialization and heavy urbanization made living conditions very harsh, featuring overcrowding and inadequate or non-existent sanitation facilities such as running water, sewers, paving, and street cleaning. Edwin Chadwick's Report on the Sanitary Condition of the Labouring Population of Great Britain (1842) revealed these failings to the British public, spurring demands for reform.

The introduction of running water into cities resulted in large increases in water consumption, as more people had greater access. However, this was not accompanied by a system designed to remove the wastes produced. It was initially expected that the previous system of waste disposal, largely cesspools and privy-vaults, would continue to function adequately. This lack of foresight, to provide for the increase in the daily load of wastewater, led to overflows that contaminated the ground and water in the vicinity. The problem of wastewater was only compounded with introduction of another sanitary invention, the water closet. This was not a new idea, one simply waiting for the constant supply that piped water provided to make its adoption efficient.
The installation of water closets in the absence of sewerage systems resulted in adaptation of elements of the old waste removal system to the new technology. Wastes from water closets were not initially deposited into modern sewers that transferred them away. Few such comprehensive systems existed. As a result, wastes were instead deposited into the old cesspools and privy vaults. While London had a system of storm sewers in some locations, it was forbidden to use them as a receptacle for human wastes. Many however made surreptitious connections as a means of adopting the new technology. The increased flow of wastes into cesspools and privy vaults soon overwhelmed their capacity and contaminated surrounding soils and groundwater. The spills or leaching of contaminants into homes was a major public health threat. This is much of what Chadwick described in his 1842 report.

Following the Sanitary Report (1842) and a recommendation by a Health of Towns Commission (1845), London created a waterborne sewerage system replacing the earlier cesspit system. The Thames became an open sewer as a result of the raw sewage and wastewater it received. As water suppliers continued to draw water from contaminated river water threats to public health increased. The need for additional facilities led municipal leaders to act.

Spurred by prevalence of epidemic disease, primarily cholera, developments in sanitary engineering coupled to a growing interest in public health led to the extension of basic amenities in London and the provincial towns. Never evenly applied to all parts of a town, results were never uniformly beneficial. Piped water was viewed more as an item of commercial value than as a necessity of urban life. Operating in the hope of profit, commercial or private water companies had minimal interest in piping their product to dwellings of the poor. Sewage systems also were built in wealthier sections of towns first and taxpayers from these classes were often reluctant to extend these systems to poorer areas. Water companies were also concerned that an expensive item such as a flush toilet could not be entrusted to poor populations as they could so easily be damaged or destroyed. For the upper and middle classes, piped water and sewerage systems certainly made improvements
in the sight and smell of their surroundings. This typically meant better health for them, but not in all cases. Piped water helped to maintain a high incidence of waterborne disease (such as typhoid, cholera, and gastro-enteritis) among those (rich or poor) who drew their water from increasingly polluted sources. The expanded use of sanitary technology, primarily in the form of piped running water and flush toilets, led to the transference of the pollution problem from one medium to another.

To be fair, Victorian sanitary reformers such as Chadwick had not intended it that way. They envisioned an egalitarian system where sanitary ideal of cleanliness could be achieved through the universal application of clean piped water with sewerage systems designed to remove wastes from the vicinity of the population. Based near the seat of power in London during the late 1830s and 1840s, a number of these men, often working through their connections with the Poor Law Commission and the Health of Towns Association, were well known for their inquiries into conditions affecting public health. Chadwick helped make sanitary reform a reality. He was an opinionated, unyielding, intolerant, and enthusiastic man. He supplied early leadership to the public health movement, providing it direction and organization from a legislative standpoint. But in cleaning up one area with his "sanitary idea," Chadwick certainly did not intend to pollute and endanger another, although this was the result. Chadwick acknowledged that discharging sewage into rivers caused pollution. He attempted to ameliorate this problem by diluting the sewage with water, carrying it in covered sewers to farmland some distance from the population centers, and distributing it as liquid manure for irrigation. This was a proven system adopted in Paris as a means of removing some of its wastes. Chadwick was only willing to use the Thames as a sewer temporarily until an integrated system was available. He considered liquid manure a valuable commodity for farmers who in turn would make this a productive and profitable use of these wastes. He even initiated his own commercial firm to help put his ideas into effect. In hindsight, his plan was a brilliant but ultimately unworkable move towards a sustainable system. He thought that through these means "the loss and injury by the pollution of natural streams may be avoided."
Chadwick's report led to passage of the 1848 Public Health Act. This Act established, for the first time, provisions for improving sanitary conditions in England and Wales under the control of a single centralized management body, a National Board of Health. Edwin Chadwick served as secretary to this body. The National Board of Health represented a primitive move towards centralization of pollution control. However, it placed primary responsibility for provision and maintenance of sewers and sewerage works on Local Boards of Health, allowing them to dispose of their sewage as they saw fit. The Act also made provisions for water supply, and more importantly, its protection. As cities and towns implemented the act, they were confronted with what to do with their sewage. Since there were no clear provisions directing them, most chose the convenient, cost-effective means of disposal, into the nearest stream or river. On the Thames this meant sewage was simply passed along to neighbors downstream. While it was recognized these actions would lead to water contamination, it was not clear whether the levels of contamination were dangerous. London, situated on the lower Thames, did not fully consider the adverse impact of its wastes, as there were no other large towns situated below it on the river. London's sewers, located along the banks of the Thames within the city's boundaries, daily poured millions of gallons of wastes into the river. By the late 1840s and early 1850s river's odor was notorious. 1848 would forever be known as the Year of the Great Stink as consequences of the Victorians actions became clear. Parliament had to suspend operations as the putrid river stifled debate. By 1857 the lower Thames received an estimated 250 tons of fecal matter each day from London. Chadwick's hope of using the river only temporarily would never be resolved. Even today, the river serves as a major artery of waste transport.

Local Government/Democracy/and Pollution Control

The nature of local government and the popular attitude toward how it operated in the early Victorian period stood as obstacles to resolution of problems created by urban living and an industrial economy. These included the problem of river pollution by sewage and industrial waste. When Victorians spoke of local self-government they placed emphasis on "self" and considered this self-reliance as the key to the nation's strength and vitality. They
recognized that local administration operated under some general oversight from central authority. They looked to Parliament to provide acts essential to effect what local government hoped to accomplish. However, they also took the expansive view that those operations that could be accomplished by local authorities should be within their control. Naturally public expenditures should be administered by those asked to bearing the expense. Centralization of power and collectivist action, even in the name of public health, was considered alien and unwelcome. As a result pollution controls were vested in local authorities, typically administered by the municipality.

By its nature, the myriad tangle of entities that collectively formed local government could not possibly meet the sanitation, water supply, pollution control, and other needs of a modern society. Instead of a precisely defined and orderly system, British urban government of the 1830's to 1850's contained a mixed bag of parish vestries, corporations, improvement commissions, and boards, the latter sometimes further weakened by their ad-hoc existence. Each pursued their individual objectives with little coordination. This led to overlapping of authority, blurring of jurisdictional lines, intrusion of jealous interests that often led to inertia.\(^\text{18}\)

The important Municipal Corporations Act of 1835\(^\text{19}\) eliminated the previous system of closed corporations and allowed "towns" (many that were already major industrial cities without any form of self-government) to incorporate and elect a council (the City Corporation of London was an exception). The councils were established with the hope that they would eliminate corruption believed inherent in old corporations not to anticipate the needs of the present and future. Thus, they were initially denied authority over services that were later regarded as unequivocally municipal, such as water supply, sanitation, sewerage, gas, and later electricity. One unfortunate effect was that when a movement toward "centralization and uniformity in public health" emerged, a new layer of vested interests with parliamentary influence stood in the way.\(^\text{20}\) Moreover, the new councils were in the hands of an emerging middle class who were fiercely protective of their newly gained powers. Consequently they resented and resisted efforts at centralization, which they perceived as an intrusion of central government on their hard won freedom and rights.\(^\text{21}\)
Importantly for the lower Thames valley, the City Corporation of London was exempted from the 1835 Act through their political power in Parliament. The City Corporation was unwilling to have its interests controlled by a new metropolitan authority, and was able to retain its independent position.

Powers granted by Parliament to municipal councils were expressed in permissive terms, in line with the majority view. "Permissive not compulsory" were important words in the legislative vocabulary of local authorities and interest groups, whether they sought a bill or had it thrust upon them. They might, as in Birmingham and half a dozen other towns in 1864, recognize a need for and seek a general public health bill to prevent "pollution of rivers and other streams." Even so a meeting of delegations, held prior to a meeting with Sir George Grey at the Home Office, indicated a desire for a permissive and not a compulsory bill.

These men were not unique in wanting to retain control of the term "permissiveness." Local authorities everywhere wanted retain determination over whether or not they would assume certain powers and functions. If action came from above, they wished freedom to pick and choose, to restrain or even reject that which seemed threatening to their positions, interests, and perhaps to the trade of the community. Ever present were fears that control would be lost, the balance of community economic interests would be threatened and that other nations, even other British communities, would gain an economic advantage that result in higher rates (taxes). After all, economy was a more meaningful measure of success of a governing authority than any initiative in the prevention of ill health.

A step towards centralized and coordinated activities was taken through the 1848 Public Health Act. The Act created a centralized General Board of Health with limited powers. The Act's history demonstrates difficulties associated with municipal governance at mid-century. The Act created a Board with no permanence. It only authorized the General Board to function from 1848 to 1854, via a standard six-year renewable commission, after which its actions would be reviewed and the Board might possibly be renewed. The Act placed its central administration under the Crown Commissioners of Works, Woods, and
Forests. It authorized formation of local boards of health that would coordinate efforts with the central Board. However, the act left initiative in the hands of local authorities. Opposition to the bill from water companies, manufacturers, corporations, and the City Corporation of London led to numerous amendments that greatly limited the General Board's ability to compel formation of local boards and approve their sanitary plans.

Almost immediately after its formation, before it could take any effective actions, the Board faced the threat of a cholera epidemic. It quickly found that it was powerless to force local Guardians to take preventive measures. As Board members (Lord Morpeth, Lord Ashley, and Edwin Chadwick) tried to enforce policies, they soon became embroiled in controversy. The Board collided with established interests that ultimately regarded it as a meddlesome bureaucracy. It alienated both the medical and engineering professions by backing ideas not accepted by the community at large. Worst of all, it provoked a battle with the City Corporation of London deriving from its exclusion from the Public Health Act.

From a dominant position in the recently formed Metropolitan Commission of Sewers (1847), Chadwick pushed his program for a comprehensive system of water supply and main drainage. For many reasons the program stalled, and when London was confronted with cholera, Chadwick influenced a decision ruinous to the Thames and disastrous to people who used its water. In the urgency of the moment, it seemed imperative wastes be removed as thoroughly and as rapidly as possible. Although conceding it to be an evil to send refuse in the Thames, Chadwick argued at a meeting of the MCS that it was "utterly inconsiderable," i.e. inconsequential, when compared to the evils of keeping "accumulations of noxious matter in densely inhabited localities" where it decomposed and gave off "pestilential emanations." The sewers of London were flushed during the spring and summer of 1848. This deliberate polluting of the Thames as the lesser of two evils earned Chadwick The Times enmity whose editorials thundered at him for "poisoning water" and described his flushing policy as a "piece of deviltry" and "elaborate depravity." Unfortunately, Chadwick became the target of various interests opposed to central control. He was an ideal candidate for such targeting as he had a high profile and was contentious in supporting his ideas, often at the expense of the
solutions he was attempting to implement. Of his opponents, the City Corporation of London was the most vigorous. While it was successful in stopping it's inclusion into the 1847 and 1848 Acts, it could clearly see the trend developing and was committed to stopping it at all costs. The City promoted its own bill, enlarging the powers of its Sewers Commission, and embedded in it a clause allowing for appointment of a Medical Officer of Health. By June 1849, when cholera first appeared in the City of London, the City's Sewer Commission appointed a part-time Medical Officer of Health, Dr. (later Sir) John Simon (1816-1904), who became the leading figure in the second generation of sanitary reformers. He built a local medico-sanitary administration that helped discredit Chadwick's system and provided other municipalities with means to resist central control.34

In popular imagination in aftermath of the 1849 epidemic, Chadwick, the Board of Health and the Metropolitan Commission of Sewers were responsible for London's inability to ward off the cholera epidemic. Chadwick and his ideas were discredited and the notion of central coordination would have to await the second half of the twentieth century. When the Board came up for renewal in 1854, its policies were viewed as a failure. Its enemies gained the upper hand, Chadwick was dismissed, and a reconstituted board, with a more limited role, signaled retreat from centralization. Most important for the future course of public health was appointment in 1855 of Dr. John Simon as medical officer to the second Board of Health. With Simon's appointment, ascendancy of his local model of sanitation was confirmed.35

The Public Health Act of 1858 signaled Lord Derby's Tory government's abandonment of central control over public health.36 The Act empowered localities to establish their own sanitary authorities. The National Board of Health was terminated and its functions scattered among various offices. Its medical duties went to the public health branch of the Privy Council, where John Simon's quiet efficiency served as an example for a future role for central government. Responsibilities relating to local government went to the Home Office. London area sewerage37 was vested to the Metropolitan Board of Works (MBW) under the Metropolis Improvements Act.38
London Metropolitan Intercepting Sewer System - 1858
As local authorities attempted to meet sanitary requirements of their towns, many of them began to take pride in their efforts, extolling the virtues of local control. But in order to meet these needs they often found it necessary to turn elsewhere for advice from experts. One place where help was found was Dr. John Simon's office, where professional men with medical, scientific, and technological knowledge were ready to help local officials. Part of Simon's success lay in his personality. While Chadwick gave the impression of bullying the nation into good health practices, Simon's influence was subtle, slow, and steady. As medical officer to the Privy Council, Simon's duties included compilation of annual reports presented to Parliament. With the nation's ever-increasing respect for technical and scientific authority, Simon's influence and reports took on great importance. Simon in turn acknowledged significant works of others, such as William Farr and the Registrar-General's Office. Beginning with his appointment as compiler of abstracts in 1839, Farr accumulated statistical facts on life and death. In Simon's judgment, publication of mortality rates and causes of death provided a great service to sanitary science by providing exact numerical standards in place of guesswork. While central control over public health issues failed, local governments increasingly turned to central government for advice and expertise thereby keeping the issue alive for future generations.

As civic reformers and sanitarians implemented a variety of plans that brought clean water into cities and built sewer systems to transport away wastes, rivers were polluted. The contamination caused a variety of problems, including the spreading of disease and destruction of fisheries and shellfish populations. Contamination rendered river water unsuitable for agricultural purposes such as irrigation and watering of livestock and destroyed its "amenity" value for those who lived nearby. The conflicting needs of individual and "corporate" users became evident.

Ostensibly, common law afforded some measure of protection against river pollution. A person owning land on a stream had equal rights with his neighbors to the natural flow of water past his land. He could use this water as long as he subsequently allowed it to flow down to his neighbor unimpaired in quality. Riparian owners and others seeking to protect
and preserve their proprietary rights against pollution could ask the civil courts to intervene by way of injunction or damages. Common law decreed that a man should not dispose of his refuse in a manner that caused nuisance to his neighbor. An individual, for example, who owned property on a river, could bring action against a manufacturer for polluting a stream. Pollution in this case could be defined as the "addition of anything to water which affects its natural qualities and thereby results in the riparian owner not receiving the natural waters of the stream."41

However, few people pursued this course due to the cost and difficulty of bringing suit against a manufacturer. Occasionally a wealthy landowner, his riparian rights violated by sewage from a municipal corporation or industrial effluent, would go to the expense and bother of seeking relief through common law.42 However, for most victims of pollution, civil action was not a practical remedy, and the pervasive nature of pollution was simply too vast for common law to have any appreciable effect.43

It became increasingly evident that parliamentary action was necessary to address water pollution. In his report to the Privy Council in 1862, John Simon recommended, "all industrial establishments which directly or indirectly endanger health, ought to be subject to official superintendence and regulation."44 Elsewhere there was discussion of legislation that prescribed safeguards and brought offending polluters before criminal courts.

With one of its own departments devoted to public health, the National Association for the Promotion of Social Science (founded 1857) provided an important forum for discussions that sometimes included river pollution. As was common for organizations of this period, its early leaders were a blend of parliamentary figures, civil servants, and intellectuals, including such men as Lord Brougham (its president), Lord John Russell, Lord Stanley, John Simon, William Farr, and John Ruskin. John Stuart Mill and Edwin Chadwick served on its governing council. Dr. Lyon Playfair, a scientist with a long-standing concern for water pollution, was active in its work. The association gained the respect of the middle class, especially in provincial cities where many meetings were held; and its departments met bi-weekly in London during parliamentary sessions.45 Importantly, for the cause of pollution
control, the Association's activities illustrated the problems of pollution to national and local governmental audiences. The use of social science to collect evidence and demonstrate potential solutions was an important element of informing the public of the extent of the problem and potential solutions.

Papers on river pollution were solicited and presented at some meetings. Various professionals, including scientists, engineers, medical doctors, and others gave papers discussing problems and sources of river pollution. They reveal a diversity of opinion with some sharp differences. While favoring use of practical means to prevent industrial pollution, a few appeared prepared to abandon some rivers to industrialists. Others insisted measures could prevent industrial pollution without injuring community trade. As to sewage, some were so appalled by what sanitary "improvements" had done to rivers, they were ready to rid themselves of flush toilets, go back to previous technologies, and make it illegal to discharge sewage into sewers. Others cited Registrar-General returns demonstrating that health had improved with the progress of sanitary science. They argued for an extension of sanitary improvements in combination with a system of sewage irrigation redirecting wastes from rivers to land. Redirecting wastes to agricultural purposes thus turned "bad" wastes to "good" purposes. While all these opinions were important to a healthy debate they demonstrated that central government had a role to play in coordinating these activities if consistent advances were to be achieved.

In 1861 a Sewage Commission reported that nearly 100 rivers were totally polluted and constituted a threat to public health. A similar Fisheries Commission reported on other rivers that were equally polluted. In 1864 pressure mounted for the Whig-Liberal Ministry of Lord Palmerston to take action against pollution, in particular that associated with sewage. In March, representatives of the Sanitary Association of Great Britain and of the Fisheries Preservation Association sent a letter to Palmerston arguing that pollution of rivers was a national problem, endangering health, destroying fish, and hampering the natural advantages derived from rivers and streams. In April, Lord Robert Montagu, Conservative member from Huntingdon, moved for a select committee of inquiry into disposal of sewage in large towns.
The select committee confirmed the report of 1861 and recommended measures for sewage utilization. In December, forty men, peers and commoners, many of them large landowners, submitted a resolution against the evil of sewage and in favor of its utilization, as far as possible, on their own estates.\(^{50}\) In addition, in December 1864, fifteen towns asked Parliament for authority to handle their sewage problems.\(^{51}\) As pollution of rivers continued unabated during the 1860s Parliament made its first tentative steps toward national control by providing the Sewage Utilization Act of 1865,\(^{52}\) giving local authorities powers to dispose of sewage as fertilizer for agricultural purposes, thereby closing the gap left open in 1848.\(^{53}\)

However, this did not remedy the pollution problem. While sewage irrigation worked, the vast amount of land required to properly consume the wastes of cities made the process inefficient and uneconomical. The Act was permissive, following the period's dominant tendency. Local authorities determined how they would handle their sewage. In most cases, especially London, this meant sewage wastes continued to be conveniently disposed of in local rivers and streams.

The Move Towards National Legislation

Lawrence E. Breeze's *The British Experience with River Pollution 1865-1876* examined the actions and non-actions of British government during the mid-Victorian period. He showed how a few individuals and groups tried to rescue rivers from polluters. Their efforts led to the appointment of two Royal Commissions on Preventing the Pollution of Rivers, one established in 1865, the other in 1868. Breeze's work relied heavily upon, and followed the structures of the commissioners' reports. The Commissioners were charged with examining certain designated rivers and streams polluted largely from industrial wastes, sewage, or both. They were asked to determine what might be done to improve river conditions without endangering public health or jeopardizing trade. In 1876, ten years after issuance of the first report, Parliament passed the Rivers Pollution Prevention Act.\(^{54}\) This act would remain the basic law on river pollution until the mid-twentieth century.

Strikingly, arguments to accept the need for continued pollution are similar in debates today. For example, it was believed that pollution control costs would make British industry
noncompetitive with other nations, not to mention unprofitable, if they were required to render
harmless their own polluting matter. Industrialists appealed to their riparian rights as
landowners to continue to pollute. Some, concerned with policy, argued that if pollution
control costs made industry noncompetitive, this would indirectly threaten Britain's general
free trade policies. In addition, costs to local authorities (charged with pollution control) would
be borne by ratepayers. Politicians, always concerned with upsetting their constituencies,
believed the popular maxim that there were no votes in sewage. This acted as an effective
bar to action, even when it was acknowledged that river pollution was a problem for public
health and an increasing number of industries requiring clean water for their processes.

A second theme of Breeze's work showed the jealous partiality for local control over
central authority. Deeply ingrained as a prerequisite for liberty, this worked against those
who sought to prevent river pollution. For example, some of the worst offenders, then as
later, were town authorities who used rivers to dispose of their sewage. Additionally,
industrial polluters invariably influenced local government. They resisted the notion that
some central office inspector would come and harass them. Similarly, they resisted the
Royal Commission recommendation for creating a larger administrative unit placing a river
basin under control of a single conservancy board. This recommendation would have to wait
almost a century to become law. Those who fought for pollution control thought it was a
mistake of the Disraeli government, in 1876, to leave initiative for pollution control action in
local authority hands. Events proved them correct.

Victorian society did believe in the value of recycling its wastes. For many cities and
towns this took the form of sewage irrigation on farms. This was nothing more than
application of sewage as fertilizer to land owned by the municipality. In other cases,
municipalities contracted with private agricultural interests to secure disposal of wastes. On
municipal sewage farms, crops were grown for the local market and costs were recovered
from the community through the sale of produce. While this showed some merit, and was a
proven technology in France, British towns did not adopt it on a large scale due to
concentration of population and the amount of sewage produced was too great for the land to
Too often the convenience of dumping wastes into a nearby river overcame the potential costs of creating such irrigation farms, not to mention the commercial aspect of going into direct competition with local farmers for market share within their municipalities. Similarly, a small number of industrialists, primarily those in cloth manufacturing and mining, developed practices to salvage materials that otherwise found their way into local rivers and streams. A conference on river pollution sponsored by the Royal Society of Arts showed these industrialists recovered their costs and in some cases made a profit. As manufacturer John Thom reported, "I get a good percentage on all the money spent, and that after having paid all working expenses." Thus, profit continued to be the defining motivation for their actions.

While some industrialists cared about river pollution—especially those, like paper manufacturers, who relied on clean water for industrial processes they were often silenced by other concerns or their peers when it came time to support legislation. Individuals who fought against pollution control measures could look to manufacturing societies and local chambers of commerce for support. In addition, some members of Parliament with close commercial ties to trade and industry remained alert to divert perceived threats to their interests.

Those in favor of preventative measures to control pollution represented a diverse group that included landed elements, both gentry and nobility; engineers, such as Robert Rawlinson, the dominant figure of the first Royal Commission on Preventing the Pollution of Rivers; chemists, like Dr. Edward Frankland, the key member of the second Royal Commission on Preventing the Pollution of Rivers; sanitarians, such as Dr. John Simon; clergymen; academics, especially from Oxford; and medical doctors, especially those from the British Medical Association. The Fisheries Preservation Association was also in the vanguard of protest against river pollution. Through such organizations as the National Association for the Promotion of Social Science and the Royal Society of Arts, these men exchanged views and information. The nature and work of these societies gave critics an opening to deride results as mere theory and not to be taken seriously by men of practical affairs. Overshadowing the broad anti-pollution concerns of certain landed aristocrats, the
passion for angling by members of that class allowed critics to argue that profits and jobs should not be sacrificed for the sport of the privileged.

Breeze also demonstrated, in a limited way, how mid-Victorian science lacked answers to questions of water purification, the nature of pollution, and the effect of pollution upon health. Expert opinions differed on these and related matters, such as the self-purification of rivers. Science's inability to give definitive answers to these questions made it easier for government, beholden to the philosophy and policy of laissez-faire, to await further investigation before taking action, a trend that continues today.

Britain's first river pollution legislation, the Rivers Pollution Prevention Act, 1876, contained twenty-two clauses in six parts. Although the preamble noted it would be expedient to make further provisions for the prevention of river pollution, it stressed the particular object of preventing the "establishment of new sources of pollution." The Act prohibited dumping of solid matters, such as animal corpses, solid and liquid sewage (new sources), and mining wastes (untreated water from within and wastewater runoff from without). Administration was vested in sanitary authority of a district through which a stream passed (ironically usually the largest polluter). Offenses were determined by inspectors appoint by the local sanitary authority.

The legislation had several problems. Polluters were able to evade the law either by claiming their previous rights to pollute or by showing the use of best practicable means to reduce their wastes. "Best practicable means" relates to processes and methods used to dispose of wastes. Use of "standard" technology and accepted practices as used in the wider community were considered acceptable criteria for comparison. In addition to these advantages the legislation placed restrictions on disciplinary proceedings. Action against alleged offenders was only possible with consent of the Local Government Board. In giving or withholding consent the Board was to give due regard "to the industrial interests involved in the case and to the circumstances and requirements of the locality." Given the prevalence of industrial interests on local boards it was unlikely they would give such consent to their own prosecution. Additionally, no proceedings in the seat of a manufacturing industry were
to be approved unless the board, "after due inquiry" into all "circumstances of the case," concluded that "reasonably practicable and available" means could be undertaken, and that "no material injury" would be inflicted by such proceedings on the interests of such industry. 60

Inspectors of "proper qualification" (no definition was offered) were appointed by the local board. An inspector determined whether the means used to render polluting matter harmless were the "best or only practicable and available means under the circumstances of the particular case." If so, his certificate was to be accepted by all courts as "conclusive evidence of the fact." Certificates could remain in force for up to two years and were renewable for a like period. A person aggrieved by an inspector's action, either in granting or withholding a certificate, could appeal to the Local Government Board. 61

Notably missing were standards to guide those entitled to bring proceedings and those who applied the law. The general terms "poisonous," "noxious," and "polluting" appeared several times in the language of the statute. But aside from saying, under "definitions" in clause twenty, that "polluting" should not include "innocuous discolouration" and that "solid matter" should not include "particles in matter in suspension in water," no definitions of what actually constituted pollution were offered. Admittedly, precise distinctions defining when "pure" became "polluted," or when the latter could become the former, were difficult to determine. Differences of opinion existed among medical and scientific experts of the day. Physical and chemical properties, as well as biological effects, were all matters for consideration, and with growing acceptance of the germ theory some were beginning to add bacteriology to the equation. 62

The act conspicuously ignored standards recommended by the Rivers Pollution Commission. Developed from examination of the Mersey and Ribble rivers, these standards were used by commissioners in all subsequent examinations to determine the presence and extent of pollution. While inadequate for the bacteriologist of today, they were adequate to the needs of the water chemist of that day. However, the Conservatives learned from the
experience of others. An earlier bill containing chemical tests aroused such furor from industrialists that Conservatives avoided their inclusion in 1876.63

Likewise, the phrase "best practicable and available means" was deliberately left vague. Once again the Commission's work was set aside. Even if their own laboratory experiments were dismissed as the work of impractical men, their report reflected the experiences of certain manufacturers and mine operators. Their anti-pollution and recovery methods appeared practical, affordable, and sometimes profitable. But the act offered no help with interpreting the means test, other than casting the very long shadow of the primacy of industrial interests over it.64

The same language applied to sewage. The commissioners reported that their experiments with filtration methods and sewage farms were successful and practical (similar to the conclusion of Chadwick in the 1840s). But most localities did not use them. Instead they used what was known as the A.B.C process (a mixture of aluminic sulfate, blood, and clay and charcoal) of sewage treatment. Thus a popular process, investigated and deemed inefficient by commissioners, was adopted to meet the needs of the moment.65

Given the act's language, the importance of inspectors was crucial. Yet while they were to possess "proper qualifications," these were not delineated and were left to the Local Government Board to define. Except for the indication that chemical knowledge would be an asset, it was not required. The Board appointed engineer Robert Rawlinson C.E. and Dr. Robert Angus Smith as inspectors, which signaled the variety of knowledge acceptable in an inspector.66

It is important to recognize, however, that in the case of manufacturing and mining operations, the Local Government Board and its inspectors lacked power to initiate application of the law. This was the act's Achilles' heel. Once again permissiveness won out. Once more local control held. Only a sanitary authority could put the law into motion, not an aggrieved individual nor the central government. As sanitary authorities were usually the largest polluters of a river (with sewage) this was unfortunate. Local authorities could not act without consent of the Local Government Board, but unlike earlier proposals, there was little
central government could do should local authorities fail to act. While the law gave local authorities considerable powers, it imposed upon them no obligation to do so. They remained free to choose whether or not to enforce the act. The influence of manufacturing interests either within or upon a sanitary authority in many places made it unwise to leave such discretionary powers at the local level, as it prevented true reform.

The Rivers Pollution Prevention Act of 1876, although offering some help, failed to rescue the rivers of Britain. More precisely, persons in positions to effect rescue did not exert themselves in enforcing the act. Local authorities themselves were guilty of some of the largest violations. Despite existence of plans and projects to deal with sewage, it remained a nuisance and hazard to health. The absence of a higher authority (central government), argued a speaker before the Society of Medical Officers of Health (1887), left too great a temptation for sanitary authorities to continue the old policy of "pass it on." As polluters themselves, these officials seldom imposed the law upon manufacturers and mine operators. Often they were also intimately associated with local industrial interests. Neither towns nor industries used the year of grace provided by the law to improve conditions.

At the end of the century river pollution remained an enormous problem with no politically acceptable solution. Population increased, industry expanded, and waste multiplied well beyond the plans and capacity of even relatively new sewage systems. London long since exceeded population estimates for a system designed at mid-century. Sewage outfalls of the main drainage system at Barking and Crossness were sources of continuing irritation and protest in the 1870s and 1880s. Just before it gave way to the new London County Council (LCC) in 1889, the old Metropolitan Board of Works (MBW) began constructing new works to precipitate solid matter from sewage and carry the sludge out to sea for disposal. The new precipitation works were completed and performed their task of removing solids from sewage remarkably well considering that population and industrial growth continually outstripped the system's ability to handle the increases.
The Problem of Water Quality

During the nineteenth century one of the central problems surrounding effective action on pollution control was definition of clean water. This problem moved on a constantly sliding scale. Scientific disagreement, which was thought neutral and objective, contributed to this problem.

Christopher Hamlin's seminal work, A Science of Impurity: Water Analysis in Nineteenth Century Britain, examined this question in great detail. His work tells the story of professional scientists during the nineteenth century, and the role they played in defining water quality. It points out that they were not neutral, but instead had a vested interest in the outcome of the debate as they tried to legitimize their profession through its use by government in public health.

The nineteenth century saw the massive growth of science, its clear emergence as a profession and its use by the government in decision making. Scientists defined long-term possibilities, rationalized running the state on scientific principles, grappled with the technical complexities of their solutions and were used by all sides to justify their positions on issues of public policy. The public health movement can be considered the scientific answer to urban problems of their day. Much of the transformation of public health administration from Edwin Chadwick to the present was guided by science. Drinking water, little better than diluted sewage at the beginning of the century, was transformed by bacteriological analysis which detected the microorganisms responsible for disease, making prevention possible by end of the century. While this made informed public policy possible, much occurred during the century that can be considered ill-informed.

As demonstrated earlier in this chapter, water policy belonged to the Parliamentary select-committee system, to the courts, and to local authorities rather than to the civil service. This did not change until well into the twentieth century. These institutions were old, designed for problems of the eighteenth century and adapted to those of the nineteenth, particularly municipal improvements, which included the use of water. Scientists were a key component of this structure. As Hamlin stated, "Science was a rich and expressive idiom of
that conflict, one characterized by the ideal that there was a best answer, a natural truth, for any question, and yet possessing vast flexibility, being capable indeed of giving expression to very nearly any argument one wished to advance.70

The problem of water purity was such a case. Analyses were not conducted by neutral governmental departments, as none existed at the time. Instead, they were conducted by a new class of educated professionals who claimed they alone knew what represented true science, and had the proper methods for obtaining information needed for effective action. Unfortunately they were compensated by those with economic interests in the results. While they agreed chemistry would provide answers, they disagreed over methods of analysis, educational levels required to certify such analysis, and how results were interpreted. While such questions were usually seen as part of the scientific process itself, they did not lead to concrete resolution because science could only provide the arguments for the context of the moment. Scientists were doing no more than providing legitimate arguments for the self-interested proposals of their employers. Their testimony was believed and effective because "they were able to show that contemporary understanding of nature made possible, plausible, or necessary certain consequences which those who hired them wished to demonstrate "that water running in a river would invariably become pure, for example."71

While the question of water quality seems simple— is it clean? — There are really two questions, one of the water's composition and the other of its assessment. The second is far more important. While it seems the first question naturally leads to the second, some of the most prominent analysts of the nineteenth century, including Edward Frankland, who served on the Second Royal Commission on River Pollution and whose work was incorporated into the 1876 Rivers Prevention of Pollution Act, focused on the second question and let it lead them to the first. Analysis of water's composition might confirm a scientist's diagnosis, but its main function, according to Hamlin, was to symbolize to the public the validity of the assessment.72
Hamlin pointed out that the majority of conflicts that arose within this debate were based on analysts' assumptions. He showed that three issues arose in examining water composition. First, how does one know the analytical method one is using can detect all of the entities that might exist in water? Second, how does one know the method is neutral? If the method affects the nature of the material, in this case water, and if one were to assume such, how does one determine what these changes were? Third, how do you know you have chosen the correct method and are using it at the right level? For example, during the century water analysis methods were applied to inorganic salts, then to organic matter, and then to species of bacteria.73

Hamlin also pointed out that in examining the second issue (assessment) many key questions revolved around whether scientists could identify the active medicinal or pathologic entities present, and if so, could they reliably be predicted? Hamlin showed that mineral water chemists, who dominated the early part of the century, claimed such knowledge and techniques. The potable water analysts who followed them in the middle of the century were less sure and made no claims about the cause of disease and had doubts about whether their methods, or any other, could be used to reliably predict such causation. The biological scientists who succeeded the chemists during the latter part of the nineteenth century (and who still control the process today) were more sure about identification, but still unsure about the causal relationship between the presence of such entities and the transference of disease.74

Much of the problem that surrounded the question of disease transference was due to incomplete knowledge. The miasmatic theory of disease transference was dominant during the majority of the nineteenth century. It was only replaced by the germ theory in the 1880s and 1890s. It was not recognized that major diseases of the nineteenth century, cholera, typhoid, and dysentery could be water-borne until the middle of the century. The empirical studies of John Snow and Edward Frankland linked disease to contaminated water, which in turn led to the germ theory, which used bacteriological techniques to identify the
pathogens which caused disease, and made water analysis a more important matter to public
health.

The debate surrounding London's water supply provided much of the pioneering work
in public health, and consequently to debates among scientists and their employers about the
composition and assessment of water. The debate began in 1828 during meetings of the
Royal Commission on Water Supply, which investigated London's water supply and its safety.
A key figure in this debate was Dr. William Lambe, fellow and censor of the Royal College of
Physicians, graduate and fellow of St. John's College, Cambridge, who believed that
London's water supply from the Thames was dangerous due to the decomposition of
inorganic matter. Lambe was a transitional figure because he recognized the importance of
pure water supplies for the public, but used the mineral water analysis techniques of an
earlier period. The 1828 Royal Commission was the first significant discussion of water
quality standards and hammered out many of the issues and arguments that would prevail
through six subsequent investigations of London's water.

Hamlin pointed out that the hearings raised important issues of social philosophy for
the first time. Key issues concerned the right of people to good water, control of water
supplies, how safe water had to be, and how inter-regional disputes were discussed and
settled. All of these areas were subject to debate throughout the century. When scientists
took different position on water's contents and significance, they were also taking positions on
subsequent social issues as well.

The issues deliberated by the Royal Commission of 1828 occupied Parliament,
government ministries, local authorities and other interested parties for the next seventy-five
years. A pattern of outrage, inquiry, and inconsequential public response persisted
throughout the hearings of 1850-52, 1866-69, 1880-84, 1892-93, and 1898-99. Chemists,
medical personnel, engineers, geologists, meteorologists, economists, accountants and
public administrators repeated the same arguments, only changing details as their sciences
progressed. Throughout the century, the main players also remained constant. Private water
companies that supplied London, advocates of various and sometimes conflicting forms of
public control, and groups of engineers and investors sought to replace the existing supply, drawn mainly from the Thames and Lea, with their own alternatives. Scientists appeared in these forums as paid representatives of these interests, and such engagements did much to weaken the reputation of science overall, as it exposed the inconsistencies within disciplines and dramatically showed their limitations.

Developments in the fields of epidemiology and applied statistics changed the nature of the debate and suggested there was an undeniable cogency to Frankland's critique of the efficacy of water analysis. Investigations by John Simon and his colleagues at the Medical Office of the Privy Council between 1858 and 1870 showed that important and decimating infections, particularly typhoid, diarrhea, dysentery, and cholera, were either partly or wholly linked to contaminated water. Simon himself was not committed to the exclusive water theory, but this was less relevant than his detailed observations of topography, social conditions and the course of given infections in a wide range of localities. These indicated water was often the major cause of serious outbreaks of disease. It was precisely in such circumstances that the erratic nature of chemical analysis was most comprehensively revealed. In other words, social statistics and epidemiology were strengthening the position of those who argued that existing techniques of water analysis were incapable of warning when a disease might strike and when an outbreak end, or of shedding light on the likely mode of transmission. John Simon articulated this "sociomedical" assault on chemists when he told the Royal Commission of 1868 that "water might be...capable of spreading cholera but chemists would be unable to identify the particular contamination which precedes that effect."

This was exactly the problem besetting chemists all through the 1870s and 1880s. Unable to find the water "poison" which they sought, they started to borrow from other sciences, particularly biology. They adopted use of microscopes to their efforts and in the case of Frankland continued to decry the contamination of the Thames with human sewage. As medical science progressed and the germ theory replaced the miasmatic, water analysis moved from the chemical to the bacteriological domain. By the 1890s, Frankland himself was
using bacteriological knowledge and the language of bacteriology to redefine his major preoccupation in relation to public supply systems—the practical steps which could and must be taken to pre-empt the possibility of random outbreaks of water-transmitted disease. He told the Royal Commission of 1893-94 “You cannot detect the germs by chemical means...they are too minute in quantity and weight to affect the results of chemical analysis.” He argued that more rigorous research must be undertaken to find other solutions.

During the 1890s the bacteriological researches of Edward Klein and Alexander Houston on the processes whereby water could be clear yet contain infectious diseases were explained in more rigorous terms. As water analysis moved to the domain of biology, the old focus on sewage again emerged. New purification technologies relieved much anxiety about water quality. Cheap and effective biological sewage treatment processes were available by 1895, and chlorination after 1912. Some of the most difficult political issues, such as the ownership of London's water supply, were also finally resolved as water companies were taken under municipal control in 1904.

The history of water analysis in the nineteenth century showed no great scientific breakthroughs. Instead it applied developments in other fields in a series of small steps that stumbled unevenly forward. Regarded as of little importance in 1800, water contaminated with fecal matter was recognized by 1900 as one of the principal sources of human disease. The causal agents of diseases, barely defined at the beginning of the century, were at its end easily recognized and detected.

The politics of water policy in Britain during the nineteenth century left much to be desired. It might seem logical that scientific answers would lead directly to changes to safeguard the people's health. However, this was not the case: “Parliament, the Local Government Board, the courts, and official arbitrators actively encouraged the proliferation of conflicting knowledge claims by allowing the adversary process to become central in the making of water policy.” While a balance was eventually achieved with elimination of certain constituencies, such as water companies, and incorporation of science into the
mechanisms of government, in the meantime it left determination of public safety in the hands of interested parties who defined water quality.

As the century ended, pollution control stood little further than in 1800. Some progress was made with passage of the 1876 Rivers Prevention of Pollution Act, the nation's first water pollution legislation. Solid wastes could no longer be legally dumped into rivers, and new polluters were subject to regulation and inspection, but the legislation did little to stop existing sources of pollution, especially sewage, which continued to grow as population expanded. While national legislation was passed it was negated by local control, permissiveness and "best practical means." Rivers at the end of the century, including the Thames, were more polluted than at the beginning of the century. Real efforts at pollution containment would await centralized control, effluent standards, new abatement technologies, and a new public movement that demanded action in the twentieth century.

Death of a River: The Thames to 1950

The health of British rivers, particularly the Thames, are linked to the location and concentration of populations near them. As Britain moved into the twentieth century metropolitan populations continued to grow and their demand for water and sewage services increased proportionally. This placed financial and political strains on municipalities (and private companies) who sought to provide these services. Resource use increased as more water was abstracted from and increasing amounts of wastes were placed into rivers. This was particularly true in the lower Thames valley where London impacted the river. Conditions in the Thames were the worst in and below London, reaching near anaerobic conditions. Under such conditions the river could not sustain aquatic life and became a putrid nuisance to those who lived near, worked on, or came into its contact.

To understand London's problems it is necessary to review the administrative and chemical features of pollution control. Polluting materials fall into two broad categories, biodegradable and non-biodegradable. Biodegradable materials are those that break down into natural elements over time. Non-biodegradable materials are those that cannot be
broken down by natural processes. By their nature non-biodegradable materials are the
greatest threat to any water ecosystem because they alter the natural balance.

Non-biodegradable pollutants do not form part of the natural biological cycle of rivers. They include heavy metals or other toxic inorganic substances, and organic chemicals that may be toxic to the biota, have chemical structures not readily biodegradable, or both. In the latter class, pesticides and polychlorinated biphenyl (PCB)\textsuperscript{62} compounds cause the most serious problems due to their chemical properties which make them nearly impossible to break down and therefore persistent in the environment. Such substances may be controlled by either ensuring prevention of their entrance to the water environment, or by allowing them in strictly regulated quantities to prevent the buildup of concentrations that may affect the river's biota adversely.

Most biodegradable materials are organic in nature and the products into which they can be broken down, form substrates for the biota of the stream. Bacteria are the primary organisms. They can be broadly classified into autotrophs, which require only simple substances for their metabolism, using carbon dioxide or its compounds to synthesize carbohydrates and protein; and heterotrophs, which cannot use carbon dioxide in this way, and must obtain carbon from organic compounds. Autotrophs can be chemosynthetic, deriving energy from oxidation of inorganic substances such as ammonia, or photosynthetic, when they derive their energy from light. Those bacteria which require free oxygen for growth are designated aerobic. Others (anaerobic bacteria) cannot survive in the presence of air and derive oxygen from salts such as sulphates and phosphates.\textsuperscript{63}

In a river ecosystem there exists an intermediate stage between aerobic and anaerobic conditions. Aerobic decomposition of biodegradable organic material proceeds by using the dissolved oxygen in water until its level falls to about five percent saturation. Thereafter, nitrate and nitrite are used as sources of oxygen, through the process of denitrification, preserving the critical five percent saturation level until they are all used. At this point anaerobic conditions develop and sulphate is converted to sulphide in an attempt to raise the oxygen level.
Under denitrification, elementary nitrogen is produced which escapes into the atmosphere as an innocuous gas. When anaerobic conditions prevail, sulphide is formed, which is extremely lethal to river biota, and can give rise to hydrogen sulphide in the riverside atmosphere. Hydrogen sulphide carries a very unpleasant smell like that of rotten eggs and is a nuisance to the community into which it released. By 1950, the lower Thames had deteriorated to this level, making it uninhabitable to the natural biota of a tidal river, and unpleasant for the human population that bordered its length. Leslie Wood concluded that the primary factor in the deterioration of the lower Thames was the steady decline in the levels of dissolved oxygen within the river.84 Wood's work indicated there were three phases in the deterioration of the lower Thames:85 a rapid deterioration after 1910; near-anaerobic conditions by 1935; and complete anaerobic conditions in 1950.

Between 1900-50 the quantity of polluting matter of all types being discharged to the lower Thames increased. The major contributors were "point" sources, such as sewage works outfalls, sewers from industry, storm water overflows from surface water sewers, and storm sewage overflow from sewers of the "combined" system.

By the time the lower Thames reached its worst condition, in 1950-53, effluents were being discharged from eight sewage works in the Greater London area and thirteen more from rural Essex and Kent counties.86 This pollution load was more harmful to the river than others because of its relative concentration at that point in the river. As the river moves seaward its volume increases almost exponentially, and the dilution afforded any discharge increases in a similar manner. Thus, the effect of effluents from rural Essex and Kent were small in comparison to those from the Greater London area. Pollution levels were also compounded due to widespread use of synthetic detergents, making the sewage treatment process more difficult. Their effect was to retain in suspension substances that would normally be precipitated during sedimentation. For example, at Beckton, non-biodegradable surface-active agents such as detergents cut the plants operating efficiency by approximately 30 percent, resulting in lower quality effluents and corresponding higher pollution loads discharged to the lower Thames.87
The pollution problem around London was significantly more pronounced than in other areas of the Thames Valley. The Thames in the Greater London area received the discharges of 182 sewage works. One hundred eight of these sewage plants discharged directly (or indirectly by way of tributaries) into the lower Thames. Another 74 plants discharged to tributaries of the upper lower Thames within 20 km of Teddington Weir. Since any contamination of the Thames upriver had an effect on the self-purifying capacity and process, the discharging of pollution loads into the upper part of the lower Thames had a significant effect on the ability of the river to handle additional loads down-river.88

Storm sewage overflows were another factor contributing to the deterioration of the lower Thames. Constructing treatment systems that could handle the extremely large amounts of liquid received during storms from the combined system was cost prohibitive. Storm sewage discharges always constituted a problem, as they introduced a heavy pollution load for a short period, which had a major effect on the biota of the river by creating a dead zone. While these flows were small in comparison to flows from the sewage outfalls, they did exacerbate the already bad conditions in the river between 1900 and 1950.89

Industrial effluents discharged to the lower Thames never were as polluting nor caused such intractable problems as those made to rivers in the north of England. By 1950 they only accounted for nine percent of the total Biological Oxygen Demand (BOD) load being discharged into the lower Thames.90 In contrast, the combined sewage discharges from Beckton and Crossness constituted 76.9 percent of the total BOD load.91 Clearly, the problem of river pollution within the lower Thames was linked to human sewage.

Effluents from power stations also contributed to the pollution load on the lower Thames. These effluents derived from two main sources, stack washing and thermal pollution. Stack washing produced additional liquid wastes that were discharged to the river, transferring one form of pollution into another. Thermal pollution, produced mainly as power stations used river water for cooling purposes, effectively raised the temperature of the river across a given area. Raised temperatures not only made it unsuitable for sensitive
organisms such as migrating fish, but they also decreased the concentration of dissolved oxygen that water could maintain, reducing the self-purifying capacity of these areas.\textsuperscript{92}

The deterioration of the lower Thames reached its worst point in the early 1950s when long stretches of the river were devoid of oxygen. In these anaerobic regions no aquatic life was possible. Public amenities such as fishing and swimming were not available and the offensive order of a dead river made it inhospitable.\textsuperscript{93}

Responsibility for the Thames was divided among several agencies located at different government levels responsible at different times for various parts of the river.\textsuperscript{94} All of these agencies’ foundations were in the commercial uses and activities on the river and so focused on the maintenance and improvement of navigation, not pollution control per se. Bill Luckin pointed out in his work, \textit{Pollution \& Control: A Social History of the Thames in the nineteenth century} that there was a critical difference in perceptions between the northern industrial areas of Britain and London over pollution control. In the North the rapid growth and social impact of industrialization conditioned reformers to concentrate their efforts on the impact of industrial effluents. In contrast, in London, the tremendous growth of population from late seventeenth century onward dictated that water pollution was perceived predominantly in terms of human waste.\textsuperscript{95}

Following the environmental crisis of 1858, and the decision to construct a main drainage system for the capital, there was no single body given statutory powers to reduce pollution on the Thames. Instead these responsibilities were split between several bodies including the Crown Board of Works, the Chief Crown Commissioner of Works, the Thames Commissioners, the Thames Conservancy and the Metropolitan Sewage Commissioners. Involvement of the Board of Works and the Chief Commissioner of Works was short-lived and primarily directed at establishing the Metropolitan Board of Works (MBW) and providing it financial powers to borrow funds to finance construction of London’s main drainage scheme. Once this was completed the MBW became the responsible sewage authority.

Up to the establishment of the MBW, The Thames Commissioners, established in 1751, had nominal pollution control functions on the Thames. However, in 1857 the Thames
Conservancy was created and given jurisdiction over the Thames between Staines and the mouth of the river with the Thames Commissioners’ jurisdiction limited to the upper river above Staines.

Luckin informs us that the Thames Conservancy, like the MBW, was a child of compromise. In 1840 the Thames Commissioners became involved in a long fight with the Crown over ownership of the foreshore of the river, an argument deriving from the government’s decision at that time to begin construction on the Victoria Embankment. In the eighteenth century the Commissioners drew their membership exclusively from those holding a property interest in the upper river above Staines, but after 1770 the City of London gained a large representation on the Commission leading to a de facto arrangement whereby a committee of extra-metropolitan Commissioners supervised the river above Staines, and the City of London Commissioners assumed responsibility between Staines and the sea. Thus, the dispute between the Commissioners and the Crown was in actuality a dispute between the City of London and the Crown.

In 1856 a settlement was reached which separated the divergent interests. The Crown waived all property rights relating to the Thames; the Thames Commissioners retained their jurisdiction over the river above Staines, and the new Conservancy, representing the City of London and the national executive, was given control of the lower river from Staines to the sea. This arrangement would not last long as the Conservancy soon embroiled itself in a dispute with the MBW regarding its disposal of sewage in the lower river, which the Conservancy rightly charged deteriorated the condition of the lower Thames. This dispute ebbed and flowed over several years until the London County Council (LCC) replaced the MBW in 1889. At that point in time, the Thames Commissioners controlled the river above Staines and the Thames Conservancy controlled the river from Staines to the sea. However, the London County Council still acted as the sewage authority for the metropolitan London area and the City of London controlled the river within the heart of the metropolitan area.
Pollution Control Jurisdictional Boundaries - 1858
Map 7

Pollution Control Jurisdictional Boundaries - 1889
As might have been expected this situation produced further conflict as the London County Council continually agitated for a place on the Conservancy that previously eluded the MBW. The Conservancy continued to maintain its position that it was a competent body that would not allow itself to become captured by the London County Council. It should be pointed out that the Conservancy did not attempt to “represent” the metropolitan area of London. Indeed none of its 23 members directly represented the 4.5 million people living in the county of London at the time. In 1894 a new Thames Conservancy Act was passed which granted the London County Council four seats on the Conservancy, but this did not end the conflict. Instead, the Conservancy continued to exclude the London County members from access to technical information relating to the collection and analysis of water samples.

After the turn of the century the London County Council turned its attention to another “problem” within its jurisdiction, the London docks. Long a source of pollution on the lower river, the Council determined that it could no longer be separated from management of the river. The battle over municipalisation was a savage fight that had unintended consequences for the County. Established in 1908, the newly created Port of London Authority (PLA) wound up protecting the interests of dock-owners over those of the County Council and dockworkers. However, a minor clause inserted into the Act made the PLA, and not the Conservancy, responsible for all measures regarding the reduction of pollution on the lower Thames from Teddington Lock to the sea. Suddenly, powers of the Conservancy were restricted to the part of the river that was once the province of the Thames Commissioners.

The PLA continues to manage the lower river today. It takes pollution control seriously, such as the pumping of bilges, the dumping of solid matter, and, since 1960, any discharges into the river within its jurisdiction. The PLA shared its responsibilities on the lower Thames with the City Corporation of London, the London County Council (LCC) and later the LCC’s successor, the Greater London Council (GLC). The PLA is responsible for the tideway itself and the tidal portion of all the tributaries that feed into the lower Thames. Metropolitan governments are responsible for the non-tidal portion of the tributaries that feed
Pollution Control Jurisdictional Boundaries - 1909
into the Thames within their jurisdiction, as well as operation of the London main drainage, including treatment plants and outfalls at Beckton and Crossness. The City Corporation maintains the Thames within the City’s jurisdiction and is responsible for the "lost rivers" within the Corporation’s limits. It also has limited navigation functions within its jurisdiction.

In 1948 the Rivers Board Act created the Thames River Board that superceded the Thames Conservancy as management body for the upper Thames valley. The lower Thames valley was exempted from the legislation (due to the influence of the City Corporation) and its management remained split between the PLA and the City of London. The diversity of interests on the lower Thames, and the concentration of population, made preservation of the river a continuing problem.

**Restoration Efforts**

Measures were taken around the mid 20th century to restore the polluted lower Thames. They resulted from a unique combination of enthusiasm from the responsible bodies and continuous scientific investigation. The PLA was one of the most important bodies, leading the scientific investigation and application of knowledge derived from the studies. In 1948, a new administrative structure for managing and protecting rivers across Britain was created. "River Boards" were established and provided with legislative powers to issue discharge consents by the Rivers (Prevention of Pollution) Acts of 1951 and 1961, nominally giving them control over the wastes placed into rivers. The Thames was under the nominal protection of the Thames River Board, but its authority only applied to the upper Thames. The power to issue consents, given to the River Boards, was not given to the Port of London Authority; and so no enforcement body existed to cover the lower Thames. In respect to the major polluting discharges from Beckton and Crossness, the PLA had few, if any powers, as they were under the control of the London County Council. The 1855 Metropolis Government Act was still extant, which required only that sewage effluents from these outfalls did not return to London. Despite these difficulties, the PLA's officers worked constantly, mainly through persuasion, toward improving the quality of sewage effluents to improve the condition of the lower Thames.
Map 9

The Lost Rivers of London

1 - Black Ditch
2 - Bow
3 - Counters Creek
4 - Earl
5 - Falcon Brook
6 - Fleet
7 - Hackney Brook
8 - Hole Bourne
9 - Hounds Ditch
10 - Kid Brook
11 - Kilbourne
12 - King's Scholars' Pond
13 - Lower Kid Brook
14 - Neckinger
15 - Quaggy River
16 - Ravensbourne
17 - River Effra
18 - Shore Ditch
19 - Stamford Brook
20 - Ty Bourne
21 - Walbrook
22 - Wandle
23 - West Bourne

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Pollution Control Jurisdictional Boundaries - 1948
Map 11

Pollution Control Jurisdictional Boundaries - 1974

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The other main body that acted in the lower Thames valley was the London County Council (LCC) [1888-1965] and its successor, the Greater London Council (GLC) [1965-1986]. These councils could have carried out merely what was required by statute, but no matter which political party was in power, the tradition of providing the best lifestyle for Londoners was the driving force of the councils. Their aim was first to provide Londoners with a river free from nuisance, and second, to provide a river affording amenities. The councils cooperated with the PLA to help improve the condition of the lower Thames, especially through their support of the PLA’s studies.

A river cannot be cleaned, even with the best of goodwill, solely by local government and regulatory bodies, and the Thames rehabilitation owed much to a study, probably the most comprehensive made on any British river, by scientists of the Water Pollution Research Laboratory at Stevenage (now the Water Research Center, an agency of the central government Department of Scientific and Industrial Research).

In 1947, the Chairman of the PLA, Lord Waverley, requested the Water Pollution Research Laboratory104 assist in an investigation of causes of silting in the lower Thames, especially around the Barking area, to ascertain in particular whether deposition of mud was linked to the discharge of polluting matter (this mirrored demands by the Thames Conservancy from the 1860s through 1870s). As a result the Thames Survey Committee was established. Its members included scientists and engineers from the PLA, LCC and central government, as well as consultants in the field of public health engineering. The laboratory’s investigation began in May 1949. While the silting study was undertaken by the Hydraulics Research Station, using large, purpose-built physical tidal models, the Thames Survey Committee turned its attention to the polluted state of the river and to problems of sulphide production, especially during dry months, that caused large numbers of public complaints.

The Water Pollution Research Laboratory extended its work beyond silting and conducted a decade long study (1949-1964), examining the causes of, and remedies for, the pollution of the lower Thames. Their 1964 report, “The Effects of Polluting Discharges on the
Thames Estuary\textsuperscript{106} detailed the rates of degradation of polluting matter, the concentrations of dissolved oxygen under various types of biodegradation reactions, and the mechanism of introducing and replenishing dissolved oxygen. The effects of factors such as temperature, the upland flow of fresh water, seawater penetration into the river and mixing characteristics were also taken into account. While it was understood the study would be very labor intensive and centered on laboratory research, the Survey Committee recognized it would benefit other estuaries and were willing to make the pioneering effort. The work produced a mathematical model (still used today with little alteration) that allowed scientific pollution assessment for the first time. The model was sophisticated enough to account for the position of each major discharge of effluents within the river. This model enabled study of the production of various quality effluents at different locations and their impact on the river as a whole. The entire range of pollutants could be calculated no matter their type—oxygen consuming, biodegradable or thermal pollution.

The study recognized the impact of ammonia and nitrate on water quality. It showed that ammonia discharged in effluents made a heavy demand upon dissolved oxygen resources during its oxidation in the lower Thames. The nitrate produced could provide a reserve of oxygen to prevent onset of putrid conditions when dissolved oxygen levels are low. The Thames Survey Committee concluded the discharge of nitrates could never affect an estuary adversely,\textsuperscript{106} and from this belief derived the concept of an environmental quality objective (EQO).\textsuperscript{107} It was known the lower Thames could be kept free from public nuisance (i.e., the production of hydrogen sulphide) provided nitrate was present, and the Committee concluded this should form the basis of a suitable standard, provided a margin of safety was allowed. Reserves of nitrate begin to be used when dissolved oxygen fell to approximately five percent saturation. The Committee suggested a standard for the lower Thames of a minimum of ten percent saturation of dissolved oxygen in all places at all times, providing a margin of safety against nuisance (hydrogen sulphide formation).

Concurrently with efforts on the regional level, national interest in pollution control increased because of the upcoming 1951 "Festival of Britain". On April 4, 1951 the Minister
of Local Government and Planning set up a Departmental Committee on the "effects of heated and other effluents and discharges on the condition of the tidal reaches of the river Thames." Known as the Pippard Committee for its chair, it recognized that not enough was known about factors responsible for the condition of the lower Thames to formulate a policy for its management, and that a prolonged study was necessary. Advantage was taken of the work carried out under the auspices of the Thames Survey Committee by the Water Pollution Research Laboratory. This was further reason for the Thames Survey Committee to broaden their work from the causes of silting to a study of sanitary conditions on the lower Thames. The two committees worked closely together, with nearly all members serving on both, and with the scope of research extended to cover both committees' terms of reference.

Generally, the Thames Survey Committee remained responsible for the research program, while the Pippard Committee collaborated by obtaining information on various discharges to the lower Thames.

By 1961, three years before the publication of the Water Pollution Research Laboratory Report, the Pippard Committee gathered enough information to formulate its own report, published by the Ministry of Housing and Local Government. The report contained both general conclusions, dealing with the overall condition of the estuary and the aims and methods of future management, and findings and recommendations on specific issues such as the effects of particular effluents on water quality. The Committee concluded the Thames was badly polluted and that large stretches of the river were deoxygenated, creating insufficient biological conditions to support river flora and fauna (dead zones). It agreed with the Thames Survey Committee that effluents containing oxidizable nitrogen were more complex, and the key to river management. Using results of the Water Pollution Research Laboratory, it could scientifically demonstrate the impact of sewage on BOD levels and thus make regulation possible. The Committee recommended the quality of the estuary be satisfactory (for migratory fish), but that uniform quality standards need not necessarily apply. In terms of river management, the status quo was endorsed with the exception of granting the Port of London Authority equal powers with that of river boards to manage the lower Thames.
The Committee believed its aims could be met if current polluting loads were reduced by 75 percent. Such action would raise the quality of the Thames, in terms of dissolved oxygen concentration, to levels that would permit establishment of migratory fisheries (salmon and sea trout). It understood this would require high quality effluents, whose costs were out of proportion to the benefits gained.

The Pippard Committee recommended the sewage outfalls with greatest effect on the lower Thames (those effluents produced at Beckton, Crossness, Mogden, West Kent and Acton) be required to produce higher quality effluents, as they contributed 90 percent of the total sewage effluent discharged to the river. Other recommendations included improvements to storm sewage overflow capacity, impacts of heated effluents, and location of new facilities.

Following the Pippard Report the two most important developments leading to improvement in the Thames were rebuilding of the Beckton and Crossness sewage treatment facilities and granting to the Port of London Authority effective pollution control powers equal to those exercised by the River Boards. The latter was accomplished through the Port of London Authority Act. This enabled the PLA to grant discharge consents, to keep track of the amount and quality of effluents discharged into the lower Thames, and to meet the environmental quality objectives set for the river.

The rebuilding of Beckton and Crossness during the 1960s and early 1970s resulted in production of higher quality effluents, which generated correspondingly reduced pollution loads. Beckton today is the largest sewage treatment plant in Europe, and produces a flow of effluent as great as that of the Thames' largest tributary. It remained virtually unchanged since its construction under the MBW in 1865 until 1932, when an activated sludge treatment plant went into operation. In 1959 a £7.5 million expansion of the plant was completed. This consisted of detritus removal, screen house, primary sedimentation tanks, a diffused air activated sludge plant, sludge digestion, and new gas-fired turbines. In 1967, the GLC authorized a plant capable of meeting the effluent quality called for in the Pippard report. Eight further primary sedimentation tanks, eight diffused air-activated tanks, and a further
forty-eight final sedimentation tanks were built to supplement the twenty-four already installed. In addition, the sludge digestion plant was expanded to provide an additional thirty-two tanks, capable of providing digestion treatment to the whole of the sludge. This represented a fifty percent increase in the plant's overall capacity, allowing it to handle all wastes then transferred. The reconstruction of Beckton was completed in early 1974.  

Preliminary work began at Crossness in early 1960 and the completed facility was recommissioned in 1963. The Crossness plant also remained unchanged since its initial construction in the 1860s, so an entirely new plant was designed. The works differed from those at Beckton in that the activated sludge treatment was based on mechanical aeration. Instead of the introduction of oxygen by means of fine bubbles of air, as in the diffused air process, rotating cones in the surface of the mixed liquor throw the liquid in fine droplets into the air where, in falling back into the tank, they absorb oxygen at the air-liquid interface. The cost of the works was £9 million in 1963 prices. Crossness was built after the first stage of Beckton improvements, and almost immediately after the works began to produce nitrifying effluent in 1964, sulphide disappeared from the Tideway. No sample containing sulphide has been found since, confirming the prediction of the Water Pollution Research Laboratory that nitrate would provide a safeguard against sulphide formation in the river.

The British experience with pollution control in the nineteenth and early twentieth centuries consistently showed a number of failings. Early efforts to centralize pollution control under a rational and centrally controlled administrative system were defeated by the tradition of local authority. The missed opportunities of the 1840s and 1850s were to have important consequences for the next century. The elevation of locally controlled sanitation efforts meant that every municipality acted in its own interests. Urban wastes were transferred from one “sink” to another across mediums (i.e., from land to water). Additionally, establishment of local authority over the environment meant river ecosystems were divided into a number of separate administrative parts, making holistic management impossible. Industrial technological change produced greater amounts of wastes which local authorities deposited into rivers and streams with negative effects for those downstream who used the
river for a variety of purposes, ranging from drinking water to coolants. National legislation, first passed in 1876, was weak and ill conceived. The permissive nature of the legislation left polluters in charge of regulation. Since effective action meant polluters would have to bear increased costs, there was no incentive for them to take action. As it was cheaper to produce clean drinking water through filtration and chlorination than it was to treat sewage, the majority of local authorities passed their wastes onto the “commons” of the river. River-based authorities were unable to effect real change because they were not supported by central government and because they did not control entire watersheds, preventing them from working within the natural ecological framework required for river ecosystem’s health. Finally, science and technology were revealed as “false” authorities which all sides claimed for their own positions and used to justify their actions. Evolving knowledge and recognition of the limitations of science led to the “best practicable means” approach used in the 1876 Act, an approach still used today. Together, all of these factors led to the despoiling of the natural environment and the destruction of the common resource of the river.

The relationship between promotion of social science, natural science and state centralization is informative to understanding developments through the nineteenth and early twentieth centuries. Social science, particularly the use of population studies of health and morbidity were successful in identifying the problems associated with epidemic diseases spread through unclean water. This laid the groundwork for government action. The use of the hard sciences, chemistry then bacteriology, was critical in helping the nation understand the natural processes involved with water contamination, which was in turn used by some to safeguard the populations health. While “science” was used by all sides in various debates over water quality to justify their own ends it did continue to support the idea that technological solutions were available to the problem of pollution control. Centralization, although defeated, still offered the best opportunity for applying new measures in a uniform manner throughout the nation.

Improvements at the sewage treatment facilities at Beckton and Crossness pointed the way to the future as they helped to mitigate some of the more pernicious effects of river
pollution in the lower Thames. The improvements also demonstrated how local agencies could work together in a positive manner when sufficient political will was present. However, improvements to the two sewage treatment plants did nothing to solve the primary problem of dumping large amounts of effluents into the river. These effluents, no matter their quality, still had a negative effect on the river ecosystem. Ultimately, the structure of pollution control was not fundamentally changed, as was required to ensure positive advancements.
1. See Maps 1, 2, 3 and 4 pages 25, 26, 27 and 28 respectively.

2. Teddington Weir is located 31.5 km above London Bridge. London Bridge is the point above or below which distances along the river are measured. The exact line which separates the river from the sea is not defined, but the seaward limit of the Port of London Authority (120 km below London bridge) is sufficient for this work. Thus the distance from Teddington Weir to the sea is approximately 151.5 km.


4. Metropolis Water Act, 1852 prohibited the London water companies from abstracting water from the lower Thames valley by 1856.

5. For examples of this process in the United States, which used Britain as a model, see Joel A. Tarr, The Search for the Ultimate Sink: Urban Pollution in Historical Perspective (Akron, OH: University of Akron Press, 1996), chapters 4-7.


11. Three important medical men involved in public health were James Kay, Neil Amott, and Southwood Smith. The Health of Towns Association was formed in 1844 and became an important propaganda and pressure group in support of sanitary reform.


21. Ibid.
22. The Corporation of London (a medieval corporation or guild) covered the one-square-mile geographical area of the walled city of London.

23. See Owen, chapter 1.

24. The Times, 12 December 1864, p.5, col. 5. The other towns were Nottingham, Derby, Wolverhampton, Coventry, Preston, and Bath.

25. The Office was itself a combination of two offices, that of Works and that of Woods and Forests, which had been separate until 1831, and were later separated again in 1854 when Benjamin Hall (an enemy of Chadwick) reformed the offices, and not incidentally, eliminated Edwin Chadwick from government service.

26. MacDonagh, Early Victorian Government, 144-145.


29. Ibid., 355-377. The exclusion of London from the act came with the understanding that a special metropolitan measure would be enacted once surveys and plans for a sewerage system had been completed.

30. Also growing out of the furor of the 1832 Cholera epidemic in London, and fear of a new epidemic, the Metropolitan Commission of Sewers was established in 1847 to coordinate the efforts of the district or borough sewer commissions that had been operating since the 1500's. During the 1837-38 typhus epidemic Chadwick had concentrated his activities on demonstrating the failure of local Guardians in prosecuting their office and forcing landlords to remove the decaying refuse and sewage, which he and other believed to be at the root of the problem. He had speculated that this might be avoided by the establishment of proper sanitary measure, which naturally for Chadwick, included the plentiful supply of water and a system of sewers to carry away the wastes. In September 1847 a Royal Commission inquired into the Health of the Metropolis, and with the knowledge that Cholera was advancing on Europe from the Orient, acted to replace the seven Crown Commissions of Sewers with a single Metropolitan Commission for the entire London area. The City Corporation of London was exempted because its City Sewers Commission was not a Crown appointment. For a more detailed description of the activities leading up to the MCS see Owen, The Government of Victorian London, 26-28.

31. Chadwick, in anticipation of the adoption of his plan, also set up a company to build the proposed system.

32. Times, 14 January 1848, p.3, cols 5-6, from a report on a meeting of the Metropolitan Court of Sewers, 13 January.

33. Ibid., 14 September 1848, p.4, cols. 2-3; 15 September, p.4, cols. 2-4; 21 September, p.4, cols. 3-4.


35. Ibid.

36. Local Government Act, 1858.

37. See Map 5, page 39. The intercepting sewer system built by London would vastly improve environmental conditions within the metropolitan area. However, the system merely transferred the pollution problem from the land to the river Thames and despoiled the environment of those who lived downstream.

38. The Metropolitan Board of Works was formed in 1855 and took over responsibility for sewers that had previously been vested in the Metropolitan Commission of Sewers. For a complete description of the events leading up to the formation of the MBW see Owen, The Government of Victorian London, chapter 2.


40. Ibid.


42. Times, 2 March 1865, p. 10, cols. 3-4, for the civil case of Spokes v. Banbury Local Board of Health. Vice Chancellor Sir W.P. Wood granted an injunction prohibiting the Board from draining sewage into the river Cherwell. The testimony by riparian owners and doctors...
convinced Wood that by adopting the sewage system under the Public Health Act of 1848, the Board had turned a pure stream into a foul one that was "black in colour, poisonous to fish, and highly injurious to cattle."

43. *Royal Commission on River Pollution*. Parliamentary Papers 33 (1867), Third Report, II, 70. In testimony in Dewsbury, John Jubb, chairman of the Batley board of health, told of a vicar who won a case against a manufacturer above him who polluted the stream with suds and sediment. When the examiner asked if this did not show a common law remedy available to those willing to take the time and expense to pursue it, Jubb responded that while the vicar got relief, the polluters bought up land between the Beck and the mill and simply deposited the polluted matter into the Beck at a point below the vicar's land.

44. [Benjamin Shaw], "Sanitary Reform in the Metropolis." *British Quarterly Review*, CXVIII (1865), 275.


46. Times, 4 October 1866, p. 10, col. 1; 6 October, p. 12, col. 2.


49. Ibid., 1310-1311.

50. Times, 12 December 1864, p. 5, col. 5. The resolution invited other large landowners to join them by forwarding their names to Montagu.

51. House of Commons, Sessional Papers 47 (1865), 505-509, for memorials from the Birmingham council, the Huddersfield Improvement commission, the council of Nottingham, the board of health of Rotherham and Kimberworth, the council of Sheffield, and the council of York. Other towns that memorialized the Government were Manchester, Preston, Coventry, Derby, Wolverhampton, Bath, Stockport, Cheltenham, and Oxford.


55. Hamlin, "Environmental Sensibility in Edinburgh."

56. Journal of the Society of Arts, 23 (20 November 1874).

57. Ibid., 11 November 1874, 56-57. John Thom, of Birkacre, Chorley.

58. Anglers were one of the most important groups who consistently brought pressure to bear on the issue of river pollution. This pressure has continued to the present day and represented then as now the amenity aspects of rivers to the wider community. It is also important to note the pervasiveness of sport fishing in Britain. On almost every body of water one will find fishermen; even if they know they cannot eat their catch, they still persist in practicing their sport.


60. Ibid.


64. Ibid.

65. Ibid., 190-191.

66. Times, 15 December 1876, p. 8, col. 3.

67. Lancet, 12 February 1887, p. 316. Dr. C.E. Saunders, who read a paper on "Legislation for the Purification of Rivers, and its failure."


70. Ibid., 8.

71. Ibid., 9.

72. Ibid., 9. See also chapters 6 and 7 of Hamlin, *A Science of Impurity* which documents Frankland's position within the debate.

73. Ibid., 10.
74. Ibid., 10-11.
75. William Lambe, An Investigation of the Properties of Thames Water (London: Butcher and Underwood, 1828), 52
76. Hamlin, A Science of Impurity. 75.
77. Rystone Lambert, Sir John Simon 1816-1904 and English Social Administration 1963, Part IV.
78. Royal Commission on Water Supply (1868) Q2754.
79. Royal Commission on the Water Supply of the Metropolis (1893) Q4604.
81. Hamlin, 302.
82. PCB's entered the British environment in ever greater quantities during the twentieth century, typically linked to the growth of the electrical industry.
84. Ibid.
85. Ibid., 53-54.
86. Ibid., 56.
87. Ibid., 61.
88. Ibid., 64.
89. Ibid., 66.
90. BOD is a measurement of the amount of oxygen required by polluting matter to break down into natural elements.
91. Wood, 67-68.
92. Ibid., 71-73.
93. Ibid., 81.
94. See Porter, The Thames Embankment, Chapter 6.
95. See Luckin, Pollution and Control, Chapter 7.
96. See Map 6, page 62.
97. See Map 7, page 63.
98. See Map 8, page 65.
99. There are a number of small streams and creeks running under and through the City of London. Over time, but particularly in the nineteenth century, they were incorporated into the drainage and sewerage system of the City. See Nicholas J. Barton, The Lost Rivers of London (London: Phoenix House, 1962).
100. See Map 9, page 67.
102. See Map 10, page 68.
104. The Water Pollution Research Laboratory was under the Department of Scientific and Industrial Research.
105. Water Pollution Research Laboratory, The Effects of Polluting Discharges on the Thames Estuary. (London: Water Pollution Research Laboratory, 1964)
106. It must be pointed out that the desirability of the presence of nitrate applies only to estuaries or waters not used for potable supply. In the rivers used for the latter purpose, the intake levels must be kept below the World Health Organization desirable limit of 50 mg/l NO3 and certainly below the mandatory limit of 100 mg/l NO3. Nitrate in water can give rise to the condition in bottle fed infants known as methemoglobinemia (blue babies), and is suspected of having a carcinogenic effect due to reduction to nitrite and reaction to form N-nitrosamine in the human intestine.
107. The concept of an EQO is based on the principle that it is more important to maintain the whole than any of the individual parts. This ruled out fixed emission standards that are used within the United States and the European Community for the same purposes. The adoption of EQO's in Britain would cause controversy in their future relations with the EC and this will be discussed in greater detail in a later chapter.
108. While the recommendation to reduce pollution loads by 75 percent may represent good science, it in no way considered the political feasibility of establishing such criteria, which would have been impossible.


110. Wood, 103.

CHAPTER III

CENTRALIZATION AND AUTHORITY IN BRITISH WATER INSTITUTIONS

During the 19th century, authority over the water environment was largely defined in terms of local control. Municipalities were proud of the infrastructures they had built. London was particularly proud of its road and railways, its sewerage system, and the Embankment. They viewed their efforts as achievements of a representative and progressive society. While not perfect, they represented the popular will. Therefore, it is not surprising that they fought against any form of centralization. They believed they were more responsive than central government and better situated to respond to the current and future needs of their populations. While in most cases true, localism could not ensure the larger common good. On the Thames and other British rivers, municipalities worked independently to implement environmental controls, which prevented a coordinated approach that may have proven more successful. The principle of local control, and its implied relationship with local democracy, began to be challenged obliquely through a series of small steps. These steps created larger, more complex administrative units in the second half of the twentieth century.

Many of the events surrounding water in the middle decades of the twentieth century are best understood within the context of the local v. central authority debate. Ever-increasing amounts of pollution effectively "killed" large sections of British rivers by mid-century. Critics of pollution ranging from industrialists to recreational users pointed to the declining health of British rivers as evidence that the current system was not functioning. They argued that municipalities could not be trusted with responsibilities towards pollution because it was in their financial interest to pollute. Pollution is fundamentally a human problem, a byproduct of our existence as organisms. As cities concentrate population so do they concentrate pollution to unprecedented levels. In Britain, municipalities control the sewers and sewage treatment systems and thereby directly influence the quality of effluents discharged. As a result, cities, through expenditure on plant and equipment, can directly

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improve river water quality if there is sufficient political will. However, municipalities failed to increase the quantity and quality of their capital resources congruent with population growth. As may be expected, sewage treatment could not meet the increased demand and resulted in increased pollution to the point where some sections were ecological dead.²

As the twentieth century progressed and water pollution worsened, the nineteenth-century solution of local authority over the environment began to be questioned. Successive governments began to look for more efficient means of preventing pollution, leading to new national legislation creating larger administrative units in 1951 and 1961. While thought to be more efficient and effective, they only served to further complicate pollution control as they added water supply functions to their responsibilities. The new units faced difficulties in balancing their various roles in investigating and regulating water supply with their contradictory role of ensuring pollution control. For example, water management included the approval of abstractions from the river. As abstractions reduce river flow, they negatively impact a river's pollution carrying capacity. Achieving a balance of abstractions with polluting discharges is necessary to maintain the river's health.

Two critical precursors to legislative changes in the mid-1970s were the 1963 Water Act and the 1971 Central Advisory Water Committee Report on the Future Management of Water in England and Wales.³ The 1963 Act serves to illustrate the trend towards defining authority over the environment at ever-higher levels. The 1971 Central Advisory Water Committee report set the tone and many of the terms of the debate that surrounded both the 1973 and 1974 Acts. London's experience is also instructive: while at the forefront of efforts to improve the local water environment through the coordinated activities of several bodies, the metropolis faced fundamental questions that serve to illustrate Britain's difficulties in effectively responding to water pollution.

Small Steps

In 1915, the final report of a Royal Commission on Sewage Disposal⁴ recommended the formation of a national authority to harmonize the activities of local authorities in regard to sewage disposal. Because this recommendation came in the midst of war, it received little
practical response at the time. But the recommendation did not fade away and by 1926 the
time had come to act. Stanley Baldwin's Conservative government, through the third report
of the Ministry of Agriculture and Fisheries Standing Committee on Rivers Pollution, endorsed (the concept of) the creation of a central authority to balance the various interests involved in the pollution question (municipalities, industrialists, fishermen, etc.). The committee looked to a time "when the nation will awaken to its duty" and warned that delay would mean greater expense and the likelihood of failure in the future. Along with numerous articles and letters on the subject, The Times contributed a powerful editorial on the need for new machinery to manage rivers from source to mouth.

Concurrently, the Ribble Joint Committee attempted to convince the Ministry of Health (successor to the Local Government Board) of the need to amend the 1876 Act. In a meeting with Health officials, the committee's chief inspector, George Etherton, explained the inadequacy of its powers and the frustrating delays caused by its numerous procedures. In a memorandum to the Ministry of Health, prior to a meeting with officials in the spring of 1927, he detailed the weaknesses of the 1876 Act and offered amendments to correct several deficiencies.

Additional pressure upon the government came from the newly formed Pure Rivers Society, an organization careful to emphasize that it was not a fishing group but represented diverse interests, including riparian owners, amenity groups and the tourism industry. They pointed out that the majority of river pollution that was occurring was illegal and in defiance of the 1876 Act. They also urged the appointment of a central water authority to act as an enforcement agent.

Most important of all was the formation of a joint committee by the Society of Medical Officers of Health, the Fishmongers' Company, the Salmon and Trout Association, and the British Waterworks Association. The BWA's concern derived from a fear of using polluted river sources to meet the need of a growing domestic demand for fresh water. Acting together, these groups urged the government to set up a central authority and to intensify scientific research on the best way to handle industrial effluents. A meeting with Lord
Balfour (Lord President of the Council), Neville Chamberlain (Ministry of Health), and Walter Guiness (Ministry of Agriculture) proved awkward, as they countered with the age-old argument that such action would be dangerous to the competitive position of the British manufacturing economy. Citing the need for more time to study the problem, Lord Balfour made only one concession, a commitment to support more scientific research. This led to the formation of the Water Pollution Research Board (1927) as part of the Department of Scientific and Industrial Research. The Balfour decision repeatedly produced more delays, as the technical information produced was used by both sides to augment their positions.

The condition of rivers grew worse during the next two decades. The double constraints of the Great Depression and the Second World War placed river pollution outside of the realm of consistent public action. Real action required higher public expenditures, which were not possible during the Depression or the Second World War. For example, bomb damage to London’s sewage treatment facilities, sewers, and water systems, occurring during “the Blitz”, was not completely fixed until after the war. Yet, adequate supplies of clean water were essential to support the civilian population and the industries were they worked. Water was classified as a vital national resource. An initial report presented to the Ministry of Health by its Central Advisory Water Committee in the summer of 1943 spelled out a preliminary policy. Government itself took action in the spring of 1944, and Parliament received a Government White Paper containing proposals for a “National Water Policy.”

Part I of the White Paper became the basis for the Water Act, introduced early in 1945 and enacted the week following the end of the war in Europe. This imposed upon the Ministry of Health the responsibility for the conservation and proper use of water resources throughout England and Wales. It reconstituted the Central Advisory Water Committee as a national statutory body whose services now would be available to any ministry concerned with water matters. It also provided penalties for the pollution of water used for human consumption, placing more stringent water quality standards on water suppliers. A few months later, the newly elected Labour Ministry of Clement Atlee followed with a similar measure for Scotland.
The planning commissions of the 1930s and the wartime experience of a centrally planned economy increased the likelihood of public acceptance of centralized river management. Government had directly intervened in the management of the economy during both world wars with great success. The majority of the population believed that the interventions were responsible for their victories in both wars. The example of activist government successfully bringing forth policies for the good of the nation lessened public fears of central government intrusion into their lives.

Following recommendations by the Royal Commissions of the 1860s and by various anti-pollution groups over the years, the wartime report of the Central Advisory Water Committee contained proposals for new river boards that had the sole responsibility for administering the Rivers Pollution Prevention Act of 1876. These proposals were incorporated in Part II of the Government White Paper of 1944. At the opening of the Session of 1947-48, the King's speech gave notice of the government's intent to establish river boards as a solution to the river pollution control problem. The Labour Minister of Health, Ernest Brown, commented on the importance of clean water for all. He argued that the prevention of water pollution would help undo the evil effects of the industrial revolution and bring the living conditions of all people into "accord with modern conceptions of a decent life for the citizens."  

The River Boards Act of 1948 created 32 regional boards to take over all functions, including the control of river pollution, which had previously been scattered amongst 1600 authorities. The Act was intended to create a single authority for each river, which would act in the river's best interest. The Act included all of England and Wales with the exception of the Thames and Lee catchment areas and the administrative county of London. London, characteristically, had escaped conforming to national standards via the influence of the City. The 1948 Act coincided with a growing movement in favor of changing the law on river pollution. In 1946, Clement Atlee's Labour government requested that the Central Advisory Water Committee review pollution legislation with a view towards modernization. Rather than await the results, the government proceeded with the River Boards Act so as to
have these boards established and in place and "straining at the leash" to apply the anticipated changes in pollution law. The new act gave River Boards the power to prescribe effluent standards, laid down in by-laws, subject to confirmation by the Ministry of Health. They were not intended to be uniform, but were to vary according to conditions in each river or part of a river. Special provisions for mining interests included in the 1876 act were discontinued.

Late in 1950 Labour's new Minister of Health, Aneurin Bevan, introduced legislation, based on the recommendations of the Central Water Advisory Committee, to replace the 1876 Act. The bill empowered the Boards to impose standards for determining what was poisonous, noxious or polluting matter. The Ministry of Health expected to have a series of standards laid down for different reaches of a river, in each instance ensuring a "gradual rising rather than a lowering of standards."

The passage of the Rivers (Prevention of Pollution) Act in 1951 repealed the 1876 act and a new era of consolidated river management came into force. All discharges were subjected to a consent process. Applicants had to quantify the nature, composition, temperature, and maximum volume and flow rates of their effluents. This housekeeping act consolidated the powers of the Boards, enabling them to know precisely what municipalities were placing into rivers through their sewerage systems. This information provided the basis for rational decision-making on behalf of each River Board.

Further change came in 1963, when the 32 River Boards were consolidated into 29 River Authorities. With the larger structure came new pollution control measures that sought to control discharges to underground strata that threatened underground aquifers.
United Kingdom River Authorities - 1963

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Control was established through application of a consent procedure administered by the River Authorities. The Act extended River Authorities' powers, enabling them to sample effluent discharged into inland or coastal waters in their area. River Authorities were also given the power to undertake emergency measures to mitigate or remedy pollution incidents, and to make by-laws protecting water resources. Thus, the 1963 act continued the centralization of pollution control and extended the authorities' powers beyond the river itself to all those areas that might affect the river. Consolidation was based on the idea that a River Authority's control should extend over an entire watershed allowing the complete management of the hydrological cycle. The consolidation was significant because for the first time hydrological and ecological arguments were used to define the size of the authority.28

Consolidation did not create an integrated industry. Various functions associated with water utilization and management remained divided among a number of bodies. Water supply remained under the control of municipal and private undertakings; conservation and land drainage were the responsibilities of River Authorities, and local authorities retained control over wastewater and sewage. The 1963 Act, however, helped shape perceptions of existing structures and glaringly pointed out the inadequacies of divided authority.

The Water Supply Industry & Consolidation of Local Authority

Britain's water supply industry was created piecemeal through acts of Parliament and the actions of individuals who formed private companies to supply cities and towns with water. The industry was mostly governed by market competition, only having to conform to certain quality standards. Competition between water companies usually meant that supplies were unevenly distributed amongst populations, with the poorer neighborhoods receiving service last. Many municipalities were frustrated by this situation and desired the authority to provide this service. They saw it as a logical extension of their controls over streets, sewers, and power. They also believed that they could provide higher quality service at lower price than the water companies because they were not motivated by profit. Municipal control of water supplies would both reinforce local control over another sector of the water environment and consolidate and rationalize this important service.
In many towns of the industrial midlands and north of the nation, municipal control of the water supply was achieved in the second half of the nineteenth century. For example, Liverpool's Waterworks Act of 1847 enabled the council to purchase the local water companies and embark on the "Rivington Scheme" at a cost of over one million pounds. The scheme engineered a series of linked lakes and reservoirs at Rivington Pike near Chorley and brought the water to Liverpool by gravitation. Similar achievements were made in Bradford under the Waterworks Act of 1854, and in Leeds under acts in 1837, 1852, and 1867 whereby water became "cheap and plentiful enough for its use to be taken for granted by all sections of the population."

When Birmingham took control of its water companies in 1878, local control of public utilities was commonplace. Nevertheless, Birmingham's experiment in "gas and water" socialism received greater publicity, and more lasting recognition, than the efforts of any other city. Without doubt the publicity resulted from Joseph Chamberlain's leadership as mayor of a rapid program of civic improvements. The example set by Birmingham "made local government ever more attractive to important local businessmen, who brought to civic affairs a corporate sense of mission and financial flair which generated the golden age of municipal collectivism." Chamberlain's efforts in Birmingham were, of course, built on his personal reputation and the efforts of civic gospellers before him.

In comparison, London's water supply system was irrational and inadequate. As late as the 1890s, water supplies "in the east end and many other parts were fitful, costly and, in some cases, confined to a common tap to supply a crowd of nearby tenements." London had eight separate water companies supplying the city by the 1850s. Unfortunately, their boundaries were ill conceived and ill-defined, leading to direct competition, an irrational system of charges and inadequate investment. Although these problems were eventually overcome north of the Thames (where the companies agreed to operate in defined areas) competition south of the Thames continued with adverse consequences for both supplies and public health.
Dissatisfaction with the private, commercial provision of water in London persisted well into the twentieth century. An initial but unsuccessful attempt was made to gain control of the water companies when the LCC was formed in 1889. Concurrently, attempts were made to gain control of the companies through direct acquisition and consolidation. Neither strategy proved successful but it demonstrated the need for action, which was eventually fulfilled through the Metropolis Act of 1902, which created and vested the Metropolitan Water Board (MWB) as London’s water supplier.\(^{36}\)

The new, single-purpose authority contained representatives from the LCC, the City Corporation and the recently created metropolitan boroughs, which replaced the vestries.\(^{37}\) The MWB soon achieved a scale of supply not approached by any other water undertaking in Britain. By 1914 it was supplying 244 million gallons of water a day to a population of over 6.5 million while the next largest undertaking, the South Staffordshire Water Company, was supplying only 16 million gallons a day. By 1935 the MWB was responsible for the water supply of almost 20 percent of the population of England and Wales.\(^{38}\)

The growth of local authority control over water supply is illustrated by the following: whereas only eleven local authorities were operating waterworks in 1830, by 1880 the number had risen to seventy-eight. By 1905, there were 1,142 municipal undertakings employing capital of almost 130 million pounds. In contrast, approximately 230 private companies employed capital of less than 20 million pounds.\(^{39}\) The scale of operation differed sharply. In 1914, only 137 of the municipal undertakings were supplying water at rates in excess of 500,000 gallons a day and only about seventy of the private companies achieved this figure. By 1935 the eighty-five largest municipal and private undertakings were supplying seventy-five percent of the population. The number of undertakings remained broadly constant throughout the inter-war period, although private companies began a long process of merger that reduced their numbers from roughly 170 in the 1930s to 90 in 1956 and 33 by 1970.\(^{40}\)

During the inter-war period, the linked issues of water resources, water supply and appropriate management structures became matters of growing concern to the central
government, as no central policy existed in regards to water management. The Ministry of Health gradually succeeded in establishing itself as the Ministry with prime responsibility for dealing with the water industry, but this was limited to prescription of components of water quality. In 1922 it established an Advisory Committee on Water, which recommended the adoption of legislation to safeguard supplies and prevent pollution. In 1934 the most severe drought in fifty years prompted the British Waterworks Association, the Institution of Water Engineers and the Water Companies Association to convene a joint conference to consider national water policy. The conference published a report rejecting suggestions both for a water grid (similar to that for electricity) or the nationalization of water supplies. Instead it advocated continuation of the autonomy of individual water undertakings, but under the auspices of a separate water department of the Ministry of Health. In any event, attempts to rationalize the water industry and its legislative framework were not completed until the end of the Second World War.

**Development and Extensions of Pollution Control**

The primary instrument of water pollution control was the discharge permit, a process transferred to the River Authorities under the 1963 Act. Then as today, the principle tool of water quality is the legal requirement that anyone discharging effluent to natural waters (surface and underground) must obtain "consent" from the relevant authority. In practice the River Authority receives applications for consent and issues a permit setting forth conditions for the discharge. The comprehensive system of consent permits was adopted after nearly a century of experimentation with other approaches to pollution control. Since water quality maintenance is one of the most critical aspects of water management, it is worth discussing how central government became involved in the process.

The first effort to address water pollution came in 1876 but the act was permissive and contained a number of weaknesses. Enforcement powers were located with local authorities, which was irrational since they were often the largest polluters; court costs were borne by the complainant, and there were many counter pressures so few prosecutions resulted; scientific criteria was pollution was ill defined, leaving the courts with few guidelines.
for determining violations; no penalties were prescribed for those convicted; courts could only issue a stop and desist order but could do nothing about the environmental damage.

Fisheries interests gave organized leadership to the pollution fight, not just because of the increasing damage from industrial spills, but also because first the Local Government Board, and then the later the Ministry of Health insisted on limiting its concern to the health consequences of water pollution. In 1923, the Salmon and Freshwater Fisheries Act introduced the idea of biological factors in water quality. It made illegal the placing into rivers of any matters"...to such an extent as to cause the waters to be poisonous or injurious to fish, or the spawning grounds, spawn or food fish." This provision established a more precise criterion of pollution—one that could be tested by the relatively simple technologies already available. The Act created Fisheries Boards whose jurisdictions covered specified river basins, a precedent incorporated into the design of later legislation. The Boards were given powers previously exercised by local authorities in regards to pollution control. Thus armed, the Fishery Boards were more vigorous in prosecuting violators than the previous local authorities.

Early efforts to establish general standards for human water safety had few results. A Royal Commission was established in 1898 to study water pollution. One of its later reports (1912) recommended standards that would provide a guide for later enforcement of the pollution control laws. The Commission's standards affected pollution control administration even though, with few specific exceptions, they were not enacted into law nor made a part of regulations having the force of law. Instead, they were referred to frequently in discussions of pollution control and the River Boards informally adopted them as working guidelines.

When the River Boards were set up in 1948, it was thought that they would provide a new and vigorous instrument to control pollution. Many legislative powers relating to rivers were transferred to the Boards, including powers to prosecute polluters under the 1876 and the 1923 acts. In addition, the Boards were empowered to enter onto property to take effluent samples, which, if taken properly, were admissible as evidence in legal proceedings.
For the first time, one authority was responsible for an entire river system, rather than the previous system of leaving prevention in the hands of many local authorities. This was a crucial step in defining authority over the environment and would eventually lead to more effective pollution control.

Efforts in 1948 to give the Boards stronger regulatory powers were countered by arguments in favor of the status quo. The Federation of British Industries and the National Coal Board, fearful of more stringent enforcement measures, argued that the current enforcement procedures already available were sufficient. But enforcement by court action proved inadequate, and anti-pollution interests continued to press for better controls.

These controls would first appear as part of the 1951 Act. It authorized River Boards to adopt "byelaws" establishing effluent standards as a basis for improving control, and it required any new discharge, or a substantial alteration to an old discharge, to obtain consent from the River Board. Each discharge permit could prescribe the conditions of discharge, including location, character, and capacity of the outlet, and the conditions of the effluent. The conditions attached to each permit were to be recorded in a register and made public by the River Board. (However, this valuable public record was not available until 1985 for a variety of reasons which will be discussed at length in a later chapter.) Violators were subject to a single fine up to a limit of £200.

The River Boards failed to adequately control pollution due to their administrative structure. River Boards were consolidated administrative entities. The largest pressure to pollute derived from the municipalities who were well represented on the boards. As a result, the boards' need to pollute eclipsed their responsibilities regarding pollution. This perception was supported by water professionals (engineers) who objected to the imposition of standards due to their inflexibility. For example, their largest objection was that standards did not consider the differences in the conditions of the receiving waters. According to the professionals, no standard could match the flexibility of a discharge permit. While this statement is still true today, discharges still must be monitored to ensure compliance. Simply granting a discharge permit stating particular criteria does not guarantee that the discharger
will comply. The lack of any systematic monitoring of effluents, which might have gone far in ensuring compliance, was a critical failure in the design and implementation of the new system. Additionally, the new system only applied to those discharges not covered under the previous system and did not allow the River Boards to fundamentally alter previously granted permits.

The need for better control over existing discharges led to further study by Parliament's Armer committee, which recommended that a consent procedure similar to the 1951 Act be applied to pre-1951 discharges. This recommendation would form the basis of the 1961 Rivers (Prevention of Pollution) Act. River Boards were finally granted the power and duty to license every discharge into the natural waters within their jurisdiction. The Act strengthened penalties on violators by setting no limit on fines that could be imposed by the courts upon a conviction, but limited the fine to £100,000 for a summary conviction. Section 5 of the Act required periodic review of any conditions imposed within the discharge consent and allowed the River Boards to make reasonable variations or revocations of the permit. This last provision allowed the licensing system to maintain some measure of flexibility. The discharge consent powers of the 1951 and 1961 acts gave each River Board a comprehensive system of licensing discharges, theoretically giving them the ability to directly control all major sources of pollution. However, while River Boards did bring all discharges under control, they did not limit pollution. Few permit conditions were changed and the net production of pollution increased. Thus, the combination of the permissive nature of the Acts and the influence of other local authorities on the Boards effectively blocked overall improvements.

The 1963 Water Resources Act provided few new substantive powers affecting discharge controls. However the Act did produce a move towards larger more centralized administrative units for water services management, centralized the water services and waste industries, and placed conservation and water supply responsibilities in the hands of the 29 consolidated River Authorities created under the act. It was thought that combining these responsibilities would provide for greater motivation and more rigorous application of the law,
as the authority responsible for providing clean water would also control the pollution that was placed into rivers. Unfortunately, this was not the result, as the old conflict between society's need to pollute and enforcement remained. The new River Authorities, responsible for pollution control, were also in many cases the single largest polluter, as the agency responsible for waste disposal. Having the polluters responsible for issuing their own discharge permits was a classic example of a conflict of interest that promoted inaction. This was exactly the same situation that had existed almost a hundred years earlier. The only difference in this case was that one authority was responsible for an entire watershed's water supply and pollution control, instead of the hundreds that had existed in the nineteenth century.

With creation of the new authorities, river management changed from a system of local authority based on individual rivers, to a more centralized one based on hydrological and ecological principles applied to an entire watershed. This was significant because it allowed for efficiencies through economies of scale and more importantly because it based management principles on sound scientific principles. The dual functions of providing water and waste disposal services made it necessary to think in terms of watersheds instead of individual rivers. Hydrological considerations were the key to maintaining adequate supplies of water in rivers. As discussed in the previous chapter, rivers have a natural carrying capacity of pollution. But this carrying capacity is affected by a number of factors including the amount of water in the river. Since a large amount of water supplied to cities and industry is abstracted directly from the rivers, this affects the equation of how much pollution could be placed into a river. Conversely, the greater the amount of pollution placed into a river the greater the amount of water it requires so as not to exceed the river's given carrying capacity. This complex problem became the primary mission of the River Authorities. Unfortunately, this focus meant that moving water from one part of a watershed to another became the locus of action within the Authorities, relegating pollution control to a secondary position. In the Thames Valley this went so far that schemes were designed to abstract water from one location and pump it into the river at another, so that pollution could be disposed of in a third.
The 1963 Water Resources Act also created a central body, the Water Resources Board, which provided a focus for national concern about water resources and their effective development and management. The Board was composed of eight members who were appointed by the Minister of Housing and Local Government (later the Department of the Environment). The Minister designated a chairman and deputy chairman. The law required that the Board have at least one member who had expertise on Wales, but no other qualifications were prescribed. The Water Resources Board was independent in exercising its statutory authorities.

The Water Resources Board was responsible for general surveillance of River Authority actions relating to water availability, water quality control, and the development and implementation of water conservation projects. The Minister of Agriculture, Food and Fisheries (MAFF), was responsible for supervising matters of drainage, flood control and fisheries. The Minister of Housing and Local Government (later Department of Environment) continued to exercise supervision of River Authorities concerning water suppliers. Local governments held authority relating to matters of water supply services and in the administration of waste discharge permits.

The Board assumed a positive leadership role in providing River Authorities with policy and procedural guides. In its first full year of operation (1964), it developed six comprehensive memoranda clarifying, interpreting, and suggesting procedures for carrying out the new statutory provisions. Some of these memoranda were the subject of two-and-three-day conferences with appropriate officials and/or employees of the River Authorities. The memoranda covered a number of subjects that indicated the Board's priorities: control of abstraction and impounding of water; periodical surveys of water resources, including twenty-year demand projections, and proposals for necessary action; hydrometric projects (movement of water from one area to another); water in underground strata; water quality; control of abstractions of water in underground strata.

While the memorandum related to water quality dealt directly with pollution control, all of the memoranda concerned the effectiveness of pollution control functions. The Board is
significant in that it demonstrated central government's preference for central over local control and recognized the need to collect and analyze information regarding the systematic control of Britain's entire hydrology.

The 1963 Act gave the Minister of Housing and Local Government the responsibility for the rationalization and operation of water supply services provided by private undertakers and local governmental units, and the provision of sewerage and sewage treatment systems by local authorities. In addition, the Ministry supervised the operation of River Authorities by determining "minimum acceptable flow" of water in rivers through the licensing of abstractions, by approving rate schedules, and granting consents for effluent discharges. Powers affecting water use and development were associated in the Ministry with a wide range of supervisory functions over local governments, including those relating to finance and planning.

The Minister of Agriculture, Fisheries and Food had responsibilities to recommend grants for drainage and flood defense projects (such as the Thames Barrage), and to provide policy guidance in the administration of fishing regulations and fishery improvements on inland waters within River Authorities' areas of jurisdiction. The drainage grants directly affected some rivers as they allowed cities to remedy inadequacies in storm sewers and create excess capacity at sewerage works. The Ministry was responsible for determining the minimum requirements for certain fisheries, such as Thames River salmon, and then working collectively with other agencies to implement them. As discussed previously, the salmon fishery on the Thames was destroyed during the first half of the twentieth century due to excessive pollution. Efforts by the PLA, the Thames River Board (Thames River Authority after 1963), the Thames Conservancy, and the Lee Conservancy during the second half of the twentieth century met with some success, largely due to scientific studies that determined the specific water quality levels necessary to support the fisheries.

The two Ministries (Housing and Local Government and Agriculture, Fisheries and Food) shared responsibility for general supervision of the River Authorities, particularly with respect to their establishment, membership, and general operating policies. However,
despite the appearance of authority on paper, the Ministries’ powers regarding water management were limited. The Ministries could only initiate action if a River Authority defaulted in its responsibilities, and this was rare.

Major deficiencies in the 1963 system of water management became evident early on. First, there was inadequate authorization to force creation of regional distribution and disposal systems. While River Authorities had been charged with water management responsibilities, the Ministry of Housing and Local Government was in overall control of consolidating water distribution and disposal enterprises among municipalities. Bureaucratic self-preservation prevented the Ministry from working to develop economies of scale and force integration of water management and disposal. Moreover, while River Authorities were given powers to purchase, construct and manage sub-regional distribution and disposal systems, the Act failed to make allowances for the capital financing necessary for this purpose.

A second deficiency related to River Authorities’ inability to levy abstraction charges reflecting the true value of water, which influenced price, demand, and conservation. Instead, charges were based upon the Authority’s annual revenues and capital costs, thereby making the system inefficient. Additionally, the use of abstraction charges to promote efficiencies was restrained by not passing them on to consumers. Rates charged by water undertakers were monitored and subject to adjustment by the Ministry of Housing and Local Government. But inaction by the Ministry to promote realistic (retail) water prices made rationalization of abstraction charges difficult. Moreover, the Ministry’s authority was independent and superior to that of the River Authorities and the Water Resources Board. Thus, close cooperation in the administration of water charges as a tool of water management was difficult if not impossible to impose. If close cooperation had existed and water was priced as a commodity, capital would have been generated which could have used to promote further conservation efforts and pollution control.

The 1963 Water Resources Act provided England and Wales with a comprehensive institutional system for water management. However the system still reflected a greater
dependence on, and experience in, regulating water uses than in the development and management of water as a resource. All the conditions and procedures for regulatory activities were carefully prescribed in the statutes. The inadequacy of legal powers to foster, or to construct and operate, regional waste collection and treatment systems prevented their development and the economies of scale that would have resulted from their construction. Regional waste collection and treatment systems were a critical aspect of the water management system. Unfortunately, it was precisely this area where British practice was inadequate. Without the power to finance these systems themselves, River Authorities were left to the vagaries of the Ministry of Housing and Local Government, which had both contrary institutional priorities (i.e., building housing), and political constraints (i.e., the wishes of the Prime Minister). Additionally, central government supervision was split between the new Water Resource Board and the existing Ministries. The lack of clear jurisdiction prevented the Board from being effective in its planning functions. To counter this the Board developed close advisory relationships with the River Authorities that became quite sophisticated. Lastly, and most importantly, the Act built into government a concept of integrated administration of water resource activities. This precedent would lead to further integration in the 1970s.

The 1971 Central Advisory Water Committee Report

In April 1971, Edward Heath's Ministry of Health's Central Advisory Water Committee published its report on the organization of water supply, river management, sewerage, and sewage disposal. It described the existing situation as confused and illogical. There were a variety of interests identified by the Committee. These included 198 statutory water undertakers in England and Wales obligated to provide supplies of piped water for domestic and non-domestic consumers; 1300 sewerage and sewage disposal authorities, which were either local authorities or joint boards; and 29 River Authorities, responsible for water conservation, land drainage, fisheries, pollution control, and in some cases navigation. Other interests included central government departments, specifically the new Secretary of State for the Environment; the Water Resources Board; the British Waterways Board, a public
corporation which owned the great bulk of canals and was the navigation authority for certain navigable rivers; navigation authorities, such as the Port of London Authority (PLA); local authorities through application of drainage and amenity powers; the internal drainage boards within the River Authorities' areas of jurisdiction; the Central Electricity Generating Board, a large user of water; industrial firms; agricultural interests; commercial fisherman; and advocates for sport and recreation.57

Inevitably these diverse interests tended to conflict. For example, the sewerage authority was content as long as its drains emptied into the river. What happened to water quality downstream was someone else's problem. The river authorities, charged with maintaining the quality of the water, failed to perform adequately and stop such abuses because their members were often also members of the very same sewerage authority and were reluctant to prosecute themselves. The statutory water undertakers, in their turn, faced the filthy condition of rivers, from which they had to abstract supplies for their consumers.

The Central Advisory Water Committee subscribed to the obvious view that the relationship between the various authorities must be changed so that comprehensive water management plans could be formulated, and once agreed upon, a system of organization and financial arrangements was needed for their implementation. Although the committee was in agreement concerning the need for Regional Water Authorities, they were divided over the functions and constitutions of those authorities.

Concurrent with the report of the Central Advisory Water Committee, the government had two other Parliamentary reports that impacted water: the Report of the Working Party on Sewage Disposal, known as the Jeger Report, and the Report on the Disposal of Solid Toxic Wastes, known as the Key Report. The relevance of the Key report lay in the knowledge that the annual disposal of 14 million tons of house and trade refuse and 20 million tons of commercial and industrial wastes, excluding power station ash and mineral wastes, could and did affect water quality, especially underground sources of water. The Jeger Report recommended measures to strengthen existing legislation for controlling water pollution through control of sewage disposal. It outlined controls for discharges to all tidal rivers and
estuaries, coastal water pollution, discharges of sewage from boats, accidental pollution by spillage of oil or toxic chemicals, effluents poured into sewers, storm overflows, and dumping at sea. It also recommended additional financing for research and development. The proposed changes meant that some industries and local authorities would have to spend more for treatment or disposal of effluents.\textsuperscript{58}

The two-year study by the Central Advisory Water Committee, and the reports of the Jeger and Key committees, charged with finding a way to establish order amid the chaos, solved nothing. After emphasizing the urgency of the problems involved and agreeing that far-reaching measures were necessary, these committees were unable to reach a unanimous view as was their charge. Instead, faithfully reflecting a multiplicity of entrenched and conflicting interests, they promoted two entirely contradictory solutions.

The Central Advisory Water Committee Report split over solutions. One group of advocates argued that the conservation, supply and treatment of water constituted a cycle and ought to be treated as such by a multi-purpose organization.\textsuperscript{59} A second group, much concerned with maintaining the status quo, asserted that water services were an integral part of local government and were best provided by single-purpose authorities at the local level, who were closer to the people. The argument was therefore the familiar one between those whose priority was efficiency through centralization and those whose first concern was to safeguard the sovereignty of local democracy.\textsuperscript{60} Local democracy in this context was more about the preservation of the historical system of municipal control of services than about the loss of participation. These advocates needed to safeguard their ability to act independently, which in the context of pollution control, meant a continuation of their ability to pollute at levels that served the needs of their individual communities rather than the needs of the watershed they were located within or the nation as a whole.

Politically, the water quality issue in 1971 was essentially little different than that which had existed in 1876. The multiplicity of actors involved in the process would not support the structural changes necessary for and therefore could not agree upon a solution. While some developments had occurred: better science, more exact standards for discharges
were in place, the forging of links between agencies, industry, and advocates, and most importantly, an ever increasing focus on water quality by the new centralizing river authorities, these developments did not solve the fundamental problem of overuse of the rivers as a dumping ground for waste. What was required from these developments to produce results was a resolution of the multiple divisions in pollution control between local and central government. Reorganization of local and central government, (the story of the next chapter), would set the stage for radical reform of pollution control in the 1970s.
2. Ibid., 82.
4. The Royal Commission on Sewage Disposal was formed in 1898 to inquire into methods of treating and disposing of sewage and liquids from manufactories. Its final report was issued in 1915.
5. In 1921, the Ministry of Agriculture and Fisheries established a standing committee to examine the impact of river pollution on domestic fish stocks. Particularly hard hit were the salmon fisheries that had been largely destroyed by river pollution.
6. Times, 30 August 1926, p.8, col. 5. The eight-person committee included representatives from an anti-pollution organization, British industries, fishery boards, and anglers' associations.
7. Others, such as industrialist and former mayor of Birmingham Joseph Chamberlain, feared any strengthening of the 1876 law that might prevent municipalities from dumping untreated sewage into rivers. Reversal would make municipalities responsible for treatment of their wastes, with additional costs passed along to the taxpayers.
8. Ibid., 4 October 1926, p. 15, col. 4.
9. The Committee was established in 1891 by several municipalities within the Ribble river valley seeking to cooperatively address river pollution to prevent the threat of epidemic diseases. The Committee attempted to apply the 1876 Act to its fullest extent.
11. Memorandum of 27 February 1927, which noted the differences between actions of the Ribble Joint Committee under the 1876 Act and action that could be taken under the Mersey and Irwell Act of 1892. Safeguards protective of industry and sanitary authorities that may have been essential a half-century earlier were no longer necessary.
12. Times, 6 October 1926, p.9, col. 5. The society approached the Ministry of Agriculture.
15. Ibid., 12 August 1943, p.7 cols 1-3 for the committee's proposals. The committee, chaired by Field Marshall Lord Milne, was established in 1937.
19. Ibid.
22. The variability of these standards would become a hallmark of British pollution control as they contrasted to the uniform emission standards of the European Community—a point of contention for the future.
23. Times, 12 December 1949, p. 2, col. 2. The report was prepared by the Rivers Pollution Prevention Sub-Committee of the Central Water Advisory Committee.
27. See Map 12, page 88.
30. Ibid., 138.
43. Standards adequate for public health often may be lower than the biological requirements to maintain a full range of aquatic life. This was the case in the lower Thames valley where public interest in amenities, not water quality, spurred improvements.
44. *Salmon and Freshwater Fisheries Act*, 1923.
45. Turing, *River Pollution*.
46. The Commissions report set forth five classes of water in terms of biochemical oxygen demand and "expressed the view that if the biochemical oxygen demand (BOD) of a sewage effluent did not exceed 20 parts per million (ppm) and 30 ppm of suspended solids and if the receiving stream provided a dilution of 8 volumes of clean water to one of sewage effluent, the condition of the stream below the sewage works would be satisfactory."
47. Lester, 67-71.
49 Rivers (Prevention of Pollution) Act, 1951.
50. Although the Royal Commission's effluent standards were based upon a prescribed minimum factor of dilution by the receiving waters, there was apprehension that this part of the standard would be overlooked.
54. This is not intended to imply that efficiency should necessarily be the only, or even dominant objective in setting water rates. When constructing a rate system, various objectives of a specific financial plan must be reconciled. However, efficiency does reduce overall costs.
56. The Secretary of State to the Department heads the Department of the Environment. Due to governmental reorganization in 1970 the Department of the Environment became the successor to the Ministry of Housing and Local Government and Ministry of Transport. For more on this see the preceding chapter of this manuscript.
59. This was similar to Chadwick's original vision put forward over a hundred years earlier.
60. *Times* 1 December 1971 12h.
CHAPTER IV

GOVERNMENTAL REORGANIZATION AS A PRELUDE TO ENVIRONMENTAL CONTROL REORGANIZATION

The reorganization of the British government at the national, regional, and local level between 1965 and 1973 created a new political order that enabled reform of the environmental machinery of government. As a result of reorganization those concerned with water quality were able to focus reform and regulatory efforts on fewer specific agencies, rather than the diverse groups that had existed previously. The reorganization of local government and the creation of regional governmental bodies provided a precedent utilized to reorder water services in 1973 to the regional level. Coupled to the reorganization of local government was a reordering of central government on a more rational and centralized model that resolved many areas of overlapping authority.

Organizational reform was driven by patterns of urbanization that did not conform to geographic political boundaries. In September 1965, Mr. Richard Crossman, Minister of Housing and Local Government, in Harold Wilson's first Ministry argued in an address before the Association of Municipal Corporations that public disillusionment with local government derived from the sense that it was seriously out-of-date. He thought that the county boroughs and county councils as presently organized were archaic institutions, whose size and structure made them increasingly ill-suited to fulfill the important functions (including pollution control) with which they were charged. Contrary to historic patterns therefore, government reorganization began at the local level, in London, then proceeded to the regional and national levels. This chapter will describe these changes and show how they set precedents that were later adopted for water services.

While the history of local control is strong in Britain, it works in relationship with the national government, which has significant powers of its own. Fewer checks and balances exist between the executive and legislative branches than in the United States. Members of
the British cabinet are also members of Parliament, and in the twentieth century are usually
tied together by party-related and cabinet-centered mechanisms of cooperation and
discipline. Sharing in administration, although taking political and policy cues from ministers,
are a cadre of elite administrative officers from the professional civil service.

Britain's political structure gives great powers to party leaders who are entrusted to
govern. Legislative rules preserve a sense of fair play and provide room for critical review,
but there are few checks on what the government may accomplish. The British system rests
on a tradition of responsible leadership regardless of which political ideology is dominant. It
presumes that a pragmatic consensus is achievable. While in power, party leaders who form
the government are given leeway, although the representatives of the opposing parties are
expected to question and criticize, forming the "loyal opposition." However, until the leaders
are forced out of power through the loss of an election, their government has scope for action
restricted only by the size of their majority.²

The central government, acting through its various ministries and departments,
maintains firm control over virtually every functional sphere. Whether the issue is education,
housing, transport, economic development, or more recently the environment, an appropriate
ministry is ready with its policy group, inspectors and other officials hovering over and
stipulating the activities of local government offices and staff. Local government
representatives exercise considerable initiative, but always with the realization that central
governmental agencies generally hold veto power. This veto is often cloaked in the form of
persuasion when the central government wishes to avoid openly opposing local opinion.
Alternatively, as will be seen in environmental matters, it achieves its goals through fiscal
controls, specifically control over borrowing and spending, typically in the form of central
government grants.³

The central government thus assumes direct responsibility even for exploring
governmental reform when it is thought necessary. The device typically employed in Britain
is the Royal Commission. Made up of "experts" representing diverse viewpoints and interests
and endowed with great prestige, commissioners can search out possible alternatives to a
given problem and can produce an ordered set of recommendations providing a basis for legislative action. When a government is ready to act it usually issues a "White Paper" that outlines the initial legislative ideas that might solve a particular problem. The "White Paper" is then used to begin a process of consultation between the government and interested parties. After consultation is completed a specific bill is usually put forward in Parliament to enact the agreed-upon proposals. However, the recommendations of a Royal Commission can safely be ignored if they prove awkward or difficult to the present ministry. The Royal Commission mechanism works in Britain because it coincides with expectations that the government in power will initiate the needed reforms. Moreover, the commissions are charged with obtaining a consensus that provides a basis for action. Thus, it is expected that a Royal Commission will present a complete and packaged proposal that is feasible—political, financial, and other considerations having already been debated and considered. However, whether those recommendations really solve the problem, or only appear to, is open to debate. This has been especially true of Royal Commissions that have dealt with pollution in Britain. For example, the 1865 and 1868 Royal Commissions on the Pollution of Rivers produced a set of recommendations that were only partially applied, with no effective enforcement mechanism, as was seen in the 1876 Rivers Prevention of Pollution Act.4

In Britain, local governments are known generically as "local authorities." There are several varieties: counties, county boroughs (independent of and parallel to counties), and lower-tier authorities over which counties serve as upper-tier umbrellas, such as drainage and sewerage boards. All local authorities are governed by elected councils. These councils are notable for their size, which is usually larger than in other European nations.

These large councils are in principle representative of the people. They rely heavily on committees and subcommittees that assume responsibility for specific functions. As such, they sometimes follow the pattern of Parliament, and are also consistent with a political-party approach to council organization, where one of the parties is recognized as in power, and the other major party, or parties accept(s) the role of opposition.
The reorganizations of London metropolitan and other local governments along the lines of enlarged county units are critically important to understanding how pollution control functions became organized in Britain in the 1970s. The consolidation of local governmental functions at the county level in the 1960s set a series of precedents that were later used to transfer these functions from the local to the regional level.

The British experience with reorganization of local government also served as a precursor to acrimonious debate over issues of local control and local democracy. Public perceptions regarding reorganization were colored by arguments both for and against changing the existing governmental system. Arguments in favor of change were generally cast as professional issues of management and efficiency. They argued that Britain's population growth coupled with ever-increasing urbanization had outgrown the abilities of local government to meaningfully serve them. New governmental units were required to address these societal changes so that efficient planning could be accomplished. Population and urban patterns suggested regional units. It was argued that larger units were more efficient at decision-making regarding scarce resources and would more evenly distribute benefits. Those opposed to change argued that larger units were not "close" enough to the people to serve them and were viewed as unrepresentative. Opponents were afraid of the potential power of larger units to redistribute resources from local to regional priorities. They also thought larger units, even if representational of local interests, would not truly represent the full spectrum or have the sophistication or knowledge of specific local conditions to make a difference.

To a limited extent both arguments were true. Larger governmental units did "fit" patterns of development. Long-range planning required a holistic approach, not one divided between competing local authorities with overlapping responsibilities. Local authorities were correct in their fear of the removal of their powers. Larger governmental units would mean the "end" of the current system but it was not the end of local representative government per se, as officials were still elected. Interests would still operate, but they would shift their efforts from local to regional units. Those afraid of the financial powers of larger units were correct.
in that larger units implied taking more interests into account and decision-making for the
good of the whole community.

London was the first to feel these changes. Between 1945 and 1957 limited efforts
were made to review and patch up local government. In desultory fashion several reports
came forward, but they carried admonitions not to meddle with the London County Council
(LCC) or to consider major reorganization within Middlesex County, an almost solidly
urbanized set of suburbs located north of LCC territory. While the Labour Party was in power
(1945-51), its leaders were mostly concerned with major nationalization efforts, and were in
any event not disposed to direct critical inquiry at the LCC, a body dominated by the Labour
Party. However, when the Conservative Party came to power in 1951, (under Winston
Churchill) local government review efforts were undertaken. Three governmental White
Papers were issued between 1956 and 1957 (during the Ministries of Sir Anthony Eden, April
1955 to December 1957 and Harold Macmillan, January 1957 to October 1963) proposing
review of local government in England and Wales. The reviews were couched in restrictive
terms and indicated that no reform would be undertaken unless agreed to by a majority of the
local governments affected. This was largely the course of events over the next several
years. The Local Government Act of 1958 authorized the Local Government Commission of
England (a ministerial controlled body) to review, under somewhat limited powers, the
organization of local government outside of the London Metropolitan Area.

In January 1957 Henry Brooke, Minister of Housing and Local Government in the
Macmillan government, obtained authorization to establish a Royal Commission on Local
Government in Greater London. Its chair, Sir Edwin Herbert (later Lord Tangley) was largely
independent of ties to local government and proved resourceful in analyzing problems,
identifying the most prominent alternatives and designing a completely new governmental
system.6

The Herbert Commission was directed to examine the conditions and management of
local government in London. Excluded from its consideration were police (a central
government function, in the case of London), water (under the Metropolitan Water Board)
and, tacitly at least, public transport (a responsibility of the London Transport executive, a public corporation under central government supervision). The Herbert Commission heard evidence from more than 200 authorities and organizations. There were 117 local governmental units within the commission's review area of 840 square miles. The Commission held 70 sessions taking oral evidence, spent 88 days visiting local authorities in the review area, and held 44 other meetings, and read large volumes of written evidence, including 117 communications from the public at large. Major central government departments submitted recommendations, as did the political parties, many professional organizations, associations of local authorities, and individual local authorities. As can be expected, much of the evidence argued in defense of the status quo. Some varied from this course and offered major theoretical alternatives, such as the report from the London School of Economics.

In October 1960, the Herbert commission recommended that a two-tier governmental structure be created. This was to include fifty-two new Greater London boroughs, each with a population of 100,000 to 250,000, to which as many functions as possible would be given. A Greater London Council (GLC) would also be created, encompassing an area with about 8 million residents. The GLC would assume responsibilities for such functions as might be dealt with over the entire area. All previous multi-function local governments would be superceded, with the exception of the City of London, which retained its special exemption. The organization and operations of the Metropolitan Police and the Metropolitan Water Board were not affected by the proposal, largely because they were considered efficient in their responsibilities and because they already served the entire metropolis.

The commission's report provoked acrimonious debate. It was bitterly opposed by the existing London County Council (LCC), and the London Labour Party, as representing a move to dismember the Labour Party stronghold within the County of London. It was inadvisable, they argued, to break up the LCC by distributing to the boroughs such major functions as education, health, welfare, and housing. Some outer suburban areas resisted inclusion within the proposed Greater London Council. As the drafting of the London
Government bill proceeded, the Herbert Commission recommendations underwent substantial changes. In the end the voting was heavily partisan, with the Labour Party opposing the legislation to the end. Yet the Conservatives were triumphant.

The London Government Act of 1963 excluded nine urban districts and boroughs in five outer counties from the area under the jurisdiction of the GLC. This reduced the proposed area to 616 square miles, compared to the commission's recommendation of 716, and the original commission review area of 840 square miles. The number of new London boroughs was reduced to thirty-two (plus the City, recognized, as always, as a special case).10 Thus a set of thirty-four governments— the GLC, thirty-two London boroughs, and the City— replaced the greater complexity of ninety-two earlier governments in the same geographic area. Two counties, London and Middlesex, were replaced entirely and parts of four others, Essex, Kent, Surrey, and a small portion of Hertfordshire, were separated from their home counties and incorporated into the GLC. Three county boroughs, Croydon, East Ham, and West Ham, were also absorbed. The counties had been upper-tier governmental units, and the county borough single-tier. Lower-tier governmental units that were also absorbed included twenty-eight metropolitan boroughs within the old LCC and thirty-nine municipal boroughs and fifteen urban districts within the counties outside the LCC.

After the reorganization of London's government, attention turned toward the operation of local government throughout England and Scotland.11 However, this task was left to a new Labour government under Harold Wilson, who took control from the Conservatives in October 1964. In 1966 two Royal Commissions (England and Scotland) were established to make a general review of local government and recommend new forms of administration. The English Commission was headed by Sir John Maud and the Scottish Commission by Lord Wheatley. Their terms of reference were to consider the structure of local government outside of Greater London, in relation to existing functions; and to make recommendations for authorities and boundaries, and for functions and their division, having regard to size and character of areas in which these could be effectively exercised and the
need to sustain a viable system of local democracy. Wales was excluded, as proposals for local government reform in the principality already were well advanced.

Although the new system of municipal government in London was not within the English commission's terms of reference, it heard evidence on how the system worked, as this was relevant to local government reorganization elsewhere in England. Among its achievements, the GLC could claim the reduction of local authorities from nearly ninety to thirty-four and the provision of a central planning authority. Under it, London local government conformed to the two-tier structure advocated by many municipal experts.

During the course of its work the Maud commission heard a wealth of evidence that generally supported either of two recommendations. One was the creation of between eight and ten large regions, consisting of areas previously covered by the Regional Planning Council and Regional Planning Boards. These regional units of government would be charged with large-scale infra-structural functions, such as economic planning, major highways, land use, technical education, public health, water and energy supply, and air pollution. The other tasks of government were to be accomplished by a second tier, consisting of units between 300,000 to 1,000,000 inhabitants. Such a solution was backed by a number of representatives of the academic world and such professional groups as the National Association of Local Government Officers (NALGO) and the Town Planning Institute.

A second solution, supported by the County Councils Association and many government departments, favored the creation of a first tier of some thirty-five to forty city-regions, fairly large areas consisting of central cities with a large hinterland attached and comprising populations of 300,000 to 3,000,000 inhabitants. A more representative second tier of local government could be added in some areas. The regional Economic Planning Councils and Boards were to remain as coordinating and advisory bodies.

The recommendations of the 1969 Redcliffe-Maud Commission mainly followed the second scenario. The Commission preferred a single tier system resembling the county boroughs. For the major urban areas, a two-tiered structure resembling London's system
provided for top tier metropolitan counties and second tier metropolitan districts. The envisaged division of responsibility between the two called for the counties to provide the major environmental services, while the districts would deal with personal services.

However, victory by the Conservatives and Edward Heath in the 1970 General Election meant that the Redcliffe-Maud proposals were never implemented. Although a two-tier system for metropolitan areas was accepted, the proposals for unitary authorities for the remainder of England were rejected. Instead, opting for uniformity, a two-tier system was also adopted for England and Wales, based on existing counties but with the addition of smaller county districts. Thus, in large part, the first scenario entertained by the Maud Commission was implemented by the Conservatives via the Local Government Act of 1972.

Under the Act the fifty-eight county councils in England and Wales were reduced to forty-seven. The eighty-two county boroughs were abolished and the 1,249 borough, urban and rural district councils replaced by 333 county districts. Additionally, the Act created six metropolitan counties within which there were thirty-six metropolitan districts. Briefly, in the non-metropolitan areas, the county councils received the bulk of the powers (education/social services) with the district councils playing a secondary role. However, in the metropolitan areas, the districts received the bulk of powers.

In many ways the reforms of the 1960s and 1970s did not please anyone as neither Party gained all they desired, which may suggest that indeed the best solution was selected. Nationally, politics in the 1960s and early 1970s was dominated by issues surrounding Britain's role in world affairs, attempts to join the European Community (EC), and settling into a pattern where government played a larger role in economic affairs but a smaller role in issues of morality. Beginning in the late 1960s and continuing throughout the 1970s and 1980s politics became more hostile as issues like membership in the EC and the proper role of trade unions in a welfare society raised ideological passions. Both parties suffered politically from "stop-go" economic policies that failed to revitalize the pound or provide consistent means of fighting inflation. Even with the ability to change taxing and spending
levels annually neither party was able to effectively manage the economy to produce growth and maintain full employment.

The instability in Britain's economic policies in the late 1960s under Wilson's Labour government produced conditions that threatened the party's historical base of political support, the trade-union movement. Attempts to hold down inflation by controlling wage increases in nationalized industries proved difficult. Strikes increased throughout 1967 and 1968. The government responded with an Industrial Relations Bill that would have mandated a 28-day cooling off period, a secret ballot by all union members prior to initiating a strike and penal sanctions for those who did not comply. The Bill produced a storm of protest within the Labour party that would ultimately lead to the Bill's withdrawal, in return for a promise by the Trade Unions Council's General Council that it would monitor work stoppages.

A consequence of these difficulties was a series of political reverses in parliamentary by-elections, one indicator of the nation's political mood. This was carried over into local elections where the party suffered major reverses. The GLC was lost to Conservative control in 1967 for the first time since 1934. By 1969 Labour only controlled a few elected borough and county councils throughout the nation. Even with these reverses, an improving economic situation in 1969 encouraged Wilson to call a general election. Always one to listen to polling data, Wilson was encouraged by another shift in public mood that indicated support for a continuation of the Labour government. In a surprise, Wilson was defeated in 1970 by Edward Heath, who had reminded the nation of Labour's broken promises of steady economic growth, harmonious labor relations, and ability to handle the increase in crime and violence within British society.

Heath won election not through defending the status quo but through promises of specific reforms, including a reduction in taxes, a new industrial relations bill that would make union contracts legally binding, and a renewed effort to join the European Community. Heath also believed that greater long-range efficiencies in governmental operations were achievable (i.e. savings for the central government) through a reform of local government. It is against this national backdrop that decisions regarding local government were made. Neither party
would get all they desired and the competition raised ideological passions.

The Labour Party opposed reforms, fearing the possibility of built-in Conservative majorities within the redefined counties and districts. Labour's recent experience with significant electoral reverses at the local level justified their fears. They believed that new larger councils, drawn by a Conservative government, would inevitable favor the Conservative Party. They criticized the size of the administrative areas as too large and remote to facilitate meaningful local participation. This criticism applied particularly to the county councils, the metropolitan councils, the GLC and the Inner London Education Authority (ILEA). However, it was also leveled at the London boroughs and districts. Further, the allocation of functions (particularly education) was criticized and the duplication of some functions such as housing was claimed inefficient. The London and other metropolitan areas in the top tier authorities were criticized as too weak, too expensive, too bureaucratic and irrelevant. However, attempts to strengthen them were resisted not least by the metropolitan districts and the London boroughs, who following the tradition pattern, fought to hold on to their responsibilities. In the non-metropolitan counties the districts were said to be too weak and many former county boroughs, trapped as they saw it in politically hostile counties, retained nostalgia for their former civic independence. Finally, and most importantly, there was a growing consensus that the reorganization had not achieved the economies of scale envisioned and that local government was too costly. Indeed, this was particularly true as local government reorganization had occurred without reference to the central question of funding.

Dissatisfaction with the new system soon emerged in London, predictably, as it was a Labour stronghold despite the Conservative's ability to gain control of the GLC. Some boroughs were not easily reconciled to their new limited roles as part of a larger metropolis controlled by the GLC. Richmond, Kingston and the former county borough of Croyden felt less kinship with London than with neighboring parts of Surrey. Further, the "outer London giants" such as Havering in the east and Hillingdon in the west found it difficult to create a sense of corporate identity. Finally, many of the new boroughs encountered internal
difficulties in reconciling old differences of politics and practices in the interests of an imposed and somewhat artificial unity. Paddington and St Marylebone, for example, were not readily reconciled to each other let alone to being subsumed under Westminster. Dissatisfaction also emerged concerning the role of the GLC itself. Broadly speaking, the London boroughs and the then-bipartisan London Boroughs Association (LBA) were dubious about the benefits of a top tier authority and generally hostile to the GLC’s power to raise revenue by precepting on the taxes of the boroughs. This latter particularly rankled with the wealthy boroughs, such as Westminster, Kingston, and Chelsea, who provided the bulk of funds. At the GLC it was felt that the authority was not fulfilling the strategic role it had been established to meet and was dabbling in too many services, thereby creating unnecessary overlap with the boroughs.

When the Conservatives took control of the GLC following the 1977 local elections, their leader, Horace Cutler, appointed Sir Frank Marshall to undertake an independent inquiry into the role of the GLC. Marshall was the ex-chairman of the Association of Metropolitan Corporations and former Conservative leader of Leeds City Council. London’s Labour boroughs refused to cooperate with the inquiry and did not give evidence or accept Marshall’s Report as having any official status. The report sought to give the GLC a truly strategic role by devolving powers from central government to the authority and from the authority to the London boroughs. Most controversially, the GLC would take control of local government finance in London, collecting funds centrally and subsequently distributing them to the boroughs according to the GLC’s perception of needs. The Marshall Report failed to convince its critics that a stronger GLC would be an improvement over the status quo. Importantly, central government (now controlled by Labour) was strongly against promoting the GLC to something close to a regional government, possessing its own tax base.

Dissatisfaction in London was mirrored throughout the nation. Many of the large towns and cities that had lost their borough status and had been absorbed into the surrounding counties campaigned for a return of their lost powers. In early 1979, Labour’s Secretary of State for the Environment, Peter Shore, produced a white paper, Organic...
Change in Local Government. It proposed that the structure of local government should be more flexible and allow for variations in different parts of the country. Cross and Mallen, in their study of local government, have observed that:

what in essence this amounted to was that the district councils of these cities would regain the responsibility for education and social services and some traffic and planning powers, which they had lost to the county councils under the 1972 Act. ...it reflected the dissatisfaction with the 1972 Act felt by many and in particular, Labour supporters who saw these major powers transferred from the authorities which they often controlled, to the counties which they rarely did.22

The proposals for change died when the Labour Government lost the May elections in 1979. They did, however, contain a notion more substantial than merely freeing some of the Labour controlled cities from the Conservative counties. The proposals expressed disquiet about the benefits of the two-tiered system. Increasingly it was felt that unitary, all-purpose districts, based on the modified model of county boroughs, would be more efficient and more local than what had been put in place by reorganization.23

When the Conservatives returned to power in May of 1979 under Margaret Thatcher they set about removing what they saw as unnecessary metropolitan counties. They also were determined to abolish the GLC and, subsequently, the Inter London Educational Authority (ILEA), which had become an arena for Labour-led programs. In a 1983 white paper, Streamlining the Cities, the government depicted the metropolitan counties and the GLC as a wasteful and irrelevant tier of government. The now Labour-controlled GLC had become the government's particular bete-noir under the left-wing leadership of Ken Livingstone, and the ILEA was also associated with what the government saw as unwarranted profligacy at the public's expense. By 1983 the GLC had lost many of its former powers. Mrs. Thatcher transferred virtually all of its housing programs to the boroughs and assigned planning responsibility for docklands to the London Docklands Development Corporation. Similarly, London Transport, operated by the GLC since 1969, was transferred to London Regional Transport in 1984. Briefly, the GLC was left with a rump of peripheral functions and largely justified its existence in terms of its grant-making activities to various
voluntary organizations. Under the Local Government Act of 1985 the metropolitan counties and the GLC were abolished and their responsibilities transferred to the metropolitan districts, London boroughs and various single-service "quangos", or quasi non-governmental organizations. The ILEA received a brief reprieve as a directly elected body but was ultimately abolished in 1989 and its responsibilities given to the inner London boroughs.24

During the twentieth century changes in the functions carried out by the local authorities occurred without reference to or reform of their boundaries. Although after 1888 a number of local authorities experienced sufficient population growth to obtain county borough status, the nineteenth century boundaries persisted until the 1960s and 1970s. The reforms of the 1960s and 1970s also took place without specific consideration of local government financial arrangements. The implementation of the 1972 Act generated demands for higher expenditure, but coincided with the economic recession that followed the first major hike in oil prices. The result was a crisis in local government expenditure that persists to the present.25

The reorganizations of London metropolitan and local government along the lines of enlarged county units are critically important to understanding how pollution control functions came to be exercised in Britain. The Conservatives' consolidation of functions at the county level set precedents for regional government that served as examples for the reorganization of water and sewerage functions in 1973 and 1974. Their efforts also politically charged all issues including environmentalism, which in turn would lead to more acrimonious debate between the two parties. However, another step was required to complete the reform cycle, the central government itself. Reorganization at the national level was sought to produce a more efficient and rational model for British government that would better serve the populace.

From a broader perspective, many of the activities that government was undertaking; evolving a regional economic strategy, local governmental reform, reform of planning, housing, and transport under the Wilson ministry were concerned directly, or indirectly with pollution. As Britain groped towards a new structure, the population became conscious of environmental issues by a series of accidents that illustrated the immediate impacts of pollution. The increased public awareness of pollution and a desire to see something done
about it encouraged both parties to adopt national strategies. Both parties began examining
the overlapping functions of several governmental departments and began preparing ideas
for central government reorganization.

With the ascension of Edward Heath and the Conservatives in 1970 reorganization
was placed on the national agenda. The birth of the Department of the Environment was one
of the consequences. While not unexpected, its genesis was strange. No one had expected
the Conservative Party to win the election that year, yet they returned to Parliament with a
working majority. No one expected that the environment, having been virtually written off as
an issue during the election campaign, pushed aside over larger issues such as inflation and
slow economic growth, would make a sudden and dramatic reappearance in the fall. As it
turned out, the environment proved to be the great "sleeper" issue of the year.26

The reorganization of central government in general and the creation of the
Department of Environment in particular fit within Heath's vision of creating efficient
government. The new Department of the Environment ultimately brought together disparate
functions into a comprehensive structure where the environment and related development
issues were addressed in a strategic manner.

The word "environment" appeared for the first time ever in the Queen's Speech
delivered to both houses of Parliament on July 2, 1970. The Queen reminded her audience
that "rising production and a steadily growing national income must provide the resources for
improving the social services and the environment in which we live." She promised that her
Ministers would "intensify the drive to remedy past damage to the environment and will seek
to safeguard the beauty of the British countryside and sea-shore for the future." While at first
that summer seemed to be a period of inaction, in actuality Heath's Government was
preparing for a major overhaul of the national government and its environmental machinery.
The overhaul was on the same scale as the reorganization of social services undertaken by
Beveridge after the Second World War. To some extent, it was a bipartisan affair.
Consensus existed on several changes and would likely have been implemented regardless
of who won the election. However, it was the Conservatives who were able to claim credit for these changes.

Edward Heath presented a white paper on the Reorganization of Central Government to Parliament in October 1970. Its opening paragraph stated its main intentions:

This Administration has pledged itself to introduce a new style of government. More is involved than bringing forward new policies and programmes: it means resolving the issue of the proper sphere of government in a free society; and improving the efficiency of the machinery intended to achieve the aims it sets for itself within that sphere.

The white paper's central intention was to deal with the re-ordering of responsibility for functions between the departments dealing with such matters as trade and industry, overseas aid, social services, education, and the environment. It also aimed at improving the decision-making process of central government, with the objective that it would "remove the need for continual changes for a considerable period in the future." In order to accomplish this task, the white paper considered central government from both an "analytical" and a "functional" approach. Principally, the white paper saw the need to develop a more strategic form of decision-making. This shaped the analytical approach, which aimed at assessing the relevance of departmental policies to the government's broader objectives. A system of Programme Analysis and Review (PAR) was set up to provide departments with a formal means of improving policy formation and decision-making. The Central Policy Review Staff (CPRS) was created to coordinate this process and provide the Cabinet with a non-departmental source of advice. It would reinforce the system of inter-departmental committees by providing "a clear and comprehensive definition of government strategy." The inter-departmental committees themselves, while bringing ministers together to ensure Cabinet agreement, were limited to particular subject areas, while the CPRS would link individual policies to the government's overall strategy.

In the functional approach advocated, the white paper aimed to create more strategic units of government. It identified the need to remove areas where ministerial departments overlapped, causing delay and conflict in decision-making. The white paper clearly stated
that the aim of creating functionally integrated departments was to reduce "parochial" departmentalism. A large department would have "less need to fear for and defend its interests against other interests so that in the formative stages of policy it must and will be able to discuss issues with other departments."\textsuperscript{33} A second factor was that large departments would have greater control over resources and thus create efficiencies, one of the broad objectives of the government's overall strategy. A note of caution was struck: issues that required collective Cabinet consideration might be decided within the new departments. This presented a difficulty, as one of the major advantages of large departments was seen to be the resolution of conflict within the "line of management rather than by inter-departmental compromise."\textsuperscript{34}

The white paper was debated during its second reading in the House of Commons on November 3, 1970.\textsuperscript{35} No major environmental issues were raised during the debate and minor issues, such as noise pollution generated by the Concord, were easily handled by the Government. That evening the bill was passed and the Department of the Environment was created. The importance of having a body responsible for overall environmental planning was critical for later developments, specifically the reorganization of the water authorities in 1973.

The new Department of the Environment contained all the functions of the former Ministries of Housing and Local Government, Public Building and Works, and Transport. While the Ministries and their Ministers were abolished by statute, they remained functionally within the new Department. In allocating Ministerial responsibilities, Mr. Peter Walker, Secretary of State for the Environment, achieved a total rearrangement of tasks. Instead of three separate sovereign pyramids, one single large edifice with the Secretary of State at the apex was created. Strategic powers left to the Secretary of State included control over issues of policy and priority, and public expenditure, which determined the operation of the department as a whole. The Secretary also took charge of the Department's coordination work on environmental pollution. Through this pioneering action, Britain became the first nation in the world to create a ministry-level department to handle environmental issues.\textsuperscript{36}
The development of the Department of Environment was significant for British politics, because it provided the opportunity for combining disparate policy areas into one organization. Britain's previous experience with planning convinced both parties that management from the center was possible and desirable, albeit extremely complex. It recognized that the best means of preventing pollution to rivers was through coordinated planning that took a long-range view and could weight all the factors of urban and industrial development. Planning controls would assure prevention or limitation of pollution. It is of historical note that Britain was the first nation to seek to rearrange their national governmental organization to accomplish this goal. Other nations either followed the British model or created special pollution control agencies such as the Environmental Protection Agency (EPA) to monitor and control pollution.

The complexities of pollution meant that the Department of the Environment became a department of everything. Where the “environment” began and ended was not clearly defined initially. Given that the new department's operational scope was so large offered hope that proper coordination would be forthcoming. Its control over local government organizational structure, which was responsible for the majority of pollution control functions, eventually enabled it to address such issues in a systematic manner. Unfortunately, the Department's greatest potential strength, or bringing together disparate areas was also its greatest weakness. Internal battles waged to determine which aspect of operations should have funding priority during times of scarce resources was a difficult challenge. At times this translated into the water environment not receiving all the funding necessary to achieve stated objectives.

The new Department had other allies at the national level. In October 1968, then Prime Minister Harold Wilson announced his intention to establish a permanent Royal Commission on Environmental Pollution. Wilson's rationale for the move was multifaceted. He believed that creating a permanent Royal Commission on Environmental Pollution would signal that his government was serious about environmental issues. The permanent nature of the Royal Commission also signaled the permanent nature of pollution problems in an
industrial society such as Britain. He understood that pollution and its control would continue to evolve as a political issue and a permanent Royal Commission would serve to address it in a consensual manner. The announcement was greeted with skepticism. The public interpreted the move as a cynical way for the government to be seen taking action on the environment in the run-up to the election, while actually doing nothing. All royal commissions, said the critics, take minutes and waste years. A permanent royal commission would not even have the merit of transience, but would always exist. However, the mere creation of a permanent royal commission on environmental pollution raised environmental issues and pollution controls to a new prominence nationally. The members of the new commission took their charge seriously and began planning a number of reports covering several critical environmental areas. Conscious of public criticism of previous royal commissions, they acted swiftly in several areas which was key to their success.37

The reports of the Royal Commission on Environmental Pollution (RCEP) laid out an extensive, detailed agenda for the Department of the Environment and the new regional water authorities it planned to create. Assuming a more centralized, integrated authority over water supply and waste disposal, the reports outlined specific methods of applying the conclusions reached by previous studies and applying them to the nation as a whole. The relative success of the Commission's recommendations in the Thames estuary led to the adoption of similar strategies in other river basins. Because it coincided with the reorganization of government and made clear recommendations on means of combating pollution, which illustrated the possibilities of that reorganization for environmental improvement, the Commission's work is worth reviewing in some detail.

The RCEP was granted its Royal Warrant on February 20, 1970. It was composed of a diverse mix of experts including Sir Eric Ashby, DSc (Chairman); Mr. Aubrey Buxton, a Director of Anglia Television and British Trustee of the World Wild-life Fund, William Launcelot Scott, Lord Bishop of Norwich; Sir Solly Zuckerman, Chief Science Advisor to the government; Dr. Frank Fraser Darling PhD, Vice-President of the Conservation Foundation; Neil Atkinson IIiff, Deputy Chairman and Managing Director of Shell Chemicals U.K. Ltd; and
Vero Copner Wynne-Edwards, Chairman of the Natural Environment Research Council. Its first report was completed within a year and presented to Parliament on February 16, 1971. The report was very thorough, setting the tone for all the reports that followed. It presented an overview of the British environment and predictions about future developments. The Commission employed new ecological terminology, demonstrating a linguistic shift in environmental matters. For example, in the summary, the Royal Commission stated:

"The success of the clean air policy is encouraging but more needs to be done to apply this policy throughout the country and to enquire into the effects of pollutants from road vehicles. There are possible long-term effects of atmospheric pollution on global weather and climate. Pollution of the land continues; domestic refuse and industrial waste of all kinds, and particularly toxic materials, are an ever increasing problem; there is need to accelerate the trend towards the use of less persistent pesticides; valuable manure from intensive farming is wasted. Not only is the state of some of our rivers depressing: too many of them are so polluted that they cannot be used to meet our growing needs for water. The estuaries and inshore seas are increasingly treated as an open drain and dumping ground. Oil pollution of the sea is still substantial and the danger of tanker accidents remains: waste disposal to the sea and exploitation of the sea floors are causing international concern. The disposal of radioactive waste, though satisfactory at present, will need more attention for the future. And noise is rapidly becoming one of the most disturbing features of modern society."

The Commission’s reference to global warming, the persistence of toxic and radioactive chemicals in the environment and water pollution made it clear that this body was one that would intelligently draw conclusions with both the immediate and long term in mind. The RCEP made its report not to any one department but to the Crown. However, its principle target was inevitably the new Department of the Environment, where controls over pollution of air, land, and water were clustered.

The Commission’s Second Report: Three Issues in Industrial Pollution addressed three issues the Commission felt required public discussion prior to the formation of comprehensive pollution legislation:

(a) Should information about industrial effluents and wastes remain (as it is at present) secret?
(b) Should we try to get some sort of voluntary "early warning system" for the possible impact on the environment of new chemicals or similar products, both in their production and use, as happens already over the use of drugs and pesticides?
(c) Should there not be—pending comprehensive legislation which we know is on the way—some regulation to control the tipping of potentially dangerous wastes on land?"
These issues went to the center of difficulties previously experienced in pollution control. Secrecy about the content and amount of industrial wastes and effluents released into the environment was an impediment to successful mobilization of environmental concern. The Commission, realizing the political necessity of building public support for pollution control measures and their related costs, thought it important to take away the veil of secrecy that shrouded discharges. The public's "right to know" and to act based upon such information should not be denied. Another issue surrounded voluntary testing of new chemicals to determine their impact on the environment. If such an "early warning system" worked, it would provide an increasingly worried public with better information about how to either limit or control harmful discharges to the environment.

Throughout the 1960s and early 1970s the public became environmentally conscious and began to seek better environmental standards. A series of spectacular pollution incidents, lectures on the BBC, and a media blitz on environmental topics all fueled public concern for the environment. Public opinion survey data on environmental concerns and questions are not available for the 1960s and only become reliable in the mid-1970s. However, Lowe and Goyder argue that British attitudes towards the environment mimic those in the U.S., which will serve to illustrate the point. That data suggests that public concern with environmental issues is more socially representative than the membership of environmental groups. Members of environmental groups have higher levels of income and education and hold higher status occupations than non-environmentalists. Data also shows that while there are approximately equal numbers of environmentalists and anti-environmentalists as a percentage of the population, passive support for environmental reform was much greater reaching upwards of 50 percent. Similar conclusions can be drawn about British perceptions of the seriousness of the problem and the need for remedial action, including willingness to pay additional taxes to determine the outcome. As Stanley P. Johnson, a contemporary and active participant reported, accidents like Aberfan and the Torry Canyon changed the way people thought about pollution.\textsuperscript{41} Pollution of estuaries was one of the most visible signs of pollution and the RCEP's Third Report, published in
September 1972, provided a blueprint for estuarial management.\textsuperscript{42} Although remedial work was in hand in the recommendations of the Pippard Committee, the RCEP's report reviewed and rationalized the situation. The RCEP's report is significant because it provided the model that would ultimately lead to the cleansing of the Thames. The timing of the report was also important because it preceded debate on legislation designed to transfer water services to regional authorities.

The Commission expressed concern about the polluted state of some estuaries, and the absence of appropriate legislation to deal with them, such as that available in the case of non-tidal rivers. It found the public expressed two general attitudes. One was an emotional approach which, recognizing that polluting discharges can damage or destroy shellfish, birds and fish, considered that all such contamination should be stopped to reverse the process of destruction. A second tended to underrate the damage done and stressed that discharging sewage and industrial effluents to estuaries considerably reduced the costs that would otherwise throw a very heavy burden on industry and the local community, and could involve the risk of unemployment. This was a traditional response, carrying the concern of British business and taxpayers as expressed by Neville Chamberlain in 1926.\textsuperscript{43}

The Commission adopted an intermediate, consensus approach. It considered that there was a practical limit to the burden that should be placed upon the community for the abatement of pollution to estuaries, this limit being defined as the point beyond which the marginal cost of abatement exceeded the marginal cost of the damage done. Since data on such costs were not readily available, a more pragmatic approach was desirable. The Commission recommended two methods of controlling discharges to an estuary; first, the removal of all pollutants from effluents which can accumulate in river sediments or living organisms (i.e. heavy metals, PCBs) which are not made harmless by natural processes; and the adoption of "pollution budgets" to measure the pollution load of sewage effluents as a managerial tool.

The RCEP recommended that river management should exploit rivers for waste disposal up to the level that did not endanger aquatic life, or transgress the standards of
amenity that the public desired or was willing to fund. Quality standards should be controlled through the discharge permit process to ensure that exploitation did not exceed those standards and pollution budgets should be employed as a management tool to require close cooperation between river and planning authorities.44

The Commission outlined two simple biological criteria for estuarial management: (a) the estuary should be able to support on the mud bottom the fauna essential for sustaining sea fisheries; and (b) it should allow the passage of migratory fish at all states of the tide. It also recommended that central government integrate overall pollution control of estuaries with a national policy for waste disposal, implemented through an executive responsible for controlling the pollution of an entire estuary in a single regional authority. This was obviously a step towards transference of pollution control functions from local to regional control. The Commission also proposed amendments to existing legislation, giving water authorities greater control over all discharges to sewers, rivers, estuaries and coastal waters. These statutory powers were in fact conferred on water authorities under the 1974 Control of Pollution Act.

It was also recommended that the government should take the lead in helping to reach international agreement for the publication of monitoring data regarding the quantities of certain pollutants reaching the sea. Regional water authorities should be responsible for monitoring discharges; essential substances should be examined, and certain typical organisms used as "indicator" species monitored.45

The Commission recommended that greater effort should be devoted to developing mathematical models for deriving pollution budgets, and that there should be further research into the toxicity of common pollutants to aquatic organisms; on non-biodegradable substances and their accumulation on and release from river sediments; and on the effects of trace amounts of organic chlorine and mercury compounds on photosynthesis by marine phytoplankton. The members of the Commission could not agree on a policy for charging for the control of pollution, as enough study on this topic had not been done. However, it was the view of the majority of the Commission that the established consent system be replaced
by a system of charges that would more efficiently make the polluter pay for use of waterways for waste disposal. Thus market forces would provide inducements for polluters to abate pollution.46

To some extent the previous work and reports of the Pippard Committee on the "Effects of Heated and other Effluents and Discharges on the Condition of the Tidal reaches of the River Thames" (1961) and of the Water Pollution Research Laboratory on "The Effects of Polluting Discharges on the Thames Estuary" (1964) anticipated the findings of the Royal Commission. The Commission's Third Report observed that the "improvement brought about in the (Thames) estuary provides an excellent example of how the scientific study of an estuary can be used to pinpoint the action required to clean up pollution."47 As a basis for estuarine management, however, the Report did lay down clear guidelines for defining water quality targets. These were patterned on those adopted by the Water Pollution Research Laboratory ensuring aquatic life a minimum of safety in all places at all times.48 In effect, this required establishing an environmental quality objective (EQO) for the estuary, rather than adopting fixed emission standards for individual discharges, even thought that would be the means of limiting pollution.

Implementation of the Commission's recommendations in the Thames estuary provided a significant test case for the country as a whole. Its relative success led to the adoption of similar strategies in other river basins. Implementation required the following steps:

(a) to control and remove, as far as possible, toxic, non-biodegradable substances from effluents;
(b) to accept the need for an EQO permitting passage of migratory fish at all states of the tide;
(c) to establish a pollution budget to allow the EQO to be achieved; and
(d) to monitor the estuary to confirm that the EQO was being met, and to examine the biota to ensure that the benthic49 organisms required to support sea fisheries were present.50

The control of toxic, non-biodegradable substances required better monitoring of effluents. Effluents containing these substances enter the river as discharges from sewage and industrial works, or as sewage sludge.51 They are difficult to control in domestic sewage...
because householders have rights to connect directly to main drainage systems, making monitoring of their individual discharges impracticable. For industry the situation was rather different. Legislation—such as the Public Health Act, 1936, the Public Health (Drainage of Trade Premises) Act, 1937, the Public Health Act, 1961 and the Control of Pollution Act, 1974—required industry to seek water authority consent to make a discharge.52

While the consent system may seem to resemble fixed emission standards in terms of the conditions they impose, in practice they operate quite differently. A simple hypothetical example will illustrate. Assume that there are two sewage treatment plants located along the Thames River discharging the same amount of effluents into the river. The first plant is located above London, the second below. To achieve the EQO’s for the section of the river they are located on, they will require different discharge consents affecting the quality of their effluents. Plant one is located along a stretch of river that is relatively clean, allowing the plant to discharge lower quality effluents to the river without causing harm to the river at the point of discharge. Plant two on the other hand is located below the city where the river still contains pollution from plant one. As a result plant two will have to produce higher quality effluents in order to maintain the EQO at that point in the river. Conversely, higher quality effluents may be required at plant one, so that plant two may dispose of middle to lower quality effluents and still operate within the EQO. As a result, local conditions at the point of discharge often determine the quality of effluents prescribed by the consents. Condition variables may include water volume at point of discharge (volume has a direct correlation to dispersion, and thus to the amount of effluents of a specified quality that the receiving waters can handle), temperature, salinity of the water, and the over-quality of the receiving waters. Thus, using the consent system, it has been possible to limit concentrations of toxic, non-biodegradable substances in sewage, and therefore in the effluent discharged to the lower Thames and in the sludge disposed of at sea. Similar controls were exercised under legislation such as the Port of London Acts, 1964 and 1968, and the Control of Pollution Act, 1974.
The EQO derived for the lower Thames required that it provide suitable conditions for the passage of migratory fish at all states of the tide. As early as 1964 the Water Pollution Research Laboratory Report, “The Effect of Polluting Discharges on the Thames Estuary” had estimated that a dissolved oxygen concentration of not less than thirty percent was required in April and May to re-establish a salmon fishery. April and May were the months that smolts migrated to sea. Smolts are adversely sensitive to pollution and the thirty percent requirement was designed to protect them and enable the rebirth of fisheries.53

The RCEP’s Third Report also recognized the importance of promoting fisheries to the nation and recognized anglers’ organized efforts at keeping waters free of pollution. The report called for fishery committees to continue in all British waters in which exclusive British fishing interests were maintained.54 The Commission assumed that the Minister of Agriculture, Fisheries, and Food (MAFF) would retain his responsibilities for supporting and protecting fisheries and fishing and would maintain organizations under his aegis representing the fishery interests, but that these would be supportive of the activities of the river authorities.55

A Thames Migratory Fish Committee sat from 1973-77, first under the Thames River Authority, and later, under the Thames Water Authority. It reported that restoration of the salmon fishery was possible with a minimum dissolved oxygen concentration of thirty-five percent saturation in May, with a temperature not exceeding twenty degrees Celsius.56 The river experiences its worst conditions in the summer quarter (July-September), and statistically the dissolved oxygen level of thirty-five percent in May corresponds to a minimum average of thirty percent for the third quarter of the year. For management purposes, a quarterly minimum average is an inconvenient measurement. However it corresponds to a ninety-five percentile value of not less than ten percent dissolved oxygen saturation in all parts of the river at all times, so this was taken as the standard.57

Somewhat ironically, this was precisely the standard suggested by the Thames Survey Committee back in 1964, although that Committee considered that the thirty percent dissolved oxygen saturation level for migratory fish would be unjustifiably expensive to
achieve. This standard, however only applies to the most polluted reaches of the lower Thames; in other areas for other reasons, particularly abstraction for drinking water, more stringent standards were adopted.

The lower Thames pollution budget has been locally administered by an array of authorities with pollution control responsibilities in the Thames estuary. These have included the Thames Conservancy, the Lee Catchment Board, the Port of London Authority (PLA), the Greater London Council (GLC) and the City of London. The Thames Water Authority only had pollution control functions in the non-tidal portion of the river.

While the RCEP's pollution budget and EQO recommendations were borrowed from the work of local London authorities, and significant progress towards achieving the lower Thames pollution budget was well underway, the third report placed pressure on all local authorities responsible for aspects of pollution control to reexamine their operations and plan for the future. Having established the EQO for the lower Thames at 30 percent saturation of dissolved oxygen, the RCEP pollution budget allowed industrial and metropolitan waste disposal to use up to seventy percent of the dissolved oxygen in the river.

The creation of a working mathematical model possible of examining all discharges, their quality and quantity, and oxygen demand requirements constructed by the local London authorities in the 1960s, was a significant breakthrough for river management. The model made it possible to plan how discharges and abstractions would impact the river to determine what quantities and qualities of effluents were necessary to attain the stipulated EQO levels. There are obviously an infinite number of possible arrangements of suitable effluent qualities, but there were also some practical restraints because some sewage works had already been upgraded to previously set standards. Taking these constraints into consideration, the model prescribed the most efficient use of capital for upgrading the facilities in the lower Thames. For example, while the Crossness upgrade had been completed in 1963, the upgrade at Beckton had not. Thus, taking the Crossness effluents and calculating what would be required of the Beckton effluents allowed the redesign of the plant to meet the EQO. A similar approach was adopted in the improvement of the Long Reach (West Kent) facility.
located further downstream. In this case the model determined that it would not be beneficial to redesign this facility like Beckton. Instead the works were designed to produce a non-nitrifying effluent so that its discharges would offset nitric amounts already in the river at that point being discharged upriver. Similarly, the model was able to help determine where plants could be sited that discharged heated effluents to meet the thermal budget stipulated by the EQO.

The EQO in the lower Thames was met through the coordinated efforts of several authorities working together. During the course of the 1970s and early 80s migrating fish began to reappear in the river. Success on the lower Thames set a precedent for other local communities and influenced the formulation of standards elsewhere in Britain. The recovery of the lower Thames was a testament to the ability of government to operate to benefit the community as a whole.

The establishment and maintenance of successive generations of EQOs has had a tremendous impact on how Britain handles pollution control. In the case of water pollution, the building of precise machinery to monitor discharges to rivers and streams allowed for effective planning as British society continued to develop and grow. Under the consent system individual discharges may be changed, providing the British government the means to impact water quality or cleanliness on any river or stream. This has the effect of redefining cleanliness from being a technical problem to one of political will. With political will, discharge consents can be tightened to demand higher quality effluents from those who use rivers and streams as sewers. While costs may sometimes be politically prohibitive for officials who operate in a democracy, they may be overridden by public demand for action.

The reorganization of local and national government in Britain between 1945 and 1973 created a new political order that enabled reform of the environmental machinery of government. Those concerned with water quality were able to focus reform and regulatory efforts on specific agencies, rather than battle the pervasive localism and the odd dispersal of authority that had previously existed over several levels of government. The reorganization of local government on a regional level provided a precedent used to reorder water services
in 1973 on a regional framework. Coupled to the reorganization of local government was the reordering of central government on a more rational and centralized model that resolved many areas of overlapping authority in central administration. The creation of the Department of the Environment centralized the majority of natural resource functions under one ministry, providing the opportunity for both more efficient administration and the production of consistent policies. It signaled the willingness of the British government to take a leading role in pollution control, which had heretofore been under the nominal control of a variety of local councils. The reports of the Royal Commission on Environmental Pollution provide a counter example to the common belief that royal commissions "take minutes and waste years." It produced a series of timely reports that provided a framework for legislative action, particularly towards water pollution and waste disposal. Action in 1973 and 1974 would reorder water services in Britain and provide a new framework for pollution control.

The reorganization of local government effectively transferred pollution control authority to the regional level. Reorganization of the national government in 1970, with the creation of the Department of the Environment, gave pollution control efforts new legitimacy and draped them under the power of central authority. This provided opportunities for the future, as Britain's pollution control machinery would continue to evolve. Some issues continued to remain unresolved. It was still unclear as to what "authority" over the environment meant. While the central government now held the power to order improvements, it was not clear that they would be able to do so in the changing political climate of the middle 1970s given the transfers of political control from party to another and the split between control of one party at the national level coupled with control of regional bodies by their opponents. Furthermore, those actions would have to be implemented by regional authorities operating under a new set of priorities that did not necessarily correspond to those at the center. Thus, while the structure of pollution control showed improved, direct action to "solve" the environmental question still remained open.


4. For a complete discussion of the 1865 and 1868 Royal Commissions, their recommendations and the 1876 Rivers Prevention of Pollution Act, see Lawrence E. Breeze, The British Experience with River Pollution. 1865-1876 New York: Peter Lang, 1993).

5. London's long and complex governmental evolution is somewhat unique and has consistently maintained a form apart from other British cities. Its' administrative history in the 19th century was established by three acts of Parliament. The Metropolis Management Act of 1855 created a relatively weak Metropolitan Board of Works (MBW), given direct responsibilities mainly for sewage and drainage. Most municipal functions remained with ninety-nine unreformed parishes that sent delegates to the MBW. The new, indirectly elected, limited-purpose governmental unit encompassed 2.8 million residents and included the 116 square-mile area that would subsequently become the County of London. During the next twenty years, the board's functions were gradually extended and amplified, as more and more administrative functions were passed to the board. Significantly, however, no real powers in the health and welfare spheres were given to the board, although they tried to coordinate their activities with the various health officers of the parishes.

By the mid-1880s, local governmental reform was a subject of national attention. Serious scandals attributed to a corrupt MBW insured the inclusion of London in the broader consideration. Thus, as a counterpart of legislation establishing elected councils in counties throughout England, the Local Government Act of 1888 also created a new Administrative County of London, carved from neighboring counties to take in the geographic areas previously under the jurisdiction of the Metropolitan Board of Works. This area was governed by a new London County Council (LCC). It included, for some administrative purposes, the City of London, which was otherwise relatively untouched by the reforms. While the vestries and districts remained, many of their previous powers, including control of lighting, paving, sewerage, and taxes were transferred to the LCC. The LCC brought about a complete change in the political atmosphere by reestablishing public trust lost due to MBW scandals. New councilors were viewed as able and competent, and their operations were open to public scrutiny, which engendered public confidence.

Local subsidiary governments within London were reformed by the London Government Act of 1889, which established 28 metropolitan boroughs and abolished the previous vestries and districts. The City of London was excluded from the act indicating its separate existence within the larger metropolis. Unfortunately, the metropolitan boroughs were granted so much authority under the Act that they rivaled the LCC. Boroughs took on a broad range of functions including public health, welfare, street maintenance, and inspections, including pollution control. The LCC itself saw its powers expanded to include
education, public assistance, town planning, and concurrently with metropolitan boroughs, housing.

No further administrative change was contemplated for the next 61 years. A Royal Commission on London Government (The Ullswater Commission), in session from 1921 to 1923, resulted in no effective action. During this time the number of separate specialized authorities completely outside of the LCC's jurisdiction increased. These included the Metropolitan Water Board (1902); the Port of London Authority (1908); the London and Home Counties Traffic Advisory Committee (1924); the Metropolitan Area Licensing Authority (1930), controlling the licensing of public service vehicles and goods vehicles; the London Passenger Transport Board (1933); the London Transport Executive (1947); nationalized regional gas and electricity boards and nationalized hospital service boards cutting across Greater London (1948).

6. Foley, 28.
7. Ibid.
8. Ibid., 28-29.
10. The City Corporation of London, governed by its Common Council, was given its charter in 1070, and has understandably been able to defy efforts to absorb it within larger governmental units. The Herbert Commission recommended that it be permitted to retain its status, but that it be allocated functional responsibilities as though it were a London borough. So it is both different from the London boroughs and a parallel of lower-tier authority, making it function as a borough.
11. See the works cited in note one, above.
13. The Government's proposals for reorganizing government in Wales were published as a White Paper in July 1967. They contemplated regrouping the 13 administrative counties to form 5, the retention of 3 of the county boroughs (Cardiff, Newport, and Swansea), and the amalgamation of the 164 non-county boroughs, urban districts and rural districts together with Merthyl Tydfil, which would lose its county borough status, to form a total of 36 new county districts.
15. Ibid.
16. Ibid.
19. The GLC's political history was also divisive at this time and mirrored to a limited extent national politics. The Conservative victory in gaining control of the GLC in 1967 was short-lived. The Labour party redoubled its efforts and was able to retake control in 1972, heralding Wilson's and Labour's return to power in 1974. However, the Conservatives fought back and would briefly retake control in 1977, which would then be lost in 1982.
20. The GLC's authority to precept (or take a share of) borough taxes allowed it operational revenues to perform its functions. In other words the GLC had the right to charge the boroughs for services provided across the GLC's boundaries
24. Ibid., 20.
28. Ibid., para 1
29. Ibid., paras 5 and 17.
30. Ibid., para 7.
31. Ibid., para 46.
32. Ibid., para 45.
33. Ibid., para 13.
34. Ibid., para 12.
40. Ibid., para 2.
41. Johnson, 82.
42. Royal Commission on Environmental Pollution (RCEP) [Chairman, Sir Eric Ashby], Pollution in some British Estuaries and Coastal Waters. Cmnd. 5054 (London: HMSO, 1972).
43. Ibid.
44. Ibid., para 24.
45. Ibid., paras 165-168.
46. Ibid., paras 208-214.
47. Ibid., para 3.
48. Ibid., paras 215-220.
49. Benthic organisms live at the bottom of rivers, lakes and oceans. They are sampled to determine the relative suitability of receiving waters to support aquatic life.
51. The sludge is dumped at the spoil ground in the Barrow Deep, located towards the seaward limit of the PLA's jurisdiction at the mouth of the estuary (110 km below London Bridge).
52. Consents may have conditions, such as limitations on prescribed concentrations and quantities of substances, temperature, pH, etc. Consents were reviewed by river authorities after a minimum period of two years.
54. Exclusive British waters were defined by the Fisheries Limits Act, 1964. Sea fishery districts and local sea fishery committees were established by the Sea Fisheries Regulation Act, 1966 which were formed to make bylaws for prohibiting or regulating the deposit or discharge of any solid or liquid substance detrimental to sea fish or sea fishing within the three-mile limit of British territorial waters. Such bylaws have to be confirmed by MAFF.
57. Ibid.
59. Ibid., 119.
CHAPTER V

THE WATER ACT OF 1973: THE DEVELOPMENT OF REGIONAL AUTHORITY OVER POLLUTION CONTROL

Following the successful reorganization of British central government and the creation of the Department of Environment, Britain embarked on major reform of her pollution control structure. In 1971, the Department of Environment's first secretary of state, Peter Walker, proposed legislation to reorganize the more than 1,400 local and regional agencies responsible for water supply, sewerage, and water conservation in England and Wales. In their place he planned to establish ten regional water authorities consolidating their activities. The boundaries of the new regional authorities were based on natural watersheds rather than on the jurisdictions of local governmental units. While the 1963 Water Act had extended the previous river boards authority to the entire length of a given river, the proposed regional authorities would consolidate those boards to an entire watershed encompassing a larger area. Each would be responsible for all policies regarding water from source to tap and beyond including disposal. The impetus for this proposal came from officials of the Ministry of Housing and Local Government (a predecessor of the Department of Environment) who thought that local authorities were neglecting their responsibilities for water management.

After intense negotiations (described below) the legislation was approved by Parliament in 1973 and implemented the following year. The Water Act (1973) represented the farthest-reaching reform in the history of water administration. It has been called "as radical a policy switch as can be cited in post-war Britain." While environmental pressure groups did not play a critical role in shaping the legislation, one of its immediate effects was to strengthen the pollution controller's ability to manage environmental problems.

The shift toward a regional structure placed several groups at a disadvantage. These groups included local governmental authorities (particularly water supply and sewerage authorities), local planning units, and other local agencies. Groups whose power to influence

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Map 13

Regional Water Authorities (RWA) - 1974

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events derived from electing officials to local boards were hampered when those same
officials assumed minority status within the new regional structure.

Among the loose association of groups that administered or were concerned with the
water environment, the shift toward a regional structure meant a shift in orientation or even
status. Local groups were forced to compete with regional and national groups for access to
decision-makers. Regional and national groups, who were already well placed within the
institutional structure of the state, were able to influence the underlying structure of relevant
legislation. Environmental advocacy groups were also forced to adapt. While sharing
common goals, many of these groups used different tactics to shape events and influence the
public. Their different perceptions of existing problems and their solutions would prove
significant in shaping legislation.

The design of the 1973 Water Act also represented the first movement toward
ecological systems management. Based on river basins, the proposed structure
demonstrated the primacy of environmental over utilitarian concerns. Britain was
geographically suited for this type of structure, given its large watersheds and unitary nature.
It was politically suited to this form because it did not share its river valleys with other nations,
as was common on the Continent. The move towards ecological systems management was
based on both a logical extension of previous administrative reforms and a realization that the
management of the water environment required standards and systems of control that
conformed and complemented existing hydrological structures.

Britain is often thought of as a "wet" nation, receiving considerable rainfall and not
facing huge water shortages. This perception is not entirely accurate. While it is true that
Britain does receive considerable rainfall, it is distributed unevenly, largely in the western
portions of the nation, while its populations and industries are located largely in the
southeast. As such, Britain has to transfer considerable volumes of water from the "wet" west
to the relatively "dry" east. The primary conveyors of water are rivers that, like the Thames,
are reused several times as they flow to the sea. Industry and the public require clean water
for different purposes. Industry requires it for many of its manufacturing processes and the
public for amenity and recreational purposes. In order to meet these disparate needs Britain built new regional water authorities to manage entire river basins. In this way the entire hydrological cycle could be managed to meet the water needs of the public and industry. Reuse of water dictated that better care was given to water quality.


On December 2, 1971, Mr. Peter Walker, Conservative Secretary of the Department of the Environment, announced proposals for the comprehensive reorganization of water services, including sewerage and sewage disposal. This was the Department of the Environment's first major action upon its creation. Ten new Regional Water Authorities (RWA) were to be established, with responsibility for water services based on regional watersheds. Out of deference for Conservative sensibilities the proposals did not abolish statutory water companies, those bastions of private enterprise, but there was no doubt that the reforms leaned toward a clear regional structure based on hydrological considerations and natural watersheds. The functions of the RWAs would include prevention and control of polluting discharges to rivers and estuaries, augmentation of river flows by storage schemes, treatment of water for public use, and sewage treatment.

Concurrently, RWAs would have the duty of ensuring the full development of rivers, canals, and wherever appropriate, reservoirs for amenity and recreation. Of the 209,000 acres of inland water in England and Wales, rivers and canals made up just over half; the rest were reservoirs, lakes, and ponds. Fishing was allowed on only 257 reservoirs out of the 500 owned by statutory water companies, sailing on only forty-three, and canoeing on only six. As a result, national water policy became part of the wider vision of creating a "decent" environment. With the explosion of leisure time and increased mobility, sport and recreation became an important part of the overall "quality of life." The single-purpose functional approach to water resource planning had outlived its usefulness and was now to be replaced by a multi-purpose structure.

With reorganization of the water services, the Government proposed to allocate over £800 million for new sewerage schemes and improvements to effluent treatment over the
five-year period 1971-76. This sum, equivalent to more than £13 per capita, would have been by far the largest sum spent on sewerage and disposal in any five-year period in British history. These proposals recognized the interrelationship between effluent treatment and the overall health of the water environment. Without additions to infrastructure it would be impossible to improve the quality of rivers to a level where they would be accessible for amenity purposes. The Government's proposals recognized that the largest threats to the natural river ecosystems were of human origin. Dumping of untreated industrial effluents and human sewage into British rivers was to be targeted and improved. It was believed that by restricting industrial effluents and improving effluent quality Britain's rivers quality could be raised to the point where natural processes would help rivers cleanse themselves. This would allow a continuation of the abstracting of river water for human consumption and utilization. The proposals embodied the traditional gradualist British approach. They emphasized planning and administrative reform and use of the self-cleansing quality of "natural" water.

Secretary Walker's announcement of the proposals should be considered the midpoint of the initial phase of legislative proposals. Several interrelated factors helped reach this point. These included the re-organization of local government, creation of the Department of the Environment (the first Ministry to be directly concerned with environmental issues), creation of the permanent Royal Commission on Environmental Pollution (RCEP), the 1971 Report of the Central Advisory Water Committee (CAWC), the Key and Jeger Reports, and the knowledge that water consumption across society was increasing exponentially. (See chapter 3 and 4 for a discussion of these topics) At the end of 1971, plans for the future management of water in Britain were split between two contradictory views. Faithfully reflecting a multiplicity of entrenched and conflicting interests, it listed two entirely contradictory solutions.

The initial proposals announced by the Government on December 2, 1971 were intended to be one package that would restructure the existing system of providing water services and strengthen environmental controls. The two parts of this package, new
machinery and tougher standards, would eventually split into two separate bills, which would become the Water Act of 1973 and the Control of Pollution Act of 1974. The 1974 Act is the focus of the next chapter; the remainder of this chapter concerns the 1973 Water Act.

Section one covers the initiation phase of legislation and delineates the process leading up to the Bill put before the House of Commons in January 1973. Section two examines the Bill as initially proposed, as well as the changes it underwent during its passage through Parliament (January to July 1973). Section three describes implementation of proposals that became law in July 1973 and took effect in April 1974.

I. Legislation

Discussion of the initial phase illuminates how different groups defined the proposals and how these different definitions led to compromise. For the Government, this was a continuation of the local government reform processes begun in the 1960s. Building on the 1963 London Government Act, which changed the structure of London's government, and the 1972 Local Government Act, which created a regional structure for the rest of England and Wales, the initial proposal sought to provide a similar structure for water services throughout England and Wales. Ten new multi-purpose regional water authorities were established based on natural regional watersheds. The multipurpose authorities would assume total responsibility for managing all aspects of water services, including water supply, sewerage, and sewage treatment and disposal. In addition, they were responsible for river development including drainage, amenity, and pollution control. Centralization of these numerous functions into a regional structure was intended to rationalize the system of water management in Britain, making it both more efficient and cost-effective. The Government's plan to spend some £800 million on new sewerage treatment facilities and sewerage projects was intended to reduce the amount of pollution flowing into rivers and thus improve river conditions throughout the nation. From the Government perspective, the initial proposals represented a means of improving the existing system, which at the time split responsibilities among a variety of authorities, and a means of exercising control over local governments, which in their view operated for the benefit of the locality rather than the nation.
The proposals immediately created a furor amongst local authorities, who stood to lose control over traditional aspects of their operations. In their view the proposals would deprive them of their traditional powers, weakening them in their relationship to the central government. This was a threat to local democracy, which they felt they represented.

Local authorities attempted to influence the debate and change the meaning of several of the proposals. In April of 1972 the Local Government Association, representing the Association of Municipal Corporations, the County Councils Association, the Rural District Councils Association, and the Urban District Councils Association, lodged several objections to the Government's plan. Their first complaint related to the swiftness with which water and sewage services were to be reorganized under the Government's plans. They asserted that the 1974 timeline for water reorganization would be impossible considering that local government reorganization was to occur during the same period. They further argued that the timeline was no longer than that allocated for London's reorganization, where they claimed, an officer's health was impaired by the amount of work required. Reorganization of local government would be taxing enough without synchronizing it with the reorganization of water and sewage services.

However, the association's strongest objections were reserved for the proposed appointment of chief executives (i.e. chairmen) in the 10 regional water authorities and their powers. The Government's consultation papers made it clear that not only would the chief executives be full members of their governing boards, but they, and a majority of each Board, would be appointed by the Government. The associations argued that the chief executives would be little more than minions of the Secretary of State for the Environment, and would not be responsible to (i.e. under the influence of) local voters. They argued that water and sewage services were so important to the life and health of their communities that they should be administered under the fullest control of elected representatives from local government.

The local authority associations perceived the proposals as an attack on both themselves and traditional local control. This would be a theme heard throughout the debate,
and would eventually move the Government. Clearly, local associations feared that regionally appointed officials would not listen to their concerns and would subordinate local issues to those of the entire region. This was a transparent bid by local authorities to gain control of the new structure, and by doing so, preserve as much as possible their ability to control events that affected their communities.

The Government indeed intended to create positions that were independent of local authority control, which, in their view, helped create and perpetuate the pollution problem in the first place. The Government believed it critical that experts, not politicians, direct the activities of the new regional authorities, given the scope of the proposed multipurpose regional authorities.

In May 1972 the seven river authorities responsible for the Great Ouse, East Suffolk with Norfolk, Lincolnshire, Kent, the Wye, Gwynedd and Somerset areas, which included 4,600 miles of river and 13,700 square miles of England and Wales, made a different criticism of the Government's proposals.

The “Wet Seven,” all have special difficulties in land drainage due to their location in mostly low-lying areas. They argued that their difficulties were local, needing decentralized administration on a reasonably democratic basis. They insisted that land drainage and sea defenses should not be given to the regional authorities, but instead should be placed in autonomous bodies designed to handle this specific problem (i.e. single-purpose authorities). They feared that conservation issues would dominate the agendas of the new authorities. They saw conflicts within the new authorities as to the degree of protection given to a town, the conflict of claims for flood protection and amenity, and the placement of sea defenses. They also believed that their local position placed them in a better position to address this problem, than a regional authority, which they feared would not give it the importance it deserved.7

The President of the Association of River Authorities, Lord Nugent of Guildford, formerly a junior minister in the Ministry of Agriculture, Fisheries and Food (MAFF), somewhat agreed with the “Wet Seven’s” position. Generally, he emphasized that regional
water authorities must be concerned with all functions and services, including land drainage and fisheries. He allowed that local people might be given statutory duties in land drainage, with some scope possibly for raising funds by precepts\(^8\) on ratepayers. However, he pointed out, such precepts were often opposed by local authorities, especially on the scale required for land drainage.\(^9\)

On July 20, 1972, the council of the Association of Municipal Corporations met with Secretary Walker to discuss the proposed reorganization of water services. The council took the opportunity to present joint proposals from the four authority associations as alternatives to the Government's plan. The joint proposals supported a structure composed of a national water authority to provide overall coordination, regional bodies to plan water supply and sewage disposal, and single-purpose authorities, all of which would retain local governmental elements, to administer the services. They did include regional bodies, but only for planning. They still retained their original position that local authorities should administer services.\(^10\)

In October 1972, industry joined local authority associations in their concern that the proposed regional water authorities would not be responsive to their needs and were not locally controlled (i.e. they could not control them through political support of individuals). An unnamed "leading authority on commercial water policy" was reported in the *Times* as stating "The proposed regional water authorities have very wide powers and it is very worrying that they will be responsible to no one. They will be monopoly suppliers responsible neither to Parliament nor local government—and they will not be subject to normal commercial pressures." Clearly, "normal commercial pressures" referred to the ability of local commercial interests to influence local authorities. A larger theme of equal concern to industrial interests was that "The Regional Water Authorities will be able to dictate the feasibility of development plans merely by agreeing or refusing to provide the water. The Government's plans hold strong implications for industry."\(^11\)

The Department of the Environment's response to these demands was described by the associations as totally inadequate. A joint letter to the DoE stated, "The preliminary response to our consultations indicates that concessions which you are offering fall far short
of meeting our needs." and that "The Government is busy constructing larger and stronger local authorities yet taking away from them the ability to arrange their own water supplies."

As a result, considerable support was generated for a local government boycott of preparations for water reorganization. The four local government bodies—the Association of Municipal Corporations, Urban District Councils' Association, Rural District Councils' Association, and the County Councils' Association—advised their members to refuse to serve on steering committees and working groups that would help in the transfer of functions. They stated that if their concerns over the structure were not addressed, they would not participate in helping to implement the new system.\(^{12}\)

A reluctant ally of local authorities was the Water Resources Board. In its annual report of 1971 it called for creation of a national water services authority.\(^{13}\) The report argued that the widely accepted principle of unified water management within river basins was not rigorously applied in England and Wales. The Board's own work, of planning the nation's future water resources, was restricted by its lack of formal responsibility for water quality or other aspects of river management, such as fisheries. The report urged creation of a single national water authority covering the entire field of water management. The Board argued that this national authority should be responsible for planning and coordinating both water supply and disposal of effluent, and should have power to develop and operate regional water conservation schemes. In addition, new comprehensive river basin authorities would be responsible for river management and water supply and disposal; responsibilities then would be split between river authorities, local government, joint boards and water companies.\(^{14}\)

On the surface it would seem the Water Resources Board would have supported the Government's proposals, given that they suggested the creation of a national water council and integration of water services into a new regional structure. However, this was not the case because the Government's proposals would eliminate the independent Water Resources Board and replace it with a National Water Council under the control of the Secretary of State for the Environment. The Board found common cause in opposition to the
proposals. From its perspective the Government's proposals were misguided in eliminating an independent body, active in the field of water services, that drew attention to difficult problems that other organizations with a political interest might not want to address. Since its inception under the 1963 Water Act, the Board had acted as such a body and expected to have a role to play in the new system. When that was not forthcoming, their perception of the proposals changed, even though they supported creation of integrated regional authorities to provide services.

Other organizations supported the proposals to restructure water services. In a letter to the *Times* Mr. Peter Liddel, Chairman of the Association of River Authorities, stressed the importance of sensitivity and informed public opinion, both to support development of their (river authorities) work and to influence their direction. He argued that the parrot-cry "there are no votes in sewage" had been heard too long in town halls. He stated that

This sensitivity cannot be done by river authorities alone, keen as they are to help within the resources available to them for publicity. I hope schools and educational authorities up and down the land will now take up the opportunities which clearly exist to link local field work and discussion of how public authorities deal with the local environment with the more traditional academic studies in biology and other relevant sciences.

He argued that the forthcoming publication of a survey of water quality in rivers and canals brought together by the river authorities, industry and local councils showed that while some improvement was being achieved, much remained to be done, especially on larger rivers in more densely-populated areas. He argued that articulate public opinion was most needed in support of river authorities' efforts to bring about faster progress in cleaning up rivers and keeping them clean for the future. The river authorities' support of the proposals was based on their own self-interest. Understanding the problems associated with the current system, they supported a new regionally based integrated structure. It may seem that they were working against their own self-interest, but in fact the Government intended that the existing authorities within the new regions combine themselves to form the new regional authorities. In this way, they would not be really eliminated, only merged into a new structure. In other words, the Government did not intend to re-invent water services within
Criticism of Mr. Liddel's letter and the river authorities was immediately leveled by Mr. Owen Davies of Magdalene College, Cambridge. He responded, "a sensitive and informed public opinion...can only come about once the authorities have the will and the power to release the relevant information to us." He argued that the public was prevented from knowing the truth about pollution by both the Official Secrets Act and section 12 of the Rivers (Prevention of Pollution) Act 1961. The Official Secrets Act prevented release of discharge consent applications, to guard against industrial espionage. The 1961 Act prevented the public from knowing the facts because any information "furnished to or obtained by a person in connection with an application for consent of information derived from a sample of effluent obtained under the Act shall be guilty of an offense and be liable to a fine not exceeding one hundred pounds or three months imprisonment." Mr. Liddel's call for public action in support of the River Authorities, while laudable, said Mr. Davies, was ludicrous given the inability of the public to know anything about the water that they used in their daily lives. These two letters to the Times demonstrate some of the complexities and contradictions inherent within British water services.

The Institute of Water Engineers, composed of chemists and bacteriologists, agreed with Mr. Davies about the lack of information. In testimony given before the Central Advisory Water Committee, which helped form the basis of the Government's proposals, they called for more money to be spent on sewerage and sewage treatment. The Institute stated in its written report that

"modern technology is progressing so fast that often the chemicals used and produced by industry are generally not known. If they are known there is frequently no available data to enable their toxicity to be assessed. There is no guarantee that chemicals which are water-soluble can be removed from water by conventional coagulation and filtration procedures. Furthermore, in general the quality tests conducted in a typical waterworks laboratory will fail to reveal the presence of anything unusual in water thus contaminated."

The Institute estimated that as much as 25 percent of England and Wales' water supply was drawn from sources that were frequently or continuously polluted in degrees
varying from slight to dangerous, and a further 25 percent from sources liable to sudden
capricious pollution varying from slight to severe. The report proposed provision of more staff
(e.g. water engineers) supplied with better-equipped laboratories to help fight against this
problem. They concluded that

The present position in the fields of water supply, river engineering, sewerage and
sewage disposal, and prevention of pollution is only partly satisfactory. There is a
need for all these services to be more effective, and for them to act more closely in
conjunction with each other.20

The Institute discussed two possible solutions. First, that the river, water and
sewerage services could be left as single-purpose services, coordinated nationally and locally
when necessary. Second, three-purpose authorities combining water supply, sewerage and
sewage disposal services could be established to cover river catchments or several
catchments at a time. The Institute supported the second of the two solutions, as it would
create an integrated system of water services. The report suggested that the second option
would require about 15 water and drainage boards for England and Wales, each responsible
directly to the Minister of Housing and Local Government,21 for all functions of water
conservation, water supply, river engineering, trunk sewerage and sewage disposal.22

The Institute report demonstrated how chemists and bacteriologists perceived the
problems facing the water industry in general and water pollution specifically. A new
integrated structure would allow for the type of management and application of resources that
would make pollution control effective. The chemical threat from modern industry could not
be combated with current technology, or even properly identified with the current level of
sophistication in water laboratories. In addition, no data existed on the toxicity of chemicals
discharged to waters so the threat to public health was unknown. This they proposed to
combat with new technology and more sophisticated water quality testing. They supported
an integrated structure that would increase the pollution controls the Government proposals
attempted. They were not threatened by the new proposals, as local authorities were, as
their role would only become more important and influential in the future. They criticized local
authorities for not integrating their operations, or recognizing the threat of modern industrial
effluents. The Government proposals took into account and addressed this problem with new funds earmarked for research into industrial effluent composition and new water purification technologies.

Surprisingly, the Trades Union Council (TUC) also supported the Government's proposals. During consultations with the Department of the Environment they supported a restructuring of water services and urged the Department to adopt measures necessary to control pollution arising from industry and agriculture. In considering the issue of stimulating economic growth through industrial and technological development, while preventing such developments from leading to pollution, the TUC concluded that workers should not be faced with the choice of either accepting pollution or paying for its elimination through a reduction in jobs or earnings. They argued that if it were necessary to restrict production of some goods due to pollution considerations, suitable alternative work should be found for workers so displaced. The TUC stressed the necessity of making this principle part of a national anti-pollution policy.\(^{23}\) The TUC's concerns were not directly addressed by the Government. But, indirectly they did assure the TUC that if such a situation were to develop it would receive their utmost attention. It is interesting that the TUC supported the initial proposals. While it is true that cleaner water would provide economic benefits to companies that employed TUC members and would provide them with more recreational and amenity opportunities, the issue of pollution control in general and water quality specifically was generally against their interests. The majority of TUC members were employed in industries that were labor intensive and competitively weak such as coal. The costs of water quality were sufficient to break the operating margin of weaker companies and represented a realistic threat to jobs. The answer to TUC support may lie in the fact that the new structure promised to create new union jobs associated with sewage disposal. In addition, those weaker industries were job losses were expected could not be combated via a contrary position on this issue.

The initial period, or proposal and consultation phase, offered a number of opportunities for defining the new national water policy and the structures intended to implement it. The Conservative government and the Department of the Environment were
the primary initiators of the reform. While bi-partisan support existed for improving environmental management and producing a national water policy, the structure of the Boards, with an appointed chairman and working majority, provisions for metering for services, the retention of the statutory water undertakers, and the integrated structure which would place supply, sewerage, and sewage disposal all under one structure, clearly contained a Conservative flair. The lines of debate were clearly drawn. The Government perceived the new system as a means of rationalizing the water service industries, which they believed would provide both better service and cost less in the long term, a typical Conservative argument attached to many reforms. In contrast, local authorities, largely controlled by the Labour Party at this time, perceived the reforms as a means of eliminating their control over traditional services. Being largely elected bodies, they argued that their elimination was a threat to local democracy that in their view was the bedrock of British society. This argument is somewhat spurious, as "local democracy" largely did not exist in Britain until the 1920s, and that democracy was representative at best. The true issue is one of local control, whose origins have a long history in Britain. Ironically, the Labour party, with the greatest history of centralization in Britain, went into opposition on this issue and became the defenders of local control. One motivating factor for Labour was their attempt to rebuild support amongst their traditional base and secure support from the local authorities that stood to lose control over traditional functions. It was hoped that this bedrock work would help lead the party back into power. As such their motives were politically, not environmentally oriented. Their opposition to the new structure had more to do with the threat of weakening their support amongst local government than with any environmental agenda.

An examination of the bill placed before Parliament demonstrates that the pre-Parliamentary debates yielded a compromise. Two related matters outside of the debate over the reorganization helped to bring this situation to fruition. First, given the bill was highly controversial, and that consultations revealed bitter differences, the Government knew that bringing the bill to the House would prove contentious and would hinder the ability of Parliament to move on to other pressing issues, primarily efforts to control inflation that
dominated the political agenda. The Government had the option of delaying the legislation, but that would have proved embarrassing, considering it had been promised in the Queen’s Speech. Seeing there was no political possibility of delay, the Government decided to split the proposals into two parts, one dealing with administrative reforms, the other to be offered the following year dealing with environmental pollution controls. The Government made another dramatic decision to initiate the bill on reorganization before the House of Lords. Knowing they stood little chance of getting all the initial proposals on reorganization through the House of Lords, the Government made several key concessions. Introduction of a bill to the Lords with the “awkward bits cut out” (i.e. the debate over pollution control standards) solved the Government’s dilemma. Legislation on water was possible, and honor, so far as the Queen’s speech was concerned, would be satisfied.24

The bill was introduced to the Lords on January 23, 1973 and received a second reading on February 5, 1973. The new Secretary of State for the Environment, Mr. Geoffrey Rippon, presented the bill.25 He outlined the six major objectives of the Government’s policy. These were:

first, to secure an ample supply of water of appropriate quality to meet the growing demand of the people, industry and agriculture while at the same time ensuring that it is not wasted; secondly, to provide adequate sewerage and sewage disposal facilities to cope with the natural increase in water use and with new housing, industrial and agricultural development; thirdly, to ensure that the vital contribution of land drainage and flood protection to urban and agricultural areas alike is maintained, and, where appropriate, expanded; fourthly, to achieve a massive clean-up of the country’s rivers and estuaries by the early 1980s; fifthly, to make the widest use of water space for other purposes, including recreation and amenity and, where appropriate, the protection and development of salmon and fresh water fisheries and the provision of water needed for navigation; finally, and not the least important, to protect the interests of those who may be affected by proposals for the development of water resources in any one of these respects.26

Secretary Rippon went on to detail several changes in the bill that were different from the initial proposal. In setting the stage for these he argued that the various consultations made over the previous year had been given full consideration, and from that consideration two issues had generally been resolved. First, the Government had decided the existing structure was inadequate to the needs of the future and therefore changes were necessary. Second, regional water authorities were needed to plan and coordinate activities of the new
policy.\textsuperscript{27}

He argued that the real division of views stemmed from whether a one-tier or two-tier structure was most appropriate to achieving the objectives. He restated that the Government was satisfied the only means of achieving the main objective of the reorganization was to provide for integrated management of water services through a unitary structure (i.e. a one-tier system). Further, that because water services had become increasingly multi-purpose, the regional water authorities should be responsible for all water services; should own all assets and be solely responsible for finance; and that other bodies could act as the agents of the new water authorities in the appropriate circumstances.\textsuperscript{28}

He argued that the alternative structure favored by the local authority associations, a two-tier system, would have the regional river authorities responsible only for planning and co-ordination. Below them would remain the present water undertakers, sewerage and sewage disposal authorities and the existing river authorities. The flaw in that system was the supposition that regional water authorities would have control over second-tier authorities. He argued that this would either be too loose or too tight of a structure to allow for the flexibility necessary in dealing with elected bodies.\textsuperscript{29}

The first substantial concession offered by the Government in the bill was that, in all the regional water authorities, the local authority members would have a majority over the chairman and the appointed members. He argued (and hoped) this change would satisfy the objections raised by the local authorities.\textsuperscript{30} Another change, in view of the decision to grant local authorities majority representation on the new regional water authorities, as that the proposed consultative councils were no longer necessary and were not contained in the proposed bill.

He pointed out that the proposed structure was not just an adaptation of the structure set up in 1963 under the Water Resources Act, but was radically different and therefore needed a new central structure. He argued that, with an effective regional structure, it was correct to replace the Water Resource Board with the National Water Council. Because the proposals rested on what he termed a maximum devolution of power with a clear line of
command from the Secretary of State to the regional water authorities, a central body such as the Water Resources Board was no longer necessary. However, a body was required to provide a forum in which matters common to all regional authorities could be discussed. Beyond that, it was not necessary for the National Water Council to have executive functions, which would only interpose another line of command between the Secretary of State and the regional water authorities, although the Council would provide a convenient format for consulting with the regional authorities.31

A central planning unit would also be necessary at the national level. The proposals for a central water planning unit, whose tasks would be determined by a steering committee composed of representatives of the involved Departments and of the National Water Council, and which would be given independence in publishing its reports, would prove an effective answer to creating a national plan.32

The Government also proposed that the British Waterways Board and the Inland Waterways Amenity Council would remain in existence with their present responsibilities unaltered. The new regional authorities would be responsible for fostering and promoting recreation, an area previously under the control of the British Waterways Board. It was expected the new regional authorities and the British Waterways Board would coordinate their activities in discharging this function. In addition, the bill did not contain provisions to promote more effective control of pollution. This would be put forward in more comprehensive legislation, concerning all areas of the environment, in the next session.33

Clearly, the bill as presented took into account many of the concerns expressed by local authorities. Local authorities, redefining the issue of regional authorities' structure as one that did not foster local democracy, were able to gain majorities on the governing boards, a position they previously did not enjoy. They would, however, remain in opposition to the appointment of the chairmen by the Secretary of State for the Environment. While the Water Resources Board was still to be eliminated by the bill, the National Water Council was designed to perform many of the same functions and would enjoy the independent ability to publish its findings, regardless of content. This, like the appointments to the regional...
II: Parliamentary Passage (January 1973–July 1973)

As the bill moved into the House of Commons the political parties began to alter the terms of debate. While water reorganization remained ostensibly the topic, partisan political and ideological disputes between the parties dominated the debate. It is important to remember that the 1970 election gave the Conservative government of Edward Heath only a slight majority. Every issue provided an opportunity for Labour to attack the Conservatives. Instead of a simple "machinery" bill that reorganized water services, Labour characterized it as an attack on the principles of local government. Worse still, provisions allowing the new water authorities to explore metering of water were perceived by Labour as an attempt to make water a commodity, instead of a right of the people. The Conservatives, took the bait offered by Labour, resulting in an over-politicization of the issues.

The bill was short, containing only 36 clauses. However, it had several detailed schedules that provided for the new machinery. Part I set out the Environment Minister's duties regarding national policy for water and established the areas and constitution of the nine regional water authorities for England and the Welsh National Water Development Authority. It also detailed the appointment of the majority of the members of the regional water authorities from the local authorities and provided for the appointment of the chairman by the Secretary of State, of two or three members by the Minister of Agriculture, and the remaining members by the Secretary of State. It also established the National Water Council and delineated its composition and functions.

Part II provided for the transfer of functions from the existing authorities to the regional water authorities, powers relating to those functions, and powers for certain special arrangements. The most important of these arrangements governed the relationship of statutory water companies to the regional authorities. The Government believed there was no valid reason to extend the scope of the public sector by abolishing the water companies and transferring their assets to the regional water authorities. At the same time it recognized...
that to secure integrated management, the regional water authorities would have to exercise considerable control over the water companies.  

A second special arrangement concerned sewerage. Clause 15 required the regional water authorities to arrange for their sewerage functions to be discharged on their behalf by the new disposal authorities and, where appropriate, by the new town corporations. Local authorities, subject to general policy direction by the regional water authorities, would initiate proposals for new sewerage works, which the regional water authorities would pay for but which would be carried out by the local authorities. This arrangement was perceived by the Government as an important element in associating local government with the work of the regional authorities. Other special arrangements were concluded regarding fisheries and land drainage, retaining a role for local committees.

The Government attached great importance to recreation, which was termed the "fourth dimension" of their water policy. Consequently, Clause 19 bestowed on regional water authorities the express duty of putting water and associated land under their jurisdictions to use for recreational purposes. Because of the complexities of this task (e.g., fishing and water skiing are incompatible) the regional water authorities would require help in carrying out these responsibilities, Clause 21 created the Water Space Amenity Commission, which would advise Ministers, the National Water Council, and the regional water authorities on how best to promote recreation in their areas.

Part III of the bill dealt with financial issues. The financial aspects to the reorganization were vital, but ultimately proved ineffective. The bill provided that net costs of all water services, except land drainage, were to be met by means of charges for services. The net cost of land drainage would continue to be met, as before, by precepts on local authorities and internal drainage boards and charges on agricultural land. Accompanying the bill was a Financial Memorandum from the Treasury that clearly showed no significant changes in total expenditure were expected in the short term. However, in the long term the Treasury expected to reap economies of scale. Governmental grants for water services were to continue, but expenditures on some of the services, notably sewerage and sewage
disposal, which were borne by taxes in the past, were to be paid for separately by charges. Charges for water supply and other water services consequently appeared higher, unless account was taken of the corresponding reduction in rates.\footnote{42}

Clause 28 covered installation of meters. The Government made a point of stating that it was not its intention to introduce metering in the short term. The high estimated cost of such action—about 500 million pounds if the entire country was to be metered—was used to make the point that this was very unlikely. All the bill did was to empower regional water authorities to charge by metering, and to introduce this for different consumers at different times.\footnote{43}

Part IV of the bill contained a number of miscellaneous provisions regarding the recruitment and transfer of staffs to the new authorities. A Water Services Staff Commission covering England and Wales was established to handle arrangements for the recruitment and transfer of staff to the new authorities, to ensure that the interests of the staffs affected were protected, and to advise the Secretaries of State for this purpose.\footnote{44}

Mr. Rippon, in finishing his opening arguments for the bill, linked it to the public health movement of the nineteenth century. Quoting a Member of the House who said, in 1849, “sewers are in, and not before time.” He stated that,

The present environmental movement is sometimes regarded as uniquely modern. In fact, the crusading spirit underlying what we are all trying to do has much in common with what the great propagandists, administrators and engineers of the nineteenth century were doing.

We might say today that water services are in. I believe that in introducing and considering the Bill we are inheritors of a great tradition, and are making an effective advance on what has been done by our predecessors.

Taken in conjunction with the proposals which we have on hand for further action on pollution, we are building a second great wave of preparation for dealing with the health and prosperity of our people. Of course, there are differences between us which cross party boundaries. In fact, they are found in various organizations. They are the sort of differences that are bound to arise on anything that is worth discussing. However, on the essential aim and purpose of the Bill we are sufficiently at one for me to be able quite confidently to commend the Bill as a whole to the House.\footnote{45}
Mr. Denis Howell (Birmingham, Small Heath), the shadow environment minister, responded for the Labour Party with a shot across the bow of the Conservative ship. He stated:

We used to have a Ministry of Housing and Local Government. In those days the Ministry ensured that houses were built and that local government was based on principles of local democracy. We now have the Department of the Environment. It builds fewer houses and is busily engaged in the desecration of local government and local democracy.46

Mr. Howell detailed several of Labour's objections to the bill. One of those was the apparent trend that he believed was removing local government from the people. Linking the Water Bill to the 1972 Local Government Act, he argued that in both cases local governments would lose much of their power through loss of their responsibilities. He stated that, "As a result of this Bill every local authority in the land will lose its water undertaking." He saw this as unconscionable, especially considering water companies were to be left in private ownership. Worse yet, those responsibilities that were to be taken away from local authorities were to be placed in the hands of the central government:

At the core of the Bill is the fact that more and more power, if it does not go through the regional arms of Ministries, will go directly to Ministries and Ministers. Under these proposals not only will the man from the Ministry know best but he will be the only man who will know anything. That will happen because so often the information which we and local representatives should have, as a basis upon which democratic discussion and argument about the development of public services can be sustained and maintained, will in many cases not be available to the people who need it.48

Mr. Howell believed the Conservatives were destroying the traditions of British society, and that the Water bill contributed to that trend. Additionally, he believed the bill denied the principle of public ownership of water supplies by leaving them in the hands of private companies. He argued that, "Water resources are our national and natural heritage. They belong to the people." Furthermore, society was entitled to harness these resources for the good of the nation without private exploitation. Coupled to this fundamental right was that water should be readily available to the nation. He perceived the bill as a threat to this principle, because metered water was proposed for the first time. Thus, the ability to pay for
water would take precedent over the fundamental right of the people to have a plentiful supply in support of their needs, no matter how they might use it. He pointed to the opposition from local authorities as evidence this was true.\textsuperscript{50}

He agreed with the Government about the need to make improvements in the management of water services. He argued that Labour understood that the future needs of society demanded a reorganization of water services, and he agreed with the Government that the hydrological cycle should be the basis of any reorganization. Furthermore, it was evident the geography of river basins and water supply did "not fit in tidily with our units of political control and our system of government."\textsuperscript{51} Hence it was the one service that required government be tailored to it. He also argued it made sense for the authority that deals with supply and transportation of water also become the responsible authority for the treatment and disposal of sewage and waste.\textsuperscript{52} Additionally, he stated that anything done to insist upon proper levels of purity in the waste disposed, either in rivers or the sea would gain the support of the Labour Party.\textsuperscript{53} However, the Labour Party believed the only sensible solution to the water supply issue was the establishment of a national grid system like those in other public services.\textsuperscript{54} A national grid system would essentially nationalize water resources under central government control and allow for their allocation to the nation. It is interesting that Mr. Howell argued for nationalization while at the same time arguing against the central control necessary to enable such a system to operate.

Examining the structure of the governing boards of the regional river authorities, he argued that the appointment process would enable the Government to pack these bodies with "blue-eyed boys representing the political and philosophical ideology of the Government...."\textsuperscript{55} To support his charge Mr. Howell pointed to the new town corporations, rent security committees, hospital boards, and other bodies the Government had already packed with Conservative supporters. He also found fault with the Government's proposal to appoint the chairmen of the new authorities. He argued the structure would guarantee the Government's ability to control the national water authority, as each of the chairmen would be a member of that body as well. He questioned why this was necessary and if it was sound
practice. "If the principles of local government are not to be denied, as they should not, the regional water authorities should at least be allowed to elect their own chairmen. They know their own people best."56

Mr. Howell also criticized the size of several of the new authorities, which he felt were too large and as a result too removed from the people they were intended to serve. Using the proposed Severn-Trent authority as an example, he argued that it was simply too large to effectively serve the interests of the region. Stretching from Wales to the North Sea, even based on hydrological cycle and the geological basin, it would be unmanageable, and was not justifiable in terms of local government. However, he reserved his sharpest criticism for the proposed Thames Water Authority, which would stretch from the Cotswolds to Canvey Island (located at the mouth of the Thames estuary) and would encompass the London area. He argued that the criticisms of the Greater London Council were correct:

...if we are to have a regional water authority at all, then the Greater London Council is a regional authority. That was the purpose when it was created by the previous Conservative Government, in the face of our opposition. That being the case, and since it is not disturbed by the new round of local government functions, it ought to be given immediate power to act as the regional water authority for its area....

To come back to the position of the Greater London Council, how can an elected local council responsible for the whole of London not be responsible for the River Thames? It is an absurdity that the River Thames is now to be removed from the control and influence of the GLC.57

(Mr. Rippon interjected that the Thames is a long river which has never resided within the confines of the GLC and at present the GLC was not responsible for the Metropolitan Water Board, the Thames Conservancy or the Port of London Authority.)58

Mr. Howell concluded his criticism by listing those associations in opposition to the bill. They included The County Councils Association, the Association of Municipal Corporations, the Urban District Councils Association, the Rural District Council Association, and the British Waterworks Association. He argued that all of the listed bodies were opposed to the concept of bureaucratic control embodied in the Government policy.59

The debate lasted another five hours and consisted of approximately twenty speeches by members of the House. Most of what remained rehashed previous criticisms
from slightly different perspectives. It should be noted that one area of opposition to the bill was consistent from both sides of the House, that being the abolition of the Water Resources Board. All members praised the Board's work. Most believed it was a mistake to abolish the Board, as it would leave no independent body to research and act on water issues. Most also felt the National Water Council, which would replace several of the functions of the Board, would not enjoy the same independence and would therefore lack the same effectiveness. Mr. Nigel Spearing (Acton) read into the minutes an outside view from the Confederation of British Industry (CBI) that stated,

The CBI sees very considerable cause for regret at the proposed demise of the Water Resources Board in the form in which we now know it. In the few years of its existence it has had a remarkable record. It has built up an unrivalled technical expertise of a multi-disciplinary character and this, coupled with the considerable independence it has enjoyed, has made it a force to be reckoned with. Although the CBI agrees that the ultimate decisions on future long term plans must obviously rest with the Department of the Environment, it sees much merit in forward planning studies being executed by a body which enjoys a substantial degree of independence from the normal administrative work of the Government Departments, which is insulated from political pressures, and which is also free of the possibility of embarrassing the Secretary of State in the exercise of his appellate functions.61

Spearing also produced a response from the Metropolitan Water Board concerning the issue of research on water matters. The board argued that research should be under the "National Water Council, rather than in the Government's own creatures, the proposed Central Water Planning Unit, and a new, ill-defined industrial research centre."62 The Water Resources Board itself had this to say about the Government's proposal for the National Water Council:

The Government's proposal is for a central planning unit staffed by civil servants and reporting both the Departments and to the Council. This proposal is welcome in that it recognizes the need for central planning capability. But it has a serious weakness that the units will serve two masters and will be unable to resolve conflicts which will necessarily and rightly arise between them. The central planning unit should be an arm of the national Water Council. We recognize that Ministers will also need some expert advice of their own, but we do not believe that this need result in any wasteful duplication of effort. The proposed Industrial Research Centre has a vital defect (in) that it fails to bring together the existing range of research and development expertise to match the new range of functions on which the regional water authorities will need research and development support.63

Spearing concluded his remarks by stating it was up to the Government to explain why they
wanted to eliminate such a successful organization. Answering his own question, he charged that the Minister and Whitehall created the new organizational structure for themselves. He charged that while the Water Resources Board produced an annual report, there were no assurances the new planning unit would do the same. The proposals were a backward step for democracy, and led Britain towards the creation of a "semi-corporate" State that he could not support.64

Mr. Spearing then attacked the Government's proposals concerning London. While the Government gave land drainage powers to the Greater London Council (GLC), they took away the GLC's control over its main sewers, sewage works, sludge boats and other apparatus encompassing London's main drainage. He stated that the whole history of local government in the last century was built upon the need to avoid disease by means of public health and drainage. He argued that, "If there was ever a unit of local Government embedded in the very roots of London it is the main drainage and engineering services of the GLC. To suggest that they should be taken from the GLC and be administered by the Thames Regional Water Authority is ludicrous."65 He concluded his remarks on the matter by suggesting it would be far better to allow existing agencies to continue as agents of the water authorities so there would be linkage with all the other local services.66

In the Government's official rebuttal at the conclusion of debate Mr. Griffiths, the Undersecretary of State for the Environment, argued that the debate had been a largely forward-looking exposition of a necessary reform. He characterized the Water Bill as the third pillar of the Government's modernization program, the other two being reorganization of local government and of the health service. He charged that the Labour Party's solution to water reorganization was to nationalize everything and establish a United Kingdom board that would run the entire system.67

Mr. Griffiths then reiterated several points concerning the Government's policy. First, that future water supply needs of the nation required changes in organization. The fact that water fell in the north and west while demand rose in the Midlands, East Anglia and the South, required changes. A possible solution to this problem included the building of more
reservoirs, which were unpopular, or more estuarine storage, or new groundwater projects, or desalinization. However, the best and least costly option was to use existing rivers which had the capacity to be used several times over their length, which could move water to where it was required, and which had the capability, if not abused, of purifying and restoring the quality of water for drinking purposes as they proceed to the sea. Rivers were endorsed within the bill, and by a succession of previous Acts, as the means of achieving a ready supply of water. What was required of the nation was to create a system within which their management would produce the best results. Hence they were the centerpieces of the Government's water structure. He pointed out that Britain at that time took more than a third of its water supply from rivers, and this was surely to increase in the future. The central problem was that these same rivers received large quantities of sewage and industrial effluents. Thus, the first leg of the national water policy, embodied within the bill, was a plan to bring together all aspects of water conservation and supply, sewerage and sewage disposal, the prevention of pollution, fisheries, and land drainage and reclamation. That was the reason for creating all-purpose authorities to manage each of these tasks in a coherent and mutually supportive manner. Coupled to this was the fact that rain did not fall, rivers did not flow, and water-bearing beds were not laid down, on the basis of any human boundary. Hydrological and geological realities, not political or administrative frontiers, needed to form the basis of water planning. For these reason the Government presented a reorganization that conformed to this basis.

Support for the Government's reorganization plan was widespread. Engineers and chemists in support included the Institution of Civil Engineers, the Institution of Water Engineers, the Institute for Water Pollution Control, the Society of Chemical Industry, and the Society for Water Treatment and Examination. Administrators included The Society of Clerks and Treasurers of the Water Authorities, the Association of River Authorities, the Confederation of British Industry, the Central Electricity Generating Board, the trades unions, including the National Union of Waterworks Employees, and the Association of Waterworks Officers. Environmental bodies included the Royal Commission on Environmental Pollution.
the Committee for Environmental Conservation (representing the main conservation and environmental bodies in the nation), the National Angler's Council, the National Federation of Anglers, and the Salmon Trout Association.\textsuperscript{70}

Responding to questions of how the reorganization would be implemented, Mr. Griffiths indicated there would be no sudden overnight change that would prove disruptive. The intention of the Government was to set up regional water authorities in a shadow form by the middle of 1973, allowing their chairmen-designate to help in the preparations for the full-scale transfer in 1974. Provisional management units for all services would be provided, including water supply, sewerage and sewage disposal, and river management. For water supply, the provisional units would be the existing statutory water undertakings, for river management the existing river authorities. The greatest area of change would arise in connection to sewerage and sewage disposal, which would be transferred from the local authorities. Provisionally, the local authorities would continue to operate, but they were asked to join district level bodies to help in the transfer of their functions to the regional river authorities.\textsuperscript{71}

He then assured the House that on the research side, the Government would ensure that the Water Pollution Research Laboratory, the Water Research Association, and the Water Resources Board would provide the best methods of research available to the industry. With this, he commended the bill to the House for the good of the water industry and the nation as a whole. The House divided 220 for the bill, 210 against. The vote was primarily along party lines and was a narrow victory for the Conservatives.\textsuperscript{72} With that the bill was commended to Standing Committee D for further consideration.\textsuperscript{73}

Standing Committee D sat 19 times from February 20\textsuperscript{th} 1973 to April 12, 1973.\textsuperscript{74} It handled 349 proposed amendments during this period. Several issues were raised in Committee that demonstrated the different perceptions of Conservatives and Labourites as to the purpose and function of the bill. A few examples will be sufficient to demonstrate this point. They include financial arrangements that would govern the system, centralization of the planning function within the Government's control, selection of chairmen for each water
authority, and the case of London within the Thames Valley.

One of the amended clauses concerned finance, specifically the relationship between the central government and local authorities in regard to sewerage and sewage disposal. The purpose of the amendment was to allow regional water authorities to precept rates of local authorities to finance their operations.\(^75\) Government proposals were to change the system of finance from one based on local authority rates to one based on charges for water authority services, including water supply, sewerage, and sewage treatment and disposal. To Labour, this meant water would become a commodity consumers would have to purchase. As Mr. Ted Rowlands (Merthyr Tydvil) stated,

> If there is no form of precept on local authority rates and if the cost of sewerage and sewage disposal is to be borne by the consumers themselves, there will be a very significant increase in cost to a large number of residents in the poorer communities which up to now have had central Government support in the form of a rate resources grant.

> ... I hope it is not the aim of the Bill to transfer this heavy financial burden from central Government to the local community. That has been a feature of much of the Government's legislation. Unless the new clause is accepted there will be a dramatic transfer of the financial burden from central Government to local householders.

Mr. Graham Page, the Minister for Local Government and Development, replying for the Government, stated that the proposed amendment would "change the basis of the financing from direct charges for services provided to local taxation through the general rates.\(^76\) He also indicated it was the Government's intention that,

> the whole of the charge for sewerage and water supply will fall on the consumers... That is the basis of charging under the Bill... It is the basis of the Bill that these services, as the Central Advisory Water Committee has said in more than one report, should be paid for by the consumer... Charges rather than taxation is the principle of financing here. The new clause... would reverse that and make the principle taxation rather than charges. That would lead to the uneconomic use of resources.\(^77\)

Mr. Rowlands responded that, "This is the difference between the philosophy of the Government and that of the Opposition. The Minister said that he believes in charges, not taxation. We believe in taxation and not charges.\(^78\) He went on to demonstrate the differences between the parties on this and larger issues within the bill:
We regard water services and sewage disposal matters as an important, intrinsic part of social service and public health in the service of the community. We do not regard it as a commercial enterprise. That is the difference between the two sides... I hope that this debate has shown the divide between the Opposition and the Government, and I hope that it will bring home to the public the practical consequences of the Bill. Whatever the Minister may say, I believe that people will face heavy and increased direct charges on households, irrespective of income or need, in the supply of water and sewage disposal, both of which are basic community services.79

Despite its proclaimed relevance to basic political policy differences, the amendment was withdrawn by the Opposition and was not pressed to a division of the House. The reason is unclear: the Conservative majority would have defeated the clause, but the Labour party could have pressed for a division and put the issue on the public record nonetheless. This issue would become important in the future, particularly after 1979 and the election of the Conservatives (and Margaret Thatcher). Thatcher would use this principle to realign British society from a "socialist" to a "corporate" state, where services were paid for directly by the consumer.

The two parties also clashed over the issue of planning within water services. Under the Water Act of 1963 planning functions were carried out by the Water Resources Board in an independent manner that garnered praise from both parties. Under the bill, the Water Resources Board was slated for elimination, with its planning functions redistributed to the Department of Environment and the National Water Council. Labour proposed that the bill retain the Water Resources Board and strengthen its executive functions within the new system.80 Labour's concern here was that an independent body was being dismantled. They feared that a split of powers within the new system would leave no independent voice to advise society on water issues.

Mr. Page responded that the new structure would enable all functions of the Water Resources Board to be retained, but would more efficiently produce a national water policy. Strategic planning would be vested in the Central Water Planning Unit at the national level within the civil service. As to the Boards' independence, he assured the house that the Governments' intention was for the Central Water Planning Unit to have the same type of independence. He argued that staff of the Water Resources Board had been within the civil
service, and that staff of the new planning unit would also be as well, thus retaining independence from the Government. However, he did not address Labour's main concern regarding centralization. Between the National Water Council, composed of regional water authorities' chairmen (who were Government appointees) and the Central Water Planning Unit (vested within the Department of Environment), Conservatives would control the direction of water services within the nation.

Conservatives and Labourites also differed over the method of selection of each water authority's chairman. Under the bill, chairmen were to be selected and appointed to their positions by the Secretary of State for the Environment. In Standing Committee D the Government accepted an amendment allowing water authority boards to select their own chairmen. One of Labour's main arguments was that appointed chairmen would be under control of the Minister and this would give the Government too much power over water services. They believed election of water authority chairmen from among their members would reinforce the democratic principle. Once back in the House, Mr. Eldon Griffiths, Under-Secretary of State for the Environment, moved that this amendment be overturned and the power of the Secretary of State restored in appointing water authority chairmen. Mr. Griffiths argued that the structure of the bill placed considerable responsibility on the Secretary of State for the Environment and the Minister of Agriculture, Fisheries and Food, to create and conduct a joint national water policy. It was logical that the Secretary of State would have the ability to select those individuals responsible for executing that policy. Additionally, people appointed to these positions would have to demonstrate competency in the running of large affairs. Those elected to the water authorities would not necessarily have these competencies. Furthermore, the appointment process allowed the Government to search the entire nation for those with the appropriate competencies, whereas this would not be the case if the choice came through the process of local elections. Additionally, continuity would be guaranteed under the appointment process, which would not be the case under chairs governed by the electoral process.

Mr. Denis Howell responded that he had
...rarely heard such a monstrous proposal as that in the Minister's speech to reverse the decision that the Committee took on an all-party basis after studying the matter very carefully and objectively. The Minister's arguments contained a total contempt for the process of local government as it is known in this country.

Clearly the issue dividing the Labour and Conservative parties concerned their perception of water authority board composition and function. For Labour, this concerned the familiar theme of local government control. The bill attacked these principles and the selection of chairs was just one example. They believed the boards, composed of both elected and appointed members, should exercise democratic principles and elect chairs from their own number. Without this, the chairs would be little more than the puppets of the Government, and local interests would be subject to the whims of Whitehall.

In contrast, the Conservatives perceived the boards as corporate-style managing bodies. The chairs were to be executives who would exercise leadership, both within the board and within the nation as a whole, in constructing and executing water policy. As executives they should be selected for their ability to perform these functions. While the democratic process of electing chairs might produce those with these capabilities, they could not guarantee it. And so it was reasonable that the chairs be appointed, as it guaranteed selection of those with the proper capabilities. The Conservatives did not perceive the issue as one concerning principles of local control and democracy, but one of competency. The issue was resolved in the Government's favor by a narrow margin of 157 to 139, along party lines.

Finally, the two parties differed over provisions establishing the Thames Regional Water Authority in relationship to London sewers and sewerage. As discussed in previous chapters, London had long been a leader in water issues and had well managed if overlapping structures for this purpose. The Greater London Council received powers under the London Government Act of 1963 with respect to main drainage. It looked after the major trunk sewers, undertook sewerage works, was responsible for the sludge vessels which put out to sea, and undertook flood control and land drainage. The London boroughs managed the smaller sewers that discharge into the trunk main sewers. The Port of London Authority
was responsible for pollution control, navigation, and recreation on the Thames from Teddington Weir to the sea.

The bill set forth by the Government proposed to take away the main drainage (trunk sewers) and sewerage works from the Greater London Council and vest them in the new Thames Water Authority. This naturally caused a great deal of controversy and was opposed by the Greater London Council, the London Borough Association, and the City of London. It should be noted that political control of the Greater London Council was in the hands of the Conservative Party during this period. In the standing committee, members from both parties joined together to table amendments that would have created a London Water Authority. This authority would have been responsible for all aspects of river management concerning the Thames within the Greater London Area, and would have been under the control of the Greater London Council. These proposals were defeated in Committee by only one vote and engendered considerable controversy.

Back in the House, other amendments also attempted to establish continuity within the London area. Mr. Nigel Spearing (Acton) moved an amendment that could be considered a half-measure. Instead of proposing that the Greater London Authority be given responsibilities like a water authority, it proposed the status quo be maintained with regard to sewers, sewerage, and water supply within the Greater London area.

Mr. Spearing's arguments were those previously heard concerning the right of local government to control their supply, sewer, and sewerage responsibilities. The key difference in relationship to London was that a two-tier structure already existed in London, which did not exist throughout the rest of the nation. Mr. Spearing urged that the Greater London Council, as a regional government, be vested with responsibilities for the management of its drainage and sewer system. He said considering that London government as a whole derived its roots from the Metropolitan Board of Works, which built the London main drainage system, it was incomprehensible that these functions should be taken away from such an organization and vested in such a remote body as the Thames Regional Water Authority.

The Government, in contrast, considered uniformity to be more important than the
interests of London and would not accept the proposals. In regards to water supply, the Metropolitan Water Board would become part of the Thames Regional Water Authority, while private water undertakers would remain private, but under the direction of the new authority. The Greater London Council was appeased by assuming new responsibilities over recreational aspects on the Thames. However, this conflicted with the responsibilities of the Port of London Authority, which was responsible for the surface waters of the Thames from Teddington Weir to the sea.

The committee phase of the Water Bill demonstrated numerous differences in perception between the two major political parties over a variety of issues. The most significant of these concerned local representation and control within the new structure, the operation of democratic principles in selecting chairmen and how the system would operate financially. Conservatives out-voted Labour on a number of issues that influenced the direction of water policy in Britain.

III: Implementation (July 1973 and Beyond)

Implementation of the Water Act of 1973 was scheduled to coincide with the implementation of the 1972 Local Government Act in April 1974. The regional water authorities were established with few problems. As these were to operate over an entire catchment area, they were each organized with a centrally sited headquarters and offices spread across the region, making use of local authority sites where possible. Some argued over the location of the authority's headquarters; the Thames Regional Water Authority, for example, was sited in Reading, over the objections of members from London. When possible, the majority of staffs for the new water authorities were derived from staffs of previous river authorities. This was encouraged by the Government to retain the scientific and practical expertise that the river authorities contained. Overall, more jobs were produced as a result of the reorganization, which suited professionals working in that field.

Some of the Labour Party's fears concerning the selection of the water authorities' chairmen, the metering of water, and the loss of local government participation proved correct. The selection of the water authorities' chairs was accomplished through an open
application procedure. The majority of chairs came out of the water industry or the local authorities themselves (despite Conservative fears that local authority personnel would not have "experience" with large ventures). Labour's fear that water services would become a commodity that the consumer would directly pay for was borne out. Water services since 1974 have been treated as a commodity. However, charges were not direct, but charges based on the rateable value of property. They operate as a property tax and not a user tax specifically. While local authorities were stripped of their control of sewers and sewerage, they continued to play a role (albeit a secondary one) implementing the decisions of the regional water authorities. They had representation on the new authorities and, for the most part, their concerns were addressed within the new structure as their local expertise was relied upon in the planning process. They continued to operate much the same as they had before, but as part of a larger structure.

The new structure might have made more sustainable progress under less difficult conditions. It managed well with the severe drought of 1976, so well in fact that integrated management of river basin resources and water supply services seemed justified, reducing worries about water resource adequacy. Its weakness turned out to be that, although regional water authorities were not a nationalized industry, the Treasury wanted to limit their investment spending as if they were. Moreover, the mid 1970s to the early 1980s was one of Britain's worst periods of economic performance. High inflation and a severe downward economic spiral produced an economic crisis that forced the British Government (then under the Labour Party) to seek help from the International Monetary Fund. As capital spending on sewage works came to be severely limited, their performance deteriorated. This discredited the other role of the regional authorities as controllers of pollution and protectors of basin resources. A 1985 River Quality Survey showed the number of lengths of river downgraded in quality overtaking those improved in quality for the first time since the surveys began in 1958. Moreover, the survey indirectly described worsening conditions. All through the late 1970s and early 1980s British economic production tumbled, with many industries forced into closure. Many of the improvements in river quality were not due to more rigorous
enforcement and better management on behalf of the water authorities, although this played a part, but to Britain's loss of industry with its consequent reduction of discharges to rivers.

In broad terms, the new-style all-purpose water authorities failed in what was becoming their key mission—the protection of both tap water quality and river water quality from increasing pollution by industry, agriculture, and discharges from sewage works. Largely this was due to internal functional difficulties and lack of financial support from the central government. The ambitious reshaping took water utility services out of local government control, even though until 1983 local councils nominated (somewhat ineffective) majorities of members to each regional authority's governing board. However, this shift did not turn water supply or sewerage services into a recognized or single-minded utility. No serious effort was put into moving domestic water charges from the old property rates used by local councils to the metered charging used by other utilities such as electricity, gas, or telephones, even though this was provided for in the 1973 Water Act. The progressiveness that river authorities showed in the 1960s was smothered by the problems of managing water supply and sewerage services under the direct constraints that Whitehall wanted for macro-economic reasons.

It is ironic the restructuring went sour just as environmental concerns were gaining momentum in the 1970s and 1980s. The all-purpose river authorities were unable or unwilling to respond to this trend, but did provide convenient targets for environmental advocates. They either lacked public recognition for their efforts, being viewed as little different from their local authority predecessors, or earned public hostility through failing to fulfill their environmental goals. Despite these setbacks, as ideas of privatization began to be developed in 1985, the idea of retaining power over river basin functions became very important to those water authority leaders wanting to shed the financial handicap of Whitehall.

While this study is not the place for a long discussion of privatization, it is crucial to understand the processes at work. The Conservative government of Margaret Thatcher was interested in divesting itself from as many public enterprises as possible. This fit the new
economic model of free enterprise that gained her two election victories in 1979 and 1983. In 1979 the only specific pledges for privatization were those of the aerospace and shipbuilding industries, and the sale of government shares in the National Freight Corporation. However, the government became bolder over time. One by one, state-owned industries were brought into better financial shape and, as the economic climate began to improve, were prepared for privatization. By the time of the 1983 election, the list of candidates grew to include British Telecom, British Airways, Rolls Royce, parts of British Steel, British Leyland, and the airports. After British Telecom, other utilities were privatized with differing structures and regulatory systems—gas, water, and electricity. By the time Margaret Thatcher left office in 1990 the state-owned sector of industry was reduced by 60 percent.89

Coupled to this trend was another one regarding the structure of water authorities. All during their history, environmental groups criticized water authorities for not rigorously performing their pollution control function, especially in regards to sewage disposal. The structure of the 1973 Water Act left water authorities as both the regulator of discharges and, due to their control over sewers and sewerage, the largest polluters within Britain. Information regarding the publication of discharge information was provided for in the 1974 Control of Pollution Act (COPA), but this information was not actually produced until 1985, so water authorities were able to hide the fact they were the largest polluters.90 However, the worsening pollution in British rivers could not be hidden. Together, the worsening condition of British rivers and the trend towards privatization would destabilize the regional structure for water authorities agreed upon in 1973. Under the 1989 Water Act the water industry would be privatized and water authorities' functions divided. A new agency, the National Rivers Authority (NRA), was given statutory responsibility for pollution control. The private water service corporations (PLCs) created by the Act were given the task of providing water supply and sewage collection and disposal. The separation of the water authorities' regulatory functions from their water supply, sewerage, and sewage treatment responsibilities was achieved with the prime objective of resolving these conflicting roles and providing the commercial freedom to generate necessary capital investment in the water industry.
Significant additions to the pollution control functions in the Act included provisions for statutory Water Quality Objectives, Prohibition Notices, Nitrate Sensitive Areas, and Water Protection Zones. Together, these would enhance the regulatory regime that eventually translated into improved water quality in Britain during the 1990s.
1. See Map 13, page 139.
4. Times, 30 12 71, 1a.
8. A precept is a obligatory assessment which one government entity is authorized to impose on another. Precepts are paid from whatever sources or revenues law permits, usually from local taxes.
10. Times 20 July 1972 4d.
12. Times 5 August 1972 15e
15. Times 2 December 1971 17a.
17. Ibid.
20. Ibid.
25. Due to the economic crisis facing Britain Mr. Peter Walker shifted portfolios and moved from the Department of Environment to the Department of Trade and Industry. He was replaced by Mr. Geoffrey Rippon.
27. Ibid., 37.
28. Ibid.
29. Ibid
30. Ibid. 38.
32. Ibid., 38.
33. Ibid., 39-40.
34. Times 11 December 1972. The British Waterways Board reportedly fought a backroom fight to preserve itself. This effort proved successful, although the Government did leave the possibility open to revisit the issue in the future.
35. The 1970 election surprisingly returned the Conservatives to power. The Conservatives captured 46.4 percent of the vote, Labour 43 percent. The Parliamentary breakdown was as follows; Conservatives, 330; Labour, 287; Liberals, 6; others 7.  
37. Ibid., 40-41. . The size of each of the regional water authorities would determine whether the Minister for Agriculture would appoint two or three members. In these clauses, there were special provisions for Wales.
38. Ibid., Clause 11, 41-42.
39. Ibid., 42.
40. Ibid., 44-45.
41. Ibid., 45.
68. It is important to note that the belief in the self-purifying capacity of rivers was critical to the common parliamentary understanding of water issues. However, this was no magical cure to the ills that were dumped into British rivers. As discussed previously, rivers' self-purifying capacities are limited by a number of factors, not the least the amount of wastes put into them. For many parts of rivers, especially estuaries in Britain, this level had been far exceeded.

70. Ibid., 151-152.
71. Ibid., 154-155.
72. The 1970 election returned 330 Conservative, 287 Labour, 6 Liberal and 7 other members to the House.
74. Hansard's Parliamentary Debates, 5th ser., Standing Committee D (1973), col. 1-
1016.
76. Ibid., 1008-1009.
77. Ibid., 1022-1023.
78. Ibid., 1024.
79. Ibid.
80. Ibid., 1041-42.
81. Ibid., 1049-1054.
82. Hansard's Parliamentary Debates, 5th ser., Standing Committee D (1973), col. 378-
412.
83. Ibid., 1100-1107.
85. Hansard's Parliamentary Debates, 5th ser., Standing Committee D (1973), col. 79-
188.
87 Ibid., 1026-1033.
88. The British Treasury faced a number of problems in the 1970s including high unemployment, inflation, and a worldwide recession. They limited the spending of regional water authorities through control of their grants.


90. This will be discussed in greater detail in the subsequent chapter.
CHAPTER VI

THE 1974 CONTROL OF POLLUTION ACT AND THE TRANSFER OF AUTHORITY TO THE NATIONAL GOVERNMENT

In the last chapter we saw the transfer of water pollution control functions from local to regional authorities. The 1973 Water Act established a system of regional water management administered by ten new water authorities. However, this only represented a new structure of administration. Specific measures to control waste on land, discharges to water, emissions to air, and noise were contained in a second Bill, the Protection of the Environment Bill, first introduced by the Conservatives into the House of Lords on November 27, 1973. This Bill would have a long history. It would first wind its way through the House of Lords and be reported to the House of Commons, where it was lost due to a change of Government in February of 1974.\(^1\)

With the return of a Labour government the Bill was reintroduced to the House of Lords as the Control of Pollution Bill in May of 1974.\(^2\) The Bill sped through the House of Lords and was reported out on May 21\(^{st}\) 1974. The House of Commons debated the Control of Pollution Bill during May and June and it went on to gain the Royal assent in August of that year.\(^3\)

The 1974 Control of Pollution Act (COPA) transferred authority over discharges of wastes to land, water, and the atmosphere to the Department of the Environment. Additionally, new controls over neighborhood noise were established for the first time. Environmental Quality Objectives (EQOs) for each sector of the environment, promulgated through regulations made by the Secretary of State, ensured central government authority over the environment. At the time of its inception, the COPA was the most comprehension piece of environmental legislation yet produced by Parliament. It established a systematic approach to pollution control that contained several general principles: central control of environmental management; the "polluter pays" approach to remedy pollution; the "best available means" to limit pollution; and the establishment of a comprehensive system of environmental monitoring and reporting open to the public through registers. The Act was forward thinking in design. Powers given to the Secretary
of State for the Environment allowed government flexibility in establishing standards and setting implementation criteria. This allowed central government to strengthen quality requirements to improve environmental conditions as circumstances allowed. However, this flexibility could also be a weakness if government choose not to act.

The Act entrusted central government with overall responsibility for coordinating pollution control, including monitoring and assessment systems. Since pollution effects were generally experienced within the confines of localities, primary responsibility rested with local or regional authorities. For example, the water authorities managed water resources and pollution control on a regional level, while collection of wastes for disposal to land were managed at the local level. Central government established the statutory framework for pollution control, but implementation was delegated. Flexibility to local circumstances was guaranteed as local authorities were given discretion over individual discharges through the discharge consent process. Under this process local authorities could consider a number of factors, including local resources and social priorities, the uses to which surrounding areas were put, and the capacity of the environment to absorb pollutants.

Central government retained control of pollution problems that were not easily dealt with at the local level. Besides issuing guidance and requests to the responsible regional or local authorities for certain materials (e.g., exposure to radioactive materials), in limited cases national standards were set. These were reserved for polluting products that were transmitted throughout the country, for example polluting emissions or noise from motor vehicles and other air-borne industrial pollutants, such as sulphur. In these cases the Secretary of State could set national standards. One of the best examples in this regard was an British effort to limit the lead content in gasoline, thereby reducing the ambient levels of lead content in the atmosphere.

Recognizing the need for an effective national monitoring system to underpin efforts at pollution control, the COPA required central government to collect information on existing pollution concentrations, long-term trends, and the significance of new emissions, to determine where the most significant hazards were located and what resources were needed. Central responsibility for this process allowed harmonization of monitoring systems. Previously,
monitoring systems had developed in piecemeal fashion making the collection of comparable information virtually impossible. It was intended that these systems would be centrally integrated so that a complete picture of the natural environment could be constructed.

The COPA also recognized the importance of engaging the public in pollution control efforts. Many environmental groups, scientists, politicians, and the Royal Commission on Environmental Pollution (RCEP) had called for publication of environmental data, much of which had been shrouded in secrecy. The Act embraced this principle by establishing public registers detailing discharge consents authorized by all levels of government. The public's right to know what pollutants were being discharged into the environment was believed essential for establishing support for further governmental action to improve environmental quality. As a safeguard to some businesses, whose industrial processes might be exposed by publication of discharge consent information, the Secretary of State was given powers to exempt them from the public registers. However, this was expected to be the exception and not the norm. A further benefit of lifting the veil of secrecy over discharges was that it allowed comparisons to monitoring and assessment data collected in the field. It was unfortunate that this did not occur equally for all sectors of the environment as anticipated by the Act. For example, public registers for discharges to water were delayed until 1985, whereas registers for noise and air pollution were established during general implementation of the Act in 1976.

The COPA also established in law the prevailing "best practicable means" approach to pollution control. Instead of establishing uniform emission standards for all sectors of the environment, the British approach embodies flexibility with regard to local circumstances. Authorities, both central and local, were expected to operate on the philosophy that standards should be reasonably practicable. They should take into account local conditions and circumstances, the current state of scientific, technical, and medical knowledge, of the potential harm or nuisance involved, and the financial implications of the standards set. For example, it would not be cost-effective for society to raise river water quality to drinking water standards for all rivers in all places, but only to those rivers and places where drinking water supplies are drawn. In practice this pragmatic approach permits the establishment of individual standards for
polluting emissions that can be changed in light of technical advances and/or of changing environmental needs. This approach allows greater flexibility and cost-effectiveness than uniform emission standards as they are tailored to the individual discharge.

The "polluter pays" principle established that costs for pollution control would be born by the polluter. While there is debate over where these true costs lie in practice, this principle linked financial responsibility for pollution to those who create it. The principle was double-edged: polluters could be required to change their production process or otherwise treat their waste to achieve what was hoped to be ever-improving consent conditions. If they did not achieve this they were held liable for any damage to the natural environment. In addition, fines and prison sentences were increased to give more weight to the consent processes seriousness. These principles and their mechanisms became, and continue to be, the cornerstone of British pollution control.

The Control of Pollution Act was organized into four parts, each dealing with a sector of the environment. Part I dealt with land; Part II, water; Part III, neighborhood noise; and Part IV, air pollution. As our focus is water pollution, I will first briefly describe the relevant measures contained in Parts I and IV then concentrate on Part II.

Disposal of waste on land is important to the water environment as pollution may migrate from disposal sites into groundwater. Part I provided for the implementation of many of the recommendations of the Working Groups on the Disposal of Toxic Waste and Refuse Disposal who had reported their findings in 1970. The Act provided a statutory framework for a systematic and coordinated approach to waste collection and disposal for the first time in British history. Regional (in some cases local) authorities were designated as waste disposal authorities. They were charged with surveying and producing waste disposal plans for the receipt of all household, commercial and industrial wastes and ensuring that enough sites were available, either in the public or private sector, for these wastes.

Control over waste disposal was maintained through the establishment of a new licensing system, whereby all persons wishing to operate disposal sites or treatment plants were required to seek a site license from the waste disposal authority. It was made an offense for any
person to deposit controlled wastes on land, or to use plant or equipment to dispose of controlled
waste, unless a license was issued by the waste disposal authority and its conditions were
complied with. Penalties of up to £400 on summary conviction and a maximum of two years in
prison, or a fine or both, were provided as a deterrent against unlicensed dumping. While the
Act contained provisions for incarceration to give it more teeth, these have not been used.
Waste disposal authorities were able to impose operating conditions on privately owned sites
and held extensive supervisory and enforcement powers ensuring that these were run
satisfactorily and that the conditions of operation met. Waste disposal authorities were also
required to ensure that similar standards were also maintained at their own public sites.6

In addition to the creation of disposal provisions, the Act redefined the duties and
powers of local authorities as waste collection authorities. They were required to collect all
household waste free of charge, except in certain prescribed circumstances; to collect all
commercial waste on request; and to charge for the service unless the authority considered it
inappropriate.7

The Secretary of State for the Environment was given powers to prescribe, through
regulations, on hazardous and other difficult wastes. Producers were also subject to new
controls to limit their production of wastes.8 Working groups, composed of central government
officials and representatives from waste disposal authorities and industry were established to
analyze the main groups of industrial waste that might be classified as "special", then make
recommendations regarding the best methods for handling and disposal.

Part I also placed new attention on the need to conserve resources and recycle waste
materials wherever it was practicable and economically viable. A number of provisions relating
to reclamation were contained in the COPA. For example section 2(4) of Part I of the Act
required waste disposal authorities to consider the possibilities for waste reclamation as part of
the preparation of their waste disposal plans. Section 20 gave waste disposal authorities powers
to implement reclamation and recycling projects, including provisions for plant and equipment.
Another provision enabled local authorities to buy and sell waste, giving them some flexibility in
handling wastes not suitable for disposal by commercial firms and those collected through their
own systems. It specifically stated that waste disposal authorities would not compete with the reclamation industries. Section 14 (which did not apply to Scotland) required collection authorities to deliver for disposal all collected wastes (except waste paper and recyclable waste materials); and enabled them to provide plant and equipment for sorting and bailing of waste paper, or the processing of other waste for re-use. Additionally, section 21 gave disposal authorities powers to use their waste for the purpose of producing heat or electricity, subject to certain conditions. These provisions were designed to produce a comprehensive system so that all wastes could be controlled.

Part IV of the COPA dealt with air pollution. It extended the powers of local authorities to carry out investigations into air pollution by enabling them to obtain information about emissions to the atmosphere from any premises other than private dwellings. Local authorities were also allowed to make arrangements with the occupier for either the occupier or the authority to carry out measurements; and require the occupier, by notice, to supply certain information pertinent to their emissions. The Secretary of State for the Environment was given powers to prescribe what types of information were provided to local authorities. The occupier was free to appeal to the Secretary of State against a notice on several grounds including, that the disclosure would prejudice a trade secret, be contrary to the public interest, or be unreasonably expensive to collect. All emissions information obtained by local authorities were to be held in public registers. Section 75 of the Act empowered the Secretary of State to make regulations controlling the composition of motor fuels in order to limit or reduce air pollution. This section superseded all previous voluntary agreements between the central government and industry. Section 76 of the Act gave the Secretary of State new powers to limit or reduce air pollution by making regulations to control the sulphur content of fuel oil burnt in furnaces or engines. The provisions embodied in Part IV were significant and would parallel similar measures for water. For the first time local authorities were able to collect comprehensive qualitative and quantitative emission information and provide it to the public. Also, powers reserved to the Secretary of State in Sections 75 and 76 allowed central government to move
quickly to control the lead and sulphur content of fuels, which set a precedent for similar action in other environmental sectors.

Parts I and IV of the COPA demonstrate central government's willingness to assume authority over major aspects of the environment. Working collectively with regional and local authorities to collect information vital to carrying out their pollution control functions, the central government was able to produce a comprehensive picture of the environment for the first time, and by establishing public registers, share it with the public.

Part II of the COPA applied the same principles used to control and monitor land waste, air and noise pollution to the control of water pollution. Part II extended legislative controls to include nearly all discharges to inland and coastal waters. This included specified underground waters and discharges to land that had an effect on water. Controls that previously covered only non-tidal waters were extended to cover discharges through pipelines to tidal waters or the sea and discharges from working mines (which were previously exempt). Virtually all forms of water pollution were covered by the Act.

Broadly, the Act ensured that all discharges (regular or continuous activity involving draining effluents through fixed outlets) of trade or sewage effluent made to rivers, the sea, specified ground-waters, or land were subject to water authority control. The authority could refuse a discharge or subject it to reasonable conditions. Pollution could, however, be caused by some casual or spontaneous activity not covered by the understanding of the term discharge, and for which control by consent was neither practical nor desirable—for example the dumping of containers of chemical waste into a river. The Act covered these types of entries by making it an offense to place poisonous, noxious or polluting matter into water, and severe penalties were assessed to those convicted of causing such an entry.

In England and Wales applications for consent to discharge effluent into water or onto land were made to the regional water authorities established under the 1973 Water Act. The polluter was responsible for providing details in the discharge consent of the discharge's point of entry to the environment, the nature of its composition and temperature, and the daily amount and maximum rate of discharge. These details were then advertised in national and local
newspapers and professional journals for public comment. The water authority had three months to review the discharge application and hear any objections. Appeals of water authority decisions were reviewed by the Secretary of State for the Environment. Water authorities were required to establish and maintain public registers containing information about all discharge consents. These were to be located at the water authorities' regional and local offices and be available to the public during regular business hours. The registers contained, among other things, prescribed particulars of applications for consent to discharge effluents; consents issued and the conditions attached to them; samples and analyses of effluents and receiving waters; and notes restricting certain agricultural practices to prevent the pollution of water.¹⁵

The regional water authorities were given powers and the duty to forestall and remedy water pollution, returning the stream and its flora and fauna to their natural state, in so far as practicable. If the pollution was caused by an illegal discharge, the bill was sent to the polluter. If a damaging discharge was within the conditions set by the water authority, and the consent was not due for review, the water authority had to bear the costs of the remedial work. Polluters were protected from arbitrary changes to their discharge consents, as water authorities were made liable for the changes in practices.¹⁶ But water authorities could impose more stringent consent requirements when the discharger sought a renewal.

While the legislation was primarily concerned with preventing or controlling pollution from the disposal of waste or surplus material, agriculture was viewed rather differently. Normal farming practices sometimes resulted in water pollution. Farmers were therefore afforded some protection by the Act. Briefly, so long as a farmer pursued "good agricultural practice" they were protected from prosecution under section 31 of the Act.¹⁷ However, this protection could be withdrawn if the water authority convinced the Secretary of State that pollution could be or had been caused by a particular activity, in which case a pollution notice would be served on the farmer. When a notice was served, the "good agricultural practice" protection was removed after 28 days. If the farmer continued with the particular practice and it caused pollution he was open to prosecution in the same manner as any other polluter.¹⁸ In addition, no compensation was given to a farmer who changed his practices to comply with the pollution notice.
Under the Act, penalties for pollution were substantially increased. For most offenses a person convicted in a Magistrates Court was subjected to imprisonment for up to three months, or fines of up to £400, or both; conviction in a higher court (trial by jury) led to imprisonment for up to two years, or a fine (there was no limit in this case), or both.19

Overall, Part II strengthened water pollution control by enabling the new water authorities to manage all threats to water under their jurisdictions and take action to limit pollution. Most importantly, throughout the Act, the Secretary of State was given powers to set standards, which would drive the pollution control efforts of the regional water authorities.

Parliamentary Politics

The Control of Pollution Bill did not generate the hostile division between parties experienced during passage of the 1973 Water Act. There was support across all parties for the Bill. During the Second reading debate in the House of Lords, for example, none of the fourteen speeches given opposed the Bill. While differences did exist between the parties on a number of points, some of which were pushed to a division of the House, none of them created the type of overarching animosity experienced over the re-organization of water services in 1973. Three issues serve to highlight the debates in Parliament. These were (1) the powers transferred to the Secretary of State, (2) the contents of public registers, and (3) the provisions dealing with agriculture.

Throughout the COPA, the Secretary of State was given numerous powers that effectively transferred pollution control to the central government. In Part II, the Secretary of State was given the authority to set standards, grant appeals for consents and pollution notices, and prescribe regulations that determined the contents of the public registers. Of these powers, the ability to set standards through regulations was the most important, for it determined the level of river quality expected, which in turn determined the mix of discharge consents granted by the water authorities.

The permissiveness of the Secretary's powers over public registers was brought up in debate over Clause 34 of the original Protection of the Environment Bill. This was the Conservative bill introduced to the House of Lords in late November 1973, which was
subsequently lost due to a change in government in February 1974. The Labour Party's leader in the House of Lords, Baroness White, offered two amendments seeking to strengthen the clause. The first amendment argued that that language in the clause should be changed from "may" to "shall" to make it clear the Government's intention to make such regulations. Baroness White pointed out that the language "has induced an impression, which seems to be extraordinarily widespread, that the Government are not really firm in their intention in this matter."\(^20\)

Lord Aberdare replied for the Government that

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\text{I can give... an absolute assurance that the Secretary of State will be making these regulations. It is really only a matter of drafting...that it is normal phraseology to use the word "shall"...where an immediate duty is imposed; whereas "may" is not necessarily as strong, but it leaves a little bit of flexibility, for example on the question of timing.}\(^21\)
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Baroness White was unconvinced. She replied that

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\text{I am still not quite convinced that consistency is as essential as all that when people are going to misunderstand the proposed legislation. I should have thought that one could say, "provision shall be made by regulations for the maintenance by water authorities of registers which may contain particulars"—putting the permissive part of it at the end of the phrase rather than at the beginning. Of course, timing does not really matter in this particular Bill because...Clause 97 provides: "This Act shall come into force on such day as the Secretary of State may by order appoint; and...different days may be appointed...for such different provisions of this Act and for such different purposes of the same provision as may be specified in the order." Therefore, if the Secretary of State is not ready to make his regulations he does not need to activate this particular clause. But that he must do it at some point of time is what people want to be assured about.}\(^22\)
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The language, contrary to the response from Government, shows the permissive nature of the Secretary's powers. Baroness White was correct in her original assumptions. In the following year, after Labour's return to Government, she would help to redraft the Control of Pollution Bill in a manner that placed the responsibility of action squarely on the Secretary of State. While the drafting language of "may" and "shall" was retained in the second bill, the terms were used to reduce the permissiveness of the bill, by making responsibilities clear. For example, the final form of the COPA placed the responsibility for the maintenance of registers directly on the water authorities. The language states that "It shall be the duty of water authorities to maintain, in accordance with regulations, registers containing prescribed particulars of..." So, in this regard,
the change in government did indeed result in a strengthening of the bill. It is also interesting that the Conservatives did not challenge the language and it became part of the completed Act.

One issue that persisted through all phases of the debate related to the Bill's impact on the agricultural community. This was a critical interest for many members' constituencies. The record reveals that both parties sought compensation for farmers while in opposition but would deny that right while in government. In the initial Protection of the Environment Bill, Clauses 23 and 43 placed potential restrictions on farmers, if their agricultural practices led to water pollution. The water authorities were given powers to stop some agricultural practices that threatened the purity of water.

Lord Henley, speaking on behalf of the Liberal party, brought out the difficulties in the bill. He asked:

I think some of the difficult points may concern agricultural practices. When is a practice an established one? When is it a normal one? When is it a new one? When is it a dangerous one? Conditions are changing; and you have as an example the fact that pig slurry from, shall we say, 10,000 feeding pigs is no longer farmyard manure which can be easily spread on the land with good effect; it now is, in a way, a noxious liquid...which may find its way into the water courses. This is a difficulty which we shall have to clarify.23

Lord De Ramsey also criticized this portion of the bill for Labour,

I turn to the restrictions on good husbandry, both the general restrictions under Clause 23, and the particular ones under Clause 43. I cannot help wondering whether these restrictions are necessary or, if they are, whether they are practical. In any case, the evidence will be far from conclusive and a question of compensation must arise.24

In her winding up speech for the Conservatives, Baroness Young laid out the Government's position. She stated that

The noble Lord, Lord De Ramsey asked whether agricultural and other interests may be affected by Clause 23(5) and may ask for compensation. This is a matter which is currently under discussion. The powers in this clause are intended to deal with areas where for instance, special geological conditions make water resources, often underground water, particularly vulnerable. Any orders will of course be made only after full consideration, and only where it is clear that the activities to be controlled are a real threat and that pollution is occurring or will occur.25
This debate would continue during the committee stages of both bills in the House of Lords. While numerous arguments were made both for and against compensation, none of them were particularly convincing for the other side and the division continued.

During the second reading debate in the House of Commons on the Control of Pollution Bill, Margaret Thatcher, speaking on behalf of the Conservatives, criticized the very provisions that her party had supported earlier. She stated that

> I note the changes in the clauses on pollution arising from good agricultural practice. There is a fundamental dilemma here, that good husbandry may nevertheless lead to pollution. I see what has been done in the amendments to the clauses. It may be that some of my hon. Friends who are connected with the agricultural industry still feel it is not enough. As we know, the agricultural industry is going through particularly difficult times at present and may wish to pursue the question of compensation. I know of the reasons why we should treat agriculture in the same way as we treat industrial concerns. But equally, we realize that there is a difference, and hon. Members may wish to pursue this matter in Committee in regard to treating agriculture differently.  

Later, during the committee stage of the COPA, Mr. William Benyon, on behalf of the Conservatives, put forward an amendment that provided compensation where a good agricultural practice was discontinued as a result of a water authority notice. He argued that

> There seems to be no difference between a farmer who, being dispossessed of land because of the construction of a motorway, has to discontinue farming practices which he has indulged in for many years, and a farmer upon whom a notice under this clause is served. We are not attempting...to support dirty farming practices or to get away from the idea that the polluter must pay, but farming comes in a different category from industry and mining....

Mr. Gordon Oakes, replying for Labour, likened what the Conservatives were suggesting to a speeder who is paid for complying with the law. Mr. Ralph Howell replied that he could not follow the Minister's arguments. He stated that

> If a farmer is restricted from carrying on his livelihood he will suffer serious damage. If a farmer is prevented from applying nitrogen, that part of his business is ruined; just as much as if a motorway had been driven through his land. It is recognized practice to compensate for such disturbance in other spheres, and it must be recognized that it is impossible to carry on farming without the application of nitrogen and other manures. Something must be done to ensure that adequate compensation is paid to people who suffer because a notice has been served upon them.

Mr. Arthur Blenkinsop argued against compensation. He stated that

> This amendment raises important general principles. How far do we go in awarding compensation where there is a conflict of interest between the person concerned,...and
Mr. Gordon Oakes, speaking against the amendment on behalf of Labour reminded the House that

...when similar amendments to these came along during the tour of office of the Conservative Government they were resisted—not only on the grounds of the expenditure being open-ended, but also on the principle, that the polluter must pay and that pollution is an offense....The Labour Government, like their Conservative predecessors, recognize that farmers are in a different position from that of the rest of the community and that farmers may innocently pollute waters by adding various chemicals to the soil in their pursuit of agriculture.... We have gone further than the Conservative Government went. Under Clause 46...the Government have modified the Bill to include an even stronger safeguard for the farmer by making it plain that the Minister for Agriculture will be concerned with all applications for serving warning notices.... What the Opposition are asking for in their amendment is that compensation should be paid for not breaking a law. That surely is quite unreasonable.31

The question remained unresolved and the amendment was pushed to a division in the committee. The vote was tied, seven to seven, but was broken in favor of the Government by the chair, Labour's Mr. Bryant Godman Irvine.

But the story of agriculture was not over. During the report phase of the bill, the Conservatives again attempted to insert measures for compensating farmers. Mr. Ralph Howell, speaking for the Conservatives, reiterated the argument that restrictions in the bill would create severe hardships for farmers. He argued that the provisions would deter farmers from "using fertilizers too enthusiastically" which would hamper food production. Mr. Denis Howell, speaking for Labour, urged the House not to accept the new clause and advised against writing such an unlimited financial obligation into the bill. While he expressed sympathy for the farmers and their problems, he argued that this bill was not the proper vehicle to address them. He went on to assure the House that these provisions would be carefully applied. Adequate proof of pollution was required for their application, and the farmer had recourse to an appeals process to the Secretary of State.32
The new clause was not pressed to a division, as the Conservatives knew they did not have the votes necessary. However, the above example is illustrative of many of the political arguments that are found in the debates over the COPA. Both parties argued for or against various provisions while in control of the government yet changed their position while in opposition. This ambivalence may be nothing more than each party attempting to make political points against each other. More likely, it is symbolic of the widespread support throughout the House to pass this legislation, or a combination of these two factors.

It seems clear that all sides wanted to move forward. None of the divisive language that characterized the 1973 Water Act was present in the bill. One of the reasons for this support not expressed in the debates, but underlying the entire structure of Part II of both bills, was confidence in the Department of the Environment to adequately implement the measures consistently with British practices. The fears expressed by Labour over the powers of the Secretary of State disappeared once they were in control of the state apparatus and their own minister installed. The Conservatives for their part established the central structure of the Department of the Environment and never attempted to curtail the central powers given to the Secretary of State. Parliament was eager to pass this bill because, whatever its limitations, it was a significant step forward in pollution control. Both sides wanted to be perceived as supporting issues that had widespread public support. Thus, the bill passed through Parliament and received Royal approval in August of 1974. With the passage of the Act many details of implementation were left unresolved and in the hands of the Secretary of State for the Environment. Yet economic conditions in Britain changed so rapidly that some of the provisions were delayed or not implemented.

Implementation

The COPA stands out as the decade’s most significant environmental legislation. While it was important for providing a coordinated and comprehensive approach to pollution control in Britain, it was equally important for what it did not accomplish. Part II of the COPA, dealing with water pollution, arguably the most important portion of the Act, was not fully implemented until 1985. Part II was delayed for several reasons, among them capital expenditure constraints.
imposed by the Secretary of State on the RWAs, the traditional problem of having the RWAs as both polluters and pollution control authorities, and difficulties in prioritizing the RWA's multiple functions. During the intervening period, the RWAs were under statutory obligation to improve the quality of rivers and estuaries. However, pollution statistics demonstrate that river quality actually declined during the interval.

Delay in implementation of Part II produced many harmful effects, the most serious being an undermining of public confidence in the newly created system. One of the principles embodied by the Act was governmental openness about what pollutants were being released into the environment. This was to be promoted through publication of the details of discharge consents, enabling public assessment of the water environment. Part II stipulated that all new discharge applications were to be published and open to public comment for the first time. The RWAs had an obligation to consider any public comment and make their decision within 90 days. Both the objector and the water authority had rights to an appeals process through the Secretary of State. But the delay in implementation of Part II derailed publication of the public registers, which undermined public confidence in the new system.

The Secretary of State for the Environment could have directed the water authorities to produce and make public the registers any time after January 1976, when implementation of the Act was set. But neither Labour nor Conservative governments gave such directions, even in the face of criticism. One reason for this unfortunate result was that neither the politicians nor the RWAs wanted to be blamed for the continued deterioration of river quality, which they knew was taking place. From the position of the RWAs, the government did not provide them with the capital financing necessary to make improvements, especially in the construction of effluent treatment works that would have affected river quality. For the politicians, the economic crisis that befell Britain, spurred by the doubling of energy prices by OPEC in 1973, precluded large increases in spending; they were forced to shift resources into social welfare programs as a result of large increases in unemployment. The government also believed that it could not allow the RWAs to borrow, as that would only put additional pressure on financial markets, increasing trends towards higher interest rates that they were attempting to hold down.
Trends in the level of capital investment in sewerage and sewage disposal between 1958 and 1990 are very clear. In 1958/9 approximately £200 million was spent. This increased to a high of approximately £850 million in 1973/4, the year the RWAs were created. Investment then dipped precipitously to approximately £400 million in 1981/2. Thus, during the first seven years of COPA, capital investment dropped by more than half. Between 1981 and 1984 investment hovered between £450 and £475 million. Beginning in 1985 investment again increased and continued to improve to approximately £600 million in 1990/1. While this represented a welcome improvement, the 1990/1 level of investment was still approximately £250 million less than was spent in the peak year of 1973/4. If investment had stayed constant at 1973/4 levels, approximately £5,810 million more would have been invested between 1974/5 and 1990/1. The loss of capital investment is directly linked to a decline of river water quality during this period. RWAs found themselves in a situation where they were unable to make the improvements to sewage treatment facilities necessary to maintain effluent quality. Concurrently, demand for sewage treatment services continued to increase, due to continued growth and shifting of population resulting in a situation where the amount of human pollution produced exceeded the capacity of the RWAs. Even though there was drop in the industrial effluents being placed into rivers as a result of de-industrialization this was offset by the increase and concentration of human wastes. Improvements in capital investment only began after the Thatcher government hatched plans for the privatization of water services in 1984/5. This was an obvious effort to improve the regional water authorities so that they would be viable in the open market.

As a result of the steep decrease in capital investment in sewerage and sewage disposal the RWAs were forced to work with limited resources to fulfill their multi-purpose roles during a time of rising expectations. The strain revealed a fatal flaw in the structure of the RWAs themselves. That flaw was their dual role as regulator and polluter. RWAs were responsible for monitoring river quality and determining all aspects of discharges to the water environment. However, they also controlled discharges from sewage works that, in many cases, were the largest sources of pollution. The dual nature of the RWAs embodied the traditional British
approach of combining multiple activities under one authority. The logic inherent in this
approach was that all aspects of water regulation could and should be handled by the same
authority. However, this approach assumed that all activities of RWAs would receive the same
priority and were compatible. Because the RWAs were operated by many of the same
individuals who had staffed the previous river authorities, other issues such as water supply and
flood defense predominated. Given the financial constraints imposed by the central
Government, budgets in the new RWAs were tight and water pollution efforts received less
attention and funding than other concerns such as water supply.

Implementation of Part II was continually pushed into the future by both Labour and
Conservative governments between 1974 and 1985. Both were able to accomplish this task by
simply not directing their Secretary of State to make regulations that would have brought Part II
into force. Both governments were complicit in this regard and the evidence of their inaction on
the water environment is clearly shown in river quality surveys.

The survey record on water quality is as discouraging as the record of capital
investment. Water quality surveys are important for a number of reasons. Most importantly,
they show the aggregate levels of pollution and changes in quality to the public. Secondly, they
are used by government to set pollution control priorities. Surveys of water quality in rivers,
estuaries, and canals were initiated by government in 1970\textsuperscript{35} and have been conducted every
five years since to monitor and assess progress in pollution control. They deserve recognition as
a positive step in the evolution of government policy towards water pollution control. However,
what they have shown is disturbing. Examination of the surveys of 1970\textsuperscript{36}, 1975\textsuperscript{37}, 1985\textsuperscript{38}, and
1990\textsuperscript{39} show the deterioration in pollution control linked to under-capitalization. Overall, the
surveys showed no net changes between 1970 and 1975. However there was significant
decline in water quality between 1975 and 1985. The 1990 survey confirmed the downward
trend.

The main import of the 1990 survey was that, while the proportion of inland waters of
either “good” or “fair” quality was high (89 percent for rivers), deterioration continued despite de-
industrialization and the efforts of the RWAs. This trend was disturbing because it demonstrated
that the RWAs did not have adequate controls over the water environment to prevent backsliding which they should have been able to prevent via the discharge consent process. While 11 percent of river lengths were upgraded, 15 percent were downgraded for a negative 4 percent result for the five-year period 1985-90. This was an increase in the negative trend of two percent for the period 1980-85. The 1990 survey shows that in eight out of ten regions, the net changes were relatively small, though about equally divided between four regions improving, and four regions declining.  

Table 5.1
Percentage of river length in each classification 1990

<table>
<thead>
<tr>
<th>Region</th>
<th>1a</th>
<th>1b</th>
<th>2</th>
<th>1a, 1b, &amp; 2</th>
<th>3</th>
<th>4</th>
<th>3 &amp; 4</th>
<th>Total (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglian</td>
<td>8</td>
<td>49</td>
<td>35</td>
<td>92</td>
<td>8</td>
<td>0.3</td>
<td>8</td>
<td>4328</td>
</tr>
<tr>
<td>Northumbria</td>
<td>60</td>
<td>26</td>
<td>11</td>
<td>97</td>
<td>3</td>
<td>0.2</td>
<td>3</td>
<td>2801</td>
</tr>
<tr>
<td>North West</td>
<td>45</td>
<td>14</td>
<td>20</td>
<td>79</td>
<td>16</td>
<td>5</td>
<td>21</td>
<td>5323</td>
</tr>
<tr>
<td>Severn-Trent</td>
<td>15</td>
<td>40</td>
<td>32</td>
<td>87</td>
<td>11</td>
<td>2</td>
<td>13</td>
<td>5721</td>
</tr>
<tr>
<td>Southern</td>
<td>23</td>
<td>47</td>
<td>22</td>
<td>92</td>
<td>7</td>
<td>1</td>
<td>8</td>
<td>2185</td>
</tr>
<tr>
<td>South West</td>
<td>17</td>
<td>35</td>
<td>30</td>
<td>82</td>
<td>17</td>
<td>1</td>
<td>18</td>
<td>3037</td>
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<td>Thames</td>
<td>16</td>
<td>45</td>
<td>32</td>
<td>93</td>
<td>7</td>
<td>0.3</td>
<td>7</td>
<td>3530</td>
</tr>
<tr>
<td>Welsh</td>
<td>54</td>
<td>32</td>
<td>8</td>
<td>94</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>4647</td>
</tr>
<tr>
<td>Wessex</td>
<td>28</td>
<td>32</td>
<td>34</td>
<td>94</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>2622</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>39</td>
<td>33</td>
<td>14</td>
<td>86</td>
<td>11</td>
<td>3</td>
<td>14</td>
<td>5787</td>
</tr>
</tbody>
</table>

Table 5.2 Percentages of river length changing class, 1980-90

<table>
<thead>
<tr>
<th>Region</th>
<th>1980 to 1985</th>
<th>1985 to 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up</td>
<td>Down</td>
</tr>
<tr>
<td>Anglian</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Northumbria</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>North West</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Severn-Trent</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Southern</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>South West</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>Thames</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Welsh</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Wessex</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>Yorkshire</td>
<td></td>
<td>+2</td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Against the background of small changes were two cases of significant deterioration in the Thames and South West regions (see Table 5.1). Of the river lengths in the Thames region, fifteen percent rose in classification while eighteen percent moved downwards, for a net decline.
of three percent between 1980 and 1985. The Thames Water Authority argued that these changes indicated a slight net decline in river quality after 1980, however, canal water quality showed improvement, and there was no change in estuarial quality. Some forty-five percent (73 km) of canal length had improved while only five percent declined. The majority of class changes were to, or from, adjoining classes.

The power of capital investment can be seen in the survey. Four km of the Ingrebourne (a tributary located southeast of London) improved from Class 3 to Class 1B as a direct result of improvements to the sewer system serving the Brentwood Sewage Treatment Works.

The Thames River Authority argued that the majority of changes in classification were caused by non-specific environmental influences. The rest of the changes could be attributed to increased urbanization. The specific problem faced by the Thames River Authority was maintaining effluent quality at sewage works that experienced ever-increasing flows. Various river stretches in the Thames valley (all flowing into the Thames) showed deterioration due to poor quality effluents. They included seven km of Bull Brook, twenty-one km of the Cut, seventeen km of the River Cherwell, one km of the River Lee, eighteen km of the River Loddon, eight km of the River Ray, and seven km of the River Thames. Sixty-six km of the River Wey deteriorated from Class 1B to 2 due to the failure of several sewage works to meet their ammonia standards. Two points are significant about these declines. The first is that all of the declines (according to the Thames Water Authority) are related to the production of lower quality effluents from sewage treatment plants, not from increased discharges from industrial polluters. The second is that the declines could easily have been prevented, and possibly improvements made, if government had made the capital investment in sewage treatment promised in the 1970s.

The deterioration continued between 1985 and 1990 despite privatization by Mrs. Thatcher's government. The 1990 survey showed that only nineteen percent of river lengths moved upwards in classification while thirty-three percent moved downwards, for a net decline of fourteen percent.
Comparison of the 1985 and 1990 surveys is misleading because they used separate methodologies. In the Thames region over half of the changes in category in the 1990 survey were due to more extensive monitoring, which may have simply revealed deterioration that had not been noticed in 1985. Another influence may have been low river flows due to drought, which would have affected the total amount of water flowing through the river and thereby affected the pollution capacity of the river.46

The surveys also showed that the causes of river deterioration were varied and localized. Examination of the Thames and Southwest show noticeable differences. The Thames region is densely populated and highly developed around a river heavily used for multiple purposes. The dominant influences in the region are urban. As shown above, the decline in quality was directly attributable to urban sewage. In contrast, the Southwest is more rural, has few large towns, much coastline, and considerable appeal as a vacation spot. Yet the Southwest also showed river deterioration, which suggests pollution from diffuse sources primarily associated with agriculture. The surveys clearly demonstrate a decline in water quality between 1974 and 1990, but as shown not from the same causes.

One reason why RWAs failed to achieve net improvements in river water quality between 1985 and 1990, during implementation of COPA, was due to a relaxation of standards and concealment of the results. In 1974 Parliament voted to establish open registers under Part II of the COPA, which would contain the details of discharge consents and sampling results. The responsibility for the new water authorities then operating the sewage works lay with government ministers—the very ministers who were restricting investment needed to improve the sewage works and other infrastructure. Thus under Labour and Conservative ministers in turn, the creation of public registers was postponed, for no less than eleven years after Parliament legislated for it.

Two technical points on how limits on discharges are actually expressed should be briefly noted here, as they influence perceptions of pollution control effectiveness. First, limits may be expressed as uniform emission standards (UES) or environmental quality standards (EQS). A UES would set uniform limits for the entire nation, a region or river basin that no
effluent discharge to water may contain more than, for example, 20 parts per 1000 of this or that substance. The EQS system would set limits in individual permits for each discharge in its specific location, taking account of the level of dilution available in the river and the quality of water already prevailing there. In economic terms, the EQS system has the advantage of flexibility: if the river can dilute more pollution without ill-effects, it is offering a natural opportunity that the nation may take advantage of. However, the EQS system may come under pressure when later would-be dischargers want larger shares of capacity that is already reduced by permits granted to others. Moreover, when permits are negotiated individually (and concealed as they were until 1985), a discharger may feel there is little wrong, or little chance of exposure, in frequently breaching the limits.47

The second technical difference is in the legal and practical effects of how the limits (in UES and EQS formats) are actually expressed. If the limits are absolute, any violation of the limit is readily recognizable as an offense, though no prosecution may follow. Most statutory limits are expressed in absolute terms because certainty is important for social as well as legal reasons. But limits may be expressed in percentile terms. This has the effect of allowing violations of the stated limit for a proportion of a stated period, or, more precisely, in a proportion of the sampling checks made in that period. Percentile limits may be useful in indicating the standards that must be achieved “on average”, which can be significant for measuring continuous discharges of effluent and their impact month after month. However, these limits have the drawback of setting no limit on peak pollution loads during a period of time or samples outside of the percentile limits. For example, peak pollution loads can deoxygenate a portion of the river, causing “fish kills” which would not be revived by establishing lower levels of pollution afterwards. Thus a percentile limit applying to ninety-five percent of samples may sound almost as tough as an absolute one applying at all times. The key difference, however, is the absence of any limit for some of the time.

A further drawback is the increased difficulty in identifying when an offense (as distinct from an outright violation) is committed. If five percent of samples are allowed to exceed the ninety-five percentile limits specified in any given period (say one year), no single sampling result
can be said to show a breach of the permit until it is known whether other samples have failed often enough to use up the defined quota. This depends on the number of samples taken as well as the number failing. Thus uncertainty prevails most of the time. Enforcement proceedings cannot begin until results are accumulated to show the full number of samples beyond the limits. For some purposes it is helpful to set absolute and percentile standards together. But to be easily understood by dischargers and the public, and for enforcement procedures such as warning notices or prosecutions to be issued appropriately, percentile limits can be very confusing and difficult to enforce.48

The use of different means of expressing limits helps to explain one of the worst episodes of government administration of pollution control. In 1985, when Part II of the COPA was implemented, the Department of Environment finally moved to end the concealment surrounding the discharge consent system, prevailing since its inception in 1951. While late, this move could have represented an important step: a public more concerned about the water environment was for the first time to be offered access to the relevant data. As effective environmental protection depends on the everyday awareness of individuals, this was an obvious opportunity for a constructive exercise in public information at a suitable moment. Instead, the Department of Environment was more worried about the public seeing just how many sewage works were operating illegally beyond their pollution limits, which was embarrassing to the government. Moreover, as stated previously, much of the poor performance was attributable to restrictions on capital expenditure imposed on the RWAs by the central government, or to reductions in the staffing of sewage works. The Thatcher government chose this time to alter the discharge consents of the larger sewage works operating under absolute numerical limits so the public would not see the illegalities. The key change made to the consents for sewage works operated by the RWAs (but no others), was to substitute percentile limits for the absolute ones then in use. Thus illegality was veiled in statistical obscurity. Without a "look-up" table, showing the number of samples taken and the number of violations allowed, it was impossible for the public to easily understand the information.49
This was a betrayal of the worst sort. It sought to outsmart the public by obfuscating the very facts presented for the first time. Moreover, it had no countervailing advantages. Its first effect was to make the illegal operations of sewage work discharges less obvious and thereby less embarrassing for the government and the Department of Environment. Its second effect was to undermine respect for the pollution control system that had been established.

The relaxation of restrictions came to have a new significance as preparations for privatization gathered speed from 1987 onwards. The prospectus required of each new private water company had to show information would-be investors might regard as material to their investment decisions. Data on compliance with discharge consents were thus critically important to help potential investors judge the amount of new capital required to achieve compliance. Thus, evidence of recurring illegality in sewage works discharges could not be left unclear. Yet, despite the change to percentile limits, many of the water authorities failed to meet even these lower standards, and this too could hardly be exposed. Thus, the first bad decision, shifting reporting data to percentile limits, was compounded by a worse decision: the RWAs should apply for further relaxation of numerical consents sufficient to bring even the poor performance of their troubled sewage works within the bounds of legality. The scale of such breaches, even on the basis of percentile limits, (Table 5.2) was reduced between 1986 and 1988 as consent limits were generally eased.

Table 5.3  Sewage works in breach of consent

<table>
<thead>
<tr>
<th>Water Authority</th>
<th>1986 No.</th>
<th>1986 %</th>
<th>1988 No.</th>
<th>1988 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglian</td>
<td>309</td>
<td>40</td>
<td>210</td>
<td>27</td>
</tr>
<tr>
<td>Northumbria</td>
<td>37</td>
<td>19</td>
<td>26</td>
<td>15</td>
</tr>
<tr>
<td>North West</td>
<td>62</td>
<td>14</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Severn-Trent</td>
<td>179</td>
<td>23</td>
<td>116</td>
<td>16</td>
</tr>
<tr>
<td>Southern</td>
<td>54</td>
<td>19</td>
<td>41</td>
<td>15</td>
</tr>
<tr>
<td>South West</td>
<td>55</td>
<td>29</td>
<td>68</td>
<td>29</td>
</tr>
<tr>
<td>Thames</td>
<td>67</td>
<td>18</td>
<td>60</td>
<td>16</td>
</tr>
<tr>
<td>Welsh</td>
<td>112</td>
<td>17</td>
<td>110</td>
<td>15</td>
</tr>
<tr>
<td>Wessex</td>
<td>39</td>
<td>14</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>88</td>
<td>23</td>
<td>61</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>1002</td>
<td>23</td>
<td>751</td>
<td>17</td>
</tr>
</tbody>
</table>

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An independent analysis of how ministers set about legitimizing this situation was provided by the respected ENDS Report (no. 171):

In 1988, the number of non-complying works fell to 751, or 17 per cent of those with numerical consents. But improvements are not being achieved at anything like the rate necessary to bring all works into compliance by the November (1989) deadline. Last November (1987), the DoE therefore encouraged the authorities to apply for relaxed consents, on an interim basis for smaller sewage works.

[At mid-April 1989] a total of 1,033 applications have been submitted, but the number is likely to rise well above 1,100...The number is significant because the DoE told the authorities in January that the government wished "to restrict relaxations below 1,000", no doubt because it is keen to avoid embarrassment as the Water Bill continues its passage through Parliament.

The large number of applications will also pose extreme difficulties for HMIPs water branch [the part of DoE dealing with application], which is short of support staff but must take decisions before August when its work passes to the NRA.

The proportion of sewage works for which relaxations were requested ranged from three percent in the Southern region to twenty-two percent in Yorkshire and Thames, and twenty-four percent in Anglia. The national average was sixteen percent. The ENDS Report quoted industry sources as indicating that applications were made where works were not at risk of failing consents—but where relaxations were still welcomed. These were refused by Her Majesty's Inspectorate of Pollution (HMIP) as were relaxations in cases where excessive trade effluent loads were being accepted, which were described as taking money fraudulently at the expense of the environment. As a part of the DoE due to emerge with a wider pollution control role, HMIP had an awkward task to perform. HMIP began imposing absolute limits again, and agreed with the National Rivers Authority Advisory Committee (NRAAC, the precursor of the NRA central office), rather than with the discharging authorities, in arguments about where these levels should be set.

Putting the system of discharge consents back on a basis that could command respect became the NRA's most urgent task after it was launched in 1989. The DoE invited the NRA to begin its work independently, but with agreed upon terms of reference. The Review of Discharge Consents and Compliance was the first review of the discharge consent system since concealment was ended and public registers established (1985), as well as the first open
independent review since 1975. A group of politicians, government civil servants, water industry officials, and academic experts collectively known as The Compliance Group was established to handle the review by the Department of the Environment. It was hoped that they could seriously consider the system for the first time as a means of communication and accountability between dischargers, the NRA, and other interested parties. The Group's report, published in July 1990 as Discharge Consent and Compliance Policy: A Blueprint for the Future (also known as the Compliance or Kinnersley Report), recommended that both the work of the NRA and the dischargers should be subject to more scrutiny.

The Compliance Group's recommendations concentrated on four main issues:

1. The wording of application forms, consents, and the way limits and conditions were expressed, to make them easier to understand and less ambiguous.
2. The limits that consents specify for compliance; absolute limits would be retained as the key controls, plus percentile limits where relevant. Limits on ammonia would be included more widely and consistently.
3. Proposals for more effective sampling and monitoring, including scope for automatic monitoring where practicable (and what changes in parameters might facilitate that in the longer term). Self-monitoring by dischargers can hardly be relied upon as a main method while the courts resist convicting defendant companies on their own evidence, but self-monitoring can be welcome as a real sign of dischargers' being committed to supervise their effluents.
4. The motivation of dischargers to provide up-to-date information on effluents to the NRA and to allocate clear responsibility for the supervision of discharges to named managers. This could improve internal and external liaison and accountability without making individuals liable to prosecution.

The Compliance Group's recommendations could only pave the way for improvements in the discharge statistics that the NRA inherited. At the time of the review, the best available figure for the number of discharge consents in operation (nearly 140,000) was 50,00 higher than the actual total (established by mid-1991 at 86,000). The fact that this became known was attributable to the design of the NRA, which as a national body was able to collect and present all of the data, and as another benefit of the end of concealment. But it also followed that accuracy and openness required more effort and more resources for both staffing and information technology if they were to be translated into effective action.

It was not until 1991 that the entire structure of water pollution control required by Part II of the COPA was fully implemented, fifteen years after it was intended. By then, the structure of the water industry it was designed to regulate had been transformed. However, the COPA did
transfer regulatory power over water pollution to the national government, specifically through the powers of the Secretary of State for the Environment. This transfer eventually allowed for implementation of more stringent standards resulting in better water quality in the 1990s. Many of these changes were driven by British membership in the European Union (EU), the subject of the next chapter.


5. Ibid.

6. Ibid.

7. Ibid.

8. Ibid.

9. Ibid.

10. Ibid., pt. IV.

11. Ibid.


13. Control of Pollution Act, Part II.

14. Ibid.

15. Ibid.

16. Ibid.

17. The Minister of Agriculture, Fisheries and Food and the Secretary of State for Scotland approve codes of recommended agricultural practice.

18. Control of Pollution Act, Part II.

19. Ibid.


21. Ibid., 187-188.

22. Ibid., 188.


24. Ibid., 68.

25. Ibid., 104.


28. Ibid., 57-58.

29. Ibid., 58.

30. Ibid., 58-59.

31. Ibid., 60-61.


33. All figures relating to sewerage and sewage disposal are calculated in constant 1985-86 prices.


35. An earlier survey was conducted in 1958, but it was not published at that time.


40. Ibid.
42. Ibid., 23.
43. Ibid.
44. Ibid., 23-24.
45. Ibid., 24.
48. Ibid.
50. Ibid.
51. Environmental Data Services Ltd (ENDS) was established in 1978 to provide independent and reliable intelligence on environmental affairs for professionals in the business, regulatory, academic and campaigning communities. Since then, through the monthly publication of The ENDS Report and a series of individual studies and surveys, ENDS has built up a reputation for accuracy, integrity and relevance to professional needs.
52. Her Majesty’s Inspectorate of Pollution (HMIP) was formed by the 1990 Environmental Protection Act, which created a system of Integrated Pollution Control (IPC) that HMIP would oversee. IPC includes several interlinked approaches. For substances prescribed as dangerous for disposal to air, land and water, generation of wastes was to be brought to nil or as close to nil as possible. This was to be accomplished by using the Best Available Technology Not Entailing Excessive Cost (BATNEEC).
CHAPTER VII

THE IMPACT OF THE EU ON BRITISH WATER POLLUTION CONTROL

The preceding chapters have reviewed the development and refinement of water pollution controls to illustrate how deteriorating conditions and public agitation prompted Parliament to redefine and transfer authority over the environment to increasingly higher levels, from the local to regional and then national level. The transfers each promised solutions to Britain's pollution problems, but events failed to fulfill them.

Concurrent with Britain's decision in the early 1970s to locate authority over pollution control at the national level, its acceptance into the European Union (EU) indirectly transferred authority over the environment to the supranational level, where EU institutions began to formulate policies in 1973.¹ This development produced conflicts between Britain and other member states: Britain was disparaged within the EU for poor compliance with environmental policies, most noticeably during the Conservative government of Margaret Thatcher (1979-1990), when a new focus on implementation became primary within the Union. This chapter will examine the impact of the transfer of authority from Britain to the EU through examination of several pieces of European Union legislation that impacted the water environment in the 1970s. Specifically, these were the surface water directive (75/440), the 1976 bathing water directive (76/160), the 1976 dangerous substance directive (76/464), and the 1980 drinking water directive (80/778). All four remain among the most important pieces of EU water law so far adopted and all had an impact on the British water environment.

A vast body of literature on the European Community has been compiled over the past thirty years. Most is general in nature, such as John McCormick's The European Union: Politics and Policies,² presenting an overview of the historical development of the EU. Other surveys have a decided editorial slant, such as John Pinder's European Community: The Building of a Union,³ which views EU historical development as leading inextricably towards a federal system. Still others, such as Juliet Lodge's The European Community and the
Challenge of the Future, are anthologies that present a number of specific case studies on various policies and workings of the EU. Works on environment policy and water are far fewer in number but are growing. Examples include Anthony Zito's Creating Environmental Policy in the EU, and Stanley Johnson and Guy Corcelle's The Environmental Policy of the European Communities, Tim S. Gray's UK Environmental Policy in the 1990s, Christopher Miller's Environmental Rights, and Albert Weale's Environmental Governance in Europe.

The EU regulates member states' natural environments through a variety of means. All major organs of the EU, the Council of Ministers, the European Commission and the European Parliament have roles in formulating environmental policy. The Commission's Environment Directorate General, created in 1981, is responsible for preparing and implementing environmental laws and policies. The European Court of Justice interprets Treaties and subsequent EU legislation, but it has limited enforcement powers, save the recent ability to fine member states for non-compliance.

The relationship between the EU and member states is complex. In one sense it is a dialectic whereby member state participation empowers the center and the center in turn directs the mutually beneficial activities of the community. But like the spokes on a wheel, not all are equal in strength or durability. Member states have a responsibility to give effect to EU law, generally through legislation, through their own legal systems. However, this action provides opportunities for others to participate in the process of policy formation and implementation with consequences for those policies. In many instances, Britain did not initially fulfill its obligations to the EU in regard to environmental measures, which had consequences not only for the environment, but also for the integrity of Britain's membership within the EU.

EU power derives from the willingness of the member states to give up their individual prerogatives for the "good" of the union. Each member state, represented in EU institutions, has the ability to influence events and help shape policies prior to reaching decisions. However, once decisions are reached, each member is required to fulfill its' obligation to the EU by implementing the agreed-upon measures, whether they were in
agreement or opposition during the debate phase of the policies construction. Only in this manner, can multi-national organizations operate effectively for the benefit of all. In Britain's case, especially in regard to the implementation of environmental measures, this obligation has not always been fulfilled in a consistent manner that caused it difficulties with its EU partners and the organs of EU institutions charged with ensuring its implementation. The problem has many sides but can be seen to derive partly from the evolving nature of EU environmental policies, partly in British attitudes towards the EU and vise versa, partly due to the nature of British environmental practices, and partly to the evolving nature of British politics and its subsequent relationship with the EU.

The British relationship to the EU has been influenced by internal politics at home.10 Both the Labour and Conservative parties have been split by Britain's turn towards the EU and this has, more than anything else, influenced British attitudes towards its membership. When the European Coal and Steel Community (ECSC) was initially proposed Clement Atlee's Labour government (1945-51) declined to participate. Similarly, when the initial European Economic Community (EEC) was proposed, Anthony Eden's Conservative Government (1955-57) also did not respond favorable, but instead attempted to convince the other European states to form a looser free-trade area. By 1961, the situation had changed. Eden's Conservative successor, Harold Macmillan (1957-63) attempted to make application for membership but was rejected by France's Charles de Gaulle, which was followed by another application for membership in 1967 by the first Labour government of Harold Wilson (1964-1970), which also failed.11

As the debates over membership continued, both parties became more divided over time, the Labour Party more seriously than the Conservative Party. Edward Heath's Conservative Government (1970-74) was successful in negotiation British entry into the union but he was criticized by the right wing of the party, mostly vigorously articulated by Enoch Powell. In order to head off such criticism, and to convince the British public of the advantages of membership, Heath made the creation of a EU regional policy a high priority in
the hope that it would bring tangible benefits to the British economy. This is just one example of British policy inside the EU being driven by domestic policy considerations.12

Another, more obvious example was provided by Wilson’s Labour Government (1974-76). While in opposition, the Labour Party had been racked by dissention, and EU membership had been at the heart of the problem. Several of Wilson’s Cabinet ministers from 1964-70 were committed to membership. They included Roy Jenkins, Shirley Williams, Roy Hattersley and George Thomas. But a majority of the party was still opposed, and the pressure from this majority meant that Wilson could not give unqualified approval of the entry negotiated by Heath. The result was a compromise whereby the Labour Party opposed entry to the EU on the terms negotiated by the Conservative government. Labour went into the 1974 elections committed to renegotiating the terms of entry with the threat (or promise) of withdrawal if satisfactory terms were not agreed.

Upon winning the 1974 elections, Labour then proceeded to fulfill its promise of renegotiation, which seriously disrupted the other business of the EU where more important issues, other than Britain’s terms of entry, were on the agenda. Labour’s activities involved a great deal of posturing and nationalist rhetoric from the government. However, it should be noted that this rhetoric, while strong, ultimately did not involve changing the essential terms of the Treaty. Nevertheless, these terms were put to the British people in a referendum, with a recommendation from the government that they be accepted, which they were.

The idea of the referendum originated from the left of the Labour Party, and was pressed on Wilson on the assumption that it would lead to a rejection of membership. The ultimate two to one vote in favor of membership did not last long. Britain had joined at a bad time, when continuing economic difficulties at home could and were conveniently blamed on the EU. While Wilson’s Labour opponents had to accept the verdict of the referendum, they lost no opportunity to attack the EC. Wilson accepted these attacks as they diverted attention away from his failure to solve economic difficulties at home. He himself continued to take a strongly nationalistic line in EU negotiations, as did his Labour successor James Callahan (1976-79). The balance of forces within the Labour Party meant that anti-EU forces could
make the most noise, and a cooperative attitude was not to be expected of Britain, which in turn naturally strained the relationship.\textsuperscript{13}

This position did not change when the Conservative government of Margaret Thatcher came to power in 1979. In order to confirm the support of the nationalistic right wing of the Conservative Party, which had supported her bid for the leadership, Thatcher chose to tackle the very real problem of the disproportionately high British contributions to the EU budget in a confrontational and self-righteous manner. While the other members accepted that there was some claim for a rebate, they were put off by Thatcher's demand for "our money back," and her demand that they accept structural changes to the budget that amounted to another renegotiation of the terms of entry.\textsuperscript{14}

By 1984, the budgetary issues had been settled in Britain's, but this did not translate into meaningful cooperation. Thatcher always remained careful not to lose the support of her back-benchers, and this, coupled with her own personal prejudice, meant that Britain remained an awkward and reluctant participant in EU affairs. While Thatcher's successor John Major (1990-95) was committed to membership and wanted to change the relationship from a negative to a positive position, he suffered from "Euro-skeptics" amongst his own backbenchers, those same individuals who Thatcher had to contend who had the support of the majority of the Party's rank and file members. The backbenchers surprisingly were prepared to exploit their own Party's parliamentary weakness to make their voices heard on Europe, and their tone was highly negative.\textsuperscript{15}

John Major's Government was responsible for negotiating the Maastricht Treaty. This Treaty was designed to bring the member states closer together and from a federated union. Major was forced to keep a close eye on what his own Party would accept. Thus he had to refuse the social chapter of the Treaty, which became a social protocol binding all of the other members except Britain. He had to insist on the right of Britain to opt out of the eventual monetary union. Regardless of Major's own beliefs on these issues, he was unable to make concessions, or to prevent Britain appearing isolated, because of the domestic constraints that bound him. Despite arguing that the Treaty was a success for the British view of Europe,
he had difficulty in getting the Treaty ratified and had to rely on Opposition votes to succeed. Major's problems continued in this vein through his entire tenure as Conservative Party leader. It even resulted in a challenge to that leadership in 1995 by leading Euroskeptic John Redwood. While Major prevailed, Redwood's respectable vote marked him as a figure who would have to reckoned with on the Tory backbenches. Within the Cabinet, Major had similar problems with Michael Portillo and had to transfer him from the EU sensitive post of Secretary of State for Employment to Defense, but even here he managed to embarrass Major with a Brussels bashing speech at the 1995 Conservative Party conference.

Thus, both political parties suffered from the ambiguity of large sections of their own parties. While the majority of the British electorate has remained in favor of membership since the early 1970s, this has not translated into widespread support within the parties themselves. The internal schisms meant that in numerous cases, both parties have had to appeal to the opposition to pass important EU measures. This has complicated British membership inside the EU because she was unable to speak with one voice like the majority of the other member states. It should not be surprising then, that the other EU members have questioned Britain's commitment and become tired of her incessant complaining. While none of these issues have had a direct impact on environmental issues, it has colored the entire relationship and help set the background for the debates surrounding British implementation of EU environmental measures.

The Evolution of EU Environmental Policy

When Britain joined the EU, it coincided with the historical emergence of concern over the state of the world's environment. As discussed previously, Britain had already felt the upsurge of concern over the environment and had responded through domestic legislation. As Britain entered the EU she felt secure in her position as a nation with a solid history of addressing environmental problems. Whatever the differences between that record of legislative accomplishment and the realities of pollution control, Britain perceived no threat from the EU in this area. The environment was not part of the discussions regarding Britain's entrance into the EU, and at the time, no formal environmental policy existed. The EU would
not take its first steps into this area until 1972. The one outside event that triggered policy formation was member state participation at the United Nations Conference on the Human Environment held at Stockholm, Sweden, June 5-16 1972. Participants drafted and signed an official Report that pledged their nations to taking actions to safeguard the environment. Participants included all EU nations and Britain.

John McCormick has argued that the Stockholm Conference had a number of important results. It confirmed trends that viewed the human environment holistically. Intellectual discourse had evolved from simple conservation and preservation to a holistic view of human management of ecosystems. In addition, there was a compromise between the zeitgeists of the developed and less developed nations. The compromise forced the developed world to recognize the needs of developing nations to manage the environment in terms of economic development. The creation of the United Nations Environment Program, even with its limitations and deficiencies, was able to move the world environmental agenda forward in a fashion that was acceptable to the majority of member states. Lastly, the Conference Report presented a blueprint for national action. Soon thereafter the EU decided to adopt its own environmental policy, which largely followed the model outlined in Stockholm.


The Programs detail the environmental policy intentions of the Commission and Council of Ministers. By varying degrees, and typically after a considerable period of time, policy intentions are translated into a series of council decisions in the form of regulations, directives, recommendations and non-binding opinions. These are translated into member-state law to achieve formal compliance, later followed by practical compliance (i.e. implementation on the ground). The interval of time from the first statement of intention to
practical compliance can be substantial (in excess of ten years in some cases) and the content of the original decision with its associated costs and benefits can be transformed in the process.

The first and second programs were largely focused on preventive actions to safeguard the environment and working to stop disparate national policies from becoming barriers to trade. The first action program was a long and comprehensive document beginning with a general statement delineating the objectives and principles that would form EC environmental policy. The Commission would take immediate action to: reduce pollution and nuisances; improve the natural and urban environments; deal with environmental problems caused by the depletion of certain natural resources; and promote awareness of environmental problems and education.

The third program (1982-86) marked a significant shift from the previous two as it called on members to develop an overall environmental strategy for their future development. This shift was influenced by and mimicked the adoption of the U.N. World Conservation Strategy. Environmental issues were raised from a secondary to a primary level in community decision-making through the introduction of integrated environmental management practices. Members were asked to consider the environmental implications of their development decisions. The environment was given equal weight in the EU decision-making process regarding transport, energy, industry, and agriculture. This new emphasis removed the environment as a potential block from the goal of completing the common market.

The fourth program (1987-92) was adopted in 1987, the same year the Single European Act (SEA) was passed. It was based on the principles written into the new environmental chapter of the SEA and introduced a number of specific actions for various sectors (air, water, noise, etc.). In addition to reconfirming regulatory legislation using the command and control approach, economic instruments, such as taxes and licensing fees were included for the first time. The emergence of global problems such as ozone-layer...
depletion and climate change attracted greater attention to the international dimension of EU environmental policy.

The gradual extension of EU competence into the environmental policy area was not explicitly denied by the treaties and was made possible through a broad and dynamic interpretation of the Treaty of Rome. The Preamble charged member states with ensuring "the constant improvement of the living and working conditions of their peoples." Article II expressed the objective of a "harmonious development of economic activities [and]...an accelerated raising of the standard of living"—neither of which are achievable in worsening environmental conditions. Prior to the SEA EU environmental policy was based on Article 100 or Article 235 of the Treaty of Rome. Article 100 provided a legal base for the harmonization of national laws that directly affect the establishment of the common market. In most cases, the economic link necessary to invoke Article 100 was easy to prove since environmental regulations usually have a direct impact on industrial production and commercial activities. Where this link could not be established, for example with the Protection of Wild Birds, Article 235 remained a last-resort clause. It allowed the EU to take action to attain objectives for which no powers were clearly granted. While this caused much debate, the European Court of Justice repeatedly supported the incremental expansion of EU powers over the environment. However, policymaking within this framework was limited by two factors; all environmental measures had to have economic links and unanimity was required for the adoption of measures.

The Single European Act (SEA) amended the Treaty of Rome and specifically set out the EU's role in environmental policy formation. While Articles 100 and 235 remained valid, their importance diminished rapidly as a result of the incorporation of articles (130r-t) under a new "environment" chapter that removed remaining doubts about the Union's competence to formulate environmental policy.

Article 130r defined the objectives, principles and guidelines of the common environmental policy and the EU's role in international cooperation. While "environment" was not defined, a number of policy objectives were. They are: 1) To preserve, protect and
improve the quality of the environment; 2) To contribute towards protecting human health; and 3) To ensure a prudent and rational utilization of natural resources.

The EU's environmental policy was based on the prevention principle, the polluter-pays principle and the principle that "environmental protection requirements shall be a component of the Union's other policies". In preparing environmental legislation the EU "shall take account of" four parameters. These were; 1) available scientific and technical data, 2) environmental conditions in the various regions of the EU, 3) the potential benefits and costs of action or of lack of action, and 4) the economic and social development in the EU as a whole and the balanced development of its regions.

The first two parameters were included at the request of the British government. This is important to note, given that the British government had for many years refused to accept the claim that scientific evidence existed which proved that emissions originating from British territory were causing acid rain in Scandinavian countries. The second parameter suggested that emissions of pollutants that dispersed rapidly might not need to meet the same strict standards as others. This interpretation, suggesting flexibility in approach, was strongly opposed by environmental interest groups and conflicted with the generally agreed principle contained in the action programs that environmental conditions should not worsen in any region of the EU. The fourth parameter was added to the original Commission proposal on behalf of the Irish and Greek governments, who as poorer members were worried that strict environmental standards would hamper their economic growth. Areas of industrial decline, a major focus of the EU's regional policy, face severe pollution problems. The temptation to use them as "pollution zones" by the member states had to be resisted by regional restructuring plans.

The principle of subsidiarity, contained in Article 130r, created the most controversy due to its vagueness. Under the principle the EU should take action only if the desired result could more efficiently be attained at the EU rather than the local level. Since the Danish referendum in 1992 this principle has achieved great prominence without having any functional definition. Which level is most efficient, the EU or local level, is only known after
one or the other has been tried, which of course is too late. In practice the subsidiarity principle hampered the speed of debate and made it more difficult for consensus to be achieved.

Members were allowed to adopt stricter measures within their own national legislation so long as they did not violate treaty provisions. States such as Denmark, Germany and the Netherlands, which have relatively strict national environmental standards, did not want their standards watered down by EU compromises. The possibility of adopting stricter national standards or measures by individual member states was criticized as creating a Europe of different speeds. But in reality, the SEA only legitimized what was already a reality in secondary environmental legislation. One example of this is the large combustion plant directive that set different reduction targets for sulphur dioxide and nitrogen oxide emissions from fossil-burning power stations and other large combustion plants across the EU.

The scope of Article 100a of the Treaty of Rome was widened for several reasons. The European Parliament favored its use because it guaranteed it a stronger role via the "cooperation procedure." It gave the Commission a more active role in initiating legislation as qualified majority voting increased the likelihood of quicker action. The European Court of Justice significantly extended the scope of Article 100a in a controversial benchmark decision in 1989 regarding the titanium dioxide industry. The court upheld the right of the Commission to seek a reduction in pollution from the industry under Article 100a because environmental protection is sometimes an indivisible component of other policies. The principle that environmental protection requirements be a part of the other EU policies was strengthened.

The Treaty on European Union (Maastricht Treaty, 1992) further extended the EU's environmental powers. But it did not herald radical change or resolve all the ambiguities contained within the Single European Act. Under Maastricht "sustainable and non-inflationary growth respecting the environment" (a rather complex and watered down version of the term "sustainable development") became an explicit aim. The "non-inflationary
growth" language was significant in that it reflected the importance of economic stability, a central element needed for the success of the proposed monetary union, as inflationary policies on behalf of one member would have direct negative consequences for others. Environmental policy was listed as a common task. Subsidiarity was removed from the environmental chapter and given its own separate chapter providing it with more political weight. Qualified majority voting became, with few exceptions, the rule in environmental matters. The Treaty also added the precautionary principle as a direct aim of policy.

This, the Maastricht Treaty reaffirmed the integration of environmental protection requirements into all policy. Qualified majority voting in the Council coupled with the cooperation procedure became standard decision-making procedures. However, unanimity will still required for measures primarily of a fiscal nature (environmental taxes), those relating to town and country planning, and those affecting the management of water resources or the choice of energy supply. The new co-decision procedure, which extended the power of the Parliament and the Commission, was required for the adoption of all internal market measures. In this manner the Parliament and Commission were granted equality with the Council in terms of setting the environmental agenda. No longer would the Council be able to act without reference to the input of the other bodies of the Union. The Parliament acted in this manner with regard to vehicle emissions, which resulted in the widespread use of catalytic converters.

The fifth program (1993-2000) was entitled "towards sustainability" and constituted in the words of the Commission: "a turning point for the Community.... It provides a framework for a new approach to the environment and to economic and social activity and development, and requires positive will at all levels to the political and corporate spectrums, and the involvement of all members of the public active as citizens and consumers in order to make it work." The fifth action program stressed that actors at all levels should be involved in the process but lacked specific proposals despite providing a number of examples of areas of shared responsibility.
The fifth program was a departure from its predecessors via its focus on specific activities and sectors rather than on traditional environmental elements or receptors of pollution such as land, air, and water. In shifting to the source of pollution it designated five targeted areas (industry, energy, transport, agriculture, and tourism) it expected to regulate through the application of the most efficient and unified approach. In outlining long-term objectives and setting certain performance targets, the fifth program was a step towards integrated pollution control. However, it remained largely ill defined: the discussion of priorities was only a meager half-page of a ninety-eight page document, which was hard to justify when considering the implication of the new sustainable development strategy.

Concurrent with the extension and solidification of the EU's control over environmental policy was a new adherence to monitoring implementation by each member state.

**Implementation of EU Environmental Policy**

Discussion regarding EU policy implementation during its early years has been limited. The first book published on EU policy did not even discuss implementation, and the first sustained discussion of implementation of EU legislation in any one country did not appear until 1984. The lack of focus regarding implementation was indicative of the Commission's preoccupation with drafting new legislation. The Commission assumed that directives were being implemented by member states. This assumption was challenged by a sensational incident in 1983 that brought worldwide media attention to bear. Drums of hazardous wastes (dioxin) originating from Seveso near Milan were "lost" then later "found" in Northern France. The incident initiated calls for action by the media and the European Parliament appointed a Committee of Inquiry to investigate implementation of the EU's 1978 directive on toxic waste. The investigation led Parliament to censure the Commission for failure to protect the Treaties and ensure member states compliance.

As one might imagine, implementation immediately became a more important concern for the Commission. The staff of the Environment Directorate General XI was expanded to handle the ever-increasing tasks of preparing new legislation, and the follow-up task of monitoring implementation. Dr. Ludwig Kramer was appointed to lead the Directorate.
His vigor in recommending that member states be brought before the European Court of Justice over non-compliance brought greater attention to the cause of implementation. His victories before the Court ensured the supranational status of environmental policy. As the size and stature of the directorate rose within the Commission it gained the respect and experience necessary to make decisions affecting the interests of other Directorates and member state governments.

In 1989, the EU appointed Italian socialist Carlo Ripa di Meana as Environment Commissioner. Ripa di Meana was a flamboyant and outspoken personality. He pushed for further action and publicly criticized those states that failed to meet implementation requirements. This was a fundamental shift in operational style; previously, such discussions were held privately and internally within the Commission. Ripa di Meana strongly supported Kramer's view that the law should become the active instrument in environmental battles. Questions of environmental regulations should be resolved before a court, not as in the past through more negotiation. He agreed with Kramer that current law was insufficient and he was unwilling to allow political considerations to reduce the scope of environmental action. He believed that directives should be broadly interpreted and enforced to maximize benefits to the environment. The Environmental Directorate General (DG XI) role was to act on behalf of current and future generations who lacked the resources, information, and representation to check the machinations of governments and other vested interests.53

Ripa di Meana also wanted to raise his own stature within the Commission. Having lived in London, he was aware of Britain's sensitivity to environmental issues and the perception of other member states that she was not complying with EU directives. Attacking British "failures" garnered the media attention he sought even if it was bound to create conflict. Ironically, one of the reasons Ripa di Meana was able to attack Britain so well was because she was one of the few nations who regularly sent pollution data to the Commission. The validity of the perception is arguable. Britain was no worse, and in many cases was much better at implementation than other member states. The misperception resulted from Britain's reluctance to agree to new environmental policy in its formulation stage. Britain took
the pragmatic attitude during this time not to agree to anything that could not be readily implemented, thereby avoiding the possibility of sanctions and preserving her own scope for national action. Unfortunately this stance was viewed as obstructionist by the other member states, who wanted to be seen taking action in this crucial policy sector. In contrast, Italy readily agreed to new policies, garnering support for doing so amongst the other member states, even when she had no hope of achieving implementation.

In many ways Britain became caught in the evolving nature and legal expansion of EU environmental policy. When Britain joined in 1973, EU environmental policy formation was in its infancy and was not of particular concern, as she felt reassured by her own legislative record. But as the numbers and pervasiveness of EU environmental policies grew, she found that she no longer controlled the intricacies of her own pollution standards. The growth of the Environment Directorate General's power within the Commission, coupled with aggressive leadership, fundamentally presented Britain with a political challenge that would both influence her stature within the community and force changes in her pollution control practices at home.

**EU Environmental Water Directives and Britain**

Member states' institutions are bound to act in conformity with the binding rules laid down in EU law. This obligation is derived from Article 189 EC that stipulates that a regulation shall be binding in its entirety and directly applicable in all member states. Similarly directives are also binding as to the results to be achieved, upon each member state to which they are addressed. Implementation of regulations and directives refers to the process of integrating EU principles into member states' national law. This process transfers rights and duties contained in EU law to the individual member states' legal systems, where it becomes reliable for individuals to use in court. This fulfills the legal obligation upon member states to give effect to EU law. Full and accurate transposition would create uniform law throughout the EU, one of the overall goals of integration.

Water pollution was one of the first concerns of initial EU environmental policy, with several important legislative developments occurring between 1975 and 1980. Directive
75/440/EEC initiated requirements to ensure that surface freshwater used for drinking water met certain standards and received adequate treatment before being transferred into public supply networks. Directive 80/778/EEC initiated standards for the quality of water intended for human consumption, both directly and after processing. It had the dual purpose of promoting free circulation of goods in the EU, for example bottled water, and protecting human health and improving the environment. Directive 80/68/EEC provided protection of groundwater from pollution by dangerous substances, including agricultural pesticides. Member states were charged with monitoring compliance with the conditions of authorization and the effects of discharges on groundwater. Additionally, they were to maintain inventories of authorizations and supply the EU with information regarding them at its request.

The primary legislation regarding the quality of bathing waters was set in directive 76/160/EEC, which now applies to over 10,000 bathing areas across the EU. The directive specifies nineteen physical, chemical, and microbiological parameters for the quality of bathing waters (fresh or seawater) and established a system of monitoring bathing water quality by the member states. In addition to the bathing water and drinking water directives, the directive on the discharge of dangerous substances into water (76/565/EEC) was passed as part of this early phase of legislation.

Nigel Haigh has pointed out that these early directives adopted different systems of standards for the control of pollution. The bathing water directive is a water quality standard, setting maximum concentrations for nineteen physical, chemical, and microbiological standards. In contrast, the drinking water directive was based on an exposure standard, setting parameter values (maximum allowable concentration and minimum required concentrations) for specified substances. The directive on the discharge of dangerous substances into water allowed member states to choose between two different types of standards; one that is set in reference to emission values or one set in reference to water quality. The choice in regard to this directive arose from the desire by Britain, at the time of drafting, to utilize its own traditional approach to the consenting of water pollution.
The majority of difficulties that the Commission would later cause member states, including Britain, in the late 1980s and early 1990s stemmed from implementation of these early directives. Directive 80/68/EEC was the subject of numerous violations by Belgium, the Netherlands, Italy, and Germany. Implementation of the bathing water directive took between two and eight years, and Belgium, the Netherlands, Italy, and Britain were all condemned by the Court of Justice for compliance failures. In light of this, it is striking that there is little evidence on how the bathing water standards were formulated. It is also notable that the committee established by the directive had not met by the time of a House of Commons inquiry into bathing water policy in 1989/90, so the outstanding technical questions about the standard were not addressed.

The approach employed in the dangerous substance directive gave rise to a number of problems. Even today this early legislation proves highly controversial, and EU water policy is still dominated by complex debates over the essence of the regulatory approaches taken in these original directives. For example, under the original directive a number of "daughter" directives were ultimately enacted which focused on substance reduction, setting strict limit values. Lists of dangerous chemicals were created based on priority and impact on human health. "Black list" chemicals were the most dangerous (generally, heavy metals [mercury and lead] and organochlorides), while a "grey list" covered those substances whose health effect was thought dangerous but not yet scientifically proven. In practice it is difficult to draw such distinctions and several member states, most loudly Britain, protested that the directive was not based on a serious scientific calculation of risk. They objected to incurring the costs associated with such limits when the scientific evidence proving the public health threat was lacking.

Few member states have successfully implemented all of the demands made by the dangerous substance directive, in particular the demand under article 7, which required member states to go beyond simple discharge control and stabilization via emission limits, relying on best available technology notices: instead, they should ameliorate any waters damaged by dangerous substances. Even Germany, which had originally supported the
directive, had to face court sanctions from the Commission by 1996, on the grounds that its authorization system did not cover diffuse sources of dangerous substances in water, such as those deriving from agriculture.

The drinking water standard was set in reference to standards promulgated by the World Health Organization (WHO). Yet these standards produced controversy, as they did not simply replicate those set by the WHO, but instead went much further. For example, Britain argued for a more lenient standard for lead than that proposed as a maximum allowable concentration, since the proposed value (50 ug/l) was half the WHO recommended value. Britain has special difficulty with this standard due to the antiquated nature of the majority of her water infrastructure and the wide-scale use of lead pipes in its existing housing, which resulted in higher levels of lead than normal. A second example of how politically charged and complex implementation of EU directives has proven relates to pesticides in water. The British and Italian governments believed that the stringent maximum allowable concentrations were far too strict and were, in effect, a surrogate zero. Consequently, both nations' policy was to disregard the limits.

The pesticide standard set in the drinking water directive can be interpreted as a strict application of the precautionary principle. The directive was not based on a toxicological scientific basis, but rather on whether one could measure and detect pesticides in water. The position of EU law at the time was to place a general prohibition on levels of pesticides wherever they could be detected. This did not coincide with WHO guidelines, which set various levels above 0.1 ug/l, for example 1.7 ug/l for atrazine, a pesticide causing severe pollution incidents in Italy by the mid 1980s. As a result, the Italian government attempted to pass decrees based on the WHO standards rather than those of the EU, arguing that they were more realistic. Equally, in 1986 the British Department of Environment ordered water authorities to ignore the EU standards set out in 1980, suggesting that they were unworkable, and instead issued guidelines based on WHO and domestic toxicological data.
From its entrance to the EU, British governmental officials and policy-makers have questioned the EU's approach to pollution control. For example, when the Commission first published proposals for a directive on bathing waters in 1975, the debate in the European Parliament revolved entirely around amendments deriving from British MEPs. The relevant House of Lords select committee thought the standard so undefined as to be virtually unenforceable. Expert opinion in Britain tended to support this view.\(^5\)

It is perhaps as a result of these beliefs that the British track record on full implementation of EU water directives, whether on bathing or drinking water, was less than perfect. However, a number of other reasons can be cited to account for this implementation deficit.

First, transposition was attempted initially via purely administrative means, employing departmental circulars that failed to create specific legal rights or have the transparency of legal instruments. A classic example of this was directive 80/778/EEC, which had to wait nine years until the adoption of the 1989 Water Act to find a legal parent.\(^6\)

Second, Britain lacked modern domestic law that would act as an adequate platform for legally transposing the directives. It was not until 1996 that proper legal regulations were introduced that formally transposed directive 75/440/EEC, which was slated to come into force in 1977.\(^7\) Britain eventually achieved in 1989 the type of modern water pollution legislation that most other countries had in the mid-1980s. Prior to this, there actually were no "recognized legal means" for setting statutory water quality standards.\(^8\) While the Secretary of State for the Environment was charged with setting such standards, differences of opinion between Britain and her EU partners over uniform emission standards prevented their promulgation. The 1989 Water Act included such standards which ended the controversy. Even after this legislation was enacted, implementation delays continued to hamper British performance.

An obvious reason for this attitude affecting the British-EU water policy relationship was the privatization of the water industry by the Conservative government. In their original version these plans even attempted to create private regulatory agencies. The dynamics of
privatization meant that politically the Thatcher ministry of the late 1980s did not want to agree to any legislation that would increase environmental standards and demand costly investment for the new private companies they were hoping to form. Such long-term investment needs would have made them particularly unattractive as investment opportunities for the European marketplace. On the other hand, industrial and financial interests dislike uncertainty and preferred that the outstanding disputes between Britain and the Commission be resolved to provide for predictability and stability.63

Third, even when directives did demand more concrete action, as with the bathing water directive's demand that bathing beaches be designated and monitored, British foot-dragging and regulatory minimalism were evident. As a result, famous beaches like Blackpool and Brighton were left conspicuously undesignated, while Scotland was deemed to have no bathing beaches worthy of designation.64

In examining the bathing water directive, several features of the difficulties between Britain and the EU are evident, including disagreements over technical questions, the definition of what constituted a bathing beach and the discretion left to national governments by the directive.65

The directive listed nineteen parameters for physical, chemical and microbiological quality, some of which required mandatory compliance while others were intended as guidelines. The two key parameters were for total and fecal coliform bacteria. It resides in the human organism and its presence in water indicates contamination by sewage. Bathing beaches that were to fall under the scope of the directive were to be designated by national governments. They were to designate those areas where bathing was traditionally practiced by large numbers of people. Member states were charged with organizing the necessary monitoring of water quality to obtain a suitable number of measurements to assess compliance throughout the bathing season. The number of beaches identified by this directive could be increased annually.

The designation of bathing beaches was to cause difficulties for the British government. When the directive first came into force in 1977 the British government only
identified 27 beaches not including such obvious resort communities as Blackpool and Brighton. Britain, which at the time had the longest coastline of any member state, was obviously not fully disclosing the true number of beaches that required monitoring. The British government defended this position by arguing that while many beaches existed, little bathing actually occurred. Therefore, they had acted in accordance with the directive in regards to how it had been written (ie, areas where bathing was traditionally practiced by large numbers of people).

The Commission expressed disquiet over this result that ultimately led to a "Reasoned Opinion" being issued in 1980. Britain was condemned for not taking the necessary steps to implement the directive. The Commission announced that it was not satisfied with the British interpretation of bathing waters and would enter into discussions with the government to alter the situation. The Commission also threatened to initiate infringement proceedings over the issue, a threat that ultimately helped change the British attitude towards designation.

However, no change would occur until 1987 when continuous EU pressure forced the Thatcher government to designate several hundred additional beaches. By 1992, some 416 beaches were so designated. The timing of the British decision was obviously linked to domestic changes in Britain. By 1987, plans for the privatization of the British water industry were well underway. Conforming to the directive (and several others) was important if the future costs associated with meeting EU directives were to be adequately accounted for by the new private water companies. In this sense, it was part of a larger clearing of the decks of unresolved issues pertaining to the water environment between Britain and the EU that helped resolve the designation issue.

Britain acted in this manner for several reasons. First, it believed it had the right to interpret the directive as it saw fit, regardless of the view of the Commission, a view that would ultimately be overturned by the decisions of the European Court of Justice. It also took the position during its early years of membership in the EU that its existing water authorities' investment priorities should not be distorted by its international commitments nor the desires

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of local resort communities who were acting out of their promotional interests. Considering the range of investments needed, protecting the relatively few bathers as opposed to protecting the drinking water supply of the entire community could not be justified. Haigh has argued that in the case of Blackpool, which should have been designated under any definition of a beach, the costs associated with compliance would have ranged from 10 to 50 million pounds.\(^6\)

Haigh also points out that Britain was unwilling to go before the Court of Justice, which would have had to interpret a vague definition. However, it was clear to all in Britain, based on the level of criticism, that the spirit of the directive was not being fulfilled. When it did expand the number of beaches, the government found itself with the problem of how to meet the standards contained in the directive. It was estimated that several years would be required to meet the quality standards specified in the directive for all beaches. While continual progress has been forthcoming it illustrates the extent of improvements necessary for British infrastructure to meet EU requirements.

**The Power of the Court of Justice**

The unique power of the European Court of Justice in the integration process is central to understanding events in Britain regarding water during this later period. The threat of adverse court verdicts helped both the British government and the private companies they would potentially affect focus on improving the relationship between the EU and Britain. Given the general level of difficulties between the government and the EU over compliance with water directives between 1973 and the late 1980s a new approach was required.

Towards the end of the 1980s, therefore, British approaches to EU water directives became distinctly conciliatory, and the early period of deliberate slowness and open conflict was replaced by a period of direct negotiation with the Commission.\(^6\) For example, in 1987 the British dramatically reversed course and conceded they had under-designated bathing waters and promptly identified several hundred additional areas.\(^6\) As an example of a political strategy to prevent official sanction, the change was not effective. The Commission pushed ahead with legal action against Britain and scored its first victory in 1993 over non-implementation of an environmental directive related to directive 80/778/EEC, relating to
water for human consumption. As an example of recognition of the EU's primacy in the environmental field, the effort has proved successful. Despite the power of the nation states in the policy formulation and implementation process, the rule of EU law and its working style are political realities that impinge on national autonomy and should not be considered mere legal fictions. This reality has impacted both the nature of Britain's relationship to the Union as well as her domestic policy agenda in regards to the transposition of EU legislation, both in terms of her national legal system and through successful practical implication on the ground.

In the context of environmental law, implementing environmental directives includes two obligations, a basic obligation to transpose directives into national legislation and a duty to bring about beneficial changes in the physical environment as defined by individual directives. Between 1973 and the late 1980s, Britain did not comply with the first obligation, believing it sufficient to transpose directives through administrative regulations. Given the British difficulties in implementing EU environmental directives, such an attitude was insufficient. The Commission defined or reasserted the extent of that obligation when it placed Britain before the Court of Justice in Case C-337/89: Commission v United Kingdom. Here the court held that both obligations applied, in this case to transpose into national law, through legislation, the drinking water directive's requirements and to bring about physical changes to the environment.

The Court of Justice had previously developed general criteria for determining whether a directive had been fully implemented by a member state. For example, administrative measures such as circulars were deemed inadequate as a means of transposing directives. A strong stance on this obligation was taken in a German case when the Court of Justice upheld a complaint that Germany had failed to secure legislative implementation of EU directives on air quality. Rejecting the defense that German legislation already conformed to the directives, the Court pointed out that implementation required member states to set in place specific legal frameworks relevant to the directive's subject matter to enable individuals to recognize clearly their rights and obligations under EU law.
In the environmental sector EU directives are rarely transposed into national law within the timeframe prescribed, leaving member states open to sanction. When directives are implemented the national laws are frequently defective in either form or content in regards to the specifics established in the directives. The rate for practical implementation on the ground is even lower, as is evident in EU and member state reports and the proportion of cases for practical infringement brought before the Court of Justice. For example, at the end of 1990, 218 out of the 371 proceedings brought by the Commission before the Court were for lack of effective application of EU law. In Britain, these issues were elaborated by the House of Lords Select Committee on the European Communities which attributed the implementation problems associated with environmental directives to several factors: difficulties in drafting Union legislation in this area, the process of negotiation and adoption in the Council, and the differing styles and techniques of national legislation.

The relatively high rate of non-implementation or incorrect implementation can be attributed to the specific problems posed by environmental protection. First, since natural processes are not yet completely understood scientifically, the obligation to physically improve the environment is difficult to fulfill. Second, there is a lack of reliable information on the state of the environment and considerable variation in sampling techniques among member states, making comparative analysis difficult if not impossible. Additionally, many directives confer discretionary powers on member states that raise the question of whether the exercise of such powers constitutes a failure to implement a directive in practice. This is best illustrated by directive 85/337/EEC, which called for environmental assessments to be completed on new construction projects. The directive gave discretion to member states to determine appropriate criteria and thresholds to determine which projects should be subjected to environmental assessments. This created a great furor in the EU when Britain, employing that discretion, did not employ environmental assessments for several new highway projects, which in other member states would have been mandatory.

The poor implementation record for directives with this type of discretion built into them can explain why member states have resorted to "selective application" of Union law to
avoid the costs of closer integration. Environmental legislation has proven discreet enough for some member states to discount it in this manner. This practice was also encouraged by the extension of qualified majority voting within the Council under the SEA for most environmental protection measures, whereby member states found themselves obliged to implement policies which they opposed. This problem was foreseen and a Declaration was annexed to the Treaty on European Union that indicated that each member state had to fully and accurately transpose into national law the directives of the Union within the prescribed timeframes. But in a very practical sense, the Declaration only illustrates the larger problem of the EU taking action without achieving the type of consensus that marked its earlier history. Implementation problems may also be symptomatic of continuing doubts over the Union's competence to legislate in the environmental area even though member states formally transferred legislative powers on environmental matters to the Union under the Single European Act. EU legal capacity has become compromised in practice by member state resistance and the increasing use of the subsidiarity principle in environmental matters.

The procedure for charging non-implementation requires filing a complaint with the Commission under Articles 169 and 170 of the EC Treaty. Any member state or citizen of a member state to may complain to the Commission on the grounds that the Union provisions have not been applied or have been incorrectly applied. Following investigation the Commission may refer matters to the Court of Justice if in its opinion the complaint is warranted. Successful enforcement actions brought before the Court include one against Britain for failure to fully implement directive 778/80/EEC on the quality of drinking water. This directive, adopted in 1980, was set for implementation in member states' laws by 1982, and was to have produced the desired effects to the physical environment by 1985. However, even by 1989 the maximum allowable concentration of nitrate specified in the directive was exceeded in 28 supply zones in Britain, each supplying approximately 10,000 people.

The enforcement procedure itself is inherently reactive as it relies on complaints being brought before the Commission by pressure groups and members of the public. In the
case above the charge was brought by Mr. Andrew Lees and Friends of the Earth. These
cannot reasonably be filed until the timeframes specified in the directive are exceeded. As
such, it is a very slow process, which creates significant problems in cases of irreversible
environmental damage. The procedure is also weak in that it is premised upon member
states' cooperation. Until relatively recently, under an amendment to the Treaty on European
Union, the only sanction available to the Court was political pressure in the form of an order
to the state to fulfill its Treaty obligations. Currently, in the event of continued infringement,
the Commission may refer the matter back to the Court with a penalty recommendation,
usually a fine. However as these fines are much less than the costs of compliance, they do
not amount to an economic rationale for the member state to act.

The legal response to a particular problem, for example nitrate in water from farming,
helps to illustrate the difficulties of implementing EU environmental directives in Britain. In
contrast to the broad and integrated approach laid out in the environmental assessment
directive, the directive on nitrate in water from farming was formulated to address a single
substance in a single medium deriving from one sector of the economy. The response to the
nitrate problem also illustrates the dynamic relationship between EU and British
environmental law. This is a special concern in the Thames Valley where pesticide runoff
has become a persistent problem in maintaining water quality.

Nitrate is naturally present in soil and is essential for plant growth. When crops are
harvested the nitrate used during their growth is removed from the soil; to maintain a soil's
fertility it must be replaced, either through application of inorganic fertilizer, fertilizer in the
form of farmyard manure, or through the rotation of nitrogen-fixing crops such as legumes. At
simple replacement levels, application from either form of nitrate is essential to maintain soil
fertility and crop yields. Less fertile marginal soils may be enhanced if high concentrations
are applied. Employing marginal soils in agriculture has dramatically altered rural Britain
since the 1940s and has enabled farmers to grow grain on an unprecedented scale both for
her own needs and for export.
When more nitrate exists in soils than is used for plant growth, rainwater may wash excess nitrate away, either through the soil via percolation to the groundwater or as runoff to the nearest stream or river. Nitrate from farming may thus end up almost anywhere within a particular water catchment area. Soils themselves have a variety of characteristics that either hinder or further the percolation process. In some soils, such as chalk (widespread in Britain), soil particles are very small and water percolates slowly downward to the underground aquifer. Depending on the mix of soils this process may take decades. Conversely, sandy soils have larger particles and percolation to an underground aquifer is consequently much faster. Natural manure, the waste of plants from animals, has high concentrations of nitrate. Subsequently, rain falling on farmyards may cause pollution by carrying nitrate to streams or into plowed fields where it then percolates into aquifers or runs off. Cultivation of soil also releases nitrate that was formerly fixed, so if grasslands are plowed there is often excess nitrate in the soil than is needed for crop growth.

Therefore, for agricultural purposes, the application of some nitrate is essential, but too much may produce a potential for water pollution and threats to human health. Excessive loads of nitrate on drinking water may be associated with risks to human health in the form of "blue baby" syndrome and stomach cancer. The World Health Organization (WHO) set guidelines for nitrates to safeguard human health on the assumption of life-long consumption. They are intended for use as a basis for the development of standards, which, if properly implemented, ensure the safety of drinking water supplies. When guidelines are exceeded, it is a signal to countries to investigate the causes with a view toward remedial action to safeguard human health. There are two standards employed by WHO, a stricter one that should only be exceeded under exceptional circumstances; and a lower one used as a target for nations to set their own standards.

Nitrate also impacts its receiving waters. Too much nitrate can cause waters to become eutrophic or over-enriched, producing excessive plant growth. When this occurs the oxygen available in water is depleted at higher rates making it difficult for other forms of life,
particularly fish, to survive. It may also produce a blanket of weeds that may cover mud flats to such an extent birds cannot feed on the worms and shrimps that live in the mud.

The problem of nitrate in water from farming has proved more complex than originally thought when the EU directive was first formulated. The directive itself was an early example of the use of the precautionary principle. In formulating the directive the Commission did not wait for conclusive scientific evidence on the health effects of nitrates and instead assumed that the risk was real and should be limited. The EU justified this position by the fact that humans have to drink water to survive and normal consumption of green vegetables already exposed Europeans to considerable levels of nitrate consumption. The complexity of the problem stemmed from the uncertainties associated with nitrates’ human health impact, their behavior in soil and water, and the social organization of farming.

Compared with manufacturing, where concentrations of pollution are generally limited to cities, and to a specific industry such as chemical manufacturing, which in turn limits concentrations to a few specific locations, farming is widely dispersed on land which is held in private ownership. However, the dispersal of farms is only part of the problem of pollution control. The social relationships between farmers and the state, has made the problem even more complex.

Despite Britain’s century-long history of water legislation, the legal standard remained that of “wholesome” until relatively recently. The Water Supply (Water Quality) Regulations 1989, passed under section 52 of the Water Act 1989 (reformulated in the Water Resources Act 1991 to comply with directive 80/778/EEC), defined water quality scientifically for the first time. The Act set quantifiable limits not to be exceeded for an entire list of substances, including nitrate.

The general criminal offence of causing or knowingly permitting water pollution is contained in section 85(1) of the Water Resources Act 1991. Such law is by its nature reactive in that it is only applied after pollution has occurred. Another limitation is that the law is narrowly focused on causation: a discreet incident must be found to have caused the pollution and an identifiable person must be found responsible for the incident. Nitrate
pollution of water simply does not fit into this scheme of law since the harm may have accumulated over several years from a variety of sources and many of the responsible persons may be untraceable by the time the harm becomes measurable.

In 1980 the EU issued directive 80/778/EEC on the quality of water intended for human consumption that set standards for drinking water at permitted levels of specified substances. Acting on the WHO guidelines for nitrate levels in drinking water, the EU set a limit of 50 mg/l (the WHO target level rather than the safe level of 100 mg/l), with a guide level of 25 mg/l. It has been argued, particularly by the National Farmers Union, that the EU level is arbitrary and there is no justification for halving the WHO limits. However, this did not hold because the WHO revised its levels in 1984 to 45 mg/l and 15 mg/l to take account of the importance of green vegetables in the European diet.76

When the directive first came into force in 1985 Britain sought a derogation under Article 9(1) which allows for exemptions in order to take account of "situations arising from the nature and structure of the ground in the area from which the supply in question emanates." "Friends of the Earth" complained to the Commission that Britain had failed to implement the directive that formed the basis for EU action.

In 1987 the Commission began formal proceedings under Article 169 of the EC Treaty against Britain for failure to implement the drinking water directive in its domestic legislation and for failure to apply the directive correctly. The British government argued that there was nothing else it could possibly do to secure the required water quality and it should not be held liable for the actions of third parties, in this case the privatized water companies.

In 1988, on advice from the Department of Environmental legal staff that it would lose the case in the Court of Justice, the government announced that existing dispensations allowing water undertakers to continue supplying water above the 50 mg/l limit were being withdrawn. This effectively conceded the argument to the EU and required the implementation of the EU standard.

As anticipated, in January 1992, the Court of Justice, following the Advocate General's Opinion, issued an opinion that Britain had failed to fulfill its obligations under the
The Court ruled that Britain had failed to ensure the quality of water supplies in 28 areas in England (Thames and East Anglia regions). In finding against Britain, the Court gave a clear signal that the quality standards of the directive must be satisfied. This decision reiterated the supremacy of EU law in regards to the environment.

Prior to the official Court decision, the British government under John Major reversed course and began to take a more proactive stance in regards to EU water quality directives. This was part of a systematic effort by Major, a supporter of the EU, to take a different direction from the past twenty years and begin to address relevant issues between Britain and the EU to help strengthen British membership. This was important if Britain was to continue to play a large role in EU affairs in other sectors than the environment. Directive 76/464/EEC on dangerous substances in water had a fundamental impact in Britain because the government had to formalize its systems of quality objectives for receiving waters. As previously mentioned, this was first done via governmental circulars, but the Commission was not satisfied with this action as an implementation measure as it did not spell them out in law. Britain was not the only member state employing circulars, and the issue was finally settled in 1988 when the Court of Justice ruled in Case C-361/88: Commission v. Germany, that a change in domestic law was required for formal implementation of EU law, since administrative measures were felt to be too flexible. As a result of this case, statutory water objectives were therefore introduced in sections 104 and 105 of the Water Act 1989, and are now contained in sections 82 and 83 of the Water Resources Act 1991, the current British legislation. Section 84 of the Act required that when the Environment Agency (EA) (the successor regulatory body of the National River Authority) issues discharge consents it must ensure compliance with these statutory objectives.

Several proactive measures to prevent pollution occurring at source were enacted in the Water Act 1989 and were now re-enacted in the Water Resources Act 1991. These included the provision of information, measures to encourage good storage practices, the
designation of nitrate vulnerable zones and nitrate sensitive areas, and the formulation of a
code of good agricultural practice.

It was first thought that the nitrate problem in Britain was caused by over-enthusiastic
application of inorganic fertilizers onto arable land. While this is part of the problem, it
became clear that manure spreading was the source of the majority of the pollution. This has
added greatly to the complexity of the problem of controlling nitrate applications because it is
difficult to establish the concentration of nitrate in a given load of manure. Consequently if
spreading manure must be limited, then it must also be stored and disposed of adequately.
Most dairy and hog operations do not have adequate manure storage facilities nor do they
have the means for disposal. The realization that natural manure was the real problem
challenged the popular view held by those not involved in agriculture that the artificiality of
inorganic fertilizers was the main source of the problem; nothing can be more "natural" than
manure. What is unnatural is the size of modern hog and cattle operations, which produced
unprecedented concentrations of natural manure.

Under the 1974 COPA, farmers were provided with a defense against prosecution if
they polluted a stream or river where the pollution was attributed to an act of omission that
was in accordance with good agricultural practice. However, no farmer ever applied for
protection under the act up to the time it was modified by the Water Resources Act 1991.

Section 202 of the Water Resources Act empowered the EA to request information
that could assist in the prevention of water pollution. The section allowed the EA to operate
in an advisory capacity, with the hope of establishing cooperative relationships with farmers,
so that potential problems could be discussed early and measures taken to prevent water
pollution. Such measures were diverse, ranging from avoidance of spreading manure near a
watercourse to the installation of large and expensive storage facilities.77 Section 86 of the
Water Resources Act also gave the EA power to prohibit discharges from a building or any
other fixed plant. While potentially useful in some cases, this provision would not apply to
farm waste disposal systems such as mobile slurry spreaders.
Prior to the 1989 Act, agriculture accounted for approximately twelve percent of reported pollution incidents, but these were considered only a fraction of those actually occurring.\textsuperscript{78} Eighty-seven percent of all reported farm pollution incidents were due to organic wastes.\textsuperscript{79} Oil accounted for another 3 percent. Section 92 of the Water Resources Act provided for the setting of minimum standards for keeping and handling silage, slurry, and agricultural fuel on new or altered facilities. Most existing facilities were exempt but the EA was given the power to serve notice, requiring improvements if the agency believed a pollution threat existed. Failure to abide by the notice was a criminal offense. The central offense in this case is not for causing pollution but rather for failing to take precautions to prevent it. If an offender did not comply with the notice the EA was also given the power to take independent action and bill the offender. This is a very powerful measure that could be used if a farmer did not comply with the regulations. However, it is only useful for point sources such as slurry tanks, and crucially, it assumed a financially solvent farmer. The law's concentration on the adequacy of storage facilities has resulted in great expense, arguably without solving the problem.

Section 93 of the act gave the Secretary of State for the Environment powers to designate water protection zones after consulting with the Minister of Agriculture, Fisheries and Food. In effect a local water pollution law operated within each zone, with the EA prohibiting or restricting activities that were likely to pollute water, with criminal sanctions for breaches. This first appeared as a power under the 1974 COPA but was never employed. It was carried over into the 1989 Water Act and the subsequent 1991 Act. This measure is particularly useful in protecting groundwater from diffuse pollution such as pesticides and fertilizers. A limitation was that the powers were restrictive or prohibitive only and did not include the power to require positive works to be carried out which may be necessary to meet EU standards.

While still in the EU legislative pipeline, directive 91/676/EEC on nitrate from agricultural sources prompted an inclusion in the Water Act 1989 of a provision to prevent nitrate pollution via the designation of Nitrate Sensitive Areas (NSAs) in which farming could
be modified to prevent the leaching of nitrate. An area was generally designated as a nitrate sensitive area if it formed the catchment area for a water supply. Section 112 of the Water Act 1989 and currently, sections 94 and 95 of the Water Resources Act 1991, provided powers to the Minister of Agriculture, Fisheries and Food and the Secretary of State for the Environment to designate these areas. Following an application by the EA these bodies may jointly designate areas to prevent or control entry of nitrate into controlled waters as a result of anything done in connection with, or use of, any land for agricultural purposes.

Different legal tools were employed as deemed appropriate to the problem. In the NSAs, this has involved a voluntary contract in the form of a management agreement between the Minister of Agriculture and the farmer. If this fails to meet the objective, powers exist to make the arrangement compulsory and to resort to additional criminal sanctions, generally in the form of fines.

A farmer may apply to the Minister to join such a contract and a voluntary management agreement is then entered into whereby the farmer receives payment for the agreement of the curtailment of practices (such as the spreading of manure) that may cause pollution (Conservative Party Compensation Rule). Terms are set out in Nitrate Sensitive Areas Designation Orders. The agreement allows the Minister to monitor compliance with the terms or to assess its effectiveness by going onto the land, installing equipment, taking samples and examining records. If a farmer fails, without reasonable excuse, to comply with any of the provisions of an agreement the Minister may terminate it and recover the whole or any part of any payment already made. The payments vary both from area to area and between options, according to how onerous the agreement obligations.

The proactive element of the NSAs is the protection of designated land and the powers of the appropriate Ministers to act to protect water. Pollution is taken to be at, or above the 50 mg/l level set for nitrate in the 80/778/EEC directive. The EA has a duty to identify both the controlled waters that may be threatened by nitrate and the land area in which agricultural practices require modification to prevent pollution. Specification of land use is an innovation in legal terms. The power to require positive acts by farmers, such as
the planting of cover crops in autumn, is clearly invasive. Farmers can also apply for other programs that entail permanent change to their land, with correspondingly higher payments, under a premium program that essentially alters land usage. Under this program a farmer converts arable land to unfertilized grassland or trees are planted under the Farm Woodland Scheme. This option is designed to fundamentally change the character of the land and prevent nitrate pollution.

The significance of the NSA program is that it addressed the root of the problem by coupling land use with water protection and restricting intensive farming for the sake of drinking water and the amenity quality of surface waters. It also interacted with other preventive legal measures, such as the code of good agricultural practice and the regulations for the storage of slurry, silage and fuel oil. All are designed to mitigate pollution of water from farming and prevent a repetition of Britain's failure to comply with EU directives regarding water pollution. In this manner the government has altered its social relationship with farmers. However, it has not addressed the fundamental problem, the overproduction of manure. This can only be addressed in an advanced nation with intensive agricultural practices such as Britain through direct action limiting the amount of manure produced. This would entail limiting the number of farmers, their type, their activities, and their size of operations. Given the inequities that already exist regarding the distribution of agriculture throughout the EU, specifically Britain's already small agricultural sector and its intensive practices, such action is highly unlikely. In any case, such a move would contravene the spirit of the Treaties. They call for improving the environment for all citizens of Europe and the world. Transference of agricultural out of Europe would simply shift the problem to a different region of the world, where the process of pollution control would have to be re-learned and applied. Thus, the problem of nitrate pollution in Britain, while being addressed, has not been solved and it is unlikely to be solved anytime in the near future.

In addition to a more proactive stance in regards to EU directives, Britain also took steps to conform to the EU's point source control of pollution in 1990. The Environmental Protection Act (EPA) of 1990 formally introduced the concept of Integrated (Cross-Media)
Pollution Control (IPC) to Britain. This was not a new idea. In 1976, the Royal Commission on Environmental Pollution's Fifth Report called for a version of IPC but did not suggest an administrative structure. Instead it devoted much of its attention to methods of waste reduction and defining media in which dangerous substances would cause the least damage (the best practical environmental option). In 1986, a Cabinet Office review confirmed the need for better administrative controls as they were then spread among a variety of directorates within the Department of Environment. In itself, the recommendation was a modest administrative reform motivated primarily by a desire to improve the technical effectiveness of pollution control within the established traditions of British legislation. Her Majesty's Inspectorate of Pollution was set up as an executive unit in mid 1987. Soon afterwards, the Department of the Environment issued a consultation paper making clear its new commitment to IPC. This signaled a shift away from established practices, and followed the international movement away from "end of the pipe" approaches. In light of the government's acceptance of IPC and with HMIP lacking any coherent mandate, the government introduced the Environmental Protection Act, which created the statutory framework within which HMIP would operate.

IPC concerns the unified control of discharges to air, land and water from prescribed installations and processes, including waste management, genetically modified organisms, litter, etc. This approach to pollution control attempts to avoid the common situation where control over one medium simply displaces the problem to another, without any overall strategy for the most appropriate treatment of disposal routes. IPC was conceived with the notion of preventing pollution at source using a cross-medium approach. HMIP was to provide a "one-stop shop" for applications for scheduled industrial installations and processes. Authorizations were issued based on the operator determining the "best practical environmental option" (BPEO) using the "best available techniques not entailing excessive cost" (BATNEEC). IPC in this sense is the application in law of Tarr's conclusion that polluters will seek the least expensive sink for the their wastes, although to be fair, IPC does consider cross-medium transfers.
In determining BPEO, operators consider the environmental consequences of different options. For example, capturing emissions to water requires the removal of suspended solids via natural or mechanical means, which then have to be disposed of either at sea, in a landfill, or through incineration. Are any of the disposal routes less polluting than an unfiltered emission? What process options were considered to reduce emissions, for example, turning the suspended solids into organic fertilizer for sale on the open market? BPEO was intended as a framework within which cost, benefit, ecological and community impact were considered in a rationalized system.

Under IPC the instrument of control is the license to operate, issued as an authorization by HMIP. Applications for process authorizations specify the type, quantity and fate of substances discharged to water, land, and air. Without authorization, operating a prescribed process is a criminal offense; in an industrial complex, several specific and individual authorizations are generally required. The IPC timetable for process authorizations was staggered over the period 1991-1996, according to process and sector. The staggering was necessary given the numbers of processes (about 5000) and companies (20,000) involved.83

Like the Water Act of 1989, the Environmental Protection Act of 1990 derived from both domestic administrative considerations and pressure from the EU. Which was more significant is difficult to determine. While the idea was under consideration by the British government since 1979, they did not act until EU priorities were clear. In one sense, Britain beat the EU to the punch by taking action prior to the promulgation of new EU law. No similar program would appear as EU policy until adoption of the SEA in 1987. Specific controls over processes and sectors were not introduced by the EU until 1993 under the fifth action program. However, the direction of EU policy clearly suggested what was to come. British participation in the discussions leading up to the SEA and the fourth action program alerted them to the impending source-based controls. In addition their foreknowledge of the adoption of qualified majority voting made it likely that Britain would no longer be able to employ blocking tactics in the Council to delay environmental directives.84 Thus, it was inevitable that
Britain would eventually face implementing directives (or methods) of which she did not approve.

Prior to the Act, successive British governments approached negotiations with a determination to take no actions that were economically costly, ran counter to their environmental regulation philosophy, or were based on "spurious science." This stance was apparent in the discussions surrounding the discharge of dangerous substances to water. The debate concerned the most efficient, equitable and effective means of controlling the most dangerous substances released to water (the EU's Black List). The Commission advocated uniform, source-based emission standards built around what the "best available (abatement) technology" could achieve. Conversely, Britain was adamant that standards should be set in relation to what the local aquatic environment could bear, which was more flexible and gave Britain a competitive advantage. The other member states favored Uniform Emission Standards (UES) over Environmental Quality Standards (EQS) largely out of fear that EQSs would produce unfair advantages and would result in transnational transfers of pollution. Unfair competition would result if different countries could meet the EQS for industrial effluents with different emission standards as the differing costs of pollution control would mean differences in the prices of finished products. Britain, with a large coastline and fast rivers, would be able to achieve the EQS with easier controls, entailing less cost. Other members, who share river systems such as the Rhine, would find it difficult to negotiate an EQS as upriver members would not feel compelled to impose stricter standards on their own citizens to help those downstream, meaning that those downriver would have to entail higher costs.

Britain rejected the notion of unfair competition employed by the EU, arguing that she should benefit from the natural disposition of her rivers in the same manner that Italy benefited from the natural occurrence of more sunshine as compared to Holland. She argued that it would be absurd to insist that the Italians grow tomatoes only in greenhouses to prevent "unfair competition" with the Dutch. 35
Ultimately a compromise was reached that allowed members to choose either to have "limit values" or EQS. Subsequent daughter directives followed the same compromise, with only Britain choosing to use EQS. While both sides held opposite positions in the debate it is important to note that neither side consistently followed one approach only. Britain regularly applied both types of standards. For example, a UES is used to monitor air quality as well as nitrates in water, while an EQS is used to determine overall river quality.

The conflict continued to simmer until Britain finally agreed under EU pressure to apply source-based BATNEEC control to a number of substances on the Commission's list. Thatcher's decision, announced in November 1989, coincided with its decision to move forward with IPC and signaled a change in philosophy and practice that was contained in the 1990 legislation.

Why Britain changed its position is unclear from a policy standpoint. None of its previous policy's foundations were intellectually undermined, and her recalcitrant stance had in fact forced a compromise of sorts from the Commission. One explanation for the change may be that Britain recognized the futility of further conflict. Her constant bickering over environmental directives impacted her ability to conduct other business within the community.

John Major's replacement of Margaret Thatcher as Conservative Party leader and Prime Minister in 1990 provides a political explanation. The EU's movement towards the integration of environmental policy throughout the entire policy framework made British acceptance essential if she was to play a significant role within the EU. Major understood this position wholeheartedly and wanted to alter the nature of the British relationship with the EU. Thus, Britain may have decided to conform to EU practices to enhance her position. By moving before the EU she showed her willingness to embrace the union's new direction. Whatever the rationale for the change, it brought Britain into closer alignment with the rest of the community.

Britain continued to lead from the front during John Major's tenure as Prime Minister. On July 8, 1991 he announced the government's intention of forming a combined environmental agency. Neil Carter and Philip Lowe have argued that the proposal for a fully
integrated Environmental Agency (EA) was informed by a desire to integrate, centralize, formalize, enhance professionalism and open up the process of environmental regulation in Britain. Even more importantly, it reflected a need to remove environmental regulation from the cabinet, and thereby protect it from domestic political pressures. A parallel debate occurred over whether to separate operational roles from regulation, in order to prevent conflicts of interest. There was also controversy over whether the EA should adopt the cooperative culture of HMIP or the interventionist culture of the NRA. All of the debates demonstrated the difficulties between choosing an administrative or a scientific approach to pollution control, which continue to the present.

Finally passed in 1995, the EA represented a merger of the former National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities, and several smaller units from the Department of the Environment. The Agency took over the responsibilities of its precursor organizations in addition to a variety of other tasks associated with the environment. Two of its most significant new functions were its structural independence, and its liaison role with foreign governments. Structural independence was guaranteed through the appointment of a governing board that takes direction from but is not responsible to the Department of Environment. This has allowed the EA to provide an independent and authoritative view on a wide range of environmental issues that may involve analysis and comment beyond the agency's specific regulatory remit, similar to that of the Royal Commission on Environmental Pollution. Independence is significant for a couple of reasons. On the one hand, it grants the agency freedom from direct political control, which during the 1970s and 1980s hampered the application and enforcement of environmental legislation. Its independence will allow it to identify and study environmental problems and solutions outside of the domestic political context, which is required if Britain is to be a good partner within the EU.

The EA's liaison role may be its most important. It gives the EA the opportunity to participate in the global development of consistent environmental policies. What this has meant in practice is that the EA addresses environmental issues directly to the EU.
Map 14

Environmental Authority (EA) Regions - 2002

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Commission or the Environment Directorate General on behalf of the British government. The
EA was intended to centralize pollution control into a "one-stop" shop as a matter of
convenience for those regulated. Within the EA an increasing tendency towards the
employment of uniform emission standards has developed, which signals the further
integration of the British environment into that of the rest of Europe. The EA's development
was significant for British relations with the EU because it reinforced the signal sent via the
introduction of IPC in 1990. While the decision to create the EA again derives from both
domestic and European considerations, it seems the latter made the difference in
determining the essential shape and operational culture of the new agency.

To conclude, Britain joined the EU for a variety of reasons, mostly for economic and
political gain. Whether she had a real choice or not is still open to question. What is certain
was that as Britain entered, the community embarked on a wide-ranging program of
environmental policymaking. Initially, Britain was not concerned, as she believed that her
environmental record was solid in comparison to Continental members. She was surprised to
learn that she did not meet the standards of environmental cleanliness prescribed in EU
directives. Worse, those standards were going to cost billions of pounds to implement, which
would place additional costs on industry and government during a time of economic restraint.
In addition, EU environmental directives challenged the British system of monitoring and
pollution control, which relied upon voluntary adherence and environmental quality standards
over uniform emission standards. The decade-long fight over standards was only resolved
when Britain, under pressure, decided to change practices and fall in line with the remainder
of the community. By that time, Britain had few options left. The political consequences of a
continued fight would have meant relegation to the sidelines of EU discussions. Joining with
the rest of the community offered a better approach politically for Britain's future within the
EU. With regard to pollution control administration, centralization of British institutions was
well under way and in all likelihood would have occurred in its own time regardless of
changes within the EU. What is clear is that the timing of those changes was significantly
influenced by EU developments. More importantly, the changed approach, from "end of the
pipe" to sources and processes, can be directly linked to developments in EU environmental policy. By making these changes Britain accepted the authority of the EU to set and manage environmental policy. That acceptance signified the formal transference of pollution control from the national to the supranational level and acknowledged the factual reality of this policy area as opposed to British wishful thinking.
1. Three interrelated economic and political communities developed in post-war Western Europe: the European Coal and Steel Community (ECSC) founded in 1952, the European Economic Community (EEC), and the European Atomic Energy Community (Euratom) both founded in 1958. Collectively these were referred to as the European Community (EC). Since January 1992, with the passage of the Treaty on European Union, they were known as the European Union (EU).


11. Ibid., Chapter 1.

12. Ibid., Chapter 2.

13. Ibid., Chapter 3 and 4.


15. Ibid., Chapter 7 & 8.

16. Ibid., Chapter 8.

17. Ibid.


22. Eleven principles contained in the First Environmental Action Program (subsequently repeated) are: 1) Prevention is better than cure; 2) Environmental effects should be taken into account at the earliest possible stage of decision making in all areas of EC policy; 3) Exploitation of nature or natural resources which causes significant damage to the ecological balance must be avoided. The natural environment can only absorb pollution to a limited extent. It is an asset which may be used, but not abused; 4) Scientific knowledge should be improved to enable appropriate action; 5) The "polluter pays" principle: the cost of preventing and eliminating nuisances is the responsibility of the polluter, although some exceptions are allowed; 6) Pollution control must be transnational: activities carried out in one Member State should not cause deterioration of the environment in another; 7) Environmental policy in the Member States must take account of the interests of the developing countries; 8) The Union and the Member States should act together in international organizations and in promoting international and worldwide environmental policy; 9) The protection of the environment is a matter for everyone. Public education is therefore necessary; 10) The
principle of the appropriate level. In each category of pollution, it is necessary to establish the level of action (local, regional, national, Union, international) best suited to the type of pollution and to the geographic zone to be protected; 11) National environmental policies must be coordinated within the Union, without hampering progress at the national level. This is to be achieved by the implementation of action programs and the sharing of environmental information.


25. The Single European Act was a treaty which was designed to complete the internal market through the harmonization of all policy areas and create the European Union (EU). The EU combines all of the institutions of the various communities into one body.


27. Ibid., Article 2 EEC.

28. Ibid., Article 100 EEC.

29. Ibid., Article 235 EEC.


31. Treaty of Rome, Article 130r-t EEC.


34. Single European Act, Article 100a(4).

35. Ibid., Article 100a(4) and Article 130t.

36. Directive 88/609/EEC.

37. European Court of Justice, Case 300/89.

38. The Maastricht Treaty was signed on February 07, 1992. The Treaty established the European Union, which supplanted the previous communities.


40. Maastricht Treaty, Article II.

41. Ibid. Article III.

42. Ibid.

43. Ibid. Article 130s.

44. The precautionary principle goes beyond the conventional prevention principles and aims at the minimization of risks. The application of the precautionary principle implies that action should be taken before scientific "proof" about the damaging effects of suspected pollutants is firmly established because the time differential between the discharge of certain substances and the occurrence of visible damaging effects can be considerable.

45. Maastricht Treaty, Article 130r(2).


47. Ibid., Vol. II, 74.

48. Ibid., Vol II, 6.

49. Ibid., Vol II, 95.


54. Nigel Haigh, Manual of Environmental Policy: The EC and Britain


58. Weale, 358.


61. Ibid., 4.3-1, 4.3-3, 4.3-2.

62. Ibid., 4.6-7.

63. Ibid., 4.4-6 and 4.5-5.

64. Ibid., 4.5-7.


66. Ibid.


68. Ibid., 4.5-6.

69. Ibid., 4.4-7.


71. This was first held in the environmental field in Case C-381/88: Commission v Germany (1991) ECR I-2567 and Case C-13/90: Commission v France (1991) ECR I-4327.


74. Article 171(2) EC.


76. Ibid.

77. There is evidence that some farmers have moved from dairy to arable farming as a means of avoiding the attention of the EA and subsequent expenses related to control of manure on their farms.


79. The breakdown is as follows: cow slurry 55 percent, silage 20 percent, pig slurry 10 percent, and poultry manure 2 percent.


84. For example, Britain worked towards blocking then delaying the implementation of the EU's Directives on Environmental Impact Assessment (85/337) and on Emissions from Large Combustion Plants (88/609).


87. See map 14, page 246.
CHAPTER VIII

CONCLUSION

This review of British and European Union environmental legislation demonstrates the complexities of protecting the river commons in modern Britain. It shows that the largest obstacle to effective river management is that river water is regarded simultaneously as an economic resource, a public utility, and a public amenity. Legislators, subject to pressures from industrial polluters, political parties, and advocates for environmental quality, sought at different times to locate authority at local, regional, national, and extra-national levels. However, each effort failed to resolve the issue of authority over the environment because the single-issue technical solutions implemented merely shifted pollution elsewhere.

Furthermore, the authorities created suffered from the structural difficulty of being both the guardian of rivers and the largest polluter in their individual watersheds. In hindsight, Britain's decision to join the European Community (EU) in 1973 was fortuitous, as the nation became subject to EU environmental directives and policies. While this created conflict between Britain and her European partners during her initial period of membership, it ultimately led to a supranational direction of policy for the British water environment, which resulted in improvements in water quality and more effective management of rivers.

The Thames Valley, historically managed by a complex group of national, regional, and local governmental agencies, served as the locus to this study. The Thames pollution problem has three main sources: human sewage, industrial effluent, and agricultural run-off. Of these, human sewage was, and is, the most enduring problem. This is most common in other rivers around the world as well. Three themes were evident in study of the Thames. The first was the struggle to define the level at which authority over the environment was vested. British society continually sought solutions to its water pollution problems by creating ever-larger organizational structures that were thought better equipped to resolve the problem. While the proper sized authority was eventually found, one that conformed to
ecological as opposed to political boundaries, it was not given the financial powers necessary to make capital improvements on the scale necessary to resolve the pollution problem.

A second theme evident in the story of building authority over the environment was the internal contradiction of the authority as both regulator and polluter. This structural contradiction undermined their ability to effectively manage the environment (common), as they were unable to demand more stringent controls on other polluters and precluded public scrutiny. This problem was not resolved until multi-purpose authorities, created in the 1970s, were dissolved under privatization efforts and regulatory functions were separated from water management and sewage disposal functions.

Third was the dilemma of how to use scientific and technical knowledge effectively. Exploration of how science is created within a socio-political framework and is utilized by interested parties for their own purposes shed some light on this. Definitions of water cleanliness are still open to debate as societies continually advance their understanding of the ecological processes of river management. Most, including Britain, have determined what is "sufficiently clean" for their own purposes within a context of cost-benefit analysis. In Britain, this outlook finally allowed rivers to return to a condition capable of supporting aquatic life and be utilized for industrial and amenity purposes without undue threats to public health. This is clearly evident in the case of the Thames, which over this period was transformed from a "dead" river to one of the healthiest tidal rivers in Europe. Decisions as to what is "sufficiently clean" inevitably meant the acceptance of pollution to varying degrees and precluded returning rivers to a pristine state. While some environmentalists called for such a return, arguing that technology can produce effluents of sufficient quality to have no detrimental impact, in effect eliminating human impact, this was fiscally irrational for most societies to pursue.

The British experience established three principles of environmental regulation through historical trial and error. First, regulators work best when they focus only on remediating pollution. The British experience with multi-purpose water authorities, which ultimately combined river management with regulatory functions, proved untenable and
unable to protect rivers. Internal conflicts of interest distorted authorities' activities and relegated pollution control to secondary status. Secondly, science and technology, relied upon as neutral authorities, were not neutral, but instead were tentative, dependent upon social and economic conditions, and evolutionary. This is still the case today. As societies better understand the ecological principles of rivers they continue to adopt new technologies in an evolutionary process aimed at achieving a technical solution to water pollution. However, these attempts only expand or reshape the terms of debate, they do not really provide for any definitive solutions. Previous chapters discuss the evolution of the scientific understanding of disease, a move from a miasmatic to a bacteriological foundation. Water analysis was reshaped from one based on simple observation, to one employing chemical analysis, to one based on both chemical and bacteriological analysis to today's methods, which employ all the above coupled with analysis of flora and fauna specimens drawn directly from rivers. Lastly, natural ecosystems, such as river basins or watersheds, ultimately provided a rational geographical and ecological framework for regulatory control and integrated resource management on the national level. The final shift in policy authority to the supranational level of the EU extended those controls to the bodies of water into which rivers emptied.

The British experience with water pollution demonstrates the validity of Hardin's argument regarding the interconnectedness of economic activity and environmental quality. Societies that fail to develop institutions or coercive mechanisms for managing human ecology ultimately destroy their common resources through overuse. In Britain, rivers served a variety of purposes, chief among them the major source of drinking water and the most expedient place for the dumping of wastes. The "tragedy of the river" was overuse by local authorities under pressure from industrial and population growth, particularly as a waste depository, which resulted in destruction of its natural carrying capacities, leading to the death of most of the lower Thames. The historical separation of authority between those charged with water supply and those charged with river protection precluded a harmonization of efforts during the majority of the nineteenth and twentieth centuries. Water suppliers
sought distant sources to meet ever-increasing demands, avoiding local action to limit pollution of rivers. Only in the last fifty years, when distant supplies became economically or politically problematic, did a shift to reexamine rivers as a necessary source of supply occur. Where supplies were drawn from rivers, the focus was consistently on the treatment of abstracted water, not on the source of supply. Not until the mid-twentieth century, when external supplies were no longer readily available, did suppliers begin to reexamine rivers and make common cause with river pollution regulators to take effective action. Today, water of the Thames is utilized three times as it travels to the sea. The importance of its suitability (i.e., cleanliness) for diverse usages cannot be overstated. Over the past century Britain learned that water must be conserved and reused if all divergent needs of its society are to be met. This is a lesson many regions of the developing world only recently began to appreciate to its fullest extent. Britain is a land considered by many to be “wet,” an oversimplification to be sure, but mean rainfall levels are much higher than in other regions. If British society, had to grapple with ensuring adequate supplies for its population through reuse, the issue in other countries, which are relatively drier and have higher population densities, will only become ever more important to their future success. In the future, water will most certainly be a source of conflict between nations that share common rivers. The British experience with conservation and reuse can provide practical lessons for others in mitigating these problems.

Attempts to regulate river pollution demonstrated the effectiveness of Parliament’s ability to legislate, but the institutions created often lacked the administrative and financial powers necessary to effectively act on behalf of the common good. This engendered a search to build and locate water pollution controls at the most effective level of authority, resulting in a regional management structure based on natural river basins and controlled by the national government. This structure is now subject to the supranational authority of the EU.

Beginning exploration of pollution control by examining 19th century pollution in the Thames Valley and the first national response through legislation in 1876, this study
examined the development of local control over the environment, and looked at the role of science and technology in defining water quality. It reviewed how early centralization efforts were defeated and how this hampered pollution management efforts until late in the twentieth century. River authorities such as the Thames Conservancy, the Port of London Authority (PLA), the London County Council (LCC), and the Greater London Council (GLC) failed for a variety of reasons, but mainly due to lack of geographical size and central government support. Limited size meant they were unable to control enough of the sources of pollution to have positive effects. While they sought in some cases to control pollution in their own vicinities, they were unable to address pollution that traveled into their areas from upstream. In this sense, their experience with transboundary pollution mimicked that of national states on the continent who share common river resources. It was not in the interest of the local community to expend what was believed as unreasonable sums on a problem they could not effectively control. As a result, pollution control efforts focused on solution of immediate problems, such as spills, instead of systematic problems such as dumping of sewage or industrial wastes into rivers. Localism constantly undermined pollution control priorities. Local authorities did not consider the river as a whole ecosystem and their actions simply resulted in the transference of pollution downstream.

Movement toward centralization is clearly evident from legislative history, which shows a progression of pollution control from the local to the regional level. Clear problems of localism and lack of coordination began to be addressed during this period. Creation of ever-larger units continually reduced the number of authorities responsible for river pollution control. Coupled with these changes, new powers given to the authorities improved their ability to limit the amounts of pollutants placed into rivers. In this incremental manner Britain groped toward ecologically based structures as a solution. The rational decision to increase the size and complexity of water authorities, to take advantage of economies of scale, was also experienced in other resource industries such as energy. Set within the highly competitive political environment of the era, these changes helped set the stage for local and
national governmental reorganization that in turn enabled creation of a centralized system of water pollution control.

Governmental re-organizations of the 1960s and early 1970s enabled further centralization of water pollution control functions. Governmental re-organization at the local and national level made it rational to shift pollution control management from local to central government, while retaining practical administration at the regional level. Large comprehensive agencies were created to manage the entire hydrological cycle of ecological river basins. The new governmental system made Regional Water Authorities (RWAs) appear a promising model for pollution control.

The Water Act of 1973 illustrates the synergy between government reorganization and the application of larger pollution control units that centralized river management and regulatory functions. While Parliamentary debates did shift from questions of administrative machinery to political issues, this was largely due to the domestic political needs of each party as both parties used the water environment to score political points against each other. However, ecologists and water specialists (engineers) urged recognition that water pollution control required conformity to ecological/hydrological principles. The new Regional Water Authorities (RWAs) created in 1973 were based on these principles, representing a significant change for Britain. For the first time the "environment" (river systems), not a political unit, was recognized as the proper unit of "authority." This recognition granted autonomous authority to rivers themselves, changing the fundamental relationship between society and nature. Humans would now attempt to conform to nature (in regard to river pollution control); nature would no longer be required to conform to human social organization. This fundamental shift in British attitudes deserves fuller analysis in the future.

Of special note is the role of politics regarding environmental issues. It is clear that at this time as both parties were attempting to formulate their own thinking on this policy sector neither party was willing to stand against the environment. The debates surrounding the 1973 Water Act show that Labour's attacks were directed more for the consumption of their base than against efforts to secure a healthier water environment. The election of 1974 saw a
return of the Labour Party and the second Ministry of Harold Wilson. However, this political change did not result in any revision of the 1973 Water Act. If, the Labour charges against the Act were real, and its structure was truly an assault on “local democracy” one would have expected wholesale revisions once Labour was in control. The fact this did not occur suggests that the earlier charges were baseless. Labour, like the Conservatives Party before them, could ill afford an anti-environmental perception from the public given their broad support for a cleaner environment. Instead, Labour would focus its efforts on other legislation that died as a result of the change in governments and would continue to address environmental issues.

The second major change occurring in the mid 1970s was passage of the Control of Pollution Act in 1974. Part II of the Act, specifically related to water, was a comprehensive attempt to base pollution control on regional watershed authorities under the aegis of the Department of the Environment, with flexible implementation of pollution control via regionally based authorities. Critical in Part II of the COPA was transference of pollution control powers for policy, planning, and oversight to the central government. The system failed for a number of reasons, but largely because the economic crisis in Britain in the mid-1970s left it under-funded. Regional Water Authorities, operating as public utilities through their supply and waste treatment functions, were prevented from borrowing in the private money markets due to restraints imposed by Whitehall. Central government did not want Regional Water Authorities borrowing money, pushing up interest rates for the remainder of society, hampering economic recovery. As a result of these decisions by central government, Regional Water Authorities were unable to make the necessary capital investments in sewage treatment required to produce higher quality effluents needed to improve river quality. Because Regional Water Authorities were both regulators of river pollution in their regions and disposal authorities for sewage, they remained the chief polluters in their watersheds. It became increasingly difficult for Regional Water Authorities to implement stricter controls on industry when they were unable to meet existing standards themselves. This contradiction ultimately undermined public confidence in the new system. The large
costs associated with infrastructure improvements necessary for improved river quality ultimately led the Thatcher ministry to conveniently divest itself of the sewage disposal functions via privatization.

Britain's decision to join the European Union (EU) was ultimately significant for the protection of the water environment as it impacted British institutions, procedures, and standards. No sooner had the British government established central control over pollution control policy than it was subjected to supranational influence from the EU. This was no easy process as pollution control became entangled in a host of other controversial issues separating Britain and her EU partners. Britain attempted to retain her traditional methods and practices; however, these were repeatedly deemed insufficient by the European Court of Justice. The Court's decisions ultimately indicated that authority over the environment rested with the Union and not with the national government. British membership in the EU shifted but did not resolve such questions, particularly the tension between central and local authorities, between regulators and users, or the authority of scientific or technical knowledge. However, British membership in the EU resulted in a cleaner British environment. EU standards, in most cases relating to the water environment, were more stringent or rigid in comparison to the flexible practices of the Britain. British compliance with these standards (resulting from EU pressure during the late 1980s) led to quicker improvements in water quality than might otherwise have occurred within the traditional system, where cost was given a dominant position in any analysis.

Improvements in the water environment are always related to issues of cost either for new sewage works or new industrial processes that reduce the amount and concentrations of wastes. In the modern world this is always a political question, as national governments control the means of either imposing those costs directly on their citizens via taxation or fees, or indirectly by passing those costs to the consumer via higher prices for products. Given the political/economic climate in Britain in the 1970s and 1980s, it is clear the national government was unwilling to expend resources in the amount necessary to make improvements. This was a choice that balanced the interests of the water environment
against those of the community at large. In this case the government chose to support the
desire for economic wealth over a healthy environment. Why Britain acted in this manner is
easily understood considering economic development is a concept easily grasped by the
public, is immediately obvious and individually desirable. In contrast, creating a healthy
environment is complex, indirectly influential, and desirable for the whole community yet
laden with individual costs. At its essence, this is the unchanging dilemma of the common.
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