Water Quality Policy in Three Southern States:
A Comparison and Analysis of Institutional Design

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WATER QUALITY POLICY IN THREE SOUTHERN STATES:
A COMPARISON AND ANALYSIS OF INSTITUTIONAL DESIGN

Patricia E. Norris, Roy R. Carriker and Leon E. Danielson

INTRODUCTION

Water quality management is a subset of activities comprising the general area of water management. From an economic perspective, water management may be broadly conceptualized as the process by which "needs" for water are translated into effective demand for water, physical availability of water is translated into effective supply of water, and demand for water is reconciled with the supply of water.¹ Water management, in reconciling demand with supply, must implicitly or explicitly recognize time, place and form aspects of water demand and supply.

Within the conceptual scheme of time, place and form, water quality management deals specifically with the latter. For example, the time aspects of water management are addressed by the creation of reservoirs and impoundments, to capture water when it is available and to store it until it is needed. Place aspects of water management are addressed by canals, pipelines and aqueducts -- moving water from where it is readily captured to the locations where it is in demand. The form (quality) aspects of water management are addressed by such measures as water treatment for consumption, wastewater treatment for discharge to receiving waters, and pollution prevention activities to assure the quality of water as needed in order to satisfy the requirements of effective demand.

The law embodies much of the institutional framework within which water management decisions are made, including decisions for water quality management. However, water management in general, and water quality management in particular, has been less structured than the preceding discussion might imply. In the early development of the United States, adequate quantities of water of suitable quality were usually available to satisfy the needs of the human population. Government played a minimal role in decisions concerning behavior that affected the quality of water. The disputes that did arise concerning water quality were generally handled by the courts through what is referred to as the common law dispute-settlement process. Consequently, the institutional framework which has evolved through custom and case law tended to place few restraints on the rights of individual water users.

The important point is that the functioning of existing institutions in the water management arena is predicated on a particular set of supply and demand conditions -- abundant supplies relative to demand -- and water "problems", when they occur, usually manifest themselves as inadequacy of existing institutions to satisfactorily reconcile supply with demand in terms of time, place or form dimensions. When this happens, there is a felt need to adjust the structure of decisionmaking (the institutional arrangement) in order to facilitate water management under new conditions. For water quality problems, institutional arrangements have evolved over a period of years in response to new conflicts and changes in social goals and expectations.

This paper represents an attempt to apply an institutional approach to the analysis of water quality protection in an era of rapid growth in population and economic activity, and in an era when concern for ecosystem impacts of water quality changes has become increasingly emphatic. First, attention is focused on the definition and role of institutions in water quality management. Second,

the idea of performance variables for institutional evaluation -- such as information costs, goal articulation, enforcement costs and conflict resolution -- is introduced, and a discussion is presented which compares the expected performance of water quality institutions predicated on decentralized decision making with administrative water quality protection programs which mandate centralized decisionmaking. Finally, the paper concludes with a comparative analysis of water quality management for three states in the southern region, Florida, North Carolina and Oklahoma. These three states have different geophysical settings, different political traditions, and different historical patterns of development and growth.

Institutions Defined

The most compelling environmental problems of the next decade -- including those relating to water quality -- will be the unintended side effects of reasonably informed people making rational choices within the boundaries defined by law and custom. Water quality problems typically manifest themselves in terms of conflict among people over adverse impacts of water quality degradation on public health risks, ecosystem integrity, property values, and a host of related concerns. Conflict arises over issues of who shall pay the costs of water quality protection (or restoration), the definition of "acceptable" water quality, and whose interests count when these issues are decided. The inevitability of choice suggests the need for a decision framework by which the concerns of competing interests are addressed and by which burdens and benefits are allocated. Basic to this process of choice is the functional role of the institutional arrangements for resource allocation.2

Institutions in this context are "sets of ordered relationships among people which define their rights, exposure to the rights of others, privileges, and responsibilities."3 An important subset of institutions generally defined are "economic institutions conceptualized as social decision systems [which] provide decisions rules for the use of resources and for the distribution of the income stream derived from such use."4 In other words, economic institutions provide decision rules for resource management. They specify which person, group or agency is to make decisions with respect to resource use, establish limits to the decisionmaking power of such entities, and provide rules to ensure that the appropriate constraints are observed.

Decision systems for resource management are notably hierarchical in nature. Ciriacy-Wantrup delineates a three-level hierarchy of decision systems for water management.5 The first level relates to the control of resources as inputs into consumption or production processes. The decisionmakers may be both private and public, and both are assumed to control the resource in a manner calculated to further their own particular objectives subject to constraints of technology, institutions and resource availability. Producing firms, for example, are observed to combine resources in such proportions, with respect to each other and with respect to various outputs, as to maximize net returns to the firm.

Resource users are constrained in their control of resources by the combined provisions of civil and criminal law, including case law, property law, and administrative law. The object of law as it relates to resource allocation is to provide for the orderly conduct of resource management over time

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2 Mulkey and Carriker.


and among users and uses, and as such, constitutes the institutional framework within which first level decisions are made. Decisions to change these constraints occur at the second level of the hierarchy of decision systems, and are generally made through legislatures or by various federal, state, or local agencies created to enforce and implement various legislative mandates.

A third level in the hierarchy of decisions is exemplified by the constitutional organization of the United States. It was adopted two hundred years ago, complete with prescribed procedures for altering its provisions. It created the legislative, executive and judicial branches of government, and in prescribing those duties, responsibilities, and prerogatives, established the institutional framework within which second level decisions are made. It also defined the distinctions between local, state, and federal levels within each branch, specifying which powers are retained at the federal level and which are delegated to lower levels. The constitution also contains a list of rights retained by individuals which may not be usurped by government and which serve as constraints on government activities. More importantly, with respect to the working of the resource allocation process, the third level in the hierarchy serves to impose constraints on second level decisions.

**Institutional Performance**

Within a given institutional setting, people use resources to further their own objectives. Given the hierarchical nature of decision systems for resource allocation, "...not only will people pursue their self-interest within the rules; they will also allocate resources toward changing the rules to their own benefit." The impetus for institutional change stems from the fact that there are almost always gainers and losers as a result of any change in laws or rules governing rights to the use of resources. The change manifests itself either as it affects the allocation of costs of water pollution and its control, or as it affects the distribution of benefits from water quality protection. Pressures for institutional change exist whenever sufficient numbers of people, or sufficiently influential people, are unhappy over either the allocative or distributional outcomes of first level decisionmaking.

Pressures for institutional change often come about as a result of shifts in water availability, changes in water quality, or changes in the income or preferences of citizens over time. Therefore an important consideration in institutional design is the capacity of the institution to adjust as conditions change over time.

Various segments of the constituency will often disagree over which policy measures best serve their particular interests. Therefore, political decisionmakers must have the accommodation of partisan interests in mind as an important goal.

A purpose of the institution is to ensure that behavior of individuals with respect to resource allocation is consistent with societal goals for resource allocation. Therefore, the institution must structure the set of incentives, disincentives, and constraints facing the individual first-level decisions maker in such a manner as to reduce the divergence between his/her individual self interest and the goals of society with respect to his/her behavior.

Related standards against which institutional alternatives may be compared are the levels of information costs and enforcement costs associated with each. As a decision system governing the use of resources and the distribution of income streams derived from each use, the economic institution must in some manner oversee the process by which the resource is distributed among users.

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Information is clearly a necessary condition for the orderly conduct of this process. Institutional alternatives may vary considerably in their capacities for low cost generation of essential information on the time, place, quality and quantity dimensions of the allocation process. The rules, regulations, constraints, rights, and entitlements which comprise the substance of the institution also require provisions for enforcement. Institutions which are equally desirable by other criteria may entail markedly different enforcement costs.

To the extent that institutional factors to enhance performance measured by one standard detract from performance measured by another standard, the process of institutional design resembles multiple-objective decisionmaking, and account must be taken of trade-offs among objectives of institutional change. However, it is also the case that some performance criteria are complementary.

In summary, institutions for resource allocation, including those for water quality management, must provide a decision framework governing the process by which scarce resources (or limited means) are allocated among competing uses, and by which income streams (or flows of benefits of whatever nature) are distributed among interests in society. The process by which such institutions are designed or redesigned is a political process occurring at the second level of a hierarchy of decision systems for resource management. Effective decisionmaking for institutional change must compare institutional alternatives according to:

1. The manner in which benefits and costs are allocated;
2. The ability of the institutional framework to respond to changes in conditions over time;
3. The ability to reconcile or to accommodate partisan interests;
4. The manner in which individual self interests are brought in line with societal interests; and
5. The cost and complexity of enforcement and information costs.

Water Quality and Institutional Design

A brief survey of U.S. history suggests that, for much of the nation’s history, adverse impacts of man’s activities on water quality were taken largely as a matter of course. The nation’s resources seemed unlimited. There seemed always to be new frontiers with abundant, untainted water. Progress was equated with mankind’s conquest of nature, and some degradation of resources was accepted as a natural consequence of progress.

With the passage of time, and with continued growth in population and economic activity, deterioration in water quality became increasingly deleterious to ongoing efforts to improve economics and quality of life. Raw sewage contaminated drinking water sources. Industrial wastes killed commercially valuable fisheries. Erosion produced siltation of streams and lakes, creating problems for navigation and for the propagation of aquatic species. As the early conservation movement matured into today’s environmental movement, concern for water quality began to transcend immediate economic and aesthetic impacts and acquired a voice for general ecosystem protection.

In the early years, conflict was rare. The institutional framework for resolving conflicts which did arise consisted, broadly speaking, of common law doctrines which evolved over time in custom and case law. When localized instances of water pollution produced conflict between individuals, the case was settled in court. As the nature of, and the basis for, conflict over water quality became more sophisticated, Congress and various state legislatures enacted statutory measures for addressing water quality problems. These examples of institutional change are part of an evolutionary policymaking process still underway. A common thread among the many different approaches to water quality protection is dissatisfaction with the loosely structured common law doctrines as the basis for settlement of water quality disputes.
COMMON LAW AND WATER QUALITY

Much of the water law that still governs entitlement and responsibilities pertaining to water resources in the United States is not a product of legislation. Rather, it is the cumulative product of court decisions. The judicial rule-making process, referred to in legal literature as the common law process, is a mechanism of long standing in the United States. In developing this law, the courts started from a body of general principles inherited from England. The kinds of disputes brought to courts changed with time, as did the formal doctrines applied by the courts. Over time, the decisions on water allocation within some jurisdictions tended to acquire a cohesive form. The tendency was realized in a particular jurisdiction to the extent that the individual disputes presented to the court covered a broad enough range of issues to induce development of a comprehensive body of judicial doctrine.³

Riparian Doctrine

Water law saw its greatest development with regard to water in streams because surface water bodies were, historically, the first to be developed for water supplies and power.⁴ In the eastern states, the predominant watercourse doctrine is known as the riparian doctrine. The basic concept of the riparian doctrine is that private water rights are tied to the ownership of land bordering a natural watercourse ( riparian land). The riparian right is constitutionally protected and cannot be taken without due process of law. It represents a right to use and profit from the water as long as that use does not reduce the quality or accessibility of the water to other riparian users.

Two independent doctrines of riparian rights have been identified: natural flow and reasonable use.⁵ According to strict natural flow doctrine, the riparian owner has no right to change the natural condition of the water in a navigable water body, and any such change is subject to legal action regardless of whether actual harm can be demonstrated. The reasonable use doctrine modifies the strict approach of natural flow and grants the lower riparian only the right to have his water kept free from unreasonable interference. A use cannot be found unreasonable if there is no actual injury to other riparian owners. Even if there is injury the use may be allowed if "reasonable" under all the facts. So, in certain circumstances the pollution of water may be reasonable and therefore lawful under the reasonable-use modification of natural flow doctrine. Reasonableness is a factual question controlled by the circumstances of each case.

Tort Doctrines

In the case of water pollution issues, state courts have typically applied common law tort


doctrines, such as nuisance, negligence, and strict liability.\textsuperscript{11} A private nuisance is defined as a substantial and unreasonable interference with a landowner’s use and enjoyment of his or her land and associated water resources. A public nuisance is defined as an unreasonable interference with a right common to the general public. Negligence, often described as the absence of "due care," similarly involves a defendant’s creation of an unreasonable risk of harm to others.

Thus, a blend of property and tort law once governed the common law remedies of the riparian owner damaged by pollution. The usual theory of action in a pollution suit was private nuisance, the suit being predicated upon unreasonable interference with the use and enjoyment of land and accompanying water rights.\textsuperscript{12} Generally, pollution was found to be a cause of action for an injunction, damages, or for both.

The Restatement of Torts, Second, adopted a modified approach toward pollution cases whereby such injuries are considered under nuisance theory instead of the law of riparian rights.\textsuperscript{13} The purpose of the modification is to avoid confusion in the law and to provide greater protection to plaintiffs suffering from pollution. Under riparian doctrine, courts tend to consider reasonable, beneficial uses of water as a property right incident to ownership of the riparian land. Beneficial uses of water which cause pollution might then acquire the status of a property right under riparian doctrine. Therefore, by classifying pollution under nuisance law, it becomes emphatic "that pollution is a tort and not the exercise of a property right."\textsuperscript{14} Riparian law is still applied in disputes over the quantity of water to be allocated among riparian uses.

Common law water pollution remedies may provide for injunctive relief, instructing the defendant to stop the pollution. An injunction will be issued only if the plaintiff shows that the defendant’s use is not only unreasonable, but that injunctive relief is necessary because the threatened injury is irreparable or cannot be adequately compensated by damages, or that a multiplicity of suits would result from failure to grant the injunction.\textsuperscript{15}

Common Law Approach

Legal scholars criticize the common law approach to settling disputes over water allocation or water pollution because the process is reactive and not forward-looking. It operates only after a perceived harm has been inflicted but does not actively prevent harmful acts. It must handle disputes on a case-by-case basis, and only those cases within the jurisdiction of the court. As a result, the process cannot produce a comprehensive, preventive program to resolve common categories of water management issues. It is largely because of these limitations of the common law approach that Congress and many state legislatures have enacted various statutory approaches to water management.\textsuperscript{16}


\textsuperscript{12} Maloney, et al., 1967, pp. 136-137.

\textsuperscript{13} Maloney, et al. 1980, p.333.

\textsuperscript{14} Maloney, et al., 1980, p.333.

\textsuperscript{15} Maloney, et al., 1967, p. 137.

FEDERAL STATUTES FOR WATER QUALITY

The development and evolution of institutions for water quality management by states, by the nature of the hierarchical decisionmaking process, take place within the institutional framework created by decisions at the federal level. Federal laws and regulations delineate, to a certain extent, responsibilities of states with respect to water quality management. Where state and local issues arise which are not addressed at the federal level, responses may be constrained by guidelines established under federal jurisdiction. As a result, it is important to understand the national context within which states have addressed water quality issues.

Surface Water Protection - The Clean Water Act

The first federal legislation dealing with the discharge of materials into the nation's waterways was the Rivers and Harbors Appropriations Act of 1899, which outlawed the discharge of any refuse matter (aside from municipal wastes) into navigable waters without a permit from the United States Army Corps of Engineers.17 The Rivers and Harbors Act was intended to protect navigation and was not primarily concerned with pollution.

The first comprehensive federal legislation addressing water quality was the Water Pollution Control Act passed in 1948, marking the first federal venture into what had been primarily a state and local matter.18 The law asserted, nevertheless, that states were to retain primary responsibility for pollution control and gave the federal government authority only for investigations, research and surveys. The Water Pollution Control Act Amendments of 1956 and a series of subsequent amendments gradually extended the federal role. A grants program for construction of municipal treatment plants was initiated, and procedures for federal enforcement against individuals were provided.

The Water Quality Act of 1965 sought to strengthen the enforcement process, and provided for federal approval of ambient water standards which specified the quality at which interstate or navigable waters were to be maintained. Enforcement action against those discharging wastes into navigable waters would be taken only if a particular discharge caused the quality of receiving water to deteriorate to substandard levels.

The Federal Water Pollution Control Act Amendments of 1972 added intensity to the federal government role in water pollution control, and carried with it implications for state water pollution control programs. As a measure to improve the quality of water in the United States the earlier federal policy was generally considered to be a failure. The failure was attributed to at least two factors. First, states tended to set water quality standards low enough to allow existing dischargers of industrial wastes to continue their operation without having to reduce the quantity of wastes discharged. Failure was also attributed to the difficulty of determining which of a number of waste dischargers was responsible for any deterioration in the quality of a given body of water. A Senate report concluded that the old act had not resulted in any improvement in water quality anywhere.

The Federal Water Pollution Control Act Amendments of 1972 were passed during an era of heightened interest in environmental matters and general dissatisfaction with the status of existing pollution control efforts. The new legislation virtually rewrote the Federal Water Pollution Control Act, and represented an attempt by congress to replace ineffective policies with ones that they hoped would work. It opened by asserting that "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985..."

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18 33 U.S.C.A. § 1251 et seq.
Specifically, the Act:

a) directed the Environmental Protection Agency (EPA) to conduct a program of research on, and demonstration of, waste treatment methods;

b) authorized a construction grants program for municipal waste treatment facilities, providing for the creation of an area-wide waste treatment management planning process which included planning for the control of agricultural, silvicultural and other nonpoint sources of water pollution; and

c) created a framework for setting effluent standards, requiring permits, and enforcing the effluent standards in order to achieve a 1985 goal of fishable/swimmable for all surface water.

Section 301 of the Act stated that the discharge of any pollutant by any person shall be unlawful unless, among other things, the discharge complied with Section 402. That section, in turn, authorized EPA to require a permit of anyone wishing to discharge a pollutant. This system of permitting to enforce effluent standards and limitations comprised the National Pollutant Discharge Elimination System (NPDES).

Effluent standards were a key element in the new enforcement program. Standards of quality would thenceforth be applied to wastewater at the point of discharge, rather than in the receiving waters. This eliminated the enforcement problems that had resulted from the need to establish which of several polluting sources was responsible for deterioration of ambient water quality standards in receiving waters. The Act directed EPA to impose even more stringent effluent standards wherever necessary to protect public water supplies, agricultural and industrial uses, the propagation of fish and wildlife, and to permit recreational activities in and on the water.

While section 402 of the Act authorized EPA to require permits, the Act also allowed states to administer their own NPDES permitting programs. Governors of states wishing to administer their own permitting programs were required to submit a complete description of the program to EPA along with a statement from the state attorney general certifying that the laws of the state provide adequate authority to carry out the program.

By including dredged spoil, rock, sand, and cellar dirt within the definition of pollutants, the Act created potential overlap between the new National Pollutant Discharge Elimination System and the traditional jurisdiction of the Army Corps of Engineers under the Rivers and Harbors Act of 1890. Since 1890, parties desiring to construct or excavate in navigable waterways had been required to obtain the permission of the Corps. In an effort to avoid the overlap of jurisdiction, Congress, in enacting Section 404, authorized the Corps of Engineers to regulate discharges of dredged or fill material into the waters of the United States.

Citizen suits were authorized by Section 505 of the Act to provide leverage to citizens through the courts. Citizens could file enforcement suits against sources polluting in violation of state or federal regulations, and suits against the EPA to enforce the performance of nondiscretionary duties. The citizen suit provisions were intended to enable environmental groups and individuals to function as watchdogs over the performance of EPA, to insure administrative action in accordance with congressional intent.

Section 208 of the Federal Water Pollution Control Act Amendments of 1972 required area-wide water quality planning and management and addressed the control of nonpoint sources of water pollution. However, EPA placed little importance on implementation of Section 208 planning in the period immediately following passage of the 1972 Act. The FWPCA was extensively amended in 1977 by the Clean Water Act, and following this Section 208 received greater attention. As amended by
the 1977 Act, Section 208 required area-wide planning for waste treatment management by states and certain designated areas. The planning process also required specification of a process to identify nonpoint sources of water contamination. Methods were to be set forth to control nonpoint sources, including land use requirements. Nonpoint source control requirements were developed further in 1987 amendments.

**Ground Water Protection - An Indirect Approach**

In 1984, EPA presented its Ground Water Protection Strategy, promoting development of institutional capabilities in the states and within EPA and strengthening of state ground water programs.\(^{19}\) The strategy required the states to develop and implement comprehensive ground water assessment and management plans. There is no comprehensive federal law addressing ground water protection directly. Rather, EPA oversees a somewhat disparate series of statutes that can restrict or ban the use of designated chemicals, oversee remediation of waste spills or dumps, and set drinking water standards.

**Safe Drinking Water Act**

The Safe Drinking Water Act (SDWA), passed by Congress in 1974, was designed to assure that public water systems provide to the public water which meets minimum standards for the protection of public health.\(^{20}\) As required by the act, EPA published drinking water regulations for contaminants which may have adverse effects on the health of humans. These regulations specify maximum contaminant levels (MCLs), the maximum level of chemicals which may be present in the water served to the public. The regulations also specify treatment techniques that must be used to remove contaminants which are either technically or economically infeasible to detect through testing. MCLs are enforceable, and EPA requires public systems to monitor and report findings to assure that the water they provide complies with the MCLs.

Subsequent revisions of the SDWA have given EPA direct control over underground injection of wastes and authority to approve wellhead protection programs to protect drinking water. EPA can administer the regulatory components of SDWA where a state does not develop and carry out an approved program.

The Safe Drinking Water Act covers a broad scope of potential contamination sources with its wellhead protection program provisions, but like other federal nonpoint source pollution control statutes, it does not establish direct federal control. Rather, SDWA requires the states to develop programs to protect wellhead areas from contaminants. The large number of community water systems suggests potentially broad coverage by wellhead protection programs, but it nevertheless does not extend to all ground water.

**Resource Conservation Recovery Act**

Under the Resource Conservation and Recovery Act (RCRA), as passed in 1976 and amended in 1980 and 1984, EPA implements regulations and standards for handling, storage and disposal of hazardous waste and non-hazardous solid waste.\(^{21}\) The law provides financial and technical assistance to states and political subdivisions for solid waste management. In addition, EPA regulates

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\(^{20}\) 42 U.S.C.A. § 300f et seq.

the treatment, disposal or storage of hazardous waste to control potential adverse effects, with protection of ground water quality a major concern. Individual states, with EPA approval, can implement their own hazardous waste and non-hazardous solid waste management programs in lieu of the federal program.

RCRA also addresses underground storage tanks requiring that all underground tanks above a specific size be registered by the states. In addition, EPA enforces leak prevention and detection through tank installation and performance standards.

**Comprehensive Environmental Response, Compensation and Liability Act**

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) passed in 1980 established the Superfund program, which authorizes and finances government response to releases, or threats of releases, of hazardous substances.\(^{22}\) A major factor in evaluating sites for Superfund action is the threat of ground water contamination. Superfund addresses both emergency situations and sites needing longer term remediation. Under CERCLA the party responsible for the contamination problem must reimburse expenditures from Superfund.

**Federal Insecticide, Fungicide and Rodenticide Act**

EPA also administers the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), which controls the labeling, safe and use of agricultural chemicals (excluding fertilizers).\(^{23}\) FIFRA was first passed in 1972 and has been amended extensively. Under the law, all pesticides must be approved and registered by EPA; registration may be denied if use of the product is shown to pose unreasonable risks to human health or the environment. The pesticide manufacturer is responsible for providing data, according to EPA guidelines, on which the pesticide registration decision is based. The registration or production labeling process is somewhat complicated, however, because of its involvement with product efficacy. Registration of a pesticide is granted only for specific uses, i.e. certain pests in certain crops. If a manufacturer cannot show efficacy for the labeled application, registration may not be granted. Environmental fate has become a significant part of the labeling process, and manufacturers may be required to supply information such as leaching potential of the pesticide when the label is sought. Again, states may administer FIFRA through EPA-approved programs.

**PUBLIC POLICY AND WATER QUALITY IN FLORIDA**

**Water Quality Protection in Common Law**

In 1896 the Florida court accepted the reasonable use modification of the natural flow doctrine in a case involving pollution of an underground stream.\(^{24}\) The plaintiff in the Cline case was a waterworks company which supplied water to the City of Tampa from a spring-fed stream. When the defendant, a nearby landowner, excavated a hole on his land and exposed the spring, the plaintiff brought suit to prevent further excavation, fearing that the spring would be polluted by surface runoff. The Court observed that the same rules applied to both contained surface waters and underground streams and declared that the law of riparian rights was applicable in Florida as part of the English

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\(^{22}\) 42 U.S.C.A. §§ 9601-9675.


common law. The Court seemed to reject the natural flow doctrine in favor of the reasonable use rule since it sustained the trial court's denial of injunctive relief when the plaintiff was unable to prove damages.

In a 1961 case, the plaintiff sought to enjoin the city of North Miami Beach and the North Dade Water Company from discharging effluent from a sewage plant into his lakes. In the basis of a chemist's testimony that sewage bacteria were in the lakes, the court found that defendant's actions created a private nuisance and a continuing trespass likely to endanger the plaintiff's health, welfare, and comfort and granted a permanent injunction.

In 1940 a Florida court invoked a "balance of convenience doctrine" in the case of State ex rel. Harris v. City of Lakeland. Plaintiffs (residents and farmers) sought to enjoin the city from dumping sewage effluent into a small canal on the theory of public nuisance. The Florida Supreme Court recognized the inefficiency of the city's sewage plant but applied the balance of convenience doctrine wherein it compared the relative importance of the interest of the plaintiffs and the defendant and refused to enjoin the city's operation on the ground that public interest in permitting pollution was of overriding importance, even though the plaintiff was clearly damaged. The court permitted "a reasonable period of time to allow the municipality to so improve its plant as to overcome the deleterious condition which may be found...to exist."

In some instances, the court may allow for the payment of money damages, including the costs of obtaining alternative water supplies or compensation for reduced property values. Where the courts consider a defendant's polluting activity to be abnormally dangerous, they may impose strict liability on the defendant, meaning that the defendant is liable for the resulting harm, regardless of whether he acted reasonably or with due care. Application of strict liability is limited, however, to pollution resulting from activities which create an abnormally dangerous condition of unusually high risk to surrounding property owners due to a non-natural use of the land in question. In Florida, the strict liability doctrine was first applied in 1975 when operators of a phosphate mine were held liable for water pollution caused by a break in an earthen dam which impounded phosphate slime derived from the processing operations. The court noted the "magnitude of the activity and the attendant risk of enormous damage," concluding that "the Cities Service slime reservoir constituted a non-natural use of the land such as to invoke the doctrine of strict liability."

**Water Quality Protection in Statutory Law**

**Early Legislation in Florida**

Prior to 1967, pollution control in Florida was primarily the responsibility of the State Board of Health. The board was composed of five members appointed by the Governor for four-year terms.

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28 City of Lakeland v. State ex rel. Harris, 143 Fla. 761, 767, 197 So. 470, 473 (1940); as cited in Maloney, et al., 1967, p. 137.


(Statutes required that two members of the Board must be medical doctors, one a dentist, one a pharmacist, and the other a "discreet citizen"). Within the Board of Health, the Bureau of Sanitary Engineering handled pollution problems.

Most of the Board's duties pertained to disease and health--hence the emphasis on health-related credentials in its makeup. However, the Board had powers extending beyond health aspects of pollution, including sanitary practices for public drinking water, sewage disposal, pollution of lakes, streams, and other bodies of water, and authority to prescribe qualifications for operators of milk plants, water purification plants, sewage treatment plants, and swimming pools. Installation or material alteration of a water supply or sewage disposal system required Board approval of plans and specifications. The Board had general control over all underground water, lakes, rivers, streams, canals, ditches, and coastal waters of the state "insofar as their pollution may affect the public health or impair the interest of the public or persons lawfully using them."

Finally, the board had extensive power to administer the Pollution of Waters Act of 1916, and related statutes. These statutes were divided into three parts, each concerned with a different aspect of pollution control:

1. Underground pollution. A permit from the Board was required of any entity using a sink or well for purposes of draining surface water or discharging sewage within five miles of any town or city. (The Board could revoke and change permits with notice and hearing).

2. Springs or other sources of water. It was a felony to "willfully or maliciously" defile or injure any conductor of water.

3. It was a misdemeanor to deposit in waters of the state "any rubbish, filth, or poisonous or deleterious substance or substances, liable to affect the health of persons, fish, or livestock."

When allegations of pollution were made, the Bureau of Sanitary Engineering would investigate, and field studies would be conducted to determine the extent and cause of the pollution. Conferences would be held with the polluter in an attempt to achieve a solution to the pollution problem by voluntary cooperation. Although it was broad in scope, the statute contained no provisions for preventive enforcement. It provided only criminal penalties for violations, and the bureau's main source of credibility in its efforts to restrain polluters was the threat of injunction. Should the polluter refuse to cooperate, a suit would be filed. An important activity for the Bureau of Sanitary Engineering was approval of sewage treatment facilities. It approved 1,550 sewage treatment plants between 1947 and 1967, and 68 waste treatment plants for industry during the same period.

**The Florida Air and Water Pollution Control Act of 1967**

In response to the 1965 Amendments to the Federal Water Pollution Control Act and their requirement that states establish water quality standards, Florida's governor appointed an Advisory

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31 Maloney, et al., 1967, p. 139.
33 Maloney, et al., 1967, p. 140.
34 Maloney, et al., 1967, p. 140
35 Maloney et al., 1967, p. 141.
Committee on Water Quality Control. The committee recommended a classification system, based on six classes of water purity. The State Board of Health promulgated this classification on May 13, 1967.

Meanwhile, new legislation was being introduced in the Florida legislature which would substantially revise the state's role in water pollution control. There had been several objections to designating the state Board of Health as the lead agency for pollution control. First, having a health agency in charge of water pollution control programs categorized pollution as a "health problem," and while pollution definitely affects health it is also a problem from conservation, recreational, environmental and aesthetic viewpoints. Representation of these non-health oriented concerns was sought in the pollution control agency. Another objection was that the Board of Health did not specialize in pollution control and had many other duties. Moreover, substantial appropriations for pollution control were harder to get when the pollution appropriation was just one of many items requested by the Board of Health.

The 1967 legislature enacted the Florida Air and Water Pollution Control Act on July 12, 1967, as a response to these objections. It created a Florida Air and Water Pollution Control Commission composed of the Governor, Secretary of State, Attorney General, Commissioner of Agriculture, and two "discreet citizens" appointed by the Governor and confirmed by the Senate. Provision was made for a director who "shall possess experience in bioenvironmental or sanitary engineering and such other qualifications as the commission may prescribe."

The new legislation gave the Commission more power than was available to the Board of Health. The Commission could establish a permit system for controlling the operation, construction, or expansion of any installation that might be a source of pollution. It could compel persons engaging in such operations to file reports to be used by the board in prescribing methods for controlling or preventing pollution. The legislation authorized civil penalties for violation of any order of the Commission, including orders or rules fixing standards of air and water quality, or permits issued pursuant to its authority. By providing civil sanctions, the new law overcame an inherent weakness in earlier legislation that resulted from a reluctance on the part of the agency to invoke criminal sanctions against a polluter. The new law also provided for temporary and permanent injunctions.

The functions of the Commission were subsequently transferred to the Department of Pollution Control, and then, in 1975, to the Department of Environmental Regulation (DER), which continues to be the state agency responsible for the administration of pollution control in Florida. DER was created by the Florida Environmental Reorganization Act of 1975. It is headed by a Secretary appointed by the governor subject to confirmation by the Florida Senate, and the Secretary serves at the pleasure of the governor.

The Environmental Regulation Commission (ERC), also established by the Florida Environmental Reorganization Act of 1975, is empowered to act as an adjudicatory body for final actions taken by

36 Maloney, et al., 1967, pp. 142-143.
40 Laws of Florida, Chapter 75-22.
the Department and is the exclusive standard setting authority of the Department. The ERC conducts a review of all standards proposed by DER, which must include an economic and environmental impact study for those standards that are more stringent than federal standards. Final action on the more stringent standards is taken by the governor and the cabinet, who must accept, reject, modify or remand for further proceedings the standard within 60 days from its submission.

In Florida, the Air and Water Pollution Control Act, as amended, is now a part of Chapter 403, Florida Statutes, and with several other sections of that chapter, provides the statutory basis for the regulation of most aspects of water quality in Florida.\textsuperscript{41} The Florida Air and Water Pollution Control Act has been deemed insufficient to warrant transfer of NPDES permitting authority to the state. It nevertheless provides the DER with broad powers and duties to accomplish the statutory goal of protecting and improving water quality throughout the state. These include the power to:

i) develop and adopt a long range program for the "prevention, abatement and control of pollution in the waters of the state," including the classification of waters based upon their most beneficial uses;

ii) establish ambient water quality criteria within each classification for various parameters of water quality;

iii) develop a permit system for the "operation, construction, or expansion of any installation that may be a source of...water pollution" and require posting bond to operate any such installation;

iv) require persons engaged in operations which may result in pollution to file reports regarding the location and nature of those emissions;

v) conduct water quality monitoring throughout the state;

vi) adopt rules and regulations to carry out the intent of the Act;

vii) issue orders as necessary to control water pollution.

In accordance with Section 403.087, Florida Statutes, DER requires that any installation "which will reasonably be expected to be a source of pollution" obtain a permit from the DER prior to constructing, expanding, modifying or operating any such installation (unless specifically exempted by DER rule).\textsuperscript{42}

DER has adopted rules specifying effluent standards and guidelines for dischargers of domestic and industrial wastes, which largely incorporate those adopted by EPA under the Federal Water Pollution Control Act (FWPCA) as amended.\textsuperscript{43} Domestic waste treatment plants are required to treat their effluent so as to comply with state water quality standards, and at a minimum must have implemented treatment (known as secondary waste treatment) that removes ninety percent of impurities. Industrial dischargers must meet the Best Practicable Technology and Best Available Technology effluent limitations for new and existing sources, toxic pollutants and discharges into publicly owned treatment works in accordance with time schedules specified in the FWPCA.

\textit{Florida Safe Drinking Water Act of 1977}

In Florida, prior to 1975, the state drinking water program was housed in the Bureau of

\textsuperscript{41} Maloney, et al., 1980, pp. 378-379.

\textsuperscript{42} Maloney, et al., 1980, pp. 380-382.

\textsuperscript{43} Florida Administrative Code, Chapter 17-6.
Sanitary Engineering, Division of Health, Department of Health and Rehabilitative Services (DHRS). Two separate legislative acts changed the structure of the program. The Environmental Reorganization Act transferred most of the drinking water program from the Department of Health and Rehabilitative Services into the newly created Department of Environmental Regulation. A similar reorganization act relative to the structure of the DHRS did away with the old Division of Health in that department and shifted primary responsibility over what was left of the drinking water program in the department into a Tallahassee-based Health Programs Office and eleven newly created regional districts.

Analysis by the Florida Senate Committee on Natural Resources and Conservation in 1977 revealed a lack of clear statutory authority and guidance for the drinking water program, as well as understaffing and underfunding of the program. In addition, lines of authority among DER, DHRS, and individual county health departments were unclear. Based on the committee staff report and other information, a draft version of a Florida Safe Drinking Water Act was developed for consideration by the 1977 legislature.

The Florida Safe Drinking Water Act of 1977, codified in Part IV, Chapter 403, Florida Statutes, established statutorily the responsibilities and areas of jurisdiction for DER, DHRS, and the individual county health departments. DER was given a lead role, while DHRS and the county health departments were given a supportive role primarily from the public health standpoint.

The act provided for the adoption and enforcement of state primary and secondary drinking water regulations and standards. It authorized DER to grant variances and exemptions from such standards under certain conditions. It allowed DER to take actions relative to "imminent hazards" dealing with drinking water and to plan for the provision of water in the event of an emergency. It required water system operators to notify the public and certain state agencies whenever their systems fail to comply with the provisions of the act, and it authorized relevant state agencies to inspect the systems to enforce compliance with the law. It established a program for certifying laboratories for conducting various water analyses. It also listed various prohibited acts and established civil penalties for violations of such acts. Both the federal and the state Safe Drinking Water Acts distinguished different types of public water systems. The Florida act distinguished a "community" system from a "noncommunity" system. Basically, the difference between the two is that the former addresses permanent residents whereas the latter addresses transients or persons who otherwise do not permanently inhabit a building, e.g., hotel guests.

Two basic sets of rules have been promulgated to implement the act: Chapter 17-22, Florida Administrative Code, defines the program of DER covering public water systems which, as "community" systems, fall under that department's jurisdiction; and Chapter 10D-4, Florida Administrative Code, which defines the program of HRS covering private water systems as well as

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46 Laws of Florida, Chapter 75-22.


47 Preston, p. 37.

49 Preston, p. 37.
those public water systems which are "noncommunity" systems.\textsuperscript{60}

The DER rules specify the detailed standards required of a water supply for public water systems and the sampling and analytical techniques necessary to insure that these standards are maintained. The rules also delineate the construction techniques for new systems and the operation and maintenance procedures for all public water systems under DER's jurisdiction. The rules specify the procedures by which variances and exemptions from MCLs and treatment techniques may be applied for and granted by the DER. Rules also contain provisions for record maintenance and reporting requirements. The HRS rule is not as extensive as Chapter 17-22 and covers such topics as the standards for the water systems covered; sampling and monitoring requirements; and construction, operation, and maintenance of the water systems covered by the rule.

DER regulates operators of water treatment plants under the Florida Air and Water Pollution Control Act, Section 403.101(3), Florida Statutes (1987), and Chapter 17-16, Florida Administrative Code. DER has established an operator examination and certification program and is authorized to take certain enforcement actions, including denial or suspension of operator certificates, administrative proceedings for damages or injunctive relief, and civil action in circuit courts to impose civil penalties.\textsuperscript{61}

\textit{Florida Water Resources Act of 1972}

DER regulates the construction, repair or abandonment of water wells under the Florida Water Resources Act of 1972.\textsuperscript{62} This Act brought into existence a form of administrative water law based largely on A Model Water Code which had been developed by scholars at the University of Florida College of Law.\textsuperscript{63} It provided for a system of administrative regulation within the framework of the riparian water law system. It created five water management districts, encompassing the entire state. A nine-member governing board makes policy for each district subject to provisions of the statute, a statewide water policy, and oversight by the Florida Department of Environmental Regulation. The districts are required to implement programs to regulate consumptive use of all waters of the state as well as diversions or other alterations in natural flow patterns of water. In this context DER has delegated regulatory authority for water well contractors and water well construction to the regional water management districts.

\textit{Ground Water and Hazardous Wastes}

Most major Florida laws for water quality protection passed during the 1970's tended to track companion federal laws which focused regulatory efforts on "point source" or "end of the pipe" discharges from municipal and industrial sources. Many industrial sources of effluent perceived an incentive to pre-treat their wastes through on-site facilities such as evaporation-percolation ponds before discharging into surface waters. The result, ironically, was probably an increase in the amount of pollution discharged to ground water, condoned and even fostered in many cases because the U.S.

\textsuperscript{60} Preston, pp. 38-39.

\textsuperscript{61} Sections 403.161 and 403.121, Florida Statutes (1987).

\textsuperscript{62} Sections 373.303-373.342, Florida Statutes (1987), and Chapter 17-20 and 17-21, Florida Administrative Code.

\textsuperscript{63} Maloney et al., 1980, p. 207.
Environmental Protection Agency lacked jurisdiction over direct discharges to ground water.  

By the early 1980s, Florida faced the need to address ground water protection and hazardous waste management. In 1980, the Florida legislature amended state laws dealing with hazardous waste management and regulation,\(^65\) responding to the federal RCRA and CERCLA provisions. 

In 1981 and 1982, DER renewed its effort to amend and strengthen its rules regulating the discharge of domestic and industrial liquids into ground water. By rules first promulgated in 1979 and later revised in 1983, Chapter 17-3, Florida Administrative Code, classifies ground water of the state. This Chapter sets forth four categories of ground water, based on dissolved solids within the ground water and whether the ground water in question is potable. Ground water is Class G-I (potable) if it is in single source aquifers with a total dissolved solids content of less than 3,000 milligrams per liter. Class G-II ground water (potable) is water in an aquifer with a total dissolved solids content of less than 10,000 milligrams per liter. Classes G-III and G-IV are non-potable waters. The Rule provides that DER policy shall afford the highest protection to G-I ground water, with DER providing less protection in order of classification (G-I receiving the highest, G-IV the lowest). Procedures are provided for affected parties to petition for the reclassification of ground waters. Any discharge to either G-I or G-II aquifers must meet primary and secondary drinking water standards established under the Florida Safe Drinking Water Act,\(^66\) as well as the minimum criteria established under the ground water rule. 

Despite this progress in its ground water programs, DER was unable to implement a state hazardous waste management program to the degree and with the speed which the legislature desired. Meanwhile, a widely publicized crisis involving ground water contamination by the pesticide Temik, or aldicarb, prompted an effort by DER and the Florida Department of Agriculture and Consumer Services (DACS) to assess the scope of pesticide-related ground water contamination in the state. In addition, both DER and DHRS expressed a need to assess the cumulative impact of widespread septic tank use in the growing urban areas of Florida. 

These concerns led to the appointment by the speaker of the Florida House of Representatives of a Task Force on Water Issues. The task force was to focus on the state’s ground water problems in advance of the 1983 legislative session. When the task force issued its final report in March, 1983, it made a series of recommendations on several subjects including hazardous waste management, septic tanks and small wastewater treatment plants, ground water contamination and protection strategies, pesticide use, sewage treatment plant construction funding, and organization and funding of DER and water management districts, as well as funding arrangements for each subject area studied. The legislature translated most of the findings of the task force report into legislative proposals, and on July 1, 1983, the governor signed into law the Water Quality Assurance Act of 1983.\(^67\) 

The Act was divided into twelve separate parts, each of which addressed a distinct ground water or hazardous waste problem. Under ground water protection, the Act directed DER to compile all scientific and factual information relating to water resources, and make it accessible in a central depository. Much information was being generated in response to earlier requirements that owners

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\(^{66}\) Section 17-22, Florida Administrative Code.

\(^{67}\) Ch. 83-310, Laws of Florida.
or operators of facilities which discharge effluent into the ground water monitor ground water quality in the vicinity of the discharge and submit the results of analysis to DER.

DER was directed to develop a program aimed at preventing contamination of all potable water supplies, and not just those that were previously regulated with reference to community and non-community water supply systems. Specific attention was given to plans for plugging abandoned artesian wells, many of which allow contaminated water from deeper aquifers to contaminate freshwater in shallower aquifers. The Act clarified and modified the siting requirements for on-site sewage disposal facilities and other provisions for the use of septic tanks. The new Act retained two siting factors--source of water supply and lot size and dimension--and added projected domestic waste flowage in gallons per acre per day as a factor providing a density control mechanism missing under the old statute.

The Act created the Water Quality Assurance Trust Fund to finance DER's responsibilities and to clean up contaminated areas. DER was given broad authority to regulate stationary storage tanks with a capacity of 550 gallons or more of specified pollutants, explicitly including oil, gasoline, pesticides, ammonia, and chlorine. Any person discharging pollutants is required to eliminate the discharge, but if the polluter fails to do so, the DER may arrange for cleanup using funds from the Water Quality Assurance Trust Fund. The Act shields persons who assist in cleanup activities from liability to third persons for everything except acts of gross negligence and willful misconduct. To put teeth into the cleanup provisions, the DER is required to diligently pursue reimbursement to the fund of any sum expended for cleanup, and if DER goes to court to obtain reimbursement, the statute places what amounts to strict liability on the polluter. In addition, DER is authorized to assess certain penalties against a polluter.

The Department of Agriculture and Consumer Services was given primary authority for review and regulation of pesticides with DER relegated to a review-and-comment role. A nine-member Pesticide Review Council was created within DACS and charged with reviewing data on restricted-use pesticides that are presently registered in the state, and reviewing all applications for registration of restricted-use pesticides. Procedures were established for requiring field testing of restricted use pesticides in Florida under criteria developed by the state. The final determination of whether a restricted-use pesticide should be registered for use in Florida lies with DACS.

The Florida legislature addressed several problems relating to the state's hazardous waste management that had become apparent since the program's inception in 1980. These included the need to clean up old disposal areas and contaminated ground water plumes, and the need to strengthen existing state hazardous waste regulatory programs in order to prevent additional instances of water contamination from hazardous waste. Particular attention was focused on "small generators" of hazardous waste who generally did not know about or understand federal and state hazardous waste management requirements. It was recognized by the legislature that a hazardous waste management program could not succeed unless a sufficient number of environmentally sound and economically attractive hazardous waste treatment, storage and disposal facilities were available. A program that specifically requires all hazardous waste to be properly treated, stored or disposed of must include sites that are accessible to the persons or industries covered by the law.

The Act required all local units of government to conduct hazardous waste management assessments to identify all hazardous waste generators, types of wastes generated, current waste management practices of waste generators, options available to generators of hazardous wastes, identification of abandoned dump sites, and sanitary landfill operating procedures. The counties were

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68 Hopping and Preston, p. 613.
69 Hopping and Preston, p. 614.
required to submit their assessments to their respective regional planning councils. After completion of all local hazardous waste management assessments, each regional planning council was to complete a regional hazardous waste management facility needs assessment. The Act provided that no local government law, ordinance or rule pertaining to hazardous waste regulation shall be more stringent than DER rules, and required local governments to identify small-quantity generators of hazardous waste and bring them into the active regulatory process for hazardous waste management.

A program known as "Amnesty Days" was established during which small quantities of hazardous waste would be collected free of charge and liability from homeowners, farmers, schools, state agencies and small businesses. DER was required to contract with an approved, bonded waste handling company to collect and transport such wastes out of the state for proper disposal at a federally approved facility.

The Act also sought to address problems in siting hazardous waste facilities by amending the process for appeal in cases where local governments deny variances in local codes (thereby forestalling efforts to site facilities). To foster the siting of additional hazardous waste storage facilities in Florida, the legislature required each county to designate areas within the county where such a facility could be located. Each regional planning council was directed to designate one or more sites at which a regional hazardous waste storage or treatment facility could be constructed. The Act established a separate procedure for the siting of a state-sponsored multipurpose hazardous waste facility by DER. DER was directed to develop siting criteria and a list of potential sites. The Environmental Regulation Commission was required to select a site for the state hazardous waste facility from the list prepared by DER in accordance with the siting criteria. The Act made specific provision for the siting, construction and operation of hazardous waste storage or treatment facilities, but the legislature enunciated a clear policy of prohibiting hazardous waste landfills in Florida due to the permeability of Florida soils and the general presence of a high water table in many parts of Florida.

Penalty and liability sections of the existing law were amended. Persons potentially liable under Florida law for hazardous waste violations would include those same parties liable under federal law. These include the owner and operator of a hazardous waste management facility, the transporter, and the hazardous waste generator who arranged for transport, disposal or treatment.

New statutory defenses to liability were also created. Those who have complied with the provisions of the Act and applicable rules, and who receive a certificate of disposal from a licensed hazardous waste disposal or processing facility, are relieved of liability.\(^\text{60}\) If a small generator of hazardous waste is notified of his legal responsibilities and management alternatives by the county, the generator then has the burden of proving that the hazardous waste disposal was proper. Otherwise, the burden of proving improper disposal is on DER. The Act provides immunity from liability for any "Good Samaritan" who provides good faith assistance in containing or treating any hazardous material. Intrastate transporters of hazardous waste must be bonded or insured in order to guarantee their financial responsibility for any liability which may be incurred in the transportation of such wastes.

The legislature faced two major funding problems. The first of these was how to generate the matching funds necessary to tap into the federal "superfund" available for the cleanup of hazardous waste sites. A ten percent matching of funds was required. Florida had twenty-nine eligible sites. The second major funding problem posed by the Act was how to provide financial assistance to local governments for construction and reconstruction of sewage treatment systems.

One of two main funding mechanisms of the Act was an accelerated sales tax collection provision which resulted in a one-time windfall receipt of revenue in 1983--about $150 million--of

\(^{60}\) Hopping and Preston, p.621.
which $100 million was to be deposited in the Water Pollution Control Trust Fund.\textsuperscript{61} Forty-five percent of those funds would be transferred to a newly created Small Communities Sewer Construction Assistance Trust Fund to be used for sewer grants to cities with a population of 35,000 or less. The remaining funds would be available for additional sewer grants to local governments.

The second major funding mechanism prescribed by the Act was the Water Quality Assurance Trust Fund, which was to be used by the DER as a nonlapsing revolving fund for carrying out the purposes of the act—primarily to be used to finance cleanup of hazardous waste sites, both superfund and state initiated.

With regard to spill prevention and cleanup, the act gave DER broad authority to regulate the permitting, construction, maintenance, and inspection of tanks used for the storage of oil, gasoline, and other potential pollutants. Such storage tanks were identified as a major source of ground water contamination by the legislature.\textsuperscript{62} The success of these enforcement provisions would rest on having the polluter voluntarily clean up the spill himself, without requiring DER to expend trust fund money or go to court to seek restitution. To achieve this end, the Act imposed virtual strict liability on polluters to dissuade them from asserting non-liability for spills and from failing to clean up spills to the satisfaction of DER. An additional incentive to encourage self-cleanup was a provision allowing DER to proceed with cleanup when polluters fail to do so and to seek reimbursement for costs incurred.

\textit{State Underground Petroleum Environmental Response Act of 1986}

In response to the 1983 Water Quality Assurance Act, DER developed one of the most stringent programs in the nation regulating tanks containing motor fuels (Chapter 17-61, Florida Administrative Code).\textsuperscript{63} This Stationary Tank Rule required tank owners to register with DER, keep strict inventory records, monitor their tanks for leakage, report spills and leaks to DER, and retrofit tanks according to a schedule—replacing or upgrading tanks so as to meet rigorous specifications to minimize the possibility of leaks.

In 1986, EPA released information indicating that the number of leaking underground storage tanks may have been greatly underestimated by DER.\textsuperscript{64} The Florida legislature was also informed that the efficacy of DER’s stationary tank program was threatened by noncompliance. In response, the legislature passed the State Underground Petroleum Environmental Response Act of 1986 (Ch. 86-159, Laws of Florida), dubbed SUPER.

Florida’s response to the problem of leaking underground storage tanks evolved concurrently with, and partially in response to, Federal government legislation on the problem. The first major federal effort to address leaking underground storage tanks was the 1984 Hazardous and Solid Waste Amendments to RCRA. Under this law, EPA was required to develop regulations for the detection, prevention, and correction of releases from underground storage tanks for petroleum and substances defined as hazardous under the CERCLA.

The federal law allowed states to establish standards at least as stringent as the federal regulations. Florida’s program had objectives similar to those of the federal programs, but there were differences in details of implementation. Also, because EPA’s authority is broader than DER’s, tank

\textsuperscript{61} Hopping and Preston, p. 625.

\textsuperscript{62} Hopping and Preston, p. 629.


\textsuperscript{64} Ruhl and Lowe, p. 609.
owners would be subject to requirements under both sets of regulations. 65

Florida’s SUPER Act provided incentives to tank owners to upgrade or replace their equipment and actively seek out and report leaks. A tax was imposed to generate adequate funds to clean up contaminated sites and restore or replace water supplies at contaminated sites. The Inland Protection Trust Fund was created for use by DER for this purpose, and the uses of the Water Quality Assurance Trust Fund were expanded to include restoration or replacement of water supplies contaminated by pollution sources not covered by the new Fund. Revenues for the new trust funds would come from a ten-cents-per-barrel tax on petroleum products, tank registration fees, and a $5 million loan from the Coastal Protection Trust Fund.

Although DER must generally seek recovery and reimbursement from responsible parties for funds expended under the Act, a fifteen-month grace period was established during which all qualified sites reported would be cleaned up at state expense. 66 Also, persons conducting voluntary cleanup of sites reported on or before September 30, 1987, could be reimbursed for reasonable costs incurred after January 1, 1985.

The Act created a nine-member advisory committee to be staffed and supported by DER, to review site rehabilitation and water restoration projects and to provide technical advice. 67 DER was also directed to develop a compliance verification program for its stationary tanks program. The Act made it a third-degree felony to willfully falsify inventory or reconciliation records or to intentionally damage a petroleum storage system. Finally, the SUPER Act addressed certification of installers and inspection of their work.

The act was intended to have several effects. First, it enabled DER to move swiftly to restore drinking water supplies contaminated by leaking petroleum storage tanks or by other pollutants. Cleanup of contaminated areas could be expedited, as could identification of leaks and problem sites. The Act’s Early Detection Incentive Program, with its modification of the strict liability standard was expected to encourage tank owners to meet DER’s tank monitoring and retrofitting requirements on schedule and to actively seek out and report leaks. The Act promoted a higher degree of compliance with DER’s rules by petroleum facility operators since compliance was now required in order to qualify for the incentive program, and because the Act eliminated strict liability and substituted negligence as the liability standard for operators who are in compliance with regulations. Also, the Act imposed an annual registration and a postcard notification program whereby DER would locate and better monitor tanks throughout the state and require tank owners to participate in the regulatory process. Compliance with tank regulations were expected to reduce insurance risks, and potential sources of liability would be eliminated as contaminated sites were rehabilitated. Perhaps most importantly, the Act placed emphasis on prevention rather than on reaction to environmental contamination.

Save Our Rivers Program.

In 1981 the Florida legislature established a Water Management Lands Trust Fund. 68 Money from the fund was to be used "for acquiring the fee or other interest in lands necessary for water management, water supply, and the conservation and protection of water resources...." The land acquisition program is known as the "Save Our Rivers" program. The fund was established within the Department of Environmental Regulation. However, acquisition and management of lands acquired

65 Ruhl and Lowe, p. 616.


67 Ruhl and Lowe, p. 620.

68 Chapter 373.59, Florida Statutes, 1981.
under the program is the responsibility of the state’s five water management districts. The districts were each required to submit a five-year plan for land acquisition and to submit annual updates of the plan to the secretary of the Department of Environmental Regulation. The secretary of the DER was instructed to release money from the fund to the state’s five water management districts following receipt of a resolution adopted by the governing boards of the respective districts, identifying the lands being acquired and certifying that the acquisition of those lands was consistent with the plan of acquisition. The Water Management Lands Trust Fund is financed by a portion of the proceeds from a documentary stamp tax on real estate transactions within the state. The documentary stamp tax was initially set at forty five cents per $100 of consideration in real estate transactions, and 7.2 percent of the proceeds were earmarked for the Water Management Lands Trust Fund. The tax rate was raised to fifty cents per $100 by the Florida Resource Rivers Act of 1985, which amended the original legislation for water management lands acquisition. The portion of proceeds for the Water Management Lands Trust Fund was increased to 9.8 percent. The 1985 Florida Resource Rivers Act also gave specific authority to water management districts to sell bonds for land acquisition.

The legislature specified certain tracts of land in each water management district which were required, by statute, to be among the first purchases under the program. Substantial acreage has been acquired by the water management districts since then. In April 1984, the Suwannee River Water Management District estimated that it could accrue between twenty and thirty million dollars over the first ten years of the program.68

Since this district was allocated only ten percent of the funds available each year to the Save Our Rivers Program, that estimate implies that the program statewide would generate 200 to 300 million dollars.

Water quality objectives were one motivation for the Save Our Rivers Program. The Florida Rivers Study Committee, created by executive order of the governor in November 1984, noted in its report that “increased human activity will bring increased demands for water, increased point and non-point sources of pollution, and the conversion of natural systems to other uses.” The recommendations of this committee formed the basis for the 1985 Florida Resource Rivers Act. The rationale for a land purchase program, as an alternative or as a supplement to regulatory programs, was that even strict regulations do not preserve natural systems, but merely limit impacts on them. In addition, it was argued that acquisition and management, in some cases, would be less costly than regulation if permit administration, monitoring and enforcement are all considered.

**Other State Programs**

Other programs have been created by state legislation which are motivated, at least in part, by water quality protection or restoration goals.

- The Warren S. Henderson Wetlands Protection Act of 1984 augmented the role of the DER in the regulation of upland wetlands and assigned responsibility for regulation of agricultural impacts on wetlands to the state’s five water management districts.

- The Surface Water Improvement and Management Act of 1987 promised state funding to water management districts for remedial measures to restore water quality in surface waterbodies that had been contaminated in the past.

- The Marjory Stoneman Douglas Everglades Protection Act of 1991 was a combination of provisions for taxes, land acquisition, and regulation designed to resolve a complex and controversial lawsuit concerning water quality impacts of irrigation drainage water on the Everglades marsh ecosystem in south Florida.

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- The Florida Cooperative Extension Service and the University of Florida's Institute of Food and Agricultural Sciences conduct research, education and demonstration projects specifically directed at minimizing water quality impacts of agricultural operations, and these projects often involve cooperation with the DER, water management districts, or with the Soil Conservation Service of the U.S. Department of Agriculture.

- Both DER and the U.S.D.A. have provided for cost-share assistance and technical assistance to farmers to help reduce both point-source and nonpoint-source pollution from agricultural operations, especially from dairies.

- The Department of Agriculture and Consumer Services administers a pesticide review and registration program to assure that pesticides labeled for use in Florida have been tested under Florida conditions and will not pose an unreasonable threat to water quality.

PUBLIC POLICY AND WATER QUALITY IN NORTH CAROLINA

Water Quality Protection in Common Law

From early statehood to the present, individuals have relied upon the use of common law doctrines in private civil lawsuits to collect damages from and to enjoin both public and private sources of water contamination. The two claims brought most commonly against polluters are for violation of riparian rights and for private nuisance.

Riparian rights claims have been the most prevalent and most successful private civil lawsuits brought in response to water pollution. In North Carolina, owners of land that touches a body of water (littoral or riparian owners) have the right to make reasonable use of the water (riparian rights) so long as the use does not "inflict material or substantial injury upon those below them." All littoral 4-owners on the same course have equal reasonable use rights, and each owner's use is thereby constrained by the rights of the others to have equal enjoyment of the water. Riparian rights in North Carolina include the right to have the water flow "without sensible alteration in quality." This doctrine gives littoral owners a property right in clean water that can be strictly enforced against upstream polluters. The right is similar to the right of property owners against trespassers, and generally can be enforced without regard to the claimed social benefit of the source of pollution. The remedies available to riparian owners are damages, abatement by injunction or both.

Nuisance lawsuits have also been commonly used against sources of water contamination. A nuisance claim is available to any person who suffers injury as a result of someone else's

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70 The North Carolina section of this report has benefitted greatly from a recent water quality history written by David H. Howells. See Quest for Clean Streams in North Carolina: An Historical Account of Stream Pollution Control in North Carolina, Water Resources Research Institute of the University of North Carolina, Report No. 258, November 1990, NCSU, Raleigh, NC.

71 A special thanks is due to Allain Andry, Assistant Professor, Agricultural and Environmental Law, Department of Agricultural and Resource Economics, NCSU for drafting this section on North Carolina common law.

72 Moses v. Town of Morganton, 192 N.C. 102 (1926).

73 Durham v. Cotton Mills, 141 N.C. 615 (1906).

74 Cook v. Town of Meban, 191 N.C. 1 (1928); Finger v. Rex Spinning Co., 190 N.C. 74 (1925).
unreasonable use of property and is not limited to littoral owners or to properties immediately adjacent to the nuisance. In a nuisance suit, the plaintiff bears the burden of providing that the use of property causing water contamination is unreasonable under the particular circumstances of that case. This requires a factual inquiry into the nature of activities in the surrounding area, the relative social value of the competing uses, the degree of harm to the plaintiff and the relative burden on each party to minimize the harm. In contrast to riparian rights claims, a nuisance plaintiff cannot prevail simply by proving that a particular use of property is causing water pollution.⁷⁶ Both money damages and an injunction against the nuisance are available remedies.

In practice, there has not always been a clear distinction drawn between riparian rights and nuisance claims. Many riparian rights cases discuss the water contamination as a "nuisance" to the littoral owner. At times this is merely semantic and the case is treated correctly as a riparian rights case.⁷⁷ Other cases have treated the claims of downstream riparian owners explicitly as nuisance claims and required a balancing of the value of the competing uses.⁷⁷

A few lawsuits arising from water contamination have been based upon a claim of negligence. A negligence action requires proof that the water contamination was caused by a negligent act. In most cases, a potential plaintiff would probably elect to proceed with a riparian rights or nuisance claim. A negligence action is probably most useful in the circumstance in which damages are clear and substantial, the plaintiff is not a littoral owner and the contamination is a one-time or rare occurrence rather than ongoing.

Private common law actions have often been successful in stopping the water pollution at issue or recovering damages. In several cases, defendants showed that their discharges were approved by the relevant state health authority. The courts held consistently that this conferred no right to create a nuisance or to violate downstream riparian rights.⁷⁸ In addition, common law nuisance and trespass theories have been used to bring actions for damages resulting from the pollution of ground water.⁷⁸

There are substantially fewer reported private common law actions from the 1960's to the present. Government control of water pollution may have eliminated the most egregious sources of contamination that would previously have led to a common law claim. Also, some of the more recent public laws have explicitly or implicitly preempted the prior common law rights. Nevertheless, plaintiffs continue occasionally to bring common law actions in cases where water pollution occurs in violation of public regulations.⁸⁰

Water Quality Protection in Statutory Law

Initially, due to the abundance of water resources and the economic importance of operations like tanneries, sawmills, mines and cotton mills, North Carolina was relatively unconcerned about water quality issues. However, from the early 1900s through 1930, North Carolina experienced unprecedented industrial growth and, as a result, water quality issues received greater attention. As traditional industries were displaced and the knowledge of the impacts of pollutants on water quality

became more advanced, the population of the state became more interested in controlling the discharge of harmful contaminants. In the 1970s, the people of North Carolina voted to add a new section to the state constitution titled "Conservation of Natural Resources." It laid the basic foundation for modern environmental policy in North Carolina and gave the General Assembly a base upon which to build a framework of law to protect, preserve and improve the state’s natural resources.

Two special features of North Carolina’s water policy should be highlighted. First, boards and commissions play important roles in water policy making because they formulate regulations (quasi-legislative function) and because they have the authority to hear cases (quasi-judicial function). The rule-making powers allow the commission or board to formulate new regulations and/or standards to uphold a given law. Judicial powers given to boards and commissions can include review of administrative hearings and contested cases and the ability to levy fines and to issue special orders. In all cases, the commissions and boards work closely with state agency staff members and rely on the staff’s expertise to help them reach decisions. Boards and commissions are part of the “checks and balances” on state agencies: the governor and the legislature, through their powers to appoint members to boards and commissions, can review and control the functions of a bureaucracy that otherwise might develop its own agenda; and the public, through its representation on commissions and boards and through public meetings, can participate in the rule-making process. Members are appointed primarily by the Governor; others make limited appointments depending on differing statutory requirements of the various boards and commissions. In the surface water and ground water area, 24 boards and commissions operate. Five are licensing/occupational boards, six are advisory, and three are legislative oversight. Ten are quasi-judicial boards and commissions that formulate regulations and hear cases. Some, like the Mining Commission, have very narrow areas of responsibility whereas others, like the Environmental Management Commission, have much broader roles in environmental regulation.

Second, legislative research committees (LRCs) play an important and interesting role in developing North Carolina’s water policy institutions. The LRC was created by Article 6B of Chapter 120 of the General Statutes of North Carolina in 1965. The Commission is authorized “to make or cause to be made such studies of and investigations into governmental agencies and institutions and matters of public policy as will aid the General Assembly in performing its duties in the most efficient and effective manner.” The commission is also authorized “to report to the General Assembly the results of the studies made” and to accompany these reports with recommendations and proposed legislation. Since the time the LRC was established, studies have been conducted on a variety of issues concerning surface and ground water.

Another important aspect of rule-making in North Carolina is the Administrative Procedures Act (APA) and the Office of Administrative Hearings (OAH).81 The APA was designed to give order and uniformity to the administrative rule-making process by requiring that state agencies, boards and commissions follow specific procedures in rule-making. Proposed rules, amendments or repeals to rules are published in The North Carolina Register and public hearings are held to receive public comment before the final decision to adopt them is made. Very specific timelines are set for this procedure.

In the administrative process, the water resource regulatory departments develop and implement programs, make recommendations, grant or deny permits and offer staffing assistance to the boards and commissions. Boards and commissions adopt rules, take enforcement action against polluters, and act as final agency decisionmakers. If persons feel the state agency has made an improper decision in denying a permit or taking an action, they can file a petition for a hearing with the OAH as prescribed by APA rules and procedures. Specific procedures are followed during the appeal

process.

North Carolina's body of statutory law addressing water quality has evolved as attention has turned from one specific issue or concern to the next. In general, these concerns can be categorized according to their relationship to municipal discharges and public health, industrial point source discharges, nonpoint sources, and ground water. A chronological review of attention to each area follows.

Public Health

The primary water quality concern in North Carolina during the 19th century was the impact of contaminated water supplies on public health. Population growth, with the associated increase in household wastes, began to adversely affect the quality of the water supply. Water-borne diseases were rampant. In recognition of the public health risks from contaminated water supplies, the legislature created the Board of Health in 1877 from the State Medical Society\textsuperscript{82} and charged it with developing measures to protect the public water supply. From the 19th century into the early 20th century, the Board of Health was primarily responsible for water quality.

Because the Board of Health was not given enforcement power, it actively encouraged sanitary disposal of human wastes through the creation of community sewage systems. In 1903 legislation was passed to increase the power of the Board by delegating to it the task of general oversight and care of inland waters.\textsuperscript{83} However, there was no associated funding provided to the Board, so it was not able to generate information on the status of those waters.

In the 1920s, concern for water quality continued to derive primarily from health concerns, but interests broadened to reflect concerns about sources of drinking water. The State Board of Health dealt with the protection of health in relation to the quality of the water supply while the State Conservation Commission became responsible for the protection of sources of public water supply. Realizing that meeting all these needs required a coordinated effort, the Board of Health and the State Conservation Commission set up an informal State Stream Sanitation Committee. Since it was never legislated, the Committee never received an appropriation of funds directly, although it was indirectly funded by the Department of Conservation and Development and the State Board of Health. This commission was the first step in forming a state pollution control agency. The Commission did make some progress in water quality protection but was dissolved in 1937 due to the Depression.

While the Board of Health succeeded in getting many communities to install sewage systems, the next step in maintaining high water quality was to encourage the treatment of the sewage. First, the Board investigated the most suitable sewage treatment policies and requirements. It appeared in the 1920s that North Carolina was on its way to establishing policies to regulate sewage treatment, but all the policy work came to a halt with the Depression. It was not until the 1940s that comprehensive water quality management was considered by the State. In 1937, an attempt had been made to regulate stream pollution, but the bill did not make it through the legislature until 1945. In that year the legislature formally recognized the State Stream Sanitation and Conservation Committee (SSSCC) which was to assess the need for pollution control legislation. It was not until 1947, when the unfunded commission produced a State Stream Pollution survey, that funding was provided by the legislature.

More recently, the state addressed the funding of water and wastewater treatment facilities. In 1970, the North Carolina Clean Water Bond Act was passed to partially fund construction of

\textsuperscript{82} Public Laws and Resolution, NC General Assembly, 1876-77, c. XCVI.

\textsuperscript{83} Public Laws and Resolutions, NC General Assembly, c. 165, 218, 305.
municipal water supply and wastewater collection and treatment facilities. In 1977, a second North Carolina Clean Water Bond Act was passed to provide grants for wastewater treatment.

Health concerns related to discharge of human wastes were renewed when, in the late 1980s, septic tanks (primarily in the Coastal Plains) were identified as a significant source of discharges into the water supply. In 1989 the legislature established a Septage Management Program, requiring that septic tanks be disposed of only at specified sewage treatment systems.

**Agency Reorganization**

In 1951, the General Assembly created the first regulatory body with the specific purpose of carrying out a comprehensive program to protect the state's waters. The State Stream Sanitation Act replaced the State Stream Sanitation and Conservation Committee with the State Stream Sanitation Committee (SSSC). This Committee was composed of the chief engineers of both the Board of Health and of the Water Resources and Engineering Division of the Department of Conservation and Development as well as representatives of various special interest groups.

There followed a series of reorganizations as the state attempted to provide a more comprehensive and coordinated approach to managing water quality. In 1959, a law to create a State Department of Water Resources was passed. This Department was to coordinate all state water resource activities. It was to maintain a balance among multiple interests such as health, natural resources, recreation, fish, wildlife, aesthetics, and others. A Board of Water Resources was established to administer all departmental functions of the Department and to appoint a director. The SSSC, the Board of Health's Division of Water Pollution Control, and the Department of Conservation and Development's Division of Water Resources, Inlets, and Coastal Waterways were all transferred to the Department of Water Resources. The SSSC maintained its same duties, powers, and responsibilities, but it was to be under the authority of the Board of Water Resources.

In 1971, the State Department of Natural and Economic Resources was created. With the reorganization, the Board and Department of Water and Air Resources was transferred to the Office of Water and Air Resources. This Division was made responsible for administering the state's water pollution control program. One of the most influential commissions today was created to replace the Board of Air and Water Resources in 1973. The Environmental Management Commission (EMC) was set to operate through the Division of Environmental Management within the Department of Natural Resources and Community Development. The Commission received empowerment in 1975. The Coastal Management Act was passed in 1973, creating a Coastal Advisory Council and a Coastal Resources Commission, and requiring local land-use planning. With the existence of the EMC, there was overlap between the EMC and the Coastal Area Management Commission for permitting. Other environmental and health agencies also overlapped in responsibilities with respect to small waste discharges.

The most recent agency change occurred in 1989. Responsibilities for water pollution control were shared by the Division of Environmental Management within the Department of Natural Resources and Community Development and the Department of Human Resources. Due to this shared responsibility and the need for coordination between the two agencies, the EMC called for consolidation. In 1989, an act was passed to create a Department of Environment, Health, and Natural Resources. The EMC and the Health Services Commission remained separate. By bringing

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84 Session Laws and Resolutions, NC General Assembly 1971, c.909.
85 Session Laws, NC General Assembly 1977, c.677.
86 N.C.G.S. 130A-333, Department of Human Resources.
environmental management and environmental health under one agency, it was hoped that duplication and overlap would be minimized.

Fish Life

In addition to human health, the health and protection of fish life has been a goal of North Carolina's water quality activities. North Carolina's first act concerning water quality addressed the need to provide for the free flow of water for fish. Legislation to outlaw "driving fish with poison" was passed in 1883 and 1915; the 1915 Act was not enforced and was later declared unconstitutional.

In 1903, the Audubon Society was founded to protect fish and wildlife, but was unpopular and ineffective. As a result, fish life was not being protected from pollution. Recognizing this, the legislature created a Fisheries Commission Board in 1915 to enforce laws in relation to commercial fishing. The Board was given license to prohibit the discharge into state waters of any deleterious or poisonous substances inimical to fish life. However, this power was never acted upon.

In 1928 the objectives of the Board of Health were expanded to fully conserve the interests of the public in the conservation of fish life, and in 1963 legislation stating that the state could collect for damages (i.e., the value of the fish) from polluters was passed. Violators are fined for the value of the fish lost.

Present day issues concern fish kills from eutrophication of the waters. While this issue has been important to legislators, with many acts passed, in reality progress has been difficult. While there were acts passed to prohibit pollution of fish-producing waters and driving fish with poison, there was little enforcement. As noted, it was not until 1963 that the legislature gave the state the ability to collect for damages to fish from polluters. While general damage from fish kills was charged to the polluter on instate waterways, little had been done about wastewater disposal on the coast. As a result, in the 1980s, coastal waters became heavily polluted. Presently, shellfish beds are protected under state stormwater regulations until a study can be done to demonstrate pollution impacts. The Coastal Zone Management Act was amended to require permits before development was allowed so that water quality and hence fish life is protected. The Coastal Resources Commission has been able to protect primary nursery areas and outstanding water resources from pollution with legislation.

Industrial Points Sources

During the 1800s, as discharges from early industries impacted water quality, the legislature acted in response to specific complaints. Laws were passed that applied to one particular polluted stream to a specific company that was discharging problematic wastes. In response to pollution of streams by sawmills, legislation in 1889 outlawed dumping of sawdust into the water supply in many counties. In 1905, tannery waste pollution in streams gave rise to county laws that prohibited the discharge of tannery wastes into certain streams. Also in 1905, when cotton mill wastes were impacting public water supply, application of the Act to Protect Public Water Supplies (1893) stipulated that the pollution discharged must preserve the stream in its present state of purity. In 1911, in response to siltation of streams from mining, the legislature passed county laws

87 Session Laws and Resolutions, NC General Assembly 1963, c.1086.
88 Public Laws and Resolutions, NC General Assembly 1889, c.52.
89 Public Laws and Resolutions, NC General Assembly 1905, c.562.
prohibiting mining unless certain precautionary measures were taken.\textsuperscript{91} However, there was no comprehensive management plan to protect water quality from these point sources of pollution.

For over three decades, focus of water quality efforts was upon encouragement of adoption of waste treatment measures, the study and reporting of pollution on all streams, and recognition of the need to investigate the extent and character of pollution problems before any new regulations were adopted. As industrial development increased in North Carolina, the wastes generated by industries often were disposed of in municipal wastewater and processed by the municipal water treatment plant. These industrial wastes often interfered with proper municipal waste disposal since municipal plants were not equipped to accommodate the contaminants found in industrial wastes. The Board of Health encouraged those industries impacting municipal treatment with these "non-treatable" wastes to adopt their own waste treatment facilities. In addition, the Department of Conservation and Development pointed out the need to investigate the extent and character of the pollution being discharged by industries. The SSSCC carried out this study and reported on pollution, but could do little to curtail the wastes since the SSSCC had no enforcement power. In 1947, the act creating the SSSCC was amended so that the SSSCC could fund and administer the regulations that it mandated. However, before regulating further, the SSSCC researched stream pollution throughout the State.

\textit{Stream Classification and Discharge Permitting}

At the urging of the public in 1951, and with the threat of federal action if stream conditions were not improved, the state set out to classify streams according to their best use. The State Stream Sanitation Act was passed, and the State Stream Sanitation Committee was created to carry out the Act.\textsuperscript{92} Pollution was to be reduced through permitting of dischargers. Immediately, industries began avoiding North Carolina in favor of South Carolina, where pollution control measures were not as strict. The Governor encouraged SSSCC to cooperate to make North Carolina more attractive to industry.

Throughout the 1950s, the Federal government funded water treatment plants to reduce municipal and industrial pollution. At the state level, there was slow enforcement of pollution abatement and regulation was piecemeal. Passage of additional legislation continued, primarily river by river as problems arose. In 1958, industries urged reduced stream classification levels due to undue burdens, but the State refused the requests. The 1959 law which formed the Department of Water Resources required that any dischargers of wastewater obtain a discharge permit from the SSSCC.\textsuperscript{93} The Water and Air Quality Reporting Act mandated self-monitoring and reporting of volume and characteristics of wastes discharged by each industry.\textsuperscript{94} A Mining Act was passed requiring that permits would only be granted if there was a plan to protect the environment.\textsuperscript{95} In 1972, subsurface disposal wells were prohibited, as was discharge into the Atlantic Ocean. Toxicity concerns arose in the late 1970s, and in 1980, water quality permit limits were adjusted to deal with toxic wastes.

In the early 1980s, concerns about the costs of pollution controls resurfaced and, in 1982, the General Assembly passed a Pollution Prevention Pays Program to provide technical, education, and financial assistance to industry.\textsuperscript{96} A lack of federal loan funds for waste treatment led to the authorization of Clean Water Revolving Loan and Grant Act in 1987, providing loans for waste

\textsuperscript{91} Public Laws and Resolutions, NC General Assembly 1911, c.295.

\textsuperscript{92} Session Laws and Resolutions, NC General Assembly 1951, c.606.

\textsuperscript{93} Session Laws and Resolutions, NC General Assembly 1959, c.779.

\textsuperscript{94} Session Laws and Resolutions, NC General Assembly 1971, c. 1167.

\textsuperscript{95} N.C.G.S. 143-215.

\textsuperscript{96} Industrial and Pollution Control Facilities Financing Act, N.C.G.S. 159C-1.
Federal Influence

In general, the decade of the 1970s was a time of change for handling industrial pollution. Almost all policy was dictated from the Federal level. The Federal government placed more responsibility for managing water resources into the hands of the State government. In 1973, the North Carolina General Assembly directed the Board of Water and Air Resources to administer effluent standards and limits in accordance with the EPA.\(^{98}\) In 1973, the Oil Pollution Control Act governing the discharge of oil into waters was passed.\(^{98}\)

Much of the legislation passed during the 1970s and early 1980s to address water quality, in general, reflected federal legislation and mandates. The need to protect drinking water, mandated by the Federal Drinking Water Act, resulted in passage of the North Carolina Clean Drinking Water Act\(^{100}\) During the period 1972-1979 North Carolina developed statewide 208 water quality management plans in response to EPA’s requirements for area waste treatment plans. The need to regulate the placement of hazardous waste sites resulted in passage of the North Carolina Hazardous Waste Management Act.\(^{101}\) In 1989 the need to manage solid waste resulted in creation of the Division of Solid Waste Management.

In North Carolina, most federal regulations regarding water quality have been delegated to the State including the SDWA, RCRA, CWA, and FIFRA. SDWA has been administered by the Division of Environmental Health in the DEHNR since 1979. The Division of Solid Waste Management of DEHNR has been responsible for RCRA since 1989. The State DEHNR’s Division of Environmental Management accepted primacy for NPDES permitting in 1974. The State Department of Agriculture’s Pesticide Control Board has administered FIFRA enforcement since 1972.

Agriculture and Other Nonpoint Sources

Agricultural pollution did not emerge as an issue until the mid-1950s. While there must have been problems with sediment runoff prior to the 1960s, it was not regulated. When sedimentation was recognized as a major problem for surface waters of the state and the 1973 Sedimentation Pollution Control Act mandated standards for buffer zones, slopes, and ground cover to control erosion, agricultural, silvicultural, and mining activities were exempted.\(^{102}\) Instead, from the 1950s through the 1970s, cost-sharing programs for best management practices (BMPs) were established to conserve soil and reduce agricultural sedimentation problems in 16 coastal counties. In 1989 legislation expanded this program statewide.\(^{103}\)

In 1989, the Sediment Control Act was amended to prohibit land disturbing activity unless an

\(^{97}\) NC Clean Water Revolving Loan and Grant Act, N.C.G.S. 159G-1.

\(^{98}\) Session Laws and Resolutions, NC General Assembly 1983, c.821.

\(^{99}\) Oil Pollution and Hazardous Substances Control Act, N.C.G.S. 143-215.

\(^{100}\) N.C.G.S. 130A-311.

\(^{101}\) N.C.G.S. 130B-1.

\(^{102}\) Sedimentation Pollution Control Act, N.C.G.S. 113A-50.

\(^{103}\) Agriculture Cost-Share Program, N.C.G.S. 143-215.
erosion control plan was approved. Agriculture and mining activities remained exempt. However, at the request of the forestry industry (specifically, some of the larger operations), silvicultural operations were brought under the law. Forestry operations were not required to submit an erosion control plan for approval so long as they used erosion control practices according to standards established in the law. Interest of the larger forestry operations reflected concerns that, without some proactive effort, they might be forced to comply with sediment control planning while smaller operations remained exempt.

The primary water quality management programs addressing agriculture have resulted from the use of chemicals on agricultural lands and the disposal of animal wastes. Synthetic organic chemical use was regulated in 1969 to prevent these fertilizers from entering and polluting the water supply. The Agricultural Stabilization and Conservation Service began assisting in the construction of animal waste lagoons in the early 1970s. Also, an Advisory Committee was formed to develop criteria to manage animal wastes, but only established that certain animal waste management practices have the potential to pollute the water. However, revised animal waste regulations to protect water quality were adopted by the environmental management Commission in December, 1992, and became effective February 1, 1993. Commonly known as the "0200 Rule", the amendments to the rule require that farms with livestock equal to or exceeding established threshold numbers must obtain a nondischarge permit from the DEM.

During the 1980s, other nonpoint pollution concerns included urban runoff, hazardous substance disposal, and eutrophication. In 1982, the EMC was directed to phase in stormwater runoff rules and programs. In addition, regulations were passed by the EMC in 1982 that set rules for peat mining and addressed the uncertain effects of peat mining on drainage and discharge in coastal waters. This was an important piece of legislation which, together with the 1985 Farm Bill, stopped most drainage of wetlands in the coastal region of the state.

A continuing concern during 1983-1987 for the eutrophication of rivers and sounds led to legislation prohibiting the use of phosphates in detergents sold in North Carolina. This followed debate over the use of economic incentives rather than regulations. This topic received additional attention in 1989 when studies were authorized to find out how to best manage the water resources to prevent algal blooms.

Currently, North Carolina contains one of four sites in the nation that is implementing a "nutrient trading" program to provide incentives for industries to reduce stream loadings of nitrogen and phosphorus. Nutrient trading is implied to be authorized by the Clean Water Act of 1972, but wording is not explicit as in the Clean Air Act. Under the nutrient trading scheme, industries are to either meet their targeted point source goals or contribute money to an association that will fund best management practices for agricultural non-point source programs. Although contributions by industry were to have begun in 1992, firms apparently are finding lower cost ways to meet their goals without having to resort to trading.

**Ground Water**

Although safe drinking water has been a major theme in North Carolina's history of water quality management, the predominant source of this drinking water, ground water, has not been

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\(^{104}\) Session Laws, NC General Assembly 1989, c.676.

\(^{105}\) NC Pesticide Act, N.C.G.S. 143-434.

addressed by North Carolina’s management efforts until very recently. Over half of North Carolina’s drinking water is taken from underground sources. Yet, due to the great difficulty in investigating sources of pollution, ground water has not been protected. The state’s recent interest in ground water protection was prompted largely by federal activities in the 1980s.

Following the lead of federal ground water quality activities, North Carolina began to focus on the protection of ground water quality in the 1980s. While there still is no comprehensive ground water protection plan, there are five strategies the State uses in protecting ground water from contamination. These strategies include: the regulation of potential contamination sources and substances; management of ground water contamination incidents; ambient ground water monitoring; the regulation of well construction; and the regulation of ground water use. These strategies are supported by laws, regulations, and regulatory programs.

The primary regulatory programs are largely in response to EPA’s lead. In 1989, ground water standards and classifications were redefined and pesticide use impacts on ground water were being investigated. In addition, underground storage tanks, a major source of ground water contamination in North Carolina, have been regulated according to RCRA. Drinking water is protected by the parallel of the Federal Safe Drinking Water Act. Public water systems are regulated. Private wells must meet certain requirements.

PUBLIC POLICY AND WATER QUALITY IN OKLAHOMA

Water Quality Protection in Common Law

Water rights and, by association, water quality disputes were originally addressed in Oklahoma according to the state’s adaptation of the riparian doctrine for water allocation. Individuals injured by water pollution incidents could seek relief through damages or injunctions based on their loss of rights as riparian property owners, when "pollution interfered with the health and comfort of the riparian family, rendered the water unfit for domestic use, for irrigation of commercial vegetable gardens, for stock watering, and for the propagation of fish in a reservoir supplied by the stream, and diminished the value of the riparian land.” However, it was necessary that a causal connection between surface activities and water contamination be established.

The awarding of damages under the riparian doctrine applied to surface water pollution but similar protection was generally not afforded users of ground water. However, there were cases where ground water (or well water) contamination was linked to surface water contamination so that well users were protected. Pollution of the source was considered equivalent to pollution of the well itself, justifying an award of damages.

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107 Drinking Water Act, N.C.G.S. 130A-311.
108 NC Well Construction Act, N.C.G.S. 87-88.
111 Cities Service Gas Co. v. Eggers, 98 P.2d 1114 (1940); Danciger Oil and Refinery Co. v. Donahay, 238 P.2d 308 (1951).
112 Cities Service Gas Co. v. Eggers, 98 P.2d 1114 (1940).
In general, the common law approach to protection from water pollution provided only limited protection to either water users or to the resource itself. In fact, a 1950 court held that without injury to a water user, there could be no liability on the part of the polluter.\textsuperscript{113} As particular sources of pollution became more common and incidents of pollution more widespread, the Oklahoma Legislature passed a number of statutes addressing water quality issues. However, these tended to respond to very specific problems and did not provide broad protection of surface or ground water quality. Only in recent years has a more comprehensive approach to addressing water quality been attempted in Oklahoma.

**Water Quality Protection in Statutory Law**

The Oklahoma Legislature addressed water contamination issues early in its history. Human and livestock health issues were primary concerns and surface water pollution was the primary target. Since then, there have been three other significant periods of legislative action addressing water quality. During the late 1940s to mid-1950s, legislative attention turned to concerns over ground water resources and to a more comprehensive attempt to control water pollution. A third period of activity came during the 1970s and 1980s, reflecting concerns over specific sources of water contamination and regulatory activities at the federal level. The final period of significance represents a move toward consolidation of environmental programs and a greater state role in traditionally federal water quality management programs in Oklahoma.

As in North Carolina, boards and commissions play an important role in water quality management efforts in Oklahoma. These bodies provide oversight to state agencies and departments charged with carrying out programs in the state. The boards and commissions approve rules and regulations developed in response to legislation. Their responsibilities also include holding administrative hearings in connection with enforcement and administration activities. Critical to the implementation of water quality policy in Oklahoma is the requirement that all rules and regulations promulgated by state agencies, boards and commissions must be approved by the state legislature and the governor before they can be codified.

**Water Quality and Public Health**

**Drinking Water Protection**

The protection of drinking water supplies appears to have been the first issue resulting in legislation addressing water quality. In 1908, the State Board of Health was created and was directed to establish a laboratory for examining public water supplies. That legislation also made it illegal to foul public water supplies, stating "whoever willfully and maliciously deposits excrements or foul and decaying matter or in any manner corrupts any spring or reservoir or other source of water used for domestic purposes... shall be punished by a fine."\textsuperscript{114} In 1910, municipalities were authorized to create water districts encompassing the drainage basins for their water supplies and were empowered to enforce regulations within the districts to protect their water supplies.\textsuperscript{115}

In 1927, drinking water supplies, as well as potential supplies, were afforded greater protection. Legislation passed which made it illegal to pollute or permit the pollution of a municipality’s water supply, or any stream, pond, spring, lake or other reservoir fit to be used and used as a water supply by a municipality. The law provided municipalities with the right to collect damages when

\textsuperscript{113} West Edmond Salt Water Disposal Assn. v. Rosecrans, 226 P.2d 965 (1950).

\textsuperscript{114} Oklahoma Session Laws 1908, p.705.

\textsuperscript{115} Oklahoma Session Laws 1910, p.28.
water supplies were contaminated. The statute stated that contamination lasting six months or longer was to be considered permanent.\textsuperscript{116}

The permanence of contamination has been addressed elsewhere. Courts in 1930, 1934 and 1951 agreed that contamination is permanent if it cannot be abated within a reasonable period of time by the expenditure of labor or money.\textsuperscript{117} The 1951 court held that “the word ‘permanent’ in its legal sense is not equivalent to ‘perpetual’, ‘unending’ or ‘unchangeable’. In pollution cases, permanency, in a legal acceptance of the term, does not include the idea of absolute but only of a practical or irremedial character.”\textsuperscript{118} However, permanence of contamination of municipal water supplies has not been addressed by the courts.

The 1927 law explicitly made it illegal to pollute water supplies by “salt water, crude oil or bottom settlements thereof, sulphur water, or any other mineral water or refuse from wells or mines”. Amendments in 1984 removed the reference to pollutants from wells and mines from the statutes so that pollution from any sources was implied. Also, ground water supplies were added to the law. The 1984 amendments also gave municipalities the right to seek injunctions against activities threatening water supplies, regardless of whether such activities are regulated, licensed or inspected.\textsuperscript{119}

\textit{Protection of Water Quality from Oil and Gas Wastes}

Protection of water supplies from oilfield wastes was an objective of early legislation, although it occurred in a somewhat roundabout fashion. Oklahoma’s first oil boom started in 1901, and by the time of statehood production capacity in the state had far outpaced producers’ capabilities to market and transport the oil. Oil storage tanks frequently overflowed, raising concerns about waste. The loss of natural gas from operating and abandoned wells was also a concern at the time.\textsuperscript{120} As a result, in 1909, the state legislature enacted legislation requiring the conservation of oil and gas products. All abandoned or dry wells were to be plugged to prevent the waste of natural gas. Overland flow of oil and waste products was prohibited; specifically the drainage of wastes from oil operations into water used for stock was prohibited.\textsuperscript{121} The Chief of Mines was given authority for enforcement.

Despite the early laws addressing waste of oil and gas and protection of water supplies, concerns about contamination of water sources by oil and gas production activities continued. The Corporation Commission, in 1915 in response to a number of complaints, published administrative orders requiring producers to prevent the waste of oil and to plug all dry or abandoned wells to protect sources of fresh water.\textsuperscript{122} In 1915, the state legislature empowered the Corporation Commission to adopt rules and regulations for oil and gas well drilling as necessary to protect fresh water.

\textsuperscript{116} Oklahoma Session Laws 1927, p.59.

\textsuperscript{117} Sinclair Oil and Gas Co. v. Allen, 143 Okla. 290 (1930); Comar v. Blagden, 35 P.2d 954 (1934); Danciger Oil and Refinery Co. v. Donahay, 238 P.2d 308 (1951).

\textsuperscript{118} Danciger Oil and Refinery Co. v. Donahay, 238 P.2d 308 (1951).

\textsuperscript{119} Oklahoma Session Laws 1984, c.126.

\textsuperscript{120} Franks, K.A. \textit{The Oklahoma Petroleum Industry}. University of Oklahoma Press, Norman, 1980.

\textsuperscript{121} Oklahoma Session Laws 1909, p.432.

However, it was not until 1917 that the Oil and Gas Division of the Corporation Commission was established and authorized to write regulations for plugging all abandoned oil and gas wells.\textsuperscript{124}

\textit{Water Quality and Wildlife}

The year 1909 also saw the first legislation addressing water contamination with respect to wildlife issues - it became illegal to throw deleterious substances into water to injure, poison or catch fish.\textsuperscript{126} A 1915 law removed the language related to injuring, poisoning or catching fish and made it illegal simply to throw certain substances into water.\textsuperscript{126}

\textit{Seeking Comprehensive Water Pollution Control}

The second major period of legislative attention to water quality issues began in 1949 when the first Ground Water Law was passed.\textsuperscript{127} The Ground Water Law was written primarily to address appropriation of rights to ground water use; however, it also addressed the issue of waste. Waste was defined as the taking or using of ground water in any manner so it is lost for beneficial use, and permitting or causing pollution of a sweet water strata or basin was included as waste. The State Planning and Resources Board was charged with overseeing appropriation of ground water and protection of the ground water resource.

In 1955, Oklahoma passed its first Water Pollution Control Act.\textsuperscript{128} Pollution was defined as

"contamination or other alteration of the physical, chemical or biological properties of any natural waters of the state, or such discharge of any liquid, gaseous or solid substance into any water of the state as will or is likely to create a nuisance or render such water harmful or detrimental or injurious to the health, safety or welfare of the general public, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, or fish or other aquatic life."

The law made it illegal

"for any person to cause pollution of any waters of the state or to place or cause to be placed any wastes in a location where they are likely to cause pollution."

It required the State Planning and Resources Board to oversee permits for disposal of industrial wastes discharged into water. It also required the State Health Department to oversee permits for municipal sewage disposal systems. The Oklahoma Planning and Resources Board was directed to group waters of the state into classes according to present and future best uses and authorized to adopt standards of quality for those classes of water. However, surface water classification and water quality standards were not adopted until 1968. Passage of the 1955 act represented the first time that water pollution was addressed in the statutes apart from the hazards to drinking water supplies.

\textsuperscript{123} Oklahoma Session Laws 1915, P.398.

\textsuperscript{124} Oklahoma Session Laws 1917, p.385.

\textsuperscript{126} Oklahoma Session Laws 1909, p.305.

\textsuperscript{126} Oklahoma Session Laws 1915, p.185.

\textsuperscript{127} Oklahoma Session Laws 1949, p.641.

\textsuperscript{128} Oklahoma Session Laws 1955, p.476.
In 1955, the Corporation Commission was given the authority and duty to make and enforce rules and regulations for handling, storage and disposal of saltwater, mineral brines, waste oil and other deleterious substances produced from or used in drilling, pumping, refining or processing of oil and gas to prevent pollution of surface and ground water. The law stated that such rules should not generally prohibit storage of such substances in earthen ponds, but that the use of earthen ponds should be prohibited (after hearing) if the ponds are causing or likely to cause pollution. A 1965 law required the development of standards, conditions and limitations for the use of earthen ponds for storing waste materials.

Legislation in the early 1980s also addressed the potential for water contamination from wastes and refuse at oil and gas drilling sites. A 1981 law required oil and gas lease operators to remove equipment, structures, surface debris, abutment or obstacles on leases and to grade surface of the soil until it was as near as practicable to its prior conditions (unless the landowner and lease operator had prior contractual agreement). A 1982 amendment added that the operators should also remove any oil, saltwater or debris and fill all pits for containing muds, cutting, saltwater or oil. These requirements were also to apply to drilling or conversion of any saltwater disposal or injection wells. Lease operators can seek waivers to these requirements, which will be granted unless the corporation commission finds it would likely result in substantial damage to adjoining property, substantial contamination of surface or underground water, or substantial erosion or sedimentation.

In 1957, the legislature passed a joint resolution establishing a state water policy. The resolution, intended to guide the drafting and consideration of future legislation, established the following basic principles of the water policy:

1. Water resources of Oklahoma should be developed, regulated and controlled by the people for their own use and benefits, with proper attention given to conservation and replenishment.

2. Beneficial uses of water are ordered according to importance and priority as i) sustaining life (domestic uses), ii) maintaining health, iii) providing food and fiber, iv) increasing wealth, and v) augmenting recreation.

3. A State Water Resources Board should be established to administer and settle the rights to possession and use of water, to work with the Federal Government in water development projects, and to assist in developing state-wide and local plans for water use.

4. A water resources library should be established to make available information on water resources and water law to citizens of the state.

5. Water ownership is a property right and should not be taken without due process and appropriate compensation.

6. A landowner should have exclusive land water rights to as much water as needed

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129 Oklahoma Session Laws 1955, p.482.
130 Oklahoma Session Laws 1965, c.228.
131 Oklahoma Session Laws 1981, c.90.
132 Oklahoma Session Laws 1982, c.205.
133 Oklahoma Session Laws 1957, p.670.
that occurs on the surface of his land.

7. A landowner should have rights to a reasonable share of the available supply of ground water.

8. Rights to possession and use of water resources should be issued by the Water Resources Board upon proper request.

9. No state law should impair or interfere with customary rights to use water for domestic purposes.

10. Where conflicts exist between the established recreational use of a water development area, water and related land resources development should not be permitted to affect adversely any area which has been established as having unique or irreplaceable scenic or historic values unless overall benefits outweigh the losses.

11. To gain maximum benefit, all projects should where possible be considered as multiple purpose projects.

12. The right of ownership and use of water should not include the right to waste water, to pollute fresh water resources, or to interfere with the rights and privileges of other water users.

13. Water laws should be enforced by the Water Resources Board. The Board should be charged with enforcing pollution control and correlating the activities of various agencies whose obligations concerning pollution are fixed by law.

The Water Resources Board was established in 1957.\textsuperscript{134} All of the responsibilities for water allocation, water resource development and water pollution control which had formerly been vested in the Oklahoma Planning and Resources Board became the jurisdiction of the Water Resources Board.

In 1963, the Public Health Code was rewritten and for the first time all abandoned or dry water wells were required to be plugged and all domestic supply wells were to be sealed or plugged to avoid pollution of water bearing strata.\textsuperscript{136} To earlier lists of restricted polluting activities were added discharges from water closets, bathtubs or lavatories, or effluent from any type of sewage treatment plant or collection system into wells, pits or holes or into water bearing strata from which domestic or public water supply is or may be drawn. The Board of Health was charged with adopting standards and rules for water supplied to the public. A 1971 amendment required that complaints about polluted water or polluting activities received by the Health Department be investigated by the Commissioner of Health and the Commissioner could order the activity stopped, the water treated, etc.\textsuperscript{136}

In 1965, the Corporation Commission was given police power to enforce plugging and repair requirements for abandoned or leaking oil and gas wells and saltwater injection or disposal wells. However, the law allowed that "any person who plugs, replugs or repairs a well in accordance with an order of the [Corporation] Commission should not be held responsible for future damages or problems arising from that well."\textsuperscript{137}

\textsuperscript{134} Oklahoma Session Laws 1957, p.544.

\textsuperscript{136} Oklahoma Session Laws 1963, c.325.

\textsuperscript{138} Oklahoma Session Laws 1965, c.228.

\textsuperscript{137} Oklahoma Session Laws 1965, c.228.
Because of that 1965 law, the court found in *Minshall v. Corporation Commission* that the Corporation Commission was unable to require Minshall to replug or repair an abandoned, leaking well.\(^{138}\) A 1970 amendment removed the allowance referred to in Minshall.\(^{138}\) In *Ashland Oil Inc. v. Corporation Commission*, Ashland held that it did not have to replug leaking wells based, in part, on the Minshall decision.\(^{140}\) However, the court referred to the 1970 amendment and found that Ashland was in fact responsible for replugging and repairing leaking wells.

As water quality management programs became dispersed over a larger number of state agencies, it became clear that some type of coordination of activities was needed. In response, the state legislature passed the Pollution Control Coordinating Act in 1968.\(^{141}\) The intent was to coordinate pollution control activities among the different agencies charged with such responsibilities and to avoid duplication among program efforts. The Act created the Pollution Control Coordinating Board (PCCB), to consist of representatives of the Board of Health, the Board of Agriculture, the Water Resources Board, the Wildlife Conservation Commission and the Corporation Commission. It also created the Department of Pollution Control (DPC), which was to serve in an administrative role for the PCCB. Duties of the PCCB were "to establish and maintain a coordinated, continuing surveillance of the water of this state for the purposes of controlling water quality and for preventing and abating any pollution thereof."

Duties of the PCCB were expanded beyond water pollution with 1971 amendments.\(^{142}\) In addition, the 1971 amendment expanded membership of the PCCB to include the Director of Industrial Development and the Executive Director of the Soil Conservation Board, as well as two citizen members. The 1971 amendment also added a citizen complaint system requiring the PCCB and DPC to maintain a system whereby citizens of the state could report concerns and suspected pollution problems. The 1971 law specifically assigned a watchdog responsibility to the PCCB by requiring it to keep records of all occasions when a state agency fails to perform its pollution control responsibilities and report to the legislature. The law stated that no funds would be appropriated for pollution control for agencies found by the legislature to be negligently or improperly performing assigned duties in pollution control. Membership on the PCCB was modified again in 1981, when the Mining Board was added, the Director of Industrial Development was removed, and two additional citizen members were added,\(^{143}\) and again in 1991 when the Secretary of the Environment was added and citizen members were reduced to three.\(^{144}\)

**Federal Environmental Policy Impacts on Oklahoma's Water Quality Programs**

Most recent legislative actions relative to Oklahoma's water quality management have resulted from or developed because of federal environmental legislation. Many laws have been passed to enable Oklahoma to accept responsibility for implementing environmental programs mandated at the federal level. Oklahoma has been delegated responsibility for the federal SDWA, RCRA and FIFRA programs' implementation and enforcement. Oklahoma has not received delegation for implementing its own NPDES program.


\(^{139}\) *Oklahoma Session Laws* 1970, c.217.


\(^{141}\) *Oklahoma Session Laws* 1968, c.279.

\(^{142}\) *Oklahoma Session Laws* 1971, c.338.

\(^{143}\) *Oklahoma Session Laws* 1981, c.276.

\(^{144}\) *Oklahoma Session Laws* 1991, c.340.
Water Quality Legislation

Following the requirements of the 1965 FWPCA for states to adopt water quality standards, Oklahoma developed a surface water classification scheme and adopted water quality standards in 1968. Then, Oklahoma reauthorized its Water Pollution Control Act in 1972. There were no significant changes introduced in the 1972 legislation. However, following the 1977 amendments to the federal Water Pollution Control Act, as well as subsequent amendments, several changes were made in the Oklahoma statutes. In 1980, the language addressing the development of water quality standards was modified to require that the water quality standards should give "due consideration to the impacts of factors affecting sediment where necessary and incidental to such water quality standards, excepting such impacts as may result from activities related to acceptable forestry, agricultural and petroleum operations and practices." This appears to have been a defensive reaction to the federal requirements for management of nonpoint sources of water pollution, including sediment.

In 1981, the Conservation Commission was given jurisdiction as the management agency responsible for directing nonpoint source prevention programs for all nonpoint sources outside the jurisdiction or control of cities or towns, excepting silviculture, urban storm water runoff and industrial runoff. The Department of Agriculture was to maintain its sole jurisdiction over silvicultural activities, while the Water Resources Board retained responsibility for urban storm runoff and industrial runoff. The sediment exceptions in the water quality standard requirements were removed from the Oklahoma law in 1988, apparently in response to a strengthening of federal attention to nonpoint sources in 1987 amendments to its Water Pollution Control Act.

In 1984, Oklahoma established a Statewide Water Development Revolving Fund to provide financial assistance to municipalities, political subdivisions and other public entities for water resource development and sewage treatment facilities. The Revolving Fund was added to the state's constitution during the general election of that year; responsibility for the fund was placed with the Water Resources Board. However, the Revolving Fund is now exhausted and recapitalization of the Fund has been recognized as a priority area for state environmental efforts. A Wastewater Facility Construction Revolving Loan Account was legislated in 1988. The purpose of this Account was to provide financial assistance for construction of wastewater treatment facilities under provisions of the 1987 amendments of the federal Water Quality Act. The Water Resources Board and the Health Department shared responsibility for administration of this program.

State water quality standards are updated approximately every three years. The state has adopted an anti-degradation policy which incorporates a three-tiered approach to protection of surface water quality. Outstanding Resource Waters are those which constitute an outstanding resource or have exceptional recreational or ecological significance. There is to be no degradation of these waters. The High Quality Waters category is protected to the extent that no degradation is to occur unless a study of the social and economic impacts of degradation vs. nondegradation are first evaluated. If such a study concludes that some additional discharge to the High Quality Waters is socially and economically desirable and will not threaten beneficial use of the water, then the additional discharge

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146 Oklahoma Session Laws 1972, c.242.
147 Oklahoma Session Laws 1981, c.170.
148 Oklahoma Session Laws 1988, c.46.
149 Oklahoma Session Laws 1984, p.1182.
will be permitted. Finally, no water quality degradation which interferes with the attainment or maintenance of designated beneficial uses is to be allowed.

The State Attorney General issued opinions in 1984 and in 1986 that the second tier described above was in violation of the state law prohibiting degradation of the state's waters.\textsuperscript{161} The opinion was that allowing additional discharges amounted to a lowering of the water quality standards, which was not legal. The Water Resources Board took exception to the opinion; however, it is generally held that, in fact, the state has only a two-tiered policy as a result of the Attorney General's opinions.

\textit{Mined Land Reclamation}

Oklahoma legislators passed the Open Cut Land Reclamation Act to address reclamation of surface mining areas in 1967.\textsuperscript{162} Mine operators were required to provide for reclamation of mined areas to protect the state's natural resources. Permits were required and surety bonds and reclamation plans were prerequisites for permit approval. In 1971 the Mining Lands Reclamation Act was passed, intended in part to aid in prevention of water pollution. The law applied to deep mines rather than surface mines and required refuse disposal areas to be reclaimed or treated or refuse to be contained by operators to avoid adverse environmental effects. 1978 amendments required specific procedures for reclaiming land and required operators to minimize water quality disturbances during and after mining and during reclamation.\textsuperscript{163}

Federal requirements for surface mine and abandoned mine reclamation efforts were delineated in the Federal Surface Mining Control and Reclamation Act of 1977.\textsuperscript{164} In response, Oklahoma updated its surface mine reclamation law with the 1979 Coal Reclamation Act.\textsuperscript{165} Then, in 1981, the Abandoned Mine Reclamation Act was passed to promote reclamation of mined areas left without adequate reclamation prior to enactment of earlier acts that continued to damage water resources.\textsuperscript{166} The earlier mine reclamation programs were the jurisdiction of the Department of Mines; the abandoned mine program was made the responsibility of the Conservation Commission.

\textit{Agricultural Sources}

In 1969 the first Oklahoma Feed Yard Act was passed.\textsuperscript{167} The law required that any feedyard with more than a set number of animals at any one time should acquire a license from the Department of Agriculture. Owners and operators with such a license were to provide for disposal of excrement and provide adequate drainage of surface waters to avoid pollution of any lake, stream, river or creek. The act applied to beef cattle, swine and horses. Jurisdiction over poultry operations was added in a 1973 amendment.\textsuperscript{168} Then, in response to language in the 1977 amendments to the Federal Water Pollution Control Act, the Feed Yard Act was amended in 1981 to tie licensing of

\textsuperscript{161} Opinions of the Attorney General, 1984, No. 84-124; Opinions of the Attorney General, 1985, No. 85-57.

\textsuperscript{162} Oklahoma Session Laws 1967, c.186.

\textsuperscript{163} Oklahoma Session Laws 1978, c.123.

\textsuperscript{164} 30 U.S.C.A. §§ 1201-1328.

\textsuperscript{165} Oklahoma Session Laws 1979, c.249.

\textsuperscript{166} Oklahoma Session Laws 1981, c.185.

\textsuperscript{167} Oklahoma Session Laws 1969, c.116.

\textsuperscript{168} Oklahoma Session Laws 1973, c.70.
concentrated animal feeding operations to wastewater discharges. However, enforcement of the 1981 law was sporadic and, in fact, permits were not required until an on-site visit by the Department of Agriculture determined that the facility was discharging wastes into waters of the state and should be regulated under the permit program. As a result, facilities were generally permitted only if they were the subject of a complaint and were found to be creating a pollution problem.

Responsibility for waste disposal by dairy operators was given to the Health Department by a 1949 law; however sanitation and health, not water quality, were the concerns of the waste disposal provisions. In 1981, the Milk and Milk products act was passed which set up a permitting system, to be administered by the Health Department, for dairies. Permitted dairies were required to dispose of wastes in acceptable fashion. However, protection of surface and ground water quality was not specified as an objective of waste disposal regulations and dairy permitting until 1990.

Recent promulgation of rules for confined animal feeding operations by EPA's Region 6 has important implications for livestock operations in Oklahoma. The roles of the Departments of Agriculture and Health will be changed somewhat as they are expected to cooperate with EPA in administration and enforcement of the permitting requirement. However, primary responsibility for administration and enforcement will remain with EPA.

The legislature approved an increase in "inspection fees" charged on "all commercial fertilizer sold or distributed for use in the state" in 1989. The legislation was sought by crop and fertilizer industry representatives who were interested in earmarking revenues from a fee increase for research on soil fertility and crop production. When finally passed, the law specifically stated that revenues from the increase in fees (an increase of almost 100% generating $300,000 - $350,000 annually) were to go to the Department of Agronomy at Oklahoma State University for "the sole purpose of conducting soil fertility research involving efficient fertilizer use for agronomic crops and forages and ground water protection from plant food nutrients."

Solid and Hazardous Waste

Oklahoma's Solid Waste Management Act, intended to address the collection, transport, processing and disposal of solid wastes to prevent pollution, was passed in 1970. The law designated the Health Department as the agency to participate in federal programs arising from the Federal Solid Waste Disposal Act. Guidelines for state waste disposal programs had been established with the 1970 amendments of the Federal Solid Waste Disposal Act.

Oklahoma's Controlled Industrial Waste Disposal Act was passed in 1976 to address wastes which could not be safely disposed of in sanitary landfills or waste or sewage treatment facilities. The law required the Health Department to establish criteria for the siting of industrial waste disposal

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159 Oklahoma Session Laws 1981, c.77.
160 Oklahoma Session Laws 1949, p.10.
161 Oklahoma Session Laws 1981, c.43.
162 Oklahoma Register, June 15, 1990, p.2740.
164 Oklahoma Session Laws 1989, c.145.
165 Oklahoma Session Laws 1970, c.69.
166 Oklahoma Session laws 1976, c.251.
facilities. A 1981 amendment stated that industrial waste disposal sites would not be permitted over a major ground water basin, except according to a plan approved by the Health Department.\textsuperscript{167} A 1986 amendment required ground water quality monitoring by industrial waste facilities.\textsuperscript{168} Then, in 1988 the law was modified\textsuperscript{169} to bring requirements in line with requirements of the federal Resource Conservation and Recovery Act. In 1991 the law was amended again to provide that industrial waste treatment or storage facilities could be located over a principal ground water aquifer or recharge area if the special request was included in the permit application, if a public hearing was held, if the applicant proves that ground water risk is minimal and if the applicant submits a surety bond to the Health Department.\textsuperscript{170}

Habitat for Endangered Species

Following passage of the federal Endangered Species Act in 1973,\textsuperscript{171} Oklahoma's Wildlife Conservation Code was passed in 1974.\textsuperscript{172} This law repealed all earlier statutes related to responsibilities of the Wildlife Conservation Commission and the Department of Wildlife Conservation. It replaced the earlier 1909 and 1915 laws related to contaminated water and wildlife. The 1974 law provided that, subject to a fine, no person should deposit lime, dynamite, other explosive, poison, toxic, sawdust, saltwater, crude oil, or other substances into any stream lake or pond or anywhere that they may wash into such waters. However, the law explicitly stated that any problems stemming from petroleum-related activities should be forwarded to the Corporation Commission which should seek corrective action.

Underground Storage Tanks

Federal attention to ground water quality in the early 1980's resulted in a number of adjustments to federal laws in an attempt to strengthen protection of ground water. As one example, the regulation of underground storage tanks was added to federal solid waste disposal regulations in 1984. In response to programs authorized in the federal law, Oklahoma passed a 1987 law establishing the state's Leaking Underground Storage Tank Trust Fund.\textsuperscript{173} The fund would be used to make payments to state agencies for corrective actions, enforcement actions and cost recovery actions taken in response to the federal law. A state Underground Storage Tank Regulation Act was passed in 1989 to more comprehensively regulate underground storage tanks in Oklahoma.\textsuperscript{174} Permitting, inspection, registration and enforcement programs were established to be carried out by the Corporation Commission. However, the Commission was directed to coordinate its activities with other agencies that had authority over some aspect of underground storage tanks (e.g. underground tanks on agricultural properties were under Department of Agriculture jurisdiction). An indemnity fund was established for use in response to releases of petroleum products from underground tanks when responsible parties could not be found.

\textsuperscript{167} Oklahoma Session Laws 1981, c.322.
\textsuperscript{168} Oklahoma Session Laws 1986, c.180.
\textsuperscript{169} Oklahoma Session Laws 1988, c.42.
\textsuperscript{170} Oklahoma Session Laws 1991, c. 336.
\textsuperscript{171} 16 U.S.C.A. §§ 1531-1544.
\textsuperscript{172} Oklahoma Session Laws 1974, c.17.
\textsuperscript{173} Oklahoma Session Laws 1987, c.208.
\textsuperscript{174} Oklahoma Session Laws 1989, c.90.
In 1990, above ground storage tanks were added to the Commission's permitting and registration program.\textsuperscript{176} In 1991, the above ground tanks were added to the indemnity fund.\textsuperscript{178} At that time, responsibility for all underground and above ground storage tanks was consolidated in the Corporation Commission. However, the Water Resources Board maintained responsibility for investigating complaints of water contamination caused by releases of petroleum products from storage tanks.

\textit{Ground Water}

Oklahoma adopted a classification scheme and water quality standards for ground water in 1985. These were updated in 1992. A three category classification scheme is used: special source ground water, general use ground water and limited use ground water. This scheme recognizes that aquifers which are naturally limited in quality or which have been degraded so that remediation is infeasible should not be afforded the level of protection reserved to special source and general use aquifers.

Individual municipalities may request a Wellhead Protection Program from a state three-member board that includes the Department of Pollution Control, the State Health Department and the Water Resources Board. The actual delineation of the wellhead area may be conducted by the Health Department or the Water Resources Board, or they may approve a delineation conducted by an outside consultant. However, it appears that insufficient authority exists, at either the state or local level, for controlling activities within the wellhead area. It is expected that initial land use control efforts will occur at the local level, as counties and municipalities pursue zoning and other control options. However, further state legislation is also likely.

\textit{Consolidation - An Issue for the 1990's}

Most of the agencies and their respective responsibilities described thus far changed as of July 1, 1993. A law to consolidate most environmental programs and regulations was passed in 1992;\textsuperscript{177} a transition period of one year was provided with official agency changes to occur by July 1. Until that date, water quality responsibilities have remain dispersed primarily over the State Department of Health, the Water Resources Board, the Conservation Commission, the Corporation Commission, the Department of Agriculture, and the Department of Mines.

Despite formation of the PCCB and the modification of its membership to reflect environmental program responsibilities of state agencies, there were continuing indications that problems still existed in determining agency jurisdictions and avoiding duplications of effort.\textsuperscript{178} The 1971 amendments to the Pollution Control Coordinating Act required continued study by the PCCB of the feasibility of combining all pollution control activities of state agencies into a single agency. The PCCB was required to submit reports to the Senate and House by January 10 of each year with recommendations for avoiding duplication and economizing existing programs.

Legislation was introduced in the late 1970's requiring consolidation of environmental programs. However, the bills were never heard in committee. Then, in 1989, the Governor's Oklahoma Environmental Concerns Council recommended consolidation of environmental programs.

\begin{itemize}
\item \textsuperscript{176} Oklahoma Session Laws 1990, c.252.
\item \textsuperscript{178} Oklahoma Session Laws 1991, c.181.
\item \textsuperscript{177} Oklahoma Session Laws 1992, c.398.
\end{itemize}
within a new Department of Environmental Management. Based on those recommendations, legislation was introduced in 1990. The bill received one hearing in a House subcommittee and was held over for interim study. Legislation was introduced in 1991 from the interim study, but again it did not pass out of committee.

Finally, in 1992, compromise legislation was drafted and the Oklahoma Environmental Quality Act was passed. The legislation left intact environmental responsibilities of the Department of Agriculture and the Corporation Commission. However, most environmental responsibilities, including water quality programs, from the Health Department, Water Resources Board, Conservation Commission, Department of Mines and Department of Wildlife Conservation were combined in a new Department of Environmental Quality.

An additional goal of the 1992 legislation was to bring Oklahoma’s wastewater discharge program in line with federal requirements for the National Pollutant Discharge Elimination System (NPDES). The intention is to further state efforts to gain primacy for that program. The new Department of Environmental Quality would be the agency with authority for the NPDES program. However, any agricultural or oil and gas related point sources requiring a permit would remain under the EPA, with coordinated efforts from the Department of Agriculture and the Corporation Commission.

INSTITUTIONAL PERFORMANCE: COMMENTARY AND DISCUSSION

Institutional Design

The evolution of common and statutory law in each state reflects the states’ reactions to conflicts over water use, changes in the definition of "acceptable" water quality, and competing interests in addressing these issues. Conceptually, state policymakers have a menu of policy tools with which to implement water quality goals arising from and reflecting these conflicts. In generic terms these tools include regulations, taxes and monetary incentives, acquisition, and research and education, not to mention recourse to the common law approach to dispute settlement through litigation. Whatever the policy tool selected, the basic purpose of these structures is to reconcile the interests and rights of those creating a potential water quality hazard with those who may bear the consequences of dirty water.\footnote{This discussion draws heavily from: Libby, L.W. and B.G. Boggess. "Agriculture and Water Quality: Where Are We and Why?" In J.B. Braden and S.B. Lovejoy (eds.), Agriculture and Water Quality: International Perspectives. Boulder: Lynne Rienner Publishers, 1990.}

The regulatory approach to water quality protection implies that the right to use water in ways that diminish its utility to others is transferred from certain water users to a public acting on behalf of other water users. The use of regulations is predicated on the assumption that costs to the polluter are more than offset by improvements to health and safety of other users, with overall net benefit. Reasonableness and acceptability of water quality regulations depend whether public health and safety are at risk and whether the regulations will, in fact, enable an improvement in water quality.

Monetary incentives include charges or subsidies to those water users who generate costs or benefits for others. The primary options are fees on polluting inputs, fees on outputs, cross-compliance, and abatement subsidies. For example, the so-called "polluter pays" principle is based on the assertion that polluters will be induced to reduce their polluting activity if they pay a tax proportional to their contribution to pollution. A critical challenge in constructing a fee schedule, however, is how well the fee can be tied to real social cost.

An alternative to simply taking (regulation) or inducing transfer (tax or subsidy) of rights to
clean water is for a public to buy those rights. Examples include purchase of critical land areas, transfer of development rights, and temporary or permanent easements. Acquisition may be for full or partial rights to the land uses that affect water quality. Under an acquisition program, taxpayers compensate other landowners for rights acquired at a level that presumably captures the value of any foregone opportunities.

Research and education as a policy tool reflects the recognition that timely transfer of accurate and usable information can affect behavior. Education may not transfer property rights or alter competitive advantages with respect to the uses of water, but it helps to clarify their options of water users and their places in the policy process. Gaining the knowledge that one's actions substantially affect other people may instill a sense of obligation.

Policy Tools Used in Florida

In Florida, all of these approaches have been used to some extent. In the main, Florida's approach to water pollution control is built on a framework of comprehensive regulation. Much of Florida's regulatory approach tracks with federal environmental regulatory programs administered through the states by the Environmental Protection Agency. This is especially true of Safe Drinking Water programs and programs regulating discharges of wastewater into waters of the state.

Taxes have been viewed primarily in terms of their utility as revenue sources and not in terms of their ability to shape the behavior of taxpayers with respect to water quality. Although applicants for regulatory permits typically pay an application fee, those fees are designed to pay administrative costs of processing the permit application and are not primarily designed to modify the behavior of would-be polluters. Ad valorem taxes are used by the water management districts to finance most of the districts' operations, and this form of taxation bears very little correlation to water management decisions of individuals. Similarly the documentary stamp tax which funds the Save Our Rivers land acquisition programs responds to growth in real estate transactions, but was intended as a source of earmarked revenue, not as a device to influence behavior with respect to natural resources.

Subsidies have been used to a limited extent and in specific situations. One concrete example pertains to a dairy herd buy out program sponsored by the DER to reduce pollutant loads in the Lake Okeechobee watershed by reducing the number of dairy cows in the area. The DER and USDA also cooperated in cost assistance for adoption of Best Management Practices by dairy farms in Okeechobee County. However, DER adopted regulations making it mandatory that dairies adopt BMPs, so it is not clear that cost-share assistance was a very important part of the water quality program.

Public acquisition of land for water management purposes is a significant practice in Florida. Under the Save Our Rivers program large tracts of land have been purchased by each of the five water management districts, partly in response to legislative mandate, but increasingly in response to priorities set by the district governing boards.

Research and education plays an important role in Florida programs to protect or to restore water quality. It is difficult to attribute these programs to specific state legislation for that purpose, however. The state university system supports research and teaching in the various disciplinary subjects that relate to water quality concerns. Federal and state agencies, as well as the water management districts, fund studies relating to water issues, often through the universities. The agencies themselves sponsor public information, education, research, and technical assistance programs using their own staff and resources and through contracts with private firms or public research and education institutions.

Policy Tools Used in North Carolina

The people of North Carolina have long attached great importance to private property rights.
Although this often has been expressed by lack of support for regulations, or to exemptions that have reduced effectiveness of regulatory action, this also has been translated into highly successful incentive programs such as Pollution Prevention Pays (PPP) and agricultural cost-sharing, and more recently, to nutrient trading. PPP has often been referred to nationally as a success. Perhaps the most successful incentive program is the well-funded, statewide cost-sharing program for agricultural best management practices to curtail erosion, sedimentation and nutrient runoff. This program enjoys excellent political support in the Legislature, and landowners are lined up waiting to participate in the program. State bonds also have been floated, and revolving funds set up to provide cost-sharing incentives for municipal waste treatment facilities. As in all states, of course, regulations have been and continue to be used as part of the package of tools for implementing policies and programs.

Notably, legislation often provided for studies, data collection and assessments preliminary to selection and implementation of policy action tools. Several examples were cited earlier in the discussion, including the creation of the Legislative Research Committee structure in 1965 that continues to be a driving force behind recommendations for legislation today. Boards and Commissions also play an important role in gathering data and studying issues. Especially between roughly 1911 and the mid-to-late 1940s, focus was upon encouragement for action, studies and reporting of pollution, and recognition of the need for more investigations before making policy decisions.

Finally, research and education have been well-supported within state agencies and through funding of positions and projects in the University system. Where appropriate, along with public input, input from the University has been explicitly incorporated during the process of program development.

*Policy Tools Used in Oklahoma*

Direct regulation has been the primary tool used in Oklahoma to address water quality issues. Most regulations have been passed in response to specific problems and conflicts arising from water quality problems or contamination incidents. No comprehensive set of regulations addressing water quality has been developed. Rather, individual agencies have been authorized to implement and enforce source-specific controls and regulations. With the consolidation of most environmental programs into a single agency, a more comprehensive approach is possible. Nevertheless, a source-based approach will continue. Agricultural sources of contamination will continue to be regulated by the Department of Agriculture, while petroleum industry sources will continue to be regulated by the Corporation Commission. As a result, the agency charged with controlling and preventing pollution of the state’s waters must direct problems from those sources to the other agencies.

Some financial tools have been used in attempts to prevent pollution problems. However, these are outside the standard construct of taxes and fees normally considered as financial incentives for altering individual behaviors. State loan and grant programs have been established to assist municipalities and rural utilities with construction of water supply and wastewater treatment facilities. A schedule of permit fees has been established for the provision of permits for specific activities in the state, such as water well construction, waste disposal, and oil and gas production. In addition, several waste disposal and mineral extraction regulations have required the provision of surety bonds by permitted industries. The bonds have been attached to requirements associated with environmental protection, reclamation and remediation.

Acquisition programs have not been adapted for water quality protection in Oklahoma. Acquisition has been limited to accumulation of lands for wildlife habitat and refuges owned by the State Department of Wildlife Conservation. Most acquisitions have resulted from bequests by private land owners and purchases and subsequent transfers by environmental organizations.

Oklahoma has transferred funds to private and public research institutions to address environmental (including water quality) issues. The earmarking of fertilizer inspection fees for agricultural research, specifically soil fertility and protection of ground water from plant nutrients,
represents one such action. In other cases, research funds have been provided for water quality-related research, although the funding agencies and/or programs have not been specifically tied to water quality or environmental areas. With the passage of the Environmental Quality Act, an environmental education component has been explicitly added to the responsibilities of the new Department of Environmental Quality. It is not yet clear how that responsibility will be carried out.

**Institutional Performance**

The discussion of alternative policy instruments used by Florida, North Carolina and Oklahoma for implementing water quality objectives implies that the generic instruments are substitutes for one another and invites comparison according to some criteria for institutional performance. In fact, the policy instruments are probably more likely to be treated as partial substitutes for one another in some respects and as supplements or complements for one another in other respects. In any case, it is interesting to consider each of the basic alternatives in terms of performance variables as a way to assess the characteristics of each. In the following discussion, the performance of alternative policy tools is considered and the three states' uses of the alternatives is reviewed.

**The Manner in Which Benefits and Costs Are Allocated**

Historically, because land, water and air resources generally were in generous supply and unpolluted, allocation of rights tended to include the right to freely use public resources for the disposal of wastes (e.g. fertilizer runoff in streams). Further, a general belief prevailed that resources were there to be developed, that is, to be converted from their natural state to something of greater economic value. As water quality and other issues arose, the mood of the public changed and government actions were demanded. However, property rights were, by then, well established in the minds of citizens. Thus, there has been a natural reluctance to accept policies under which the allocation of rights was changed.

Nevertheless, broader application of the "polluter pays" principle has resulted in significant regulations addressing water quality problems. Regulatory approaches to water quality protection require much in the way of rule making and administration. Administrative procedures must be established and followed to assure regulatory due process. A scientific basis for setting standards or specifying practices must be established to assure effectiveness and acceptability of regulatory requirements. In addition, political support is needed to gain acceptance of rules and aid in implementation of programs. A basis for granting exceptions and exemptions must be established and justified. Monitoring, administration, and enforcement must be provided and adequately trained staff must be employed. All of this entails costs which, to a large extent, are born by taxpayers through the state’s general revenues.

In addition, there are direct costs of regulation that fall upon the regulated community: permit fees, legal and technical services in support of permit applications, opportunity costs of foregone development options, and costs associated with uncertainty about the outcome of the regulatory decision process. Benefits of environmental regulation, on the other hand, tend to be diffuse, spread across the population more generally, and sometimes difficult to document or to perceive. A result is that opposition to regulatory approaches may be focused and well-organized, while support for regulatory programs may be general but not intense. All three states have relied upon considerable regulation when costs of pollution to society were perceived greater than prevention costs to polluters.

Monetary incentives have been used in limited situations, especially to assist adoption of BMPs in certain agricultural operations in Florida and North Carolina and specifically to decrease the number of cows in dairy herds whose impacts on water quality in Florida’s Lake Okeechobee were at issue. In these instances, the implicit decision was that water quality goals could best be achieved by having the general population, through the general tax base, compensate existing users of the resource in return for measures that would improve water quality. However, the Florida dairies were also faced
with mandatory adoption of BMPs, and were required to absorb the substantial cost of the measures. Some dairies benefited from resulting improvements in operating efficiency while some did not.

Florida, North Carolina and Oklahoma have each placed taxes on potential polluters, primarily in the form of fees. However, these taxes have been used solely to raise revenues with little effort to set taxes at a level which would serve as a disincentive for polluting behavior.

Acquisition has received widespread support as a way to assure preservation of environmental resources without the long term conflict and cost often inherent in regulatory approaches. Certainly it avoids claims often made in conjunction with regulation to the effect that private property has been taken without compensation. Acquisition programs are sometimes criticized on grounds that it removes valuable property from the local tax roles in a state where local ad valorem taxes are an important component of the local revenue base.

Acquisition is viewed more as a supplement to regulation than as a substitute for it in Florida. Some claim that the water management districts are hard pressed to adequately manage the large land holdings that have resulted from such programs as the Save Our Rivers program, and that landownership brings with it certain liability for the safety and wellbeing of people who have access to the property in one manner or another.

Much of the educational and technical assistance has been provided by public universities and by government agencies, largely with funds from general revenues. The distribution of benefits and costs of these programs is difficult to identify and is typically not politically controversial. Where fertilizer fees were used to generate research funding in Oklahoma, the original intent was that the fees would be generated from the commercial fertilizer industry. That the fees were in turn passed on to fertilizer purchasers is not a surprising result.

*Ability of Institutional Framework to Adapt to Changing Conditions*

The review of state water quality programs, including their anticipation of and response to identified problems, indicates that concerns and areas of emphasis have shifted over time. The shifts have occurred as public and private interests with respect to water quality have changed. The resulting demand for institutional response has meant, in some cases, major changes in the states’ approaches to water quality management. In other cases, institutions have evolved which, by their nature, assure attention to shifting needs.

Comprehensive programs, with some mix of regulation, incentives and education, have been touted as necessary and as being superior to simple reliance on common law processes for dispute settlement as a way to protect or to restore water quality. They offer some prospect for comprehensive approaches to water quality problems and can accommodate forward planning to avoid problems which would arise in the absence of planning and coordination. They offer the ability to retain technical expertise and to sustain long term programs of observation and analysis not readily available to the judicial system.

Florida has aggressively sought a comprehensive regulatory approach to water quality management, while attempting other more creative approaches as well. In contrast, North Carolina and Oklahoma have continued to rely more heavily on a reactive, piecemeal approach to environmental and water quality regulation. North Carolina consolidated most of its environmental programs into a single agency in 1989. Oklahoma underwent the same process during 1992 and 1993. However, much of the legislation enforced by the central agencies remains diverse and fragmented. In addition, the fact that agricultural sources of water quality problems in both states remain in separate agencies (as well as petroleum industry sources in Oklahoma) means that even a central agency charged with protecting water quality is not fully capable of enforcing such regulations.
The weakness of a regulatory approach tends to be in the uncertainty about the outcome of regulatory decisionmaking that confronts applicants for regulatory permits. Overlapping or duplicative permit requirements and sometimes long delays in processing create a certain bureaucratic inertia that inhibits and frustrates applicants. Regulatory approaches tend to yield the bare minimum of compliance, if that, and offer little incentive to the "regulated community" to look for and to adopt creative and, perhaps, more effective ways to improve water quality.

Monetary incentives can be applied in ways that encourage adjustment to changes in circumstances or in social objectives. In general they offer a friendly approach to change, but in times of fiscal austerity may not be adequately funded. Oklahoma faces this problem with the exhaustion of its revolving fund for assisting with construction of drinking water and wastewater treatment facilities.

Acquisition of land for water quality purposes allows public agencies to adjust management practices on that land as public objectives change. This flexibility is one of the great advantages of acquisition programs. However, these program can also weigh heavily on state budgets.

Education and technical assistance programs can be adjusted to account for changes in conditions over time. The impact of education and technical assistance on the practices of individuals whose behavior affects water quality is not direct, however, and results often lag implementation by months if not years. However, education and technical assistance may well be a necessary condition for the success of water quality programs, regardless of what other measures are implemented.

In North Carolina, the array of policy tools has changed in response to new issues as they arose. This is especially noticeable from a broad, historical perspective, but it is also reflected in the innovative policy tools adopted in the last decade. Current examples include nutrient trading and comprehensive basinwide management where the state is in the forefront nationally. However, the reliance of North Carolina and Oklahoma on small incremental adjustments to the body of water quality regulations has created problems which have often been avoided by Florida in its comprehensive regulatory approach.

**The Ability to Accommodate Partisan Interests**

An important component of successful water quality management is whether it is able to satisfy the needs of society, including successful compromises between competing interests. Critical to this process is the provision of opportunities for individuals to participate in the decision process. Where citizens are satisfied with the institutional structure, the resulting programs and policies are more likely to be accepted by those they impact. This means more success in implementing the management program over time.

Regulatory programs are superior to, say, reliance solely on litigation as a way to address (or to prevent) disputes over water quality. As noted above, they typically provide a format wherein potential problems can be anticipated and avoided. Conflict resolution requires more than regulatory programs are designed to accomplish, however. Education and mediation may be better suited to resolving conflict in many instances, not as a substitute for regulation but as a complement to it. Sometimes the regulatory program itself is the source of controversy, in which case it can hardly be thought of as the means to resolving conflict.

Florida has a history of relying upon special ad hoc commissions or task forces to study broad categories of environmental policy issues and develop proposals for consideration by the legislature. Sometimes appointed by the Governor, sometimes by the Speaker of the House of Representatives, and sometimes by the President of the Senate, such working groups have served to develop broad political support for specific legislative proposals long before the legislature convened, relying upon series of public hearings, conferences, and workshops to identify, air and address the concerns of
contending stakeholder groups before legislation was proposed. Examples of such working groups include the Environmental Land Management Study (ELMS - which has had three incarnations since 1970), the Senate Select Committee on Solid Waste Management (1987), and the Speaker’s Task Force on Water Issues (1982).

Heavy reliance upon boards, commissions and Legislative Research Committees in North Carolina and Oklahoma gives citizens numerous opportunities to make their positions known during the policy making process. Each provides for hearings and discussion of issues, concerns and vested-interest positions. Membership on the boards and commissions typically reflects a cross-section of interested parties, including citizens. Of particular interest for water quality issues are the Environmental Management Commission, the Commission on Health Services and the Pesticide Board in North Carolina. Oklahoma’s Legislative Task Force on Consolidation was instrumental in drafting the Environmental Quality Act for consolidating environmental responsibilities. It was during the task force meetings that the compromise with agricultural and oil and gas industry representatives was reached.

Land acquisition, once accomplished, eliminates parties to conflict. However, land acquisition can hardly be looked to as the solution to all conflict over water policy--it is neither feasible nor desirable to put all resources into public ownership in order to eliminate conflict over the uses of those resources.

**Bringing Individual Self Interests Into Line With Societal Interests**

Where there is less divergence between private and social interests, one can expect that agreement on water quality goals and management activities will be easier to achieve. One objective of evolving institutions should be to minimize that divergence. Where rights allocations and resulting opportunities and behaviors bring private actions in line with society’s goals, many of the costs of dispute resolution and mediation may be avoided.

Where they can be applied, taxes and incentives have the supposed advantage of allowing individual decisionmakers maximum flexibility in pursuing individual interests and, in the process, serving the public interest at the same time. Regulations are typically more restrictive of individual behavior, offering less individual flexibility and fewer options for individual behavior that also satisfies the public interest. Education and technical assistance can help to reduce the gap between individual self interest and societal interest by helping individuals understand societal objectives and assess individual ways in which individuals can serve their own interests and societal objectives at the same time.

**The Cost and Complexity of Enforcement and Information Costs**

The cost of generating information on rights and responsibilities varies with the institutional framework chosen. In addition, many provisions for rights, responsibilities and entitlements require some program of protection and enforcement. Enforcement costs can differ significantly across policy tools used.

Regulatory programs are typically costly and complex. By design and by the nature of their purpose they require information and compliance, monitoring and enforcement. Acquisition programs, where they are appropriate, probably achieve public objectives with relatively high initial costs but with substantially less cost of operation and maintenance. The formal transfer of rights requires limited clarification. However, it is unrealistic to expect that all resource management issues can or should be addressed by public purchase of the resources involved.

Incentive programs are costly from a public expenditure standpoint. Information and education costs can be high as potential recipients are identified and informed of the programs. Most educational
programs are typically accepted as a part of general higher education expenditures, but they are not typically adequate as the sole response to water quality problems.

At several points in time, institutional changes in North Carolina produced overlapping responsibilities within existing boards, commissions, committees or enforcement authorities. This has added complexity and confusion to the enforcement process, and required additional study, legislation or policy decisions to assign enforcement responsibility more clearly. At other times, funding was inadequate or not provided to implement policy and to develop and enforce regulations.

Oklahoma also has struggled with overlapping program and enforcement responsibilities. The resulting duplication of effort has undoubtedly meant a more costly water quality management program. The fragmentation and confusion in agency roles has also increased transaction costs for those individuals and industries forced to seek assistance, clarification of rules, permits and funding assistance.

CONCLUSIONS

This report has reviewed the institutional approach of three states to addressing water quality management issues. Because of differences in the kinds of problems observed, the timing of attention to issues, and the types of institutions found to be acceptable by the citizens of the states, water quality management programs in the three states have varied widely. All three states have used many of the same policy tools, with varying degrees of success. There are some distinct differences, however.

Florida has pursued a comprehensive regulatory approach to water quality management since the mid-1960s. Most potential water quality problems are addressed by a small number of major laws. All pollution control responsibilities were consolidated into a single agency in Florida in 1975. North Carolina and Oklahoma have continued to add to large bodies of legislation addressing water quality; laws have tended to address specific problems or sources with little attention to effective, broad, enabling pollution-control legislation. Consolidation of most pollution control activities into a single agency has occurred in North Carolina and Oklahoma. However, both states have reserved certain pollution control responsibilities for other agencies (agriculture, for example). As a result, fragmentation and duplication are still potential problems in implementation.

Future research should include study of whether, in the three states, water quality in the states has been helped or hampered by the institutions which have evolved. However, the kinds of problems realized in the states, and the publics' level of concern and willingness to insure corrective actions, differ widely. Comparing the relative performance of the three state programs will not be a simple task.

This report has indicated, to the degree possible, approaches within the individual states which have been particularly successful or problematic. Water quality management agencies in other states may benefit from the efforts and experiences of Florida, North Carolina and Oklahoma as they anticipate institutional changes. Research in each of the three states has revealed that, over time, each state has faced similar problems and responded in a similar fashion. However, it also appears that some aspects of Florida's programs may reflect a level of comprehensiveness toward which North Carolina and Oklahoma are moving.
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