Adaptation, Evolution and Symbiosis in Water Law

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Abstract: This article traces the evolution of the laws governing the use of water for consumption, waste disposal, public purposes and environmental protection. It provides a unique integration of water resources law and environmental law, two fields that are otherwise highly fragmented in the United States. Both the historic tensions and the emerging collaborations among federal, state, tribal and private interests in managing water resources are assessed in an effort to illuminate future pathways for conservation and the restoration of degraded waterways. The article begins with colonial America and proceeds through five significant eras in U.S. history: the Gilded Age of industry; the Progressive Era of wise use; the rise of the administrative state and first generation environmental regulations during the New Deal; the conservation movement of the post-War years; and, finally, the late twentieth century era of beneficial use tempered by second generation command and control regulation.

In the early days, discharges of sewage and industrial toxins, depletion of stream flows and the contamination of drinking water supplies were addressed only haphazardly, and almost exclusively at the local level. The federal government influenced water policy through navigational enhancements and reclamation works, but took a deferential stance toward state and local law on water rights, land use and public welfare. Beginning in the New Deal years of the 1930s, Congress and the federal agencies assumed active involvement in multiple-use development of hydropower, floodplains and recreation. Rigorous requirements to protect the integrity of waterbodies and the fish and wildlife species that depended on them were not embraced, however, until the 1970s. The command and control regulatory programs initiated in the 1970s are as powerful today as they were then, but the low-hanging fruit has been harvested and additional “next generation” tools are needed to restore and protect the nation’s waterways. Meanwhile, organic, ever-evolving common law norms will likely play a revitalized role in the sustainable management of water resources, but only if complemented by a strong, ecologically based federal regulatory baseline.
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Adaptation, Evolution and Symbiosis in Water Law
Sandra Zellmer

Water is life. Each drop is a benediction.

Introduction

Environmental concerns related to water resources emerged in the law and politics of the United States within two largely disparate contexts: water resource allocation and use and water pollution. The historic development of private and public law responses to water resource management objectives and pollution control requirements has contributed to the continuing fragmentation of water law and environmental law. As a result, integrated, holistic management and protection of the nation’s waterways continues to elude legislative and executive decisionmakers at both the federal and state level. Understanding the history of both strands of the law is essential for the adoption of sustainable, next-generation responses.

Generally speaking, efforts to improve water quality by minimizing pollution from sewage and industrial discharges occurred far earlier than efforts to incorporate environmental considerations into water resources planning and use. The political influences during each significant era of American history were felt in distinct fashions within each context. During the earliest days of the republic, the expansion of navigational capacities was foremost on the political and economic scene of colonial and, subsequently, federal and state governments. Establishing a new constitutional government, promoting economic growth and ensuring national security consumed the attention of federal, state, territorial and local governments throughout much of the eighteenth century, and very little thought was given to pollution prevention or resource conservation.

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1 Professor and Hevelone Research Chair, University of Nebraska College of Law. I am thankful to Professor Joseph Dellapenna for his comments on a draft chapter on this topic in THE EVOLUTION OF THE LAW & POLITICS OF WATER (eds. Dellapenna & Gupta) (U.N. Educational, Scientific & Cultural Organization, forthcoming 2008).
The young but rapidly growing nation soon faced the realities of water-borne disease and the depletion of natural resources like water. The earliest environmental concerns to emerge in American water law related to public access to waterways for fishing and navigation. Protecting and restoring water quality and water-dependent fisheries, wildlife and vegetation did not become a priority for federal or local governments until much later, in the latter half of the twentieth century.

United States water law has evolved from exploration and conquest, to water quantity allocations reflecting property and tort law, to broader ecologically-based requirements. Although state common law doctrines once dominated the field, today, every major river system in the western United States and many in the east are managed pursuant to contemporary environmental legislation. The federal Endangered Species Act\(^3\) and Clean Water Act,\(^4\) in particular, have begun to eclipse traditional, commodity-oriented water law in many watersheds.

This article traces the emergence of environmental considerations in U.S. water law and politics, beginning with colonial America and proceeding through five significant eras in U.S. history: the Gilded age of industry; the Progressive era of wise use; the New Deal and the rise of the federal administrative state; the multiple-use impulses of the post-War era; and the modern “command and control” era beginning in the 1970’s. It then turns to emerging management initiatives for ecological restoration and adaptive management. Tensions among regulatory regimes and common law norms and remedies are explored throughout each era, as are the often acrimonious but sometimes collaborative interplay of federal, state, tribal and private interests.

The approach weaves together the law governing water use and allocation with the law governing water quality in a fashion rarely attempted by water lawyers. This historic, integrated perspective demonstrates that the picture of environmental quality in the nation’s waterways today is far brighter than it was in past decades, but much work remains to be done. Although the country has made significant gains in reducing chemical pollution, numerous watersheds remain impaired by toxins from municipal and industrial sources. Meanwhile, nutrients, pesticides, sediments and pathogens from

\(^3\) 16 U.S.C. §§ 1531-1543.
agriculture and other diffuse sources, along with flow alterations from structural barriers like dams and levees, impose serious threats to the physical and biological integrity of the nation’s freshwater ecosystems. The cooperative federalism structure of modern environmental laws has facilitated pollution control and species protection, yet power plays between federal, state, tribal and private actors with contradictory motivations continue to pose impediments to long-lasting resilient solutions. The lack of a coherent federal management vision allows and even encourages governmental and private interests to scramble for money and power while avoiding responsibility and shifting blame. This is particularly true in areas of jurisdictional overlap such as wetlands protection and flow impairments. Rigorous enforcement of uniform environmental standards, coupled with innovative restoration partnerships, likely hold the key to future successes in the protection of water and water-dependent resources. Meanwhile, an organic, ever-evolving body of common law property and tort law, reflecting modern day social norms that demand healthy drinking water and clean, free-flowing rivers, will continue to play a viable role in the conservation of water resources, as complemented by a strong federal regulatory baseline.

I. COLONIAL AMERICA

American governments began to address certain water-related issues even before the Constitutional Convention of 1787. Ensuring open access to harbors, navigable waterways and fisheries was among the colonies’ leading concerns. The legislature of colonial Massachusetts, for example, adopted a measure to regulate fisheries by declaring all natural bodies of water at least ten acres in size to be open to the public for fishing and fowling.5 When the original colonies were liberated from England after the Revolutionary War, they assumed the Crown’s sovereignty over navigable waters and submerged lands.6 Subsequent states, entering the Union on “equal footing” with the original colonies, have the same authority, unless, before statehood, the U.S. clearly

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expressed the intent to reserve the lands underlying navigable waters for federal purposes.7

Although the states as sovereigns have wide-sweeping powers over navigable waters and submerged lands within their boundaries, they are limited by the public trust doctrine. The Northwest Ordinance of 1787, which applied to the lands west of the original colonies between the Appalachian mountains and the Mississippi River, proclaimed that inland navigable waterways were “common highways and forever free” for public use.8 This language was included in the statehood acts of all the states in the Northwest Territory (Ohio, Indiana, Illinois, Michigan Wisconsin, and Minnesota) as well as in the charters of several other states.9 The Northwest Ordinance remained the guiding policy for the admission of all future states into the Union, and provided a firm expression of the United States’ intent to embrace the public trust doctrine.

The public trust doctrine imposes an obligation on the states, as trustees, to protect navigable waters for use by the public.10 A state may not act in derogation of the trust by disregarding its obligation to protect the waters and streambeds which constitute the corpus of the trust or by abdicating its obligation by conveying the trust corpus to private interests. The doctrine also empowers a state to take affirmative steps to safeguard the public’s rights of navigation, recreation and fishing.

The states are also limited by federal constitutional powers. Federal power to promote navigation on the nation’s interstate waterways has been widely acknowledged since the early days of the nation.11 This power is rooted in the federal Commerce Clause power over interstate commerce, the federal Property Clause power to regulate public lands and the federal Spending Power to impose conditions on the receipt of funds.12

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8 Rogers App. 6 (1993); The Northwest Territorial Government, Ordinance of 1787, Art. IV (1787) (re-enacted under the Constitution in 1789, 1 U.S. 50).
12 U.S. Const. Art. I, Sec. 8, cl. 3; Art. IV, § 3, cl.2; Art. I, § 8, cl. 1.
Not long after the Constitution was ratified, the federal government took steps to develop navigable waters under the premise that “rivers best serve society if they are controlled, diverted, and dammed.”13 The first federal agency to involve itself in water affairs was the Corps of Engineers, which traces its history back to 1775 when the Continental Congress appointed a Chief of Engineers of the Continental Army under General George Washington. The original Corps was the military’s engineering and construction arm until the close of the Revolutionary War in 1783. Congress re-established the Corps within the U.S. Army in 1802.14

Also in 1802, President Thomas Jefferson pursued his hopes of discovering an all-water route to the Pacific Ocean by sending Meriwether Lewis and William Clark on an expedition along the Missouri River, through a territory that was largely unknown and unmapped. Although his dream was not fulfilled, Lewis’s and Clark’s “Corps of Discovery” brought back “a treasure of scientific information.”15 Its zoological and botanical discoveries on and near the River and its tributaries were of incalculable value to scientists, and, later, river managers.

Beyond its navigational aspirations, federal authority over water resources was sharply disputed in early America.16 There was no “monolithic ‘central government’”17 that controlled the waterways; rather, “the efforts of federal, state, and local governments complemented as well as competed with one another.”18 While the nation’s population remained relatively sparse, pollution of the waterways did not pose much of a concern to state, much less federal, government. It was not long, however, before untreated sewage and other pollutants of the growing cities of the eastern seaboard became a public health concern. Municipal governments may have suspected that cholera, typhoid and other

18 Pisani xi-xii (2002).
epidemics that had ravaged European cities were caused by exposure to pathogens in polluted waters, yet little was done to correct the problem until the late 1800s.19 Although water quantity and water quality are closely related, American water law was slow to respond to this reality and the law governing water use and allocation developed long before the law of pollution control emerged.

II. THE GILDED AGE

Nineteenth century law encouraged rapid settlement and exploitation of land and natural resources. Easy access to public land was lauded as the foundation of both individual autonomy and national prosperity.20 Federal laws governing homesteading, ranching, railroad expansion and gold mining caused a "Great Barbecue" of the public lands and resources.21 The opening of the Great Plains and Rocky Mountain region to agriculture between 1870 and 1900 doubled the nation’s cultivated land, causing heightened pressure on water resources.22 At the same time, laissez-faire sentiments, premised on the belief that government should not interfere in the marketplace because individual bargaining power would result in efficient resource allocation, dominated the nation’s policies and law.23

Westward expansion, along with industrialization and urbanization, effectuated a crisis in the quality and quantity of the nation's waters and water-dependent resources. By the mid-1800’s, environmental degradation from mining, milling and other industrial pursuits was becoming a serious problem, and water-borne disease posed severe threats to public health. Water quality concerns in eastern and Midwestern cities centered primarily on the discharge of untreated or inadequately treated human waste. Meanwhile, shortages of fresh water for sanitation and agriculture, particularly in the arid west,
threatened to limit development potential and quality of life.24 Yet governments
embraced the Gilded Age mentality of limitless resources and industrial expansion, and
for the most part shrugged these concerns to the side.

Outside of the most highly populated urban centers, governments at every level
were slow to respond to water quality concerns. During the 1800s and most of the 1900s,
conflicts over both water quality and quantity were left largely to private law remedies.
Disputes involved parties who sued to protect their property interests in water as well as
parties who asserted various tort law theories to rectify harms inflicted by environmental
degradation. The common law governing water use and allocation developed much
earlier than did laws focused on water quality, but even in the early cases water quality
concerns frequently arose.

A. Property Law Governing Water Use, Allocation and Quality

The public trust doctrine is the oldest common law property-based theory utilized
to enjoin waste dischargers from degrading water quality or to compel state regulators to
control discharges. 25 However, this theory was raised only infrequently in court and few
polluters or regulators have been found liable for violating the public trust. 26

As for water rights, the states generally follow one of two doctrines to apportion
water quantity, either of which could be asserted to ensure adequate water quality to
satisfy the user’s needs. Riparianism is common in the eastern states, while prior
appropriation is preferred in the west. Riparian systems, which base water rights on
ownership of land adjacent to a waterway, allow the riparian landowner to make
reasonable use of water, taking into account the needs of other riparians. Prior
appropriation rights, in contrast, do not depend upon land ownership, nor are they
correlative. When conflicts between states arise over interstate waters, neither doctrine
will be strictly applied; rather, an equitable apportionment is sought.

1. Riparianism

24 Andreen, Water Quality Today, supra note , at 553-554.
25 Peter N. Davis, Protecting Waste Assimilation Streamflows by the Law of Water
Allocation, Nuisance, and Public Trust, and by Environmental Statutes, 28 Nat. Res. J. 357, 380
(1988).
26 See, e.g., National Audubon Society v. Superior Court of Alpine County, 658 P.2d 709,
732 (Cal. 1983); State v. City of Bowling Green, 313 N.E.2d 409, 411 (Ohio 1974). But see
In early America, no riparian was allowed to take all the water from an adjacent watercourse, but must share it with other riparians.\(^{27}\) The earliest American cases followed the strict English law prohibition against any interference with the natural flow of the watercourse. Under the natural flow doctrine, a riparian landowner has a right "to have the waters of a natural watercourse flow along or through his premises as it would naturally flow, without change in quantity or quality."\(^{28}\) This included the right that nothing be introduced into the water which prevents the use of the stream for irrigation or other useful purposes.\(^{29}\) Strictly applied, the rule became increasingly unworkable as industrial uses expanded, as no one could withdraw any water or discharge any effluent into the water without diminishing quantity or impairing water quality.\(^{30}\)

American law evolved in about 1830 away from the restrictive natural flow doctrine and toward a riparian doctrine based on "reasonable use."\(^{31}\) This doctrine no longer gave riparians an absolute right to be free from pollution because courts would balance the defendant's need to discharge wastes in pursuit of reasonable uses against the harm to the plaintiff and the needs of other riparians.\(^{32}\)

Under reasonable use riparianism, domestic water supply, stock-watering, irrigation, manufacturing and hydropower are recognized as reasonable types of uses that are allowed so long as the method and quantity of use qualify as reasonable. Likewise, waste disposal (pollution) is generally deemed an acceptable use of the nation’s waterways. So long as the riparian polluter does not substantially impair downstream


\(^{29}\) Id.


\(^{31}\) See, e.g., Tyler v. Wilkinson, 24 F.Cas. 472 (C.C.D.R.I. 1827) (No. 14,312); Cooper v. Hall, 5 Ohio 320, 324 (1832). See generally Samuel Wiel, Waters: American Law and French Authority, 33 HARV. L. REV. 133, 134 (1919) (arguing that the riparian doctrine first assumed the “reasonable use” form in civil law countries through the Napoleonic Code of 1804.).

\(^{32}\) Tarlock, supra note , § 3.65.
riparian users by unreasonable use, activities that polluted the water or otherwise altered water quality were, by and large, lawful.33

An unreasonable discharge is one that causes a substantial injury, not merely a slight inconvenience or annoyance.34 Factors considered include the extent and toxicity of the wastes discharged, the location and nature of the riparians' respective uses, the extent of pollution caused by third parties, the size and velocity of the receiving waters and economic and social benefits and costs.35 Courts typically refused to enjoin the discharge of even great amounts of noxious substances, such as tannery by-products, from large, profitable industries.36 As a result, riparian landowners alleging injuries from pollution began to seek relief under common law tort claims, such as nuisance, rather than property-based claims.37

2. Prior Appropriation

In the west, the aridity of the region, populist impulses, federal ownership of vast areas of public land and the customs of the mining camps provided fundamental reasons for a departure from the riparian doctrine. Prior appropriation provided a mechanism to reward water users who did not own large riparian estates and to prevent monopoly by land speculators.38 By the late 1800s, most western states had transitioned away from

36 See, e.g., Snow, 28 Vt. at 462; Gould v. Boston Duck Co., 13 Gray 442, 79 Mass. 442 (1859); Tennessee Coal, Iron & R.R. Co., 14 So. at 169; Peter Davis, Federal and State Water Quality Regulation and Law in Missouri, 55 Mo. L. Rev. 411, 629 (1990) (citing cases). But see Lockwood v. Lawrence, 77 Me. 297 (1885) (enjoining lumber mills from depositing sawdust that polluted the stream to the injury of downstream cotton mills even though it would be difficult and costly for the sawmills to otherwise dispose of their waste; Parker v. American Woolen Co., 195 Mass. 591, 605, 81 N.E. 468, 471 (1907) (enjoining defendant from discharging “any acids, soaps, . . . iron, chemicals, scourings, dye stuffs, sewage, or any objectionable substances whatever, in quantities that noticeably or appreciably affect the purity of the waters when they reach the plaintiff's premises” where an injunction would not unduly interfere with defendant’s manufacturing industry).
37 See Section II.B, infra.
38 See High Plains A & M, LLC v. Southeastern Colorado Water Conservancy Dist., 120 P.3d 710, 719 n.3 (Colo. 2005), citing David B. Schorr, Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights, 32 Ecol. L.Q. 3, 33, 41, 55-56 (2005);
riparian rules to prior appropriation.39 An appropriative right is established by diverting water from a waterbody and applying it to beneficial use. The first to accomplish this is rewarded with a senior right to the quantity of water utilized. Appropriators are also entitled to an adequate quality of water to satisfy their beneficial uses.40

Unlike riparian rights, appropriative rights are strictly hierarchical based on dates of establishment. A right with an earlier priority date is entitled to full satisfaction before a later appropriator is entitled to a drop of water. Water rights are retained so long as they are actively used; if not, the water user loses the water right through abandonment or forfeiture.41

The prior appropriation system fosters expectations in secure, vested property rights in water, which in turn can encourage maximum utilization and promote stewardship and wise investment.42 A significant disadvantage of the appropriation system, however, is that it stimulates a “use it or lose it” mentality and perpetuates the belief that any water left in the stream is effectively wasted.43 These elements of the prior appropriation system penalize water rights holders for conservation or innovation and motivate appropriators to divert and apply as much water as possible.44 Not surprisingly, over-appropriation has become an almost insurmountable problem throughout in many watersheds of the West.45 Also, by encouraging individuals to put water to maximum beneficial uses, prior appropriation has promoted rapid depletion of


43 See Sax, Limits of Private Rights, supra note , at 474-475; Sax, Future of Water Law, supra note , at 258.

44 Neuman, supra note , at 977; Freyfogle, Common Wealth, supra note , at 26, 45.

45 Neuman, supra note , at 967.
the resource and, in some cases, the collapse of riparian communities. Problems include alkali and salt buildup through excessive irrigation, damage to fish and wildlife habitat through stream dewatering and lackluster land use planning for fear of offending seemingly inviolate property rights.

3. Interstate Apportionment and Remediation

When conflicts over interstate waters arise between sovereign states, the doctrine applicable within each litigating state is a factor for consideration but it is not determinative. Interstate disputes are heard by the U.S. Supreme Court, exercising original jurisdiction under the Constitution. In its first dispute over the allocation of water of an interstate river, *Kansas v. Colorado*, the Court employed federal common law to discern a guiding principle of “equality of right” to allow both states to share the river’s benefits in roughly equal fashion. Relevant factors include seniority, physical and climatic conditions, return flows, the effect of wasteful uses and the benefits and detriments of withdrawals on each state. The Court refused to enjoin Colorado’s withdrawals, as Kansas had suffered little while Colorado had benefited greatly.

The quantity and quality of water in eastern rivers has been the subject of Supreme Court attention as well. Litigation over interstate pollution in the Mississippi River was brought before the Court in 1901, followed by a series of lawsuits over New York Harbor. In the Mississippi River case, Chicago’s sanitation problems prompted Missouri to file suit against Illinois. Horrific conditions prevailed in Chicago, where waste water from sewers and packing houses poured into the Chicago River and Lake Michigan. In the 1850s, a severe cholera outbreak killed as much as five percent of the city's population. Although the exact cause of the outbreak was unknown, it was clear that Chicago would have to stop dumping its raw sewage into Lake Michigan, the source

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48 U.S. Const. art. III, § 2, cl.2.
49 206 U.S. 46, 97, 100 (1907).
51 206 U.S. at 113-14.
of its drinking water.\textsuperscript{53} By 1871, Chicago had constructed a pumping system and canal to send 85 percent of its sewage into the Chicago River and to reverse the River’s flow so the waste would go downstream into the Mississippi River, away from the City. Whenever heavy rainfall overwhelmed the pumps, however, the river would reverse course and flow back into Lake Michigan toward the city’s drinking water intakes. Over 1000 persons died from typhoid in 1890, and in 1891, the death rate nearly doubled. In 1900, the city opened a new, larger sanitary canal and diverted so much water to it that, by 1927, the mean level of Lakes Michigan and Huron had dropped six inches. In spite of the new canal, typhoid outbreaks continued to occur because some sewers still flowed into Lake Michigan.

Missouri argued that the canal would cause 1500 tons per day of “filth and sewage and poisonous and unhealthful and noxious matters” to flow into the Mississippi River and on to the city of St. Louis, thereby creating a continuing nuisance by rendering the river "wholly unfit and unhealthful for drinking and domestic uses."\textsuperscript{54} Chicago countered that, due to the increased volume of water flowing through the canal, its sewage would be diluted and therefore harmless. Although the Court, accepted the “prevailing scientific explanation” that contaminated water could cause typhoid fever, it concluded that everything else about Missouri’s case was questionable. Missouri had not proven that typhoid fever had increased significantly since the construction of the canal, nor had it established that the typhoid bacillus could survive the journey to St. Louis. According to the Court, Missouri’s case “depends upon an inference of the unseen. . . . There is nothing which can be detected by the unassisted senses--no visible increase of filth, no new smell.”\textsuperscript{55} The Court also hinted that St. Louis and other Missouri cities were “fouling their own nests,” such that investments in filtration systems for public water supplies would be necessary in any event, and dismissed Missouri’s petition.\textsuperscript{56} Over twenty years later, Chicago was required to reduce (but not stop) diversions of water from Lake Michigan into the canal to mitigate harm caused to upstream interests by

\begin{footnotes}
\item[54] Percival, supra note , at 721-722, citing Missouri v. Illinois, 200 U.S. 496 (1906).
\item[55] 200 U.S. at 522-23.
\item[56] Id. at 523-524.
\end{footnotes}
diminished water levels. The city eventually began to experiment with the use of chlorine, and by 1916 the entire drinking water supply was treated.

The states of New York and New Jersey were also engaged in decades-long litigation over interstate water quality. Discharges of sewage from New Jersey cities into the Passiac River had created a public health crisis in New Jersey, and in 1907 the legislature required sewage discharges to the Passaic to be phased out. The Passaic Valley Sewerage Commissioners adopted a plan to construct a new sewer system that would discharge into New York Harbor instead of the river. In 1921, the state of New York sued to enjoin New Jersey from discharging sewage into the harbor, alleging that the pollution would constitute a public nuisance resulting in severe injury to health, property and the economic welfare of the people of New York. The federal government intervened to ensure that New Jersey's disposal plans would not obstruct navigation in New York Harbor. Eventually, the United States and New Jersey reached agreement on a method of sewage treatment that would allow greater diffusion at a greater depth, and the intervention petition was dismissed.

As for New York’s claim, the Court found that the state had a right to pursue its complaint for the menace to its citizens and their property allegedly caused by the new sewage system. However, citing *Missouri v. Illinois*, the Court stated, "Before this Court can be moved to exercise its extraordinary power under the Constitution to control the conduct of one State at the suit of another, the threatened invasion of rights must be of serious magnitude and it must be established by clear and convincing evidence." According to the Court, New York had failed to meet this burden, so it entered a decree denying relief without prejudice to the initiation of another lawsuit if the sewage proved sufficiently injurious to the waters of the harbor.

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60 256 U.S. at 298.
61 Id. at 304-305.
63 256 U.S. at 314.
A few years later, the tables were turned, and New Jersey had cause to sue New York City for polluting New York harbor with its garbage. New York City had long dumped its refuse into the harbor, but Congress eventually banned its unpermitted discharges because of interference with navigation. The City then turned to incinerators and landfills to dispose of its waste, but it began dumping again after the incinerators were shut down in response to protests about offensive odors. By the mid-1920s, so much trash was reaching New Jersey's beaches that “fifty truckloads of garbage would have to be hauled away from a single beach.”  

New Jersey filed a complaint with the Supreme Court, alleging that New York City's garbage had polluted its beaches and damaged its citizens’ property values and its fishing industry. The Court agreed that the dumping constituted a public nuisance by restricting fishing and bathing in New Jersey waters and beaches and issued an injunction prohibiting dumping, but only after the City was given a reasonable time to build adequate incinerators. The saga continued for years as the City struggled to construct incinerators and to deal with massive volumes of sludge generated by its treatment processes.

Subsequently, in a pair of 1931 cases, the Supreme Court had occasion to consider the equitable apportionment of eastern rivers. In *Connecticut v. Massachusetts*, Connecticut sued to prevent Massachusetts from diverting water from the Ware and Swift rivers to the Boston vicinity. Connecticut argued that it was entitled to water “unimpaired as to quantity and uncontaminated as to quality.” The Court rejected Connecticut’s request for unimpaired flows, finding that the injury was too speculative to warrant injunctive relief, but acknowledged Connecticut’s right to sue in the future if its interests were substantially injured by the diversion.

In *New Jersey v. New York*, New Jersey’s sought an injunction to prevent diversions from the Delaware River to New York City’s water supply system. New Jersey claimed that its downstream municipalities, fisheries, oyster beds and farmlands

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66 283 U.S. at 473, 482-483.
68 282 U.S. 660 (1931).
69 Id. at 663.
70 Id. at 674.
would be harmed by diminished water quality and quantity.\textsuperscript{71} The Court observed that, as the upstream state, “New York has the physical power to cut off all the water . . . [b]ut clearly the exercise of such a power to the destruction of the interest of lower States could not be tolerated.”\textsuperscript{72} It held that no one state could monopolize the flow; instead, the states’ interests must be reconciled in an equitable way, without quibbling over formulas. Although the Court denied New Jersey’s request for an injunction, it limited the diversion and imposed conditions to ensure a minimum flow in the river.\textsuperscript{73} In a famous statement penned by Justice Oliver Wendell Holmes, the Court noted, “A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it.”\textsuperscript{74}

B. Common Law Tort Liability

Common law tort theories have long been utilized to impose liability for degrading water quality by discharging pollutants or altering the flow regime. In the early development of American tort law, tort theories of nuisance and trespass both operated as a type of strict liability law, where injuries would be redressed even if the offending conduct was highly lucrative. The courts played an important role in addressing the increasingly complex challenges of an increasingly industrialized society through the creative use of tort law.\textsuperscript{75} Courts commonly assumed the mantle of “judicial zoning,” enjoining uses of land for factories, pubs, pig sties and otherwise lawful activities when a neighboring landowner’s enjoyment of water, light, air or other essential elements of ownership was adversely affected.\textsuperscript{76}

As the industrial revolution got underway, however, plaintiffs harmed by diminished water quality began to experience more difficulty proving the necessary elements of their claims. So long as the discharger did not act unreasonably as measured

\textsuperscript{71} New Jersey v. New York, 283 U.S. 336, 342 (1931).
\textsuperscript{72} Id. at 342.
\textsuperscript{73} New Jersey v. New York, 283 U.S. 805, 806 (1931).
\textsuperscript{74} 283 U.S. at 342.
\textsuperscript{75} Klass, \textit{supra} note , at 567.
\textsuperscript{76} Horwitz, \textit{supra} note , at 31; J.H. Beuscher & J.W. Morrison, Judicial Zoning Through Recent Nuisance Cases, 1955 Wis. L. Rev. 440-457.
by the standards and expectations of the time, no liability would be imposed.77 Even if plaintiffs were successful in bringing suit, their remedies were often quite limited. According to legal historian Morton Horwitz, “the evolving law of water rights had a greater impact than any other branch of law on the effort to adapt private law doctrines to the movement for economic growth.”78 Then and now, water provides a fertile ground for legal evolution because it is a limited resource, essential for both domestic and industrial uses.

Private nuisance law protects the use and enjoyment of private property from unreasonable interference by others.79 Courts engage in a balancing test to determine liability, weighing the utility and economic benefit of the polluter’s conduct against the social and economic costs to the plaintiff and, more broadly, impacts to the public interest. Nineteenth century courts often struck the balance in favor of industry and denied recovery for the plaintiffs. In Pennsylvania Coal Co. v. Sanderson, for example, the plaintiff, who had built a “handsome residence” next to a mountain stream and used its water for recreational and domestic purposes, brought a nuisance suit against an upstream coal mine, complaining that pollution from the mine had utterly destroyed her use and enjoyment of the stream.80 Because the company was engaged in a “great industry” that was highly beneficial to the state, the court refused to impose liability.81 It reasoned that, absent willfulness or negligence, acid mine drainage was not a nuisance but rather “a right incident to the ownership of coal property; and when exercised in the ordinary manner, and with due care, the owner cannot be held for permitting the natural flow of mine water over his own land, into the water-course. . . .”82

Plaintiffs, particularly governmental entities, have had slightly greater success in bringing public nuisance claims against polluters. A public nuisance is an action or

77 David R. Hodas, Enforcement of Environmental Law in a Triangular Federal System: Can Three Not Be a Crowd When Enforcement Authority is Shared by the United States, the States, and Their Citizens?, 54 Md. L. Rev. 1552, 1566 (1995).
78 Horwitz, supra note , at 34.
80 113 Pa. 126, 6 A. 453 (1886).
81 113 Pa. at 147, 6 A. at 459.
82 113 Pa. at 146, 6 A. at 457.
condition or a failure to take action that “injuriously affects the safety, health or morals of
the public, or works some substantial annoyance, inconvenience or injury to the public.”83
The activity in question must interfere with the exercise of a public right, but it is not
necessary that the entire community be affected.84 Examples of public nuisances include
interfering with public access to navigable rivers or highways, fouling public bathing
beaches and killing fish in a navigable stream.85 Some years after the Pennsylvania Coal
case, water suppliers brought a public nuisance case against a mining company in
Sagamore Coal Co. v. Mountain Water Supply.86 The company was enjoined from
discharging polluted mine drainage into a creek above the water suppliers’ dam, as
“defendants have no right of any kind to drain their mine waters into the stream,
considering the public use which is made of its waters. . .87 Diminution of private
riparian rights by pollution, however, does not necessarily constitute a public nuisance
even when a large number of plaintiffs are affected, as private plaintiffs must show that
they have suffered a unique injury that is different in kind, rather than in degree, than the
public at large.88

Liability for water pollution will be imposed under a negligence theory if injury
was caused by the pollution and the defendant knew or should have known that the injury
may occur. In other words, the injury must have been reasonably foreseeable.89 In
bringing a negligence lawsuit, a plaintiff must prove four elements: (1) a legal duty of
care was owed the plaintiff; (2) a breach of that duty; (3) a causal relationship between
the breach of the duty and the injury; and (4) injury occurred.90 In an 1884 California
case, Harrison v. Spring Valley H.G. Co., injured farmers successfully prosecuted a
negligence claim against an upstream hydraulic gold mining operation.91 The farmers

83 Hodas, supra note , at 883.
84 Hodas, supra note , at 883 n.1, citing Prosser, Private Actions for Public Nuisance, 52
85 Restatement (Second) of Torts § 821B, comment g (1979).
87 281 Pa. at 249, 126 A. at 391. See People v. Gold Run Ditch and Mining Co., 66 Cal.
138, 4 P. 1152 (1884).
88 Hodas, supra note , at 884.
89 Davis, supra note , at 496, citing Restatement (Second) of Torts § 283 (1965).
90 John W. Wade, et al., Prosser, Wade and Schwartz's Cases and Materials on Torts 669-
686 (9th ed. 1994).
91 65 Cal. 376, 4 P. 381 (1884).
were awarded damages for lost crops that were flooded when the defendant’s canal gave way because the defendant permitted more water, charged with mining debris, to flow in the canal than it could safely carry. Conversey, in *Cauley v. U.S.*, the plaintiff’s claim that mash from an illicit distillery was negligently released into his pond by government employees who dynamited the distillery was dismissed for failure to prove that the release was the result of the explosion rather than the distillery itself.

Even if negligence cannot be shown, strict liability for injury caused by abnormally dangerous activities may be imposed. Plaintiffs must prove: (1) the polluter’s conduct caused the invasion of their interests; (2) the conduct was intentional and unreasonable, reckless or abnormally dangerous; and (3) the kind of harm experienced was the kind that made the activity dangerous. Strict liability has been imposed on mining companies for the escape of phosphate slimes into public waters where the impoundment of waste behind earthen walls, even with the exercise of the best of care, was deemed an abnormally dangerous, “non-natural” use of the land. Conversely, strict liability claims were dismissed when deposits of common yet hazardous solvents at a municipal landfill escaped and contaminated nearby wells because the activity was considered a common usage and its value to the community outweighed its dangerous attributes.

Trespass, an interference with the right of exclusive possession of property, is the final common-law claim typically employed in environmental cases. The distinction between trespass and nuisance can be subtle, but caselaw indicates that a direct and immediate physical invasion of plaintiff’s property, as by casting stones on it, is a trespass, while a more indirect invasion, such as the seepage of water, is a nuisance. Flooding can be both.

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92 65 Cal. at 377, 4 P. at 381.
94 Restatement (Second) of Torts §520.
96 Fortier v. Flambeau Plastics Co., 476 N.W.2d 593 (Wis. 1991).
98 Rodgers, *supra* note , § 2.15 n.5, citing Mueller v. Fruen, 36 Minn. 273, 30 N.W. 886 (1886); Irvine v. Oelwein, 170 Iowa 653, 150 N.W. 674 (1914).
Early cases indicated that any trespass, no matter how slight, was actionable, as the law “jealously guards” against interference with property rights: “the owner of land is entitled to the water upon his place in its natural state, and any pollution or contamination . . . will give a right of action for damages [for trespass] resulting from such wrongful act.”99 In an 1871 trespass case, the Montana Territorial Supreme Court declared that there was "no right to fill the channel of a creek with tailings and debris."100 The case was unusual in that the polluter, a mining company, had sued a downstream riparian for constructing a dam to prevent tailings from flowing downstream. The defendant was allowed to maintain the dam even though it interfered with profitable mining operations upstream.101

By the time the industrial revolution had rolled around, courts began to disregard de minimis trespasses to allow industry to continue production free from liability for insignificant harm. To hold otherwise, according to the courts, would cause manufacturers to be “harassed and the litigious few would cause the escalation of costs to the detriment of the many.”102 The difficulties of bringing common law claims to rectify environmental harms eventually prompted governments to implement direct regulatory efforts to control water pollution and other forms of environmental degradation.103

C. State Regulatory Efforts

Nineteenth century state legislatures made some efforts to address water pollution from mining and other industrial activities. In 1852, California passed an "Act to prevent certain public nuisances," which made it a misdemeanor to pollute any creek, stream, or

101 Nelson, 1 Mont. at 284.
pond. In 1877, the Montana Territorial Legislature outlawed the dumping of coal slack in the waters. In the East, some states adopted simple prohibitions on poisoning drinking water or dumping animal carcasses into streams. None addressed industrial water pollution in any meaningful way.

Large cities like New York, Chicago and Pittsburgh created the first modern city health departments in the 1860s and 1870s. In 1869, Massachusetts established the first operational state health board. Subsequently, Ohio and Pennsylvania expressly authorized their state health boards to regulate new or expanded sewage discharges. Other states soon followed, but most of these boards were “weak and ineffectual bodies.” They received minimal funding for a broad array of health and sanitation issues and they experienced enormous pressure to allow untreated sewage discharges. As a result, they had little interest in adding water quality problems to their agenda.

By the late 19th century, industrial interests had gained substantial power. The prevailing laissez-faire mindset in America permeated water law and policy. Just as litigation provided only minimal recourse for environmental degradation, state legislatures acquiesced in alleviating restraints on industry through measures such as the Mill Act. Mill Acts, adopted in many states, fostered mill development by precluding permanent injunctions and punitive damages for landowners who were flooded or otherwise injured.

The Wisconsin legislature attempted to buck the trend toward favoring industry with an initiative to purchase private timberlands in order to establish a public forest reserve. Legal historian James Willard Hurst’s account of the judiciary’s response in Law and Economic Growth: The Legal History of the Lumber Industry in Wisconsin 1836-1915, highlights the deficiencies of legal responses at the turn of the century.

104 Bakken, supra note , at 97.
105 Id.
106 Andreen I, supra note , at 179-180.
107 Id. at 178.
108 Id. at 179-180.
109 Id. at 179.
110 Horwitz, supra note , at 47.
111 Id.
Hurst examined *State ex rel. Owen v. Donald*, which invalidated the Wisconsin forest initiative as beyond the state’s constitutional police powers.\(^{113}\) According to Hurst, the pursuit of profits overwhelmed all other values. The legal system utterly failed to fulfill the aspirations of “rational public policy . . . to the detriment of the long-term vitality of the whole society.”\(^{114}\) Although Wisconsin eventually enacted a constitutional amendment to promote public forest reserves,\(^{115}\) the *Donald* case was indicative of the constraints imposed on governments that attempted to protect natural resources, including water and water-dependent resources, from the adverse effects of industrialization. Hurst concluded that “by the end of the nineteenth century the unreflective cult of free enterprise had brought about major crises in the form of unforeseen externalities such as resource exhaustion and a dangerous concentration of political and economic power.”\(^{116}\)

By the 1920s, the tide was beginning to turn, and states began to take more assertive steps to control water pollution by establishing quasi-zoning systems for their streams and lakes. Pennsylvania’s Sanitary Water Board, established in 1923, was required to classify streams according to their beneficial uses and to protect those uses.\(^{117}\) Similarly, Ohio’s Health Department was given authority to zone public water supply sources and to require new industries to treat discharges that might pollute those sources. These efforts foreshadowed federal requirements for water quality standards, but they were limited in scope and in effect.

**D. Federal Public Law**

In 1897, the national forest system was created to secure “favorable conditions of water flows, and to furnish a continuous supply of timber.”\(^{118}\) Although this has been flagged as the most significant event in federal conservation history, according to historian Donald Pisani, “water management had far greater impact on the national economy and American institutions.”\(^{119}\)

\(^{113}\) 160 Wis. 21, 151 N.W. 331 (1915).
\(^{115}\) Hurst, *supra note*, at 598.
\(^{117}\) Andreen I 182.
\(^{118}\) 16 U.S.C. § 475.
Three major themes are found in federal water management policies. First, although the history of relations between governments over water resources is not a consistent, predictable one but rather “a concoction of Byzantine politics and legalistic archaeology,”¹²⁰ both federal and state governments adopted policies that “exemplified the American will to order and dominate the physical world.”¹²¹ Imperialism is the second theme. The federal government’s desire to secure and integrate the American West. Rivalries between the East and the West, as well as between the states and the United States, have affected water politics at all levels of government.¹²² The third theme is the failure to engage in comprehensive water resources planning, due largely to the challenge of maintaining centralized control in a political system specifically designed to protect local interests.¹²³ Localism has often overcome nationalism, efficiency and sustainability.¹²⁴

In the early years, federal water policy concerned itself almost exclusively with maintaining and improving navigable waterways and harbors. Both water quality and the use and allocation of water quantity, however, remained unaddressed at the federal level. Even in the west, where the federal government was deeply involved in the acquisition and settlement of the public lands, Congress and the executive branch remained silent on the subject of water supply, leaving irrigation and other water supply issues, as well as flood control and drainage, to state and local governments and private enterprise.¹²⁵ By its silence, the United States tacitly consented to “free and unrestrained occupation” of public resources, including not only water but also minerals and forage.¹²⁶

After gold was discovered in California in 1849, prospectors rushed to the West. Much of the activity was on federal land. It was years before Congress stepped in, but in 1866 it passed the General Mining Act, which protected the “possessors and owners” of rights to use water on the federal lands “whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and

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¹²¹ Pisani, supra note , at 272 (2002).
¹²² Id. at 272-273.
¹²³ Id. at 273.
¹²⁴ Id. at 280, 284.
¹²⁵ Id. at xvi.
¹²⁶ Irwin v. Phillips, 5 Cal. 140, 146 (1855).
accrued, and the same are recognized and acknowledged by local customs, law, and the
decisions of courts. . .” An 1870 amendment subjected federal homesteads and other
land grants to “any vested and accrued water rights, or rights to ditches and reservoirs
used in connection with such water rights” acquired under the 1866 law.

The states did not enjoy “total hegemony” over water resources, however, as
federal law controlled in three distinct areas: navigability; federal reserved rights for
tribal lands; and the allocation of interstate waters under the doctrine of equitable
apportionment, described above. By the early twentieth century, federal law and
policy regarding the reclamation of arid western lands played a prominent role in water
supply as well, although water rights continued to be left to the states. Navigation and
federal reserved water rights are addressed in this section, while reclamation is addressed
below.

1. Taming the Mighty Rivers for Navigation

In the early nineteenth century, the United States was determined to promote
economic development and secure its Manifest Destiny -- “an integrated nation that
stretched from sea to sea” -- by taming the nation's water resources for navigational
purposes. The War of 1812 between the U.S. and Great Britain demonstrated the need
for a reliable inland navigation system for national defense purposes. The Supreme
Court affirmed Congress’s power to regulate navigation in 1824 in Gibbons v. Ogden.
Since then, it has “consistently held that the states could not authorize interferences with
interstate navigable waters.”

The Corps of Engineers played a leading role in adapting European strategies,
particularly large-scale hydraulic works, to the country’s geographic, political and
economic characteristics.\textsuperscript{135} In the chaotic early years of the Republic, the Corps
represented enlightenment era virtues of rationality and science, and its mission grew
from defensive fortifications to navigational enhancement.\textsuperscript{136} Efforts to survey and
construct canals emerged on the Ohio River and soon expanded to the Mississippi River.
Advancements in snag removal and dredging technologies enhanced navigational
capacities on the lower Mississippi and the treacherous Missouri River. The completion
of a 20-foot deep shipping canal from the Mississippi River to the Gulf of Mexico in
1879 symbolized the engineers’ conquest over nature.\textsuperscript{137}

The Rivers and Harbors Act of 1899, a piece of Progressive Era legislation
described in detail below,\textsuperscript{138} gave the Corps explicit authority over obstructions and other
activities that could affect navigation. Until well into the twentieth century, federal
engineers made virtually all important navigational decisions as well as many other
decisions related to water management.\textsuperscript{139}

\textbf{2. Federal Reserved Rights}

Since the Revolutionary War, the United States has held both proprietary and
sovereign interests in the federal lands.\textsuperscript{140} Under the U.S. Constitution, these interests,
along with interests in water rights for federal lands, are explicitly authorized by the
Property Clause, which gives Congress “Power to dispose of and make all needful Rules
and Regulations respecting the Territory or other Property belonging to the United
States.”\textsuperscript{141} Accordingly, the federal government has a right to the continued flow of
water as necessary for the beneficial uses of federal properties bordering on a stream.\textsuperscript{142}

The first federal reserved rights to be asserted before the Supreme Court involved
water for Indian reservations. One of the earliest policies for addressing the native

\textsuperscript{135} A. Dan Tarlock, A First Look at a Modern Legal Regime for a "Post-Modern" U.S.
\textsuperscript{136} Tarlock, supra note , at 1299, 1301.
\textsuperscript{137} John M. Barry, Rising Tide: The Great Mississippi Flood of 1927 and How it
Changed America 21, 89, 264-265 (Touchstone Ed. 1998).
\textsuperscript{138} See Section III.A, infra.
\textsuperscript{139} Tarlock (2004), at 1305.
\textsuperscript{140} United States v. Rio Grande Dam and Irrigation Co., 174 U.S. 690 (1899).
\textsuperscript{142} U.S. v. Rio Grande Dam & Irrigation Co., 174 U.S. 690, 703 (1899).
populations encountered by Europeans coming to America was to remove them from colonized areas to the “wild” mid-western and western regions of the country to clear the way for settlement.\textsuperscript{143} Through treaties, many tribes ceded their homelands in exchange for more remote western lands, but they typically retained fishing and hunting rights on the ceded lands.\textsuperscript{144} By the mid-1800’s, removal had become “far less popular, less successful than planned, and enormously expensive.”\textsuperscript{145} A strategy of assimilating Indian people into American culture prevailed from 1871-1928, effectuated largely by the Dawes Act, also known as the General Allotment Act, of 1887.\textsuperscript{146}

The government's new mandatory initiative resembled the homestead program in that it allotted parcels of reservation land to individual tribal members... [to become] yeoman farmers--full participants in American capitalism. ... After the federal government finished meting out reservation land to tribal members, it opened the remainder, or "surplus," to others... The policy also reduced total Indian landholdings by 35 percent... Tribes were left with lands of lesser quality, where almost half of the land was either desert or semidesert. All told, tribes lost over 80 percent of the value of their lands due to the allotments.\textsuperscript{147}

Although the loss of land and diminution of aboriginal governments depleted the political power of tribes, in 1908, the height of the allotment era, the federal government asserted an implied, federally reserved water right for the tribes of the Fort Belknap Indian Reservation in Montana.\textsuperscript{148} Congress had established the reservation in 1888 to provide a permanent home for the tribes. In \textit{Winters v. U.S.}, the Supreme Court awarded the tribes a right to the waters of the Milk River, in spite of conflicts with state prior appropriation law, reasoning that water was reserved appurtenant to the land because it

\textsuperscript{144} U.S. v. Winans, 198 U.S. 371, 381 (1905); U.S. v. Adair, 723 F.2d 1394, 1408-15 (9th Cir.1983).
\textsuperscript{145} Thorson, \textit{supra} note , at 373.
\textsuperscript{146} General Allotment Act, ch. 119, 24 Stat. 388 (1887).
\textsuperscript{147} Thorson, \textit{supra} note , at 373-374.
was an “absolute necessity” to fulfill the reservation's purposes.\textsuperscript{149}

It was not until 1963 that the Court specified a standard for quantifying reserved rights. According to \textit{Arizona v. California}, if the primary purpose of the reservation is agricultural, tribes are entitled to the amount of water necessary to irrigate "practically irrigable acreage."\textsuperscript{150} The \textit{Winters} doctrine has been extended to non-agricultural purposes, such as domestic supply and livestock watering.\textsuperscript{151} Along with water quantity, tribes have asserted rights to an adequate \textit{quality} of water.\textsuperscript{152} Although this right is not well defined, the Supreme Court has noted that a right to fish includes more than just a right to dip a net in the water.\textsuperscript{153} Courts have concluded that tribes possess rights to adequate flows for fish habitat as well as sufficient water quantities to maintain appropriate water temperatures for native fish.\textsuperscript{154}

\textit{Arizona v. California} also extended the \textit{Winters} doctrine to all federal public lands reserved after statehood.\textsuperscript{155} Reserved water rights for non-Indian federal lands, such as national forests and parks, extend only to the primary purposes for which the land had been withdrawn from homesteading and other disposition.\textsuperscript{156} With respect to federal lands destined for disposition through grants to homesteaders, railroads, veterans and others, the United States continued to leave water rights determinations to the states, absent navigational or other federal concerns.

III. THE PROGRESSIVE ERA

The ideal of frontier America -- an agrarian, autonomous, and virtuous society --

\begin{itemize}
  \item \textsuperscript{149} \textit{Id.} at 577.
  \item \textsuperscript{150} 373 U.S. 546, 601 (1963).
  \item \textsuperscript{151} Hope M. Babcock, Reserved Indian Water Rights in Riparian Jurisdictions: Water, Water Everywhere, Perhaps Some Drops for Us, 91 Cornell L. Rev. 1203, 1229 (2006).
  \item \textsuperscript{155} Arizona v. California, 373 U.S. at 597-98.
  \item \textsuperscript{156} United States v. New Mexico, 438 U.S. 696, 715-18 (1978).
\end{itemize}
persisted through the early 1900s. Pressures on the nation’s natural resources mounted as the U.S. population grew by over 20 percent in each decade between 1870 and 1910.\textsuperscript{157} Federal and state decisionmakers soon realized that the nation’s natural resources were not, in fact, limitless and conservation principles began to take root.\textsuperscript{158} National policies evolved to reflect progressive ideals, which influenced policy and law in America from around 1890 to 1920.\textsuperscript{159}

The Progressives were urban reformers, farmers, teachers, suffragists and regular, every-day people. They were civic-minded citizens who believed that the government should play a leading role in making life better for all of its citizens, not just for the privileged special interests.\textsuperscript{160} The movement was epitomized by populists like William Jennings Bryan, who advocated the aggressive use of federal resources on behalf of farmers and laborers,\textsuperscript{161} and Republican President Teddy Roosevelt, who made unprecedented strides at curbing industrialists’ power by breaking up oil and railroad monopolies through trust-busting.\textsuperscript{162}

The Progressive Era represented a critical moment in American water resources policy.\textsuperscript{163} Although many American settlers still harbored a “deep-seated distrust of centralized authority,” particularly where property rights were concerned, they also believed in the rational and orderly use of water and other resources.\textsuperscript{164} The rise of a more affluent leisure class began to influence American political and social life with a sense of “community through nature.”\textsuperscript{165} Nature, as portrayed in art and literature,

\begin{itemize}
  \item \textsuperscript{157} Pisani, \textit{supra} note \ , at 277.
  \item \textsuperscript{158} Deverell, \textit{supra} note \ , at 466.
  \item \textsuperscript{159} SAMUEL P. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT 1890-1920 (1959).
  \item \textsuperscript{160} Patricia O’Toole, The War of 1912, TIME July 3, 2006, 75-76; PATRICIA O’TOOLE, WHEN TRUMPETS CALL: THEODORE ROOSEVELT AFTER THE WHITE HOUSE (2005).
  \item \textsuperscript{161} Michael Kazin, A Godly Hero (2006). \textit{See} Jim Chen, \textit{Vox Populi}, 85 Neb. L. Rev. 1, 3 (2007) (concluding that the New Deal, the Great Society and others owe their origins to Bryan).
  \item \textsuperscript{162} See O’Toole, The War of 1912, \textit{supra} note \ , at 76 (stating that Roosevelt believed that “the Federal Government was the only institution strong enough to combat . . . [corporations’] Darwinian tendency to crush competitors and maximize profits”).
  \item \textsuperscript{163} Tarlock, \textit{supra} note \ , at 1302.
  \item \textsuperscript{164} Deverell, \textit{supra} note \ , at 465-66.
\end{itemize}
conveyed an image of America as the chosen land, which in turn promoted a sense of opportunity and duty to maximize the productivity of the nation’s abundant natural riches.\textsuperscript{166} The goal was not preservation but rather wise use. “Thus power and irrigation sites would be leased to private enterprise and developed according to government standards. . . . Forests would be logged and grasslands would be grazed under permits that guaranteed sustained yields. . . .”\textsuperscript{167}

To the Progressive movement, “the control of water ‘was the single step remaining to be taken before Man becomes master over Nature.’”\textsuperscript{168} The Bureau of Reclamation and the Corps of Engineers were perhaps the two greatest proponents of this notion. This Section addresses the major Progressive Era programs of these two agencies: the Rivers and Harbors Act; federal reclamation; and flood control.

\textbf{A. The Rivers and Harbors Act}

In the 1880s, Congress provided broad authority to the Corps of Engineers to promote commerce on the nation’s waterways by preventing navigational obstructions, refuse and mill wastes.\textsuperscript{169} The legislation was initially limited to New York Harbor, but subsequently, in the Rivers and Harbors Act of 1899, Congress broadened its geographic focus. Sections 9 and 10 prohibit construction of bridges or dams and obstructions to the navigable capacities of any waters of the United States, as well as the excavation or fill or the alteration of “the course, location, condition, or capacity of . . . any port, . . . harbor, canal, lake. . . of the channel of any navigable water of the United States.”\textsuperscript{170} Section 13, known as the Refuse Act, prohibits the discharge of "any refuse matter of any kind or description whatever," except for municipal sewage and storm-water, into navigable waters or "any tributary of any navigable water from which the same shall float or be washed into such navigable water” unless a permit is obtained from the Corps.\textsuperscript{171} It also

\textsuperscript{166} See NOVAK, \textit{supra} note, at 16, 53.
\textsuperscript{168} McCool, \textit{supra} note, at 1904 (quoting W.J. McGee, President Teddy Roosevelt’s Secretary of the Inland Waterways Commission).
\textsuperscript{169} Andreen Part II, \textit{supra} note, at 220.
\textsuperscript{170} 33 U.S.C. §§ 401, 403.
\textsuperscript{171} 33 U.S.C. § 407.
prohibits the placement of any material along the banks if the material could impede navigation when washed into the water. Although Section 13 could be construed to cover many types of pollutants, the Corps initially applied it only to materials that could actually impede navigation.\footnote{Andreen Part II, supra note \ref{andreen}, at 221.} A few decades after its passage, “it was widely conceded that the four decade-old federal Refuse Act was not adequate to prevent illegal dumping. . . R. Drane White, supervisor of New York Harbor, [testified before Congress] that it was virtually impossible to convict persons dumping debris into the harbor under existing law.”\footnote{Percival, supra note \ref{percival}, at 741.} The Act’s potential for the protection of water quality was not realized until citizen groups resurrected it in the 1960’s, as described below.\footnote{See Section V.B, infra.}

**B. Making Deserts Bloom Through Reclamation**

The creation of the U.S. Geological Survey in 1879 increased federal capacity to engage in hydrological research and laid a foundation for comprehensive planning.\footnote{See Section V.B, infra.} In the late 1800’s, John Wesley Powell, director of the United States Geological Survey (USGS), argued that watersheds, not surveyor’s rectangular sections, should be the basic planning unit.\footnote{Tarlock, supra note \ref{tarlock}, at 1304-1305, citing NATIONAL RESEARCH COUNCIL, OPPORTUNITIES IN THE HYDROLOGIC SCIENCES 41-42 (1991).} The federal government, however, was disinclined to adopt comprehensive disposition policies for either land or water. Instead, federal policies promoted rapid settlement by assisting settlers in converting land to agricultural purposes. From its earliest days, American agriculture was “characterized by the exchange of poor, exhausted land for virgin soil.”\footnote{Wallace Stegner, Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West 322 (1954).} This had tremendous implications for water quality and water-dependent resources.

In the East and Midwest, conversion was stimulated by the federal Swamplands Acts of 1849, 1850 and 1860, which encouraged the draining of wetlands by providing land, tax incentives and other enticements to construct levees and drains.\footnote{See Sam Kalen, Commerce to Conservation: The Call for a National Water Policy and the Evolution of Federal Jurisdiction Over Wetlands, 69 N.D. L. Rev. 873, 877 (1993); Swamp Lands Act, R.S. § 2479 derived from Acts Sept. 28, 1850, c. 84, §§ 1, 4, 9 Stat. 519, codified at 43 U.S.C. §§ 982-984.} At the time,
wetlands were considered a nuisance that inhibited development and threatened public health with mosquito-born diseases.\textsuperscript{179} Through the years, over 50 percent of the nation's wetlands have been drained to create cropland and allow residential and commercial development.\textsuperscript{180}

In the western U.S., federal reclamation projects “promised to ‘subdue worthless land,’ turn the desert wilderness into a garden, and convert the West into a commonwealth of small farms.”\textsuperscript{181} Reclamation became an important cornerstone of Progressive Era policies, yet federal reclamation policies were not especially progressive or forward-looking. Historian Donald Pisani attributes reclamation to the continuing nineteenth-century desire to fulfill the nation’s Manifest Destiny and to quell lingering fears of the chaotic 1890s when drought caused complete crop failure and unemployment skyrocketed.\textsuperscript{182}

Making the desert bloom with reclamation water was seen as a solution to many of America’s social and economic problems, such as overcrowded cities, the growth of slums, immigration, wage slavery and political unrest. Promoters claimed that reclamation would “save wasted lives along with wasted land. . . resuscitate the ideal of the family farm, revive civic virtue, and serve as an antidote to a variety of social diseases associated with industrialization and urbanization.”\textsuperscript{183} The federal government promoted reclamation of its vast western land holdings by subsidizing railroads, surveying and mapping the land, and enacting legislation intended to encourage western settlement and an agrarian lifestyle. Meanwhile, proponents of comprehensive watershed planning assumed that large-scale water resource projects were necessary to promote the efficient use of water.\textsuperscript{184} Politicians had additional goals in mind. Federal reclamation was a

\begin{itemize}
\item \textsuperscript{180} Interagency Floodplain Mgmt. Review Commission 43 (1994).
\item \textsuperscript{181} Pisani, \textit{supra} note 179, at 272. \textit{See} Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275, 292 (1958).
\item \textsuperscript{183} Pisani, \textit{supra} note 179, at xii.
\item \textsuperscript{184} Tarlock, \textit{supra} note 179, at 1302 (2004).
\end{itemize}
means of getting a leg up in the competition for federal funding and capturing the newly minted western states for the Republican party.\textsuperscript{185}

In the Reclamation Act of 1902, Congress authorized the U.S. Bureau of Reclamation to construct and operate water projects in seventeen western states.\textsuperscript{186} The Bureau was to build the projects and supply water to resident farmers on modest-sized tracts; in turn, the farmers were expected to pay a portion of the costs.\textsuperscript{187} Water rights acquired under the Act were appurtenant to the land irrigated, with beneficial use as “the basis, the measure, and the limit of the right.”\textsuperscript{188} To allay states’ concerns that reclamation would result in federal take-over of water resources, Section 8 of the Act — Congress’s paramount statement of deference to the states in water resource matters\textsuperscript{189} — provides:

Nothing in this act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested rights acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this Act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof. . . .\textsuperscript{190}

The federal reclamation program became the most intrepid public works initiative ever undertaken in the United States.\textsuperscript{191} The Bureau built over 600 dams and related infrastructure. At present, reclamation projects supply water to 20% of western farmers for the irrigation of 10 million acres, which makes the Bureau the nation’s largest water

\textsuperscript{187} See Amy K. Kelley, Federal Reclamation Law, in 4 WATERS AND WATER RIGHTS (Robert E. Beck ed., 1991), §§ 41.02 – 41.03.
\textsuperscript{188} 43 U.S.C. § 372.
\textsuperscript{189} Benson, supra note , at 38.
\textsuperscript{190} 43 U.S.C. § 383.
\textsuperscript{191} Pisani, supra note , at xvi.
wholesaler. The Bureau typically delivers water under a contract with an irrigation district, which in turn delivers water to individual farms. Although over 80 percent of water from the Bureau’s projects is dedicated to irrigation, the projects also generate enough hydropower for six million homes and provide water supply for over 30 million people.

Despite these impressive statistics, federal reclamation has left a legacy of adverse environmental and social impacts. Environmental effects are most obvious, including degraded water quality and the destruction of habitat for native species. Social impacts are somewhat more subtle but, on balance, they too have been negative. Although federal dams benefited large irrigation districts and some homesteaders, they were, in many cases, detrimental to Native American populations. According to the World Commission on Dams, “dams in the United States . . . are guilty of disrupting the cultures of some marginalized members of society.” Dams on the Missouri River, for example, flooded vast areas of tribal lands while providing few advantages to displaced tribes, and controversy continues today over fluctuating reservoir levels that erode shorelines and expose burial sites and human remains.

At the same time, reclamation exacerbated water waste and unsustainable growth patterns by promoting the erroneous belief that the nation’s water resources were limitless. The Act also inhibited the ability to select projects on technical grounds by requiring that fifty-one percent of the funds for reclamation raised through the sale of

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193 Benson, supra note , at 37.
195 See Bruce Babbitt, Cities in the Wilderness 127-128 (2005).
200 Babbitt, supra note , at 124-127.
public lands in any given state be spent in that same state. No soil analyses were performed to determine whether the land to be irrigated could actually support crops. Where fertile soils did exist, the Act stimulated land speculation and drove up prices in project areas, to the detriment of the landless and the poor farmer alike.\textsuperscript{201}

\textbf{C. The Great Mississippi Flood}

The United States has involved itself in flood control, albeit on a limited scale, since 1850, with the appropriation of federal funds for Corps of Engineers to study flood control methods on the Mississippi River.\textsuperscript{202} In 1861, the Corps embraced the Humphreys-Abbott engineering report, which asserted that flooding could be controlled only by the construction of levees, not reservoirs, a theory that continues to influence flood control policies today.\textsuperscript{203} For decades, the Corps focused almost exclusively on levee construction and resisted new theories of water management, such as multiple-purpose planning.\textsuperscript{204} The 1920’s ushered in a more “complicated mosaic” of federal water policy.\textsuperscript{205} The Great Mississippi Flood of 1927 was a transformative event that inundated 27,000 square miles, displaced over 300,000 people and drowned at least 250 people.\textsuperscript{206} The Flood stimulated a major shift in American sentiment about the proper role of the federal government in disaster relief and the control of great rivers like the Mississippi.\textsuperscript{207}

President Calvin Coolidge initially refused to support federal flood relief. Characterizing the flood as an act of God, he rejected any notion of federal responsibility for the failed “levees only” policy. Proponents of a comprehensive flood control package overcame Coolidge’s resistance with provisions for state and local funding contributions.\textsuperscript{208} The bill that emerged, the Flood Control Act of 1928, declared that the federal government would take full responsibility for the Mississippi River. In so doing, it “set a precedent of direct, comprehensive, and vastly expanded federal involvement in local affairs. . . reflect[ing] a major shift in what Americans considered the proper role

\textsuperscript{201} Walton, \textit{supra note 1}, at 3.
\textsuperscript{202} TARLOCK, \textit{supra note 1}, at 1301-1302.
\textsuperscript{203} \textit{Id.} at 1301.
\textsuperscript{204} \textit{Id.} at 1303.
\textsuperscript{205} Pisani, \textit{supra note 1}, at 235.
\textsuperscript{206} Pisani, \textit{supra note 1}, at 235.
\textsuperscript{207} Barry, \textit{supra note 1}, at 399-400, 407.
\textsuperscript{208} Barry, \textit{supra note 1}, at 406.
and obligation of the national government. . . .”

Coolidge’s obduracy generated a public backlash. His popularity dropped precipitously and he announced that he would not seek reelection in the 1928 presidential race. Herbert Hoover was elected in a landslide that year. Hoover followed the Progressive Era philosophy that Americans had an obligation to develop the nation’s natural resources as rapidly as possible. The cornerstone of his conservation agenda was a broad-sweeping national program for the full utilization of streams, rivers and lakes: “[e]very drop of water that runs to the sea without yielding its full commercial returns to the nation is an economic waste.”

Hoover believed that rivers had tremendous potential to maximize the nation’s wealth through reclamation, water power and transportation, and that the federal government should take the lead in promoting economic growth. Without coordinated water management, “the United States would remain vulnerable to boom and bust cycles.” It was several years, however, before Congress fully embraced this notion in the Flood Control Act of 1936 and other New Deal measures described below.

IV. NEW DEAL FIRST-GENERATION RESPONSES

Progressive ideals continued to resonate in American politics for decades, and greatly influenced New Deal policies aimed at counteracting the ravages of the Dust Bowl and bringing the nation out of the Great Depression of 1929-1941. Skyrocketing unemployment, depressed wages at factories throughout the nation and the lack of viable farm markets for meager crops eked out of desiccated soils evidenced endemic market failures. Beginning with the election of President Franklin D. Roosevelt in 1932, the New Deal strengthened the Progressive Movement's resolve to make public health and well-being a matter of federal concern.

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209 Barry, supra note , at 407.
210 Barry, supra note , at 414.
211 Pisani, supra note , at 243-244.
212 Id.
213 See in Section IV.A, infra.
214 Patricia O'Toole, The War of 1912, supra note , at 75-76.
Roosevelt’s New Deal created the modern administrative state by delegating sweeping regulatory powers to over a dozen new executive agencies, authorizing them to watchdog the securities markets, safeguard the workplace and bolster agricultural prices.\textsuperscript{217} Perhaps most of all, the Roosevelt Administration wanted to alleviate the ill effects of the Depression by putting people to work. Many of the “make work” projects benefited the environment, but some did not. For example, between 1931 and 1938, the number of publicly owned sewage treatment facilities grew by nearly 50 percent, and the total population served increased over 85 percent but nearly 50 percent of municipal sewer systems continued to discharge raw, untreated waste.\textsuperscript{218} Beyond assistance for local sewage treatment, the New Deal authorized huge multi-purpose federal water projects to provide hydroelectric power, irrigation, flood control and transportation benefits. Providing work was a primary justification for the second largest earthen dam in the world, Fort Peck on the Missouri River, and many others, with little regard to whether water or power was actually needed in the affected area.\textsuperscript{219}

Even as New Deal initiatives exploited the broadest array of economic uses from river basins, federal water policy became increasingly disjointed. By putting jobs first, Roosevelt’s water policy treated water development projects as local relief rather than integral components of a comprehensive plan.\textsuperscript{220} Bureaucratic rivalries deepened, as Cabinet officials such as Interior Secretary Harold Ickes and Agriculture Secretary Henry Wallace competed for public works spending, making coordinated planning nearly impossible.\textsuperscript{221} Meanwhile, Congress expanded the power of the Corps and the Federal Power Commission and created the Tennessee Valley Authority, causing even greater fragmentation.

During the initial years of the New Deal, the courts were less than enamored with expansive ideologies. The judiciary “could be counted on as the bastion of the most powerful and resourceful industrialists—those very same entities who had benefited greatly from laissez-faire government and the common law’s protections for contract and

\textsuperscript{218} Andreen, Part II, supra note 226.
\textsuperscript{219} Zellmer, New Corps of Discovery, supra note 22, at 314 n. 47.
\textsuperscript{220} Pisani, supra note 22, at 271.
\textsuperscript{221} Id. at 266, 270.
property rights."\(^{222}\) From 1905-1937, a period known as the Lochner Era,\(^{223}\) redistributive laws were routinely invalidated as interfering with the freedom to contract, substantive due process, Commerce Clause constraints and separation of powers principles.\(^{224}\) In the wake of the New Deal, however, judicial resistance dissipated and the Supreme Court announced that the Commerce Power was broad enough to cover a wide range of water-related activities and interests, such as controlling floods and promoting the development of water resources.\(^{225}\)

**A. Famine and Flood**

The Dust Bowl years of the 1930’s devastated the economies of the Midwest and the Great Plains. During the first few decades of the 20th century, homesteaders, encouraged by federal land grants and other incentives, settled on the arid grasslands of the Great Plains and plowed the native sod to plant millions of acres of wheat as global demand increased.\(^{226}\) Over 100 million acres of cropland lost all or most of its topsoil.\(^{227}\) By 1934, over 75 percent of the country was desiccated by drought.\(^{228}\) In the spring of 1935, millions of tons of dust from the Great Plains swept through the Midwest to Washington, D.C., eclipsing the sun and turning the air a dark copper color, just as a Senate committee was considering legislation to provide aid to farmers.\(^{229}\) Congress declared soil erosion "a national menace," and passed legislation creating the Soil

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\(^{224}\) Zellmer, *The Devil*, supra note , at 942 n.2; SUNSTEIN, supra note , at 19-20.


Conservation Service and providing for research and preventative measures in order to “preserve natural resources, control floods, prevent impairment of reservoirs, and maintain the navigability of rivers and harbors . . . .” Even so, drought, together with the Great Depression, combined to deflate the agricultural boom and leave the region’s people and its economy devastated by “the nation's worst prolonged environmental disaster.”

Ironically, the decade-long drought was soon followed by a series of extreme floods on the Missouri River. The need for regional assistance coincided with the desire to put people to work. The New Deal dramatically expanded the federal government’s role in water resources planning and enabled the Corps of Engineers to extend its activities from the east to the west. In the Flood Control Act of 1936, Congress declared that “destructive floods,” like soil erosion, “constitute a menace to national welfare.” Accordingly, the Act proclaims that “the Federal Government should improve . . . navigable waters or their tributaries, including watersheds thereof, for flood-control purposes,” and authorizes the Corps to proceed with a project whenever its benefits are in excess of its costs. This directive provides the Corps with a great deal of discretion in conducting its activities. Various amendments to the Flood Control Act have been passed since 1936, but none constrains the Corps in any significant way.

Decisions about distribution of the federal financial largesse often were based on political vote trading in Congress, where individual representatives worked with the agencies and their constituents who stood to benefit from the projects—the "pork barrel" as critics of the Corps call it. As a result, the "iron triangle"—consisting of the Corps, powerful Congressional committee chairs, and local project proponents—reduced the executive branch's role to screening out the least

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231 Egan, supra note , at .


233 Barry, supra note , at 414; Tarlock, supra note , at 1304.


justified projects from Congressional consideration, rather than budgeting for an optimum set of projects derived via a carefully developed planning process.\textsuperscript{238}

In many basins, the fallacy of prioritizing flood control over other objectives has become clear, evidenced by the loss of wetlands and the precipitous decline of fish and wildlife species.\textsuperscript{239} The environmental calamity resulting from misguided floodplain development is profound: polluted drinking water sources; contaminated sediments; decimated riparian areas and tidal marshes; smothered fisheries and oyster beds. Limitations on flood control activities finally began to be imposed in the 1970s by modern federal environmental laws, addressed below.\textsuperscript{240}

B. Hydropower

The Federal Power Act of 1920 (FPA), a piece of Progressive Era legislation, gained significance in both magnitude and scope during the New Deal Era. The FPA requires any non-federal entity seeking to build or operate a hydropower project to comply with a license issued by the Federal Power Commission (now known as the Federal Energy Regulatory Commission or FERC).\textsuperscript{241} The Commission initially asserted licensing jurisdiction only over projects on navigable waters or on federal public lands,\textsuperscript{242} but in 1935 Congress extended its authority to new hydropower projects that would affect interstate or foreign commerce and any new hydropower projects on non-navigable waterways subject to federal power under the Commerce Clause.\textsuperscript{243}

In the landmark case of \textit{First Iowa Hydro-Electric Coop. v. Federal Power Commission}, the Supreme Court described the FPA as “a complete scheme of national regulation which would promote the comprehensive development of the water resources of the nation, in so far as it was within the reach of the federal power to do so.”\textsuperscript{244} In \textit{First Iowa}, the project proponent proposed to divert nearly the entire flow of the Cedar River for twenty or so miles, but Iowa law required water to be returned to the stream

\textsuperscript{238} Tarlock, supra note , at 1301-1304.
\textsuperscript{239} Zellmer, supra note , at 336 (2004); Oliver Houck, Can We Save New Orleans?, 19 Tulane Envtl. L. J. 1, 48-50 (2006).
\textsuperscript{240} See Section IV. , infra.
\textsuperscript{241} 16 U.S.C. § 817.
\textsuperscript{242} 16 U.S.C. § 817(1).
\textsuperscript{244} 328 U.S. 152, 180 (1946).
from which it was diverted “without being materially diminished in quantity or polluted or rendered deleterious to fish life. . .”245 The Commission supported the design, but the state opposed it.246 The Court construed the FPA’s provisions on state authority narrowly, and held that the Act preempted state laws that could be inconsistent with Commission licenses. According to the Court, Section 9(b) of the FPA, which requires an applicant to supply the Commission with evidence that it has complied with the requirements of state law, does not provide states with veto authority; instead, it suggests “subjects as to which the Commission may wish some proof submitted to it of the applicant’s progress.”247 The Court also interpreted Section 27, which declares that the Act should not be construed as interfering with state laws “relating to the control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses, or any vested right acquired therein,” as applying primarily to proprietary water rights.248 To hold otherwise, it reasoned, “could destroy the effectiveness of the Federal Act,” and negate the statutory purpose: a comprehensive, national regulatory scheme to promote full development of the nation’s water resources.249 Subsequently, in California v. FERC, the Court reaffirmed First Iowa and explicitly distinguished the FPA from the Reclamation Act, which requires the Bureau “to proceed in conformity with” relevant state laws.250 It found that the absence of similar language in the FPA indicated less deference to the states because the FPA authorized a much broader federal oversight role in hydropower development than did the Reclamation Act.251

As a result, the Commission possesses the authority to impose a broad array of license conditions, even those unrelated to the protection of navigability or production of power, such as fisheries protection, flood control and others. Although environmental considerations played little role in the initial licensing decisions,252 the 1935 amendments to the FPA required that projects be adapted to a comprehensive plan for water-power

245 328 U.S. at 164-166, citing Iowa Code §§ 7767 and 7771.
246 Id. at 158-159, 170-171.
247 Id. at 177-178.
248 Id. at 176.
249 Id. at 164, 180-181.
251 Id.
252 Lawrence, supra note , at 285.
and other public uses. Scant attention was paid to this provision until 1965, when in Scenic Hudson v. FPC a federal appellate court held that it “undoubtedly encompasses the conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites.” Two years later, the Supreme Court agreed that FERC must consider fish and wildlife needs in its licensing decisions. As a result, FERC must consider environmental issues raised by interested parties, including state agencies and tribes, prior to issuing the license rather than merely monitoring effects afterwards. Dismay over the adverse environmental impacts of hydropower facilities and other dams led to the passage of the Wild and Scenic Rivers Act of 1968 and the Electric Consumer Protection Act of 1986, the latter of which modified FERC’s licensing process in several ways. First, FERC must give "equal consideration" in its relicensing procedures to "the preservation of . . . environmental quality" and the production of power. It must also accept any conditions on licenses recommended by state or federal resource agencies or to explain in writing why it rejected the recommended conditions. Finally, FERC must provide a cumulative impact assessment to analyze multiple projects in any given river basin.

C. Multi-Purpose Water Resources Development

The drive for comprehensive river basin development to spur national economic recovery gave birth to the Tennessee Valley Authority (TVA) in 1933. Because the TVA Act was passed in the same political climate as the 1935 Federal Power Act amendment and the 1936 Flood Control Act, its statutory purposes are equally utilitarian:

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256 Scenic Hudson, 354 F.2d at 612.
257 See Section V.C, infra.
258 16 U.S.C. §§ 792-828(e); Lawrence, supra note , at 285.
261 Spence, supra note , at 431.
navigation, flood control, agricultural and industrial development and hydropower production. The Act "proclaimed a policy for the unified development of a watershed for the national welfare, for the restoration of exhausted lands, for the development of Tennessee in its entirety, for the reforestation of cut-over lands, for the alleviation of unemployment, for promotion of the interests of national defense, and for the revitalization of an entire region economically." This statute "provides remarkably little in the way of policy guidance or statutory mandates, leaving much to the discretion of TVA's directors." Not surprisingly, the TVA has a "multifarious record" of managing the region’s water resources.

Although the TVA is “notorious for its history of breakneck dam construction at almost any cost,” it was not alone in its dam-building zeal. “During the twentieth century, the United States embarked on a dam-building binge,” motivated and funded primarily by the federal government. The Corps built nearly 500 dams and 8,500 miles of levees, while the Bureau of Reclamation operates 348 dams and 56,000 miles of conveyance systems. Hydroelectric dams, navigational devices, flood control structures and reservoirs have provided extensive benefits to the American people. They provide water supplies, generate 10% of our power and create miles of waterways for commercial and recreational boat traffic. But the costs have been at least equally high. Nearly every major river in the continental United States has been fundamentally altered by dams; as a result, less than 2% of America's streams remain free-flowing enough to qualify for inclusion in the nation’s Wild and Scenic River program.

V. THE POST-WAR YEARS

During World War II, Congress was preoccupied with the war effort and gave scant attention to the deteriorating condition of the nation's waterways and riparian

264 Thorson et al., supra note , at 57-59.
265 Adler, supra note , at 1060-61 and n.519.
266 Id.
267 Id.
269 McCool, supra note , at 1905.
270 Id.
271 Id. at 1908. The Wild and Scenic Rivers Act is addressed in Section V.C., infra.
ecosystems. The War “spawned a chemical revolution that increased the complexity and risk posed by industrial wastewater, which continued to be dumped -- generally without treatment -- into the nation's surface water.”272 After the War, it became clear that industrial expansion and the extensive network of dams across the nation had wrought tremendous damage to riparian ecosystems. Private and public strategies had proven unequal to the task of protecting the nation’s waterways from degradation.

The response was multi-faceted. Some states began to make progress toward controlling water pollution. The Pennsylvania Sanitary Water Board, in particular, required both industrial and sewage treatment facilities to treat and reduce their waste discharges, imposing uniform effluent limitations in tandem with water quality standards.273 Faced with concentrated opposition from industry and municipalities alike, however, state authorities were disinclined to apply new regulatory devices or to initiate vigorous enforcement actions.274 On the federal front, Congress enacted several significant pieces of legislation, some aimed at enhancing water quality while others preserved free-flowing rivers. Meanwhile, litigation under the Rivers and Harbors Act of 1899 blossomed.


In 1945, various water pollution bills were introduced in Congress, some of which included rudimentary water quality standards while others proposed funding mechanisms. The debate turned in large part on federal versus state control. “[N]o one seemed in a mood for compromise. . . [and] water pollution soon took a backseat amid the press of other post-war legislation.”275

Water quality concerns surfaced again in Congress in 1947. The Federal Water Pollution Control Act (FWPCA), “a bill of modest dimension,” varied little from the more lenient bills of 1945, but it did include slightly stronger provisions on federal enforcement.276 It was passed by Congress with minimal debate and signed into law by

273 Andreen I, supra note, at 193.
274 Andreen I, supra note, at 200.
275 Andreen II, supra note, at 236.
276 Id. at 291.
President Truman in 1948.\textsuperscript{277} FWPCA left primary responsibility for water quality with the states, but expanded federal research activities, provided more aid for sewage treatment and established a mechanism for federal enforcement of interstate pollution, albeit a cumbersome one.\textsuperscript{278} The Surgeon General was authorized only to investigate specified pollution problems at the request of a state, and the states were given power to veto any federal enforcement suit that followed.\textsuperscript{279} Other obstacles to federal enforcement included requirements that prosecutors prove that a polluter had actually endangered public health in an adjacent state – “a particularly difficult task” -- and that courts, in issuing decisions on enforcement cases, consider "the physical and economic feasibility" of preventing the polluted discharge.\textsuperscript{280} Exacerbating the Act’s inherent deficiencies, expenditures dropped by two-thirds between 1950 and 1955 as federal funds were redirected to the Korean War effort.\textsuperscript{281}

The 1956 FWPCA Amendments removed a few of the enforcement obstacles, but even so, at the end of the Eisenhower Administration in 1961, the Surgeon General described the condition of America’s rivers as “a national disgrace.”\textsuperscript{282} By the time President Kennedy took office, the public was demanding greater protection for the environment.

The environmental consciousness of the nation was growing during the early years of the 1960s, inspired in part by the message and eloquence of Rachel Carson's Silent Spring, published in 1962. Her warnings of a world stricken by a mysterious blight were underscored by massive fish kills which were occurring with great frequency in the early 1960s. . . . Lake Erie was choking in algae, a victim of accelerated eutrophication, commercial fisheries were in decline elsewhere on the Great Lakes, and beaches were being closed all over the country. Increasingly, Americans who now had the time and resources to engage in various kinds of outdoor recreation found their favorite rivers and lakes fouled by

\textsuperscript{277} Id. at 237.  
\textsuperscript{278} Id. at 291.  
\textsuperscript{279} Id. at 238-239.  
\textsuperscript{280} Id. at 240.  
\textsuperscript{281} Id. at 238.  
\textsuperscript{282} Id. at 241.
industrial and municipal pollution. . . . With increasing frequency, citizens turned to the federal government for help.283

President Kennedy asked Congress to pass legislation to strengthen federal enforcement options. Congressional members were supportive, as political support for quality of life issues like education, health and environmental protection was high.284 The FWPCA Amendments of 1961 authorized increased expenditures for sewage treatment plant construction and extended federal enforcement authority to all navigable waters and tributaries where pollutant discharges endangered health or welfare.285 Federal power over intrastate pollution was still quite limited, however, as suit could not be filed absent the consent of the state governor. Federal officials “talked tough,” but little came of it.286 By the end of the 1960s, industrial discharges contributed 80% of all water pollution, and less than 30% received any treatment whatsoever.287

Congress soon went back to the drawing board to strengthen the federal government's ability to combat oil pollution in the wake of well-publicized spills such as the wreck of the Torrey Canyon and the 1969 Santa Barbara blowout. The Water Quality Improvement Act of 1970 amended FWPCA to prohibit discharges of harmful quantities of oil into navigable waters from vessels or facilities and to impose hefty fines and strict liability on violators.288 The Act also attempted to enhance the efficacy of water quality standards by requiring applicants for federal permits to obtain state certification that discharges from the proposed activity would not violate water quality standards.289

One of the first cases brought under the 1970 amendments, Reserve Mining v. EPA, compelled a federal district court to grapple with difficult causation issues regarding long-lasting harms posed by carcinogenic pollutants.290 Reserve Mining

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283 Id. at 244-245.
284 Id. at 242.
289 Andreen II, supra note , at 257-258.
Company, a joint venture of Armco and Republic Steel, began mining taconite along the shores of Lake Superior in Minnesota in 1955. By the time of trial, it was discharging 67,000 tons of tailings per day into the lake. After 139 days of trial with over 100 witnesses and 1,600 exhibits, the court held that the mine’s discharges violated FWPCA and also constituted a common-law nuisance.\(^\text{291}\) Despite the adverse consequences of an injunction on the regional economy, the court enjoined further discharges, citing both the mine’s obdurate refusal to dispose of the tailings by safer means and the grave yet unquantified threat to the public health.

It has been clearly established in this case that Reserve's discharge creates a serious health hazard to the people exposed to it. The exact scope of this potential health hazard is impossible to accurately quantify at this time. . . . Diseases . . . do not develop until 15 to 20 years after the initial exposure to the fibers. The state of the scientific and medical knowledge . . . is in its early stages and there is insufficient knowledge upon which to base an opinion as to the magnitude of the risks associated with this exposure.\(^\text{292}\)

The injunction was stayed by the court of appeals, which found that, although the evidence showed that the discharges represented a "possible medical danger,” the actual level of risk was unknown.\(^\text{293}\) It criticized the trial court for improperly engaging in a quasi-legislative function by adopting a precautionary policy that resolved all doubts in favor of health.\(^\text{294}\) In spite of the adverse ruling on appeal, courts have construed Reserve Mining to provide fact-finders with broad discretion to address uncertain but substantial risks, particularly where the harm in question involves latent health effects like cancer.\(^\text{295}\) Today the case is hailed as "one of the most significant decisions in the field of environmental law."\(^\text{296}\)

### B. The Revitalization of the Rivers & Harbors Act of 1899

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\(^{291}\) 380 F.Supp. at 15.  
\(^{292}\) 380 F.Supp. at 17, 88-91.  
\(^{293}\) 514 F.2d 492 (8th Cir. 1975) (en banc).  
\(^{294}\) Id.  
The enforcement provisions of FWPCA proved so cumbersome that, in the mid-1960s, citizens began to utilize the Rivers and Harbors Act of 1899 to bring private actions against polluters. The Act prohibits the discharge of refuse in navigable waters, but the Corps of Engineers used its authority sparingly. Polluters had been assessed only minimal penalties. When enforcement actions came before it, the Supreme Court held that the Act could be utilized to enjoin industrial pollution, regardless of whether a violation of water quality standards or endangerment to health and welfare could be proven. This enabled prosecutors to file suit without observing the restrictive requirements of FWPCA; as a result, over 60 enforcement actions were initiated under Section 13 of the Rivers and Harbors Act in 1969 and 1970. Even so, judicial enforcement could barely make a dent in the number of polluters that needed attention. President Richard Nixon issued an executive order in 1970 compelling the development of a permit program to regulate discharges. Around the same time, Nixon created the U.S. Environmental Protection Agency (EPA) and nominated William Ruckelshaus, who had developed a good reputation in pollution enforcement with the Indiana Board of Health, as EPA's first Administrator.

In response to Nixon’s Executive Order, the Corps issued regulations in 1971 for a permit program covering “all direct and indirect discharges,” other than liquid discharges flowing from sewers, into “a navigable waterway or tributary.” In issuing permits, the Corps was responsible for determining the impact of discharges upon navigation, but had to obtain and comply with the EPA's advice regarding compliance with water quality standards. Joint administration was awkward and “the task of setting permit levels that would protect water quality standards was nearly hopeless”

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298 Andreen Part II, supra note , at 222.
300 Andreen Part II, supra note , at 222.
303 Andreen II, supra note , at 259-260.
304 Exec. Order No. 11,574.
given the limited stream data and technical resources available at that time. The program “ground to a halt” in 1971, when a federal court prohibited the issuance of permits for failure to comply with the newly enacted National Environmental Policy Act (NEPA). The Corps had only issued twenty permits, and around 23,000 applications remained in the pipeline. These events set the stage for congressional action, culminating in the Clean Water Act of 1972, described below.

C. The Wild and Scenic Rivers Act

Congress enacted the Wild and Scenic Rivers Act (WSRA) in 1968 to counter the adverse effects of decades of dam-building and flow alterations in the nation’s rivers. The public’s desire to preserve public lands for growing recreational demands had been recognized just a few years earlier, in the Wilderness Act of 1964. The WSRA complemented the Wilderness Act and declared that “the established national policy of dam and other construction . . . needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing conditions to protect the water quality of such rivers and to fulfill other vital national conservation purposes.”

Rivers and river segments are added to the National Wild and Scenic Rivers System to protect their free-flowing condition and other “outstandingly remarkable values,” such as water quality, recreation, scenery, fish, wildlife or cultural resources. Qualifying rivers are to be designated and preserved in free-flowing condition “for the benefit and enjoyment of present and future generations.” Designations of rivers are

305 Id. at 259-260.
306 Andreen Part II, supra note , at 260.
308 Andreen Part II, supra note , at 260.
309 Section VI.B, supra.
313 Id.
made by Congress, but the WSRA includes a mechanism by which states may nominate rivers as well.\textsuperscript{315}

Rivers may be designated as wild, scenic or recreational.\textsuperscript{316} “Wild,” which is the most restrictive designation, requires that the river be "free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted."\textsuperscript{317} Although other designations are not as limiting, the purposes of the WSRA -- to preserve a river’s free-flowing condition and to protect and enhance the values for which it was designated -- apply equally to each of the three classifications of rivers in the system.\textsuperscript{318}

WSRA designations can result in strict controls within the river's corridor.\textsuperscript{319} In particular, Section 7 of the WSRA prohibits FERC from licensing “the construction of any dam, water conduit, reservoir, powerhouse, transmission line or other project works under the Federal Power Act on or directly affecting any river which is designated. . ."\textsuperscript{320} In \textit{City of Klamath Falls v. Babbitt}, the city challenged the designation of a segment of the Klamath River as "scenic" because the designation would preclude the completion of a hydroelectric project initiated by the City.\textsuperscript{321} The designation, which was accomplished through a statewide voter initiative, was upheld as within the discretion afforded by the Act.\textsuperscript{322}

The Act also prohibits FERC and all other federal agencies from assisting “by loan, grant, license or otherwise” in the construction of any water resources project that would have a direct and adverse effect on the values of a designated river.\textsuperscript{323} Water resources projects include dams, reservoirs, bridges, bank stabilization and channelization.

\textsuperscript{315} 16 U.S.C. § 1273(a).
\textsuperscript{316} 16 U.S.C. § 1273(a).
\textsuperscript{317} 16 U.S.C. § 1273(b)(1).
\textsuperscript{318} 16 U.S.C. § 1278(a).
\textsuperscript{320} 16 U.S.C. § 1278(a).
\textsuperscript{322} \textit{id.} at 1-2.
\textsuperscript{323} 16 U.S.C. §1278(a).
projects, levees, boat ramps and piers. If a project would have direct and adverse effects on the river’s values, the acting agency may not proceed. In *Sierra Club v. Pena*, for example, federal permits for the construction of a bridge across a designated river were denied, as the bridge, which would involve placing fill materials in the riverbed, would have adverse impacts on the river's scenic values.

Finally, designated rivers must be managed “in such manner as to protect and enhance the values which caused it to be included in said system.” The Act requires primary management emphasis to be given to “esthetic, scenic, historic, archeologic and scientific features.” In some cases, special emphasis has been placed on a river’s exceptional water quality, and water quality standards typically prevent any degradation of water quality in such rivers.

In spite of its accomplishments in protecting free-flowing segments of some rivers from destructive water projects, it has been far less effective at controlling incompatible land uses in the riparian corridor, and it has barely addressed watershed degradation. Fragmented ownership patterns exacerbate the ill-effects of the fragmented legal system. Most rivers have a patchwork of public and private owners. In the absence of land use regulation, privately-owned land along WSRA-designated rivers is at risk for activities which increase erosion and pollution, harming the values for which the river was preserved. Land development along rivers ranks as the greatest concern to public interest groups interested in designating a river under the WSRA or managing already-designated rivers.

As with other federal and state laws related to water pollution and resource management, the effectiveness of the WSRA as a holistic tool for sustainable management has been

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325 Sierra Club North Star Chapter v. Pena, 1 F. Supp. 2d. 971, 979 (D. Minn. 1998).
330 Id.
hobbled by the failure to integrate watershed management with the protection of water quality and streamflows.331

D. Groundwater Controls

Farmers devastated by the Dust Bowl years found renewed hope with the New Deal’s Rural Electric Association, which delivered power to remote areas previously “off the grid,” and the availability of cheaper, more powerful irrigation pumps. Naturally, they turned to groundwater resources to satisfy irrigation demands. Great Plains agriculture is blessed with the largest underground reserve in the world: the High Plains Ogallala Aquifer.332 Its significance to the U.S. economy cannot be understated. The fourteen million acres of crops spread across its flat surface account for at least one-fifth of the total annual U.S. agricultural harvest. . . . If the aquifer went dry, more than 20 billion worth of food and fiber would disappear immediately from the world’s markets.333

When pumping first began, legislatures and courts stayed out of the realm of groundwater management, viewing underground aquifers as too “secret, occult and concealed” to be subject to the law.334 This view rationalized the “rule of capture,” which rewards the landowner who captures groundwater exclusive ownership of that water. Today, most states have abrogated this rule in favor of groundwater laws based on a concept of reasonable use.335 These laws are a step forward, but they address groundwater overdraft crudely, at best. Even with modern Geographic Information Systems, groundwater remains a subject of misinformation, and private actors retain great latitude to exploit groundwater well beyond the point of safe yield.336

As for the vast Ogallala Aquifer, in some areas of Texas and Kansas, it has been so depleted that it is no longer feasible to extract more water. On the Great Plains, groundwater mining is no accident; “it is a way of life,” albeit one that cannot be

331 Id.
333 Ashworth, supra note , at .
334 Frazier v. Brown, 12 Ohio St. 294, 300 (1861).
335 Sax, et al., supra note , at ; Robert Glennon, Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters (2002).
sustained. In other regions of the country, excessive groundwater pumping has caused dePLETED surface water flows and riparian zones, land subsidence, saltwater incursion and other forms of contamination. On occasion, the United States has exercised its power to conserve groundwater resources pursuit to modern environmental statutes such as the Endangered Species Act and the Safe Drinking Water Act, and through the interstate allocation of water through equitable apportionment and interstate compacts. For the most part, however, it has left groundwater use, allocation and management to state law.

VI. MODERN SECOND-GENERATION RESPONSES

In spite of earlier private and public efforts, by the early 1970s, water quality continued to worsen and water-dependent species were suffering. Professor William Andreen provides a description of an Ohio river as it existed in the mid-twentieth century:

The lower Cuyahoga River and navigation channel throughout the Cleveland area [was] a waste treatment lagoon. At times, the river is choked with debris, oils, scums, and floating globs of organic sludge. Foul smelling gases can be seen rising from decomposing materials on the river's bottom.

While the Cuyahoga provided one of the most nefarious examples of water pollution in the United States, horrendous conditions afflicted streams and lakes nationwide.

Congress found it impossible to ignore heightened media coverage of the abysmal state of affairs, and it finally began to take more aggressive steps to improve water quality and to protect species imperiled by water pollution and other harmful activities. The National Environmental Policy Act of 1970, the Clean Water Act of 1972, the Safe Drinking Water Act of 1974 and the Endangered Species Act of 1973, addressed in turn

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337 Ashworth, supra note  , at .
338 See Section VI, infra.
341 Andreen, Part I, supra note  , at 198.
in this section, remain true landmarks of federal environmental legislation. Meanwhile, states and Indian tribes took bold steps to implement stringent water quality standards and to protect and conserve instream flows through water resources conservation.

A. Information and Public Participation

NEPA is known as the grandfather of the extended family of federal statutes enacted around 1970, which together became the cornerstone of a new environmental era.Shortly after NEPA’s enactment, Judge Skelly Wright described NEPA and its statutory cohorts as reflecting “the commitment of the Government to control, at long last, the destructive engine of material ‘progress.’” By making environmental protection part of the mandate of every federal agency, NEPA “takes the major step of requiring all federal agencies to consider values of environmental preservation in their spheres of activity, and it prescribes certain procedural measures to ensure that those values are in fact fully respected.”

NEPA requires federal agencies to prepare an environmental impact statement (EIS) for “every recommendation or report on proposals . . . and other major federal actions significantly affecting the quality of the human environment.” This compels agencies to "look before they leap" by analyzing environmental effects and alternatives before they take action. Although this is a limited duty, in that it is wholly procedural and does not force any particular substantive outcome, NEPA has wrought extensive changes in the way agencies do business, in large part by opening the door to informed public involvement. NEPA analyses provide the information needed by decisionmakers and stakeholders to evaluate the merits of proposed projects; once project details are exposed in this public fashion, political pressure can be brought to bear. As

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345 Id.
347 Oregon Natural Resources Council v. Lowe, 109 F.3d 521, 526 (9th Cir. 1997).
a result, many projects have been altered or even abandoned to minimize adverse effects to water quality, wetlands, coastal areas and riparian communities.\footnote{See, e.g., Marsh v. Oregon Natural Resources Council, 490 U.S. 360 (1989); Dubois v. United States Dept. of Agriculture, 102 F.3d 1273 (1st Cir.1996); Save our Wetlands v. Rush, Civ. No. 75-3710, slip op. (E.D. La. 1977).}

**B. The Clean Water Act of 1972**

The Clean Water Act of 1972 (CWA) substantially amended the pre-existing FWPCA.\footnote{See Pub. L. No. 95-217, 91 Stat. 1566; 33 U.S.C. § 1251 note.} President Nixon vetoed the bill for fear that it would result in “extreme and needless overspending,” but Congress overrode the veto.\footnote{Robert W. Adler et al., The Clean Water Act 20 Years Later 1-2 (1993).} The Act proclaims the ambitious goal of eliminating water pollution and protecting the chemical, physical, and biological integrity of U.S. waters.\footnote{33 U.S.C. § 1251(a)(1).} It imposes permit requirements, with technology based standards, on discharges of pollutants into surface waters of the United States. It also strengthens enforcement provisions, supports state and tribal water quality standards, incorporates elements of “cooperative federalism” with states and tribes to enhance implementation, and protects wetlands by controlling dredge and fill activities.

1. **Curtailing Water Pollutants Through Discharge Permits**

The primary mechanism for accomplishing the CWA’s goals is Section 301, which prohibits the “discharge of any pollutant by any person” unless either a Section 402 National Pollution Discharge Elimination System (NPDES) permit or a Section 404 dredge and fill permit is obtained.\footnote{33 U.S.C. § 1311(a), 1342, 1344.} The CWA’s permit programs rely heavily on uniform technology-based regulatory standards for minimizing harm from pollutants.

The key trigger for both the NPDES and the 404 permit requirements is the “discharge of a pollutant,” defined, in relevant part, as “any addition of any pollutant to navigable waters from any point source.”\footnote{33 U.S.C. § 1362(12).} The term “point source” means “any discernible, confined and discrete conveyance,” including pipes, ditches, canals, concentrated animal feeding operations and other conduits from which pollutants may be discharged except “agricultural stormwater discharges and return flows from irrigated...
 Pollutants include a variety of substances, including garbage, sewage, chemical wastes, biological materials and even heat.\textsuperscript{357}

The term “navigable waters,” defined vaguely as “waters of the U.S.,”\textsuperscript{358} has been the subject of extensive judicial attention in recent years. In \textit{U.S. v. Riverside Bayview Homes}, the Supreme Court upheld federal jurisdiction over wetlands adjacent to a navigable lake, stating that the term “navigable” was of limited importance in determining CWA jurisdiction.\textsuperscript{359} In 2001, however, \textit{Solid Waste Authority of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC)} narrowed the scope of waters regulated by the CWA.\textsuperscript{360} The Court refused to extend federal jurisdiction to a man-made lake with no connection to a navigable waterway, stating that to do so would “result in significant impingement of the States’ traditional and primary power over land and water use.”\textsuperscript{361} The Court’s most recent word on the subject does little to dispel the confusion over the CWA’s geographic scope. In \textit{Rapanos v. United States}, a split decision which gathered no clear majority, four justices expressed a view that would pave the way for development of most non-adjacent wetlands as well as non-perennial streams.\textsuperscript{362} As in \textit{SWANCC}, the lead opinion by Justice Scalia stated that the CWA must be construed narrowly to preserve “primary state responsibility for ordinary land-use decisions,”\textsuperscript{363} in spite of the fact that 33 States and the District of Columbia filed amicus briefs on behalf of the U.S., seeking to maintain broad federal jurisdiction over wetlands and tributaries.\textsuperscript{364} The precedential value of the \textit{Rapanos} case appears limited.\textsuperscript{365}

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{358} 33 U.S.C. § 1362(7). \textit{See also} 40 C.F.R. § 122.2.
\item \textsuperscript{359} 474 U.S. 121, 133 (1985).
\item \textsuperscript{360} 531 U.S. 159, 172-174 (2001).
\item \textsuperscript{361} \textit{Id.} at 174.
\item \textsuperscript{362} 126 S.Ct. 2208 (2006).
\item \textsuperscript{363} \textit{Id.} at 2223.
\item \textsuperscript{364} \textit{id.} at 2224 n.8.
\item \textsuperscript{365} \textit{See} Inside the EPA, Competing Bush Policy Goals Hamper EPA Push for Wetlands Guide, 2007 WLNR 5926032, Mar. 30, 2007, sec. 13 (noting limited progress on agency guidance on the scope of CWA § 404 over isolated wetlands after the divided ruling in \textit{Rapanos}); Gareth McGrath, Attempt to interpret high court: decisions stalling development, Star-
\end{enumerate}
\end{footnotesize}
Permits for point source discharges within the scope of the CWA must incorporate effluent limitations reflecting the best technology available.\textsuperscript{366} Today, around 100,000 facilities have obtained permits.\textsuperscript{367} Most permits are issued by state agencies with delegated authority from the U.S. EPA.\textsuperscript{368} Permit requirements may be enforced through injunctions, administrative, civil and criminal penalties and citizen suits.\textsuperscript{369}

As a result of the NPDES program, chemical pollutants from point sources have been reduced significantly.\textsuperscript{370} Unfortunately, non-point source pollution, such as farming and construction run-off, remains virtually controlled. Unlike the permitting provisions for point sources, EPA lacks direct regulatory authority over non-point sources. At most, EPA may withhold funding for delinquent states that do not take timely steps to address non-point pollution.\textsuperscript{371}

States are required to establish water quality standards (WQS), which are comprised of designated uses for waterways within the state and standards sufficient to meet those uses.\textsuperscript{372} If the states fail to do so, EPA must promulgate legally enforceable WQS. Some states and Indian tribes have utilized their ability to establish WQS to achieve benefits far beyond those required by federal law. The Pueblo of Isleta provide a leading example of one such tribal program. In \textit{City of Albuquerque v. Browner}, a federal court upheld the Pueblo’s stringent water quality standards for primary contact ceremonial usage in the Rio Grande River, even though the City of Albuquerque would be forced to implement expensive upgrades for its upstream wastewater treatment plant.\textsuperscript{373}

\begin{thebibliography}{9}
\item News (Wilmington, NC), Apr. 5, 2007, at 1B (reporting that the confusion spawned by \textit{Rapanos} has frustrated developers and environmentalists alike)
\item 366 \textsuperscript{366} 33 U.S.C. § 1311(b)(2)(A).
\item 368 \textsuperscript{368} State enforcement efforts are described in Section VI.B.3, \textit{infra}.
\item 369 \textsuperscript{369} \textit{Id.}
\item 371 \textit{Id.}
\item 372 \textsuperscript{372} 33 U.S.C. § 1313.
\item 373 \textsuperscript{373} 97 F.3d 415 (10th Cir. 1996), cert. denied, 522 U.S. 965 (1997).
\end{thebibliography}
Waterways that do not meet WQS are listed as impaired and total maximum daily loads (TMDLs) must be set.\textsuperscript{374} TMDLs are applied to point sources through the NPDES permit program, but mechanisms for applying them to non-point sources are unclear.\textsuperscript{375} As a result, the track record for WQS implementation has been “less than stellar,” and the health of freshwater systems is continuing to decline.\textsuperscript{376} Both urban and rural watersheds remain chemically impaired with pathogens, phosphorus, insecticides, herbicides, nutrients, and sediments. Meanwhile, over 90% of the natural vegetation in riparian areas has been lost, making them “some of the most severely altered landscapes in the country.”\textsuperscript{377}

2. Protecting Wetlands Through Dredge and Fill Permits

Wetlands act as buffers against flooding and as filters that trap pollutants. They also provide essential breeding, nesting and feeding grounds for countless migratory birds, fisheries and wildlife species. Congress’s recognition that wetlands provide a variety of ecosystem services worthy of protection is evident in CWA Section 404, which authorizes the Corps of Engineers to issue permits "for the discharge of dredged or fill material into the navigable waters at specified disposal sites."\textsuperscript{378} The EPA retains oversight and veto power over permits. Individual permits are evaluated on a case-by-case basis, while general or nationwide permits may be issued for categories of activities that are similar in nature and have only minimal impacts.\textsuperscript{379} Nationwide permits have been authorized for an array of activities ranging from farming cranberry bogs to mountaintop removal for coal mining.\textsuperscript{380} No public involvement is required before individual projects go forward once these types of permits are issued.

To receive an individual permit, by contrast, Section 404 requires that the public have notice and an opportunity to comment.\textsuperscript{381} The project proponent must first

\textsuperscript{374} 33 U.S.C. § 1313(d).
\textsuperscript{375} Adler, \textit{supra} note \textsuperscript{,} at 57 (2003).
\textsuperscript{376} Oliver A. Houck, The Clean Water Act TMDL Program: Law, Policy, and Implementation 5, 63 (2d ed. 2002).
\textsuperscript{377} Adler, \textit{supra} note \textsuperscript{,} at 47, 50.
\textsuperscript{378} 33 U.S.C. § 1344(a).
\textsuperscript{381} 33 U.S.C. § 1344(a).
demonstrate that there are no practical alternatives to the destruction of wetlands.\(^{382}\) The agencies presume that a practical alternative exists if the project is not water-dependent.\(^{383}\) Second, steps must be taken to minimize the adverse effects of development on the wetlands.\(^{384}\) Finally, if damage to the wetlands cannot be avoided or minimized, the permittee must compensate for the damages.\(^{385}\)

The wetlands provisions of Section 404 are complemented by the Swampbuster program of the Food Security Act of 1985.\(^{386}\) These provisions remove previous federal incentives to drain wetlands by withholding federal subsidies from farmers who produce crops on converted wetlands.\(^{387}\) Even with the protections of the CWA and Swampbuster in place, between 1986 and 1997, over 640,000 acres of U.S. wetlands were lost. Yet the rate of wetland loss has slowed from nearly 500,000 acres per year to less than 60,000 acres per year.\(^{388}\)

3. Cooperative Federalism: State and Tribal Delegations

The CWA assumes a “cooperative federalism” approach to relationships with states and Indian tribes.\(^{389}\) It directs federal agencies to partner with states in developing solutions to prevent pollution “in concert with programs for managing water resources.”\(^{390}\) The Act also proclaims the congressional policy that “the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired” and that “nothing in this chapter shall be construed to

\(^{382}\) Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines, 55 Fed. Reg. 9210, 9212 (1990) [hereinafter Mitigation MOA].

\(^{383}\) See 40 C.F.R. 230.10(a); Mitigation MOA, supra note , at 9212.

\(^{384}\) 40 C.F.R. 230.10(d).

\(^{385}\) Mitigation MOA, supra note , at 9212.


\(^{387}\) Kalen, supra note , at 906 n. 175.

\(^{388}\) Adler, supra note , at 52 (2003).

\(^{389}\) See U.S. Dep't of Energy v. Ohio, 503 U.S. 607, 633-34 (1992) (White, J., concurring) (describing the approach codified in the CWA as “a partnership between the States and the Federal Government”). See also Robert L. Glicksman, From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy, 41 Wake Forest L. Rev. 719 (2006) (describing “the transformation of environmental law from a set of rules and doctrines that enabled federal and state governments to cooperate in the quest for environmental protection, to a revised system that . . . restrains both levels of government from the vigorous pursuit of that goal”).

\(^{390}\) 33 U.S.C. § 1251(g).
supersede or abrogate rights to quantities of water which have been established by any State.”

In addition, states and tribes that meet statutorily delineated criteria are authorized to accept delegations from the EPA to administer permit systems and take enforcement actions under the CWA. Upon delegation, the EPA’s permit program is suspended but it may still review and veto proposed permits and must periodically review overall state or tribal administration to ensure compliance with the CWA. States may impose more stringent requirements than required by federal law, but may not dip below the federal baseline.

The state response has been varied. Although almost all states have assumed delegated authorities, not all of them are equally aggressive at issuing and enforcing permit requirements. Due in part to budgetary and data shortfalls, but also to political influences, state regulators have been slow to renew NPDES permits, allowing many facilities to operate with outdated and inadequate permit limits. Enforcement has been even more lackadaisical. Many states have failed to conduct inspections, undertake timely enforcement actions or extract meaningful penalties for noncompliance, leaving many permit holders significantly out of compliance with permit conditions. Meanwhile, the EPA’s own data-management systems are outdated and woefully inadequate, in that they lack compliance data for 96 percent of dischargers.

The CWA provides additional powers to the states in Section 401, which compels applicants for a federal permit or license to obtain a certification from the appropriate state that the proposed project will not impair water quality. This effectively gives state agencies a limited veto over proposed projects. States have utilized this power to

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391 33 U.S.C. § 1251(g).
392 33 U.S.C. §§ 1342(b), 1370, 1377.
393 33 U.S.C. § 1342(b)-(c).
396 Id.
impose minimum streamflow requirements on hydroelectric dam projects licensed by FERC. In *S.D. Warren v. Maine,* the company, Warren, sought the renewal of its federal licenses for five hydroelectric dams it operates to generate power for its paper mill. Each dam impounds water, which is then run through turbines and returned to the riverbed, passing around a section of the river. Under protest, Warren applied for water quality certifications from the Maine Board of Environmental Protection pursuant to § 401. The Board determined that Warren's dams had caused long stretches of the natural river bed to be essentially dry and thus unavailable as habitat for fish and other aquatic organisms, that they had blocked the passage of sea-run eels and fish to their spawning and nursery waters, and that they had eliminated opportunities for fishing and other recreational activities in long stretches of the river. It issued a §401 certification that required Warren to maintain minimum stream flows and allow passage for fish and eels. FERC licensed the dams subject to compliance with those certifications. The Supreme Court agreed that, because the Warren’s dams raised a potential for a discharge, § 401 was triggered and compliance with state certification was required.

The handwriting was on the wall when the *S.D. Warren* case came before the Court. Years before, in 1994, the Court issued its only other case on § 401, *PUD No. 1 of Jefferson Cty. v. Washington Dept. of Ecology.* At issue in *PUD No. 1* was the State of Washington's authority to impose minimum stream flow rates on a hydroelectric dam. As the Court noted, in *PUD No. 1,* there was no dispute that the dam operators were required to obtain a certification pursuant to § 401; indeed, they had conceded that the project would result in at least two possible discharges -- the release of dredged and fill material during project construction and the discharge of water at the end of the tailrace after the water has been used to generate electricity. The operators’ argument that the streamflow conditions exceeded Washington’s authority to prevent degradation of water

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400 *Id.* at 1853. The Court specifically noted that “[c]hanges in the river like these fall within a State's legitimate legislative business, and the Clean Water Act provides for a system that respects the States' concerns.” *Id.*
402 *Id.* at 711.
quality was soundly rejected. Clearly, CWA § 401 has altered the FPA in a significant way. If the First Iowa case had arisen after 1972, the Court would have, in all likelihood, affirmed Iowa’s certification for maintaining flows in the river under § 401, and FERC would have been required to honor such conditions in its license.

4. Citizen Enforcement Measures

The successes of the CWA are attributed in part to its provisions for public involvement. Before a permit may issue, the public must be provided an opportunity to comment. Public input is included as part of the administrative record. Once a decision is made, any interested person may request a formal hearing before the permitting agency or bring suit in federal court under the CWA’s citizens’ suit provision. Successful plaintiffs can recoup their attorneys’ fees and costs.

Citizen suits have had a significant impact on the way business is conducted. Citizen suits provide a vehicle for enforcement where the EPA has been unwilling or unable to move forward due to lack of resources or lack of political fortitude. They are especially important to ensure the implementation of politically charged programs like water-quality standards and pollutant allocations for nonpoint sources, many of which require changes in local land use planning. . . . It is fair to say that, without citizen enforcement, most environmental programs would have “languish[ed] under the political constraints of the marketplace.”

Ironically, even while it enhanced the ability of citizens to enforce statutory requirements against polluters and recalcitrant government agencies, the CWA curtailed the development of federal common law as a tool to abate interstate water pollution. In City of Milwaukee v. Illinois, the Supreme Court held that the CWA preempts the federal

403 Id.
404 See First Iowa, 328 U.S. at 180; PUD No. 1, 511 U.S. at 711; S.D. Warren Co., 126 S.Ct. 1843.
common law of nuisance.\textsuperscript{410} While recognizing that "the Court has found it necessary, in a 'few and restricted' instances . . . to develop federal common law," the Court concluded that it should be employed only when necessary to resolve issues that are not addressed by statutes.\textsuperscript{411} State common law remains intact, however, and can be utilized by injured parties to seek damages or injunctive relief from polluters.\textsuperscript{412} Indeed, private and public entities have exhibited a renewed interest in using state common law to protect water quality as well as air quality, and to force polluters to clean up contaminated sites and compensate injured persons for harm.\textsuperscript{413}

C. The Safe Drinking Water Act

The CWA addresses only “waters of the U.S.,” generally defined as surface waters and adjacent wetlands. Groundwater controls are left primarily to the states and local governments, and many aquifers have been left vulnerable to contamination from leaking storage tanks, landfills, saltwater intrusion and other pollution sources. Contaminated drinking water supplies, in particular, have been a matter of persistent concern throughout the nation’s history.

In 1974, Congress responded to reports of increased waterborne diseases and public alarm about cancer and other health risks by enacting the most comprehensive drinking water program to date, the Safe Drinking Water Act (SDWA).\textsuperscript{414} Although previous enactments had authorized the establishment of standards for bacteriological and some chemical contaminants, those provisions were applicable only in limited circumstances, such as water supplies on interstate carriers.\textsuperscript{415} The SDWA, designed to protect and ensure the safety of public water supplies, goes well beyond those

\textsuperscript{411} 451 U.S. at 313-14, 317-319.
\textsuperscript{412} International Paper Co. v. Ouellette, 479 U.S. 481, 497 (1987) (holding that the federal Clean Water Act did not preclude plaintiffs from seeking a remedy against an out-of-state polluter under the common law of the state in which the polluting source was located).
\textsuperscript{413} Klass, \textit{supra} note \textsuperscript{169}, at 595-97 (citing examples); Section VII.A, \textit{infra}, and accompanying text (describing reinvigoration of common law remedie).
provisions. It regulates many types of contaminants in public drinking water supplies (both surface and groundwater) and protects certain types of groundwater aquifers. A public water system is one that "has at least fifteen service connections or regularly serves at least twenty-five individuals." The SDWA, as amended in 1986 and 1996, accomplishes its goals through four key programs: the establishment of national drinking water standards; the regulation of underground injection wells; the protection of aquifers that serve as the sole source of municipal drinking water; and the protection of areas surrounding wellheads that provide municipal water supplies. The 1986 amendments required EPA to expand and quicken the pace of the standard-setting process. Implementation of the standards is the responsibility of the state under a delegation of "primacy" from the EPA; in the absence of such delegation, administration becomes an EPA responsibility.

The 1996 SDWA amendments were intended to enhance the Act’s effectiveness by providing federal support for state and municipal efforts to comply with drinking water standards, requiring that risk assessment and cost-benefit analysis be utilized in adopting drinking water standards and enhancing strategies to protect source waters before they are contaminated. In addition, the amendments require that the public be informed about the safety of their drinking water.

Under the SDWA, the nation has made tremendous strides in ensuring the quality of public drinking water supplies, and about 200,000 public water systems providing water to over 240 million Americans are regulated.

Chief among the public health triumphs of this century has been the provision of safe and healthful drinking water to most of our citizens. This single measure has done more to improve the health status of the community, and at a lower cost,
than any other achievement, not excepting immunization, advances in medical technology, or modern medical treatments and drugs.423

Yet there is still work to be done. The SDWA protects only public, not private, drinking water supplies. Groundwater is covered only to the extent it is used as a public drinking water supply, but not if used for agricultural or industrial purposes. According to the EPA, even water from public drinking water supplies may contain “lead, chloroform, and disease-causing microorganisms . . . pos[ing] relatively high human health risks.”424 Lack of funding and under-enforcement have been at the root of the problems. Although the SDWA provides for civil and criminal penalties, federal and state regulators rarely impose them.425 Regulators find it difficult to prosecute municipalities and small system operators “in light of the political clout of the former group and hapless ineptitude of the latter.”426 Private enforcement through SDWA citizens’ suits and common law tort claims are likely to increase in an effort to fill the enforcement gap.427

D. The Endangered Species Act

The federal Endangered Species Act (ESA) has become a lightning rod for societal debates over elemental issues such as regulatory power over private property, the respective roles of state and federal governments in environmental protection and resource conservation, and the extent to which individual citizens should be able to reshuffle administrative priorities through litigation.428 Although the ESA is excoriated by developers as the “pitbull” of federal environmental law, it is widely popular across the nation and many states have adopted legislative counterparts.429

425 Id. at 221.
426 Id.
427 Id. at 222. See Section VII.A, infra (describing common law claims against groundwater polluters).
429 Zellmer, supra note , at 320 n.90.
Dramatic changes in water usage have been wrought by the ESA. Some of the most highly publicized cases involve the Rio Grande, the Columbia, the Klamath and the Missouri Rivers in the western and mid-western United States. But the first major battleground between development interests and environmental protection arose in the East, on the Little Tennessee River. In *Tennessee Valley Authority v. Hill*, the Supreme Court upheld an injunction of a nearly completed multi-purpose TVA dam on the grounds that it would jeopardize the endangered snail darter, finding “beyond doubt that Congress intended endangered species to be afforded the highest of priorities.” The Court commented that it “may seem curious to some that the survival of a relatively small number of three-inch fish among all the countless millions of species extant would require the permanent halting of a virtually completed dam for which Congress has expended more than $100 million,” but “the explicit provisions of the Endangered Species Act require precisely that result.”

The ESA specifies that all federal agencies should use their existing authorities to conserve listed species. In addition, as a matter of policy, the ESA proclaims “that Federal agencies shall cooperate with state and local agencies to resolve water resource issues in concert with conservation of endangered species.”

Two ESA provisions, Sections 9 and 7, are particularly important in the context of water resources management. Both sections apply only when a species is listed as endangered or threatened.

Section 9, which applies to all persons, prohibits the “take” of any member of a protected species of fish or wildlife. The term “‘take’ means to harass, harm, pursue,
hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Regulations define “harm” to include “significant habitat modification or degradation where it actually kills or injures wildlife,” thus penalizing some types of habitat destruction on waterways and even private lands. There are few cases involving ESA “take” claims in the context of irrigation use. A water withdrawal would surely result in an illegal take if it caused the death of a listed species by extracting all of the water from a river or lake, and at least one irrigation district has been found liable for operating a diversion with inadequate fish screens, causing the death of listed fish.

Section 7, which applies only to federal agencies, imposes both procedural and substantive duties. First, it compels agencies to consult with either the U.S. Fish and Wildlife Service or, for marine and oceangoing species such as salmon, NOAA Fisheries, if the agency’s proposed action may adversely affect a listed species. At the culmination of consultation, the Service issues a Biological Opinion, assessing the effects of the proposed action on a listed species. If the Service determines that the proposed action may jeopardize the species, it must suggest “reasonable and prudent alternatives” to avoid jeopardy while meeting the purposes of the proposal. The action agency may not proceed until consultation is completed. If the agency wants to go ahead with the proposed action despite a jeopardy opinion, it may seek an exemption from the Endangered Species Committee, better known as the “God Squad.” The project proponent must show, among other things, that there are no “reasonable and prudent alternatives,” that the benefits of the project clearly outweigh the benefits of alternatives consistent with conserving the species, that the project is in the public interest and of

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441 50 C.F.R. § 17.3.
regional or national importance.\textsuperscript{450} Exceptions are rare, but one was granted in 1979 for a dam on the Platte River after an artificial wetland was developed as mitigation for the endangered whooping crane.\textsuperscript{451}

Substantively, Section 7 prohibits federal agencies from taking any action which may jeopardize the continued existence of a listed species or adversely modify its critical habitat.\textsuperscript{452} “Jeopardy” is defined as lessening likelihood of survival and recovery of a listed species.\textsuperscript{453} Activities that affect either water quality or quantity can be inhibited by the application of Section 7.\textsuperscript{454} The Corps of Engineers will not issue a CWA Section 404 permit if the proposed discharge would jeopardize the continued existence of a listed species.\textsuperscript{455} Likewise, the EPA has taken the position that activities that may cause jeopardy by degrading water quality are not consistent with the CWA’s provisions.\textsuperscript{456} Section 7 has also prevented the development of new water projects requiring federal permits and restricted the delivery of water from existing federal or federally permitted projects when it could cause jeopardy to listed species.\textsuperscript{457} The U.S. Bureau of Reclamation, which must consult on its methods of operation,\textsuperscript{458} has been required to reduce water deliveries to irrigators when the water is needed to ensure the survival of a listed species.\textsuperscript{459} Irrigators’ rights to water from a federal project have been deemed “subservient” to the ESA.\textsuperscript{460} Although persons holding state-sanctioned water rights do

\begin{notes}
\textsuperscript{450} See 16 U.S.C. § 1536(h)(1).
\textsuperscript{451} Species Panel Denies Exemption to Tellico Dam But Exempts Grayrocks Dam, 9 Env’t Rep. (BNA) 1776 (1979); Nebraska v. Rural Electrification Admin., 12 Env’t Rep. Cas. (BNA) 1156 (D. Neb. 1978), appeal dismissed, 594 F.2d 870 (8th Cir. 1979).
\textsuperscript{452} 16 U.S.C. § 1536.
\textsuperscript{453} 50 C.F.R. § 402.02.
\textsuperscript{455} 40 C.F.R. § 230.10(a).
\textsuperscript{456} Memorandum of Agreement Regarding Enhanced Coordination under the Clean Water Act and the Endangered Species Act, 66 Fed Reg. 11,202, 11,205 (2002).
\textsuperscript{457} Riverside Irrigation District v. Andrews, 758 F.2d 508 (10th Cir. 1985).
\textsuperscript{458} Pacific Coast Federation of Fishermen’s Associations v. U.S. Bureau of Reclamation, 138 F. Supp.2d 1228 (N. D. Cal. 2001).
\textsuperscript{459} O’Neill v. U.S., 50 F.3d 677 (9th Cir. 1995); Rio Grande Silvery Minnow v. Keys, 333 F.3d 1109, 1138 (10th Cir. 2003), vacated as moot, 355 F.3d 1215 (10th Cir. 2004).
\textsuperscript{460} Klamath Water Users Ass’n v. Patterson, 15 F. Supp. 2d 990, 993 (D. Or. 1998), aff’d, 204 F.2d 1206 (9th Cir. 1999). See Barcellos & Wolfsen, Inc. v. Westlands Water District, 849 F.
not enjoy “a special privilege to ignore the Endangered Species Act,” they may assert that
they are entitled to compensation for a Fifth Amendment taking if their property rights in
water are infringed.461

E. State Laws Protecting Instream Flows

Western state water law historically considered water left in the stream to be wasted. Within the past two decades, to counter the adverse environmental effects of
diversions, both western and eastern states have adopted instream flow legislation.462
The specifications and implementation of instream flow laws vary widely. Western
states’ laws range from complex statutory schemes to simple authorizations for state
agencies to seek appropriations for specified instream purposes, such as fisheries, wildlife
and recreation and, in some cases, water quality and aesthetics.463

Florida has taken the lead among eastern states by adopting a type of “regulated
riparianism” scheme, where water users must get permits from the state, which retains
oversight and control of water resources. Florida statutes explicitly require the state to
protect streamflows and direct local water management districts to establish minimum
flow levels for all watercourses within their jurisdiction.464 The minimum flow is defined
as the point at which further withdrawals could be “significantly harmful to the water
resources or ecology of the area.”465

Congress has directed that the Bureau reserve water for environmental purposes, [the irrigators]
cannot be heard to insist that their water rights require the Bureau to disobey the law.”). 461
U.S. v. Glenn-Colusa Irrigation District, 788 F. Supp. 1126, 1134 (E.D. Cal. 1992);
Zellmer and Jessica Harder, Unbundling Property in Water, 59 Ala. L. Rev. (forthcoming 2008)
(analyzing the merits of “takings” property in water).

462 See Jesse A. Boyd, Hip Deep: A Survey of State Instream Flow Law From the Rocky
Mountains to the Pacific Ocean, 43 Nat. Resources J. 1151, 1152 (2003); Cynthia F. Covell, A
Survey of State Instream Flow Programs In the Western United States, 1 U. Denv. Water L. Rev.
177, 178 (1998).

46.15.145(a)(1-4); Cal. Water Code § 1707 (a)(1); Kan. Stat. Ann. § 82a-928 (i); Idaho Code §
42-1501; Mont. Cod Ann. § 85-2-316(2)(a); Or. Rev. Stat. § 537.336(1); Utah Code Ann. § 73-3-


Instream flow requirements have become useful tools for protecting the ecological and economic values of the nation’s rivers and streams. Along with the federal environmental statutes described above, state instream flow laws have begun to push river restoration initiatives throughout the country.

VII. NEXT GENERATION INITIATIVES

Beginning with the Republican Revolution of 1995 and extending through the Bush Administration in the early years of the 21st century, both Congress and the executive branch seem to have relegated environmental protection to its lowest priority. At the same time, the Supreme Court has been ever more antagonistic to federal initiatives, striking down an array of public welfare laws ranging from gun control to waste management. “Not since the Supreme Court's resistance to the New Deal crumpled in the late 1930's has the court been so hostile to the exercise of federal power.” State governments and private citizens alike have grown increasingly frustrated since 2001, as federal enforcement efforts continue to decline. States, in

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469 See Marty Coyne, Enforcement: Polluters Have Benefited from Lax EPA Enforcement, Greenwire (Envtl. and Energy Publishing, LLC) (Oct. 13, 2004) (finding that the EPA lawsuits against violators of the Clean Water Act and other federal environmental laws dropped seventy-five percent between the last three years of the Clinton administration and the first three years of the Bush administration); Joel A. Mintz, "Treading Water": A Preliminary
particular, are becoming more aggressive in bringing public nuisance lawsuits against federal agencies as well as polluters, alleging harms ranging from lost coastlines due to global warming\textsuperscript{470} to methyl tertiary butyl ether (MTBE) contamination in groundwater aquifers.\textsuperscript{471}

Meanwhile, the “command and control” approach of environmental regulation through uniform technology-based pollution control requirements, utilized throughout the past quarter century, has come under fire. Although this approach has yielded significant environmental protection, some believe that the “low-hanging fruit” has already been picked and that the time has come to question the existing regulatory approach and the institutional processes that implement it.\textsuperscript{472} Critics argue that nationally uniform technology standards fail to take into account the wide variation in the effects of pollution and the costs of controlling it among facilities and regions, causing great inefficiencies. They also claim that this approach stifles innovation; if so-called best available technology is all that is required, there is no incentive to take additional measures.\textsuperscript{473}

Some advocate a greater reliance on market-based approaches to supplement or even

\textsuperscript{470} See Massachusetts v. EPA, 127 S.Ct. 1438 (2007) (finding that State of state of Massachusetts had standing to sue, and that the Clean Air Act authorizes the EPA to regulate greenhouse gas emissions from motor vehicles); Connecticut v. American Electric Power Co., 406 F. Supp. 2d 265 (S.D.N.Y. 2005) (dismissing public nuisance claim brought by Connecticut and non-profit groups against electric utilities for abatement of greenhouse gas emissions on grounds that the relief sought, an injunction to reduce emissions, was a "transcendently legislative" political question); Kirsten Engel, State And Local Climate Change Initiatives: What Is Motivating State And Local Governments To Address A Global Problem And What Does This Say About Federalism And Environmental Law?, 38 Urb. Law. 1015 (2005) (describing cases filed by state attorneys general, including litigation against the EPA to compel it to regulate greenhouse gas emissions from vehicles and public nuisance actions).

\textsuperscript{471} See notes , infra, and accompanying text (describing MBTE litigation).


\textsuperscript{473} Hirsch, supra note , at 3-4.

\textbf{A. The Revitalization of the Common Law}

An emerging 21st century trend in environmental law is reflected in renewed efforts by state and local governments to employ common law theories to make up for regulatory gaps in environmental protection.\footnote{Czarnezki and Thomsen, supra note \textit{,} at 5 (“the legal pendulum is swinging back ever so slightly toward common law tort actions”).} These lawsuits indicate that the common law can continue to play a significant role in shaping appropriate remedies in areas not covered by statute, and indeed that it is once again becoming a key institutional player.\footnote{Klass, supra note \textit{,} at 582-583; Roger E. Meiners et al., Burning Rivers, Common Law, and Institutional Choice for Water Quality, in The Common Law and the Environment: Rethinking the Statutory Basis for Modern Environmental Law 54, 71 (Roger E. Meiners & Andrew P. Morriss eds., 2000).} Common law provides a vehicle by which ordinary people can protect themselves from environmental harm by seeking compensatory damages, punitive damages and injunctive relief. State tort law, in particular, “allows a fair redistribution of resources from those who market dangerous products and engage in risky activities to those who are damaged when things predictable go astray, and it provides a vehicle for holding companies accountable for malfeasance in a forum that is less subject to control by risk-producing
industries. Most federal environmental statutes, by contrast, do not allow compensatory or punitive damages, and some do not even provide for private-party injunctive relief. In most cases, Congress has evidenced its intent not to displace state common law actions by providing savings clauses that preserve the ability of states and state citizens to enact or otherwise impose more stringent standards and more expansive remedies than required by federal law. In spite of federal savings clauses, a 1998 study of environmental cases found that the number of common law actions to address pollution-related harm declined markedly beginning in 1975. Those common law claims that were brought were often mere “add-ons” to statutory claims raised in federal court; as such, they likely received less attention than they might have in state court. A few notable cases buck this trend. In Harrison v. Indiana Auto Shredders Co., the court declared that the right of injured parties to obtain judicial relief “serves as a necessary and valuable supplement to legislative efforts to restore the natural ecology of our cities and countryside.” The difficulties of “environmental balancing” were specifically noted, but the court concluded that judges are nonetheless qualified to provide a forum for aggrieved parties by performing this task. According to the court,

478 McGarity, supra note , at 402. See Klass, supra note , at 580 (“Efforts to make renewed use of state common law augmented by statutory policy and data created over the past thirty years can be justified not only to increase environmental protection, but also to provide a closer connection and more consistency between statutory and common law in a field that has always been a function of both statutes and common law.”).

479 Klass, supra note , at 583.

480 Klass, supra note , at 580. “principles of federalism require that a federal statute will not preempt historic state police power absent the clear and manifest intent of Congress.” Id. at 563 n.108, citing Bates v. Dow Agrosciences, 544 U.S. 431, 449 (2005) (rejecting the United States’ arguments for broad FIFRA preemption of state law tort claims). Moreover, “[a]lthough the Clean Water Act and the Clean Air Act provide a federal-permit shield, which prevents most federal enforcement under those laws against parties in compliance with the terms of their permits, in many jurisdictions a state common law nuisance action is available even if the party is in compliance with a state or federal permit.” Id. at 583.


482 Green, supra note , at 108.

483 Harrison v. Ind. Auto Shredders Co., 528 F.2d 1107 (7th Cir. 1976).

484 Id. at 1120.
the judiciary may even have certain advantages over legislatures. "Courts are skilled at balancing equities, are insulated from lobbying from industrial polluters, and often are in a better position to judge the effect of a pollution nuisance upon a locality because of their physical proximity to the individual problem." 485

In the past decade, state courts have begun to utilize their common law powers to protect human health and the environment based on new information generated by the vast federal and state regulatory system. 486 For example, the New Jersey Supreme Court relied on the growing knowledge of the hazards of toxic wastes to impose strict liability on abnormally dangerous activities that resulted in mercury pollution of state waterways. 487 Similarly, a chemical-waste disposal site was declared a nuisance based on growing awareness of the potential risks of harm from polychlorinated biphenyls (PCBs) at the site. 488 Key evidence included the ban on PCBs instigated in 1979 under the federal Toxic Substances Control Act. 489

In recent years, the public trust doctrine has also been used to protect inland wetlands, tidelands and even groundwater, reflecting a growing belief that one of the doctrine's most important uses is "preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life." 490 The doctrine has also been invoked to support erosion-control measures and to prevent development in coastal areas. 491 Courts have affirmed protective measures in part because they perceive

485 Id. See Klass, supra note , at 573 (describing advantages).
486 Klass, supra note , at 574-583.
489 Id. at 828-831.
490 Klass, supra note , at 593. See Just v. Marinette County, 201 N.W.2d 761, 767-68 (Wis. 1972) (recognizing that, although wetlands were once considered wastelands, we now realize that they "serve a vital role in nature, are part of the balance of nature and are essential to the purity of the water in our lakes and streams"). In 2000, the Hawaii Supreme Court expanded the public trust doctrine to groundwater, recognizing that "[m]odern science and technology have discredited the surface-ground dichotomy"; accordingly, there is no sense in "adhering to artificial distinctions" not supported by "practical realities." Id., citing In re Water Use Permit Applications, 9 P.3d 409, 447 (Haw. 2000).
that the threat to national resources is "not just environmental" but also critical to "the health, safety, and welfare of our people, as coastal erosion removes an important barrier between large populations and ever-threatening hurricanes and storms."\textsuperscript{492}

Common law tort litigation has blossomed in the aftermath of Hurricane Katrina. Residents of Jefferson, Orleans and St. Bernard Parishes filed class actions asserting that activities of oil and gas producers and pipeline companies exacerbated the hurricanes' destructive impact.\textsuperscript{493} The companies allegedly damaged the marshes between Louisiana's uplands and the Gulf of Mexico, thereby weakening a protective barrier against hurricanes and exposing Louisianans to the prospect of greater harm from these storms. The court dismissed the negligence claims, finding that defendants had no duty to these hundreds of thousands of plaintiffs to protect them from the results of coastal erosion allegedly caused by activities that were physically and proximately remote from plaintiffs or their property.\textsuperscript{494}

Tort theories are also playing a significant role in addressing groundwater contamination by the gasoline additive methyl tertiary butyl ether (MTBE).\textsuperscript{495} In 1979, the EPA approved MTBE as an additive to improve engine performance but its use did not become widespread until 1990, when the Clean Air Act Amendments required

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\textsuperscript{492} Klass, \textit{supra} note , at 594.


petroleum companies to sell reformulated gasoline in areas with significant air pollution problems.\textsuperscript{496} In less than a decade, studies showed both considerable MTBE contamination in groundwater supplies throughout the country and a heightened risk of cancer to humans from MTBE. Estimates place the cost of cleanup nationwide from $25 billion to $85 billion.\textsuperscript{497}

The EPA has yet to limit the use of MTBE, although several states have banned it.\textsuperscript{498} Other state and local governments have sued the gasoline companies. The South Lake Tahoe Public Utility District, for example, brought tort claims against several major gasoline companies when MTBE pollution forced it to close one-third of its drinking-water wells. After a jury found that the defendants had knowingly placed a defective product on the market when they sold gasoline with MTBE, the parties reached a settlement in which the defendants agreed to pay $69 million to remediate the contaminated wells.\textsuperscript{499} Meanwhile, water suppliers in several states are in the midst of a multidistrict lawsuit in New York against gasoline producers based on claims of nuisance, negligence, trespass and other common law and statutory theories to recover for contamination or threatened contamination of groundwater.\textsuperscript{500} And the State of New Hampshire filed suit for negligent water pollution and strict liability against gasoline manufacturers and distributors, seeking damages and injunctive relief for contaminating the groundwater of all but one county in the state.\textsuperscript{501} It alleges that MTBE is present in hundreds of public water systems and approximately 40,000 private water supplies.\textsuperscript{502}

If liability is imposed, the cost of restoring contaminated water supplies to their pre-contaminant condition is an appropriate measure of compensatory damages.\textsuperscript{503}

\textsuperscript{496} McGarity, \textit{supra note} , at 373.
\textsuperscript{497} Klass, \textit{supra note} , at 596.
\textsuperscript{498} McGarity, \textit{supra note} , at 393-94.
\textsuperscript{499} \textit{Id.} at 597.
\textsuperscript{501} New Hampshire v. Dover, 891 A.2d 524, 527 (N.H. 2006) (detailing the history of MTBE use in gasoline and granting the State declaratory relief to block separate product liability suits by cities against manufacturers, distributors, and suppliers of MTBE). \textit{See} McGarity, \textit{supra note} , at 379-80 & n.46, 393-94.
\textsuperscript{502} \textit{Id.}
\textsuperscript{503} Czarnezielki, \textit{supra note} , at 27, citing \textit{inter alia} Johnson Controls, Inc. v. Employers Ins. of Wausau, 665 N.W.2d 257, ¶ 57 (Wis. 2003) (holding that costs to restore and remediate contaminated property were “damages” within the meaning of applicable insurance policies). \textit{But see} New Mexico v. General Electric, 467 F.3d 1223 (10th Cir. 2006) (dismissing negligence and
Fearing broad-sweeping liabilities and loath to meet an array of state-specific requirements, industries have successfully lobbied Congress to adopt uniform federal standards to avoid more stringent state standards for automobile emissions, pesticide labeling and use restrictions and control of certain additives in gasoline.\textsuperscript{504} As for MTBE, Congress considered including a provision in the Energy Policy Act of 2005 to shield gasoline manufacturers from product-liability lawsuits for groundwater contamination, but removed it at the last minute.\textsuperscript{505}

No doubt, the common law has its shortcomings. Common law remedies are retrospective, rather than proactive; relief is often awarded, if at all, long after the harm has occurred, and sometimes when the affected ecosystem is beyond recovery. Common law remedies cannot provide comprehensive solutions to regional and national problems. Moreover, the common law develops slowly and it is not uniform across jurisdictions. These shortcomings highlight the continuing need for uniform federal standards that serve as protective baselines and for vigorous enforcement of existing statutory provisions. To the extent that federal preemption has prevented the imposition of more environmentally protective measures, statutory and regulatory reform may be necessary as well.\textsuperscript{506} Rather than eclipsing common law property and tort theories, federal and state legislative and regulatory efforts can empower plaintiffs and institutions by harmonizing common law theories with the environmental policies expressed in statutes and regulations and by new learning and information compiled in agency databases.\textsuperscript{507}

B. Symbiosis Through Restoration

In recent years, citizens’ groups, state and federal agencies and Indian tribes have initiated restoration efforts on great rivers, such as the Colorado River, entire watersheds, such as the Florida Everglades and the Chesapeake Bay, river deltas, such as the

\textsuperscript{504} See id. at 599; Plater et al., supra note 140, at 299-300.
\textsuperscript{506} Klass, supra note , at 583.
\textsuperscript{507} See Klass, supra note , at 554 (“The growth of the regulatory state should complement, not displace, common law”). See also J.B. Ruhl, Ecosystem Services and the Common Law of "The Fragile Land System," 20 Nat. Resources & Env't, Fall 2005, at 3 (arguing that legislative ecosystem management initiatives can benefit from common law guidance).
Aquatic restoration initiatives generally entail replicating natural flows to meet the needs of native species, protecting and enhancing water quality and coordinating river operations to the greatest extent possible to continue providing flood control benefits, power generation and other services while promoting sustainability and resilience of the entire system. Approaches range from dam removal to less drastic measures like floodplain protection and habitat re-construction. The common thread is the integration of pollution control requirements and water resource management objectives.

The effort to re-plumb southern Florida is perhaps the most well-known restoration initiative. By the late 1980s, wetland loss, declining species and widespread contamination in the Everglades attracted national attention. Florida's "Save Our Everglades" Program, launched in 1985, included an experimental program allowing the unregulated flow of water into Everglades National Park. The next year, a Technical Advisory Council to the Governor of Florida made a number of additional recommendations, including the reduction of phosphorus and a nutrient-removal program. Building on these efforts and existing partnerships, the federal government authorized the South Florida Ecosystem Restoration Task Force in 1993, and launched a massive federal-state initiative to restore the Everglades.

The Everglades Plan includes structural responses, including the removal of existing man-made canals to restore natural meanders and enhance fisheries and water quality on the Kissimmee River. Adaptive management is also a key component. The Plan specifies that the evaluation and implementation and assessment of projects and

510 Adler, Restoring, supra note , at 55.
system responses should be viewed as an “open-ended learning and planning process,” and commits to refining the definitions of overall plan success as new scientific knowledge provides improved understandings of natural and human systems. This is a tall order, and Everglades officials continue to struggle over the parameters of adaptive management in the implementation of restoration efforts.

Since the late 1990s, restoration opportunities have also cropped up through federal licensing and regulatory requirements. The Federal Power Act is one key legal tool to effectuate restoration. Many hydropower projects are nearing the end of their fifty-year federal licenses from FERC. The license renewal process may incorporate conditions designed to restore degraded fisheries and waterways. During the relicensing proceedings for hydropower facilities on the Kennebec River in Maine, FERC ordered the Edwards Dam to be removed to restore Atlantic salmon runs that had been obstructed for nearly 200 years. FERC then turned its attention to the Elwha River in Washington, where dams had decimated Pacific salmon runs. The relicensing process provided a critical first step for allowing interested stakeholders to participate and for reassessing regional priorities. Congress ultimately authorized the Secretary of Interior to purchase the dams and study removal options. The Secretary determined that dam removal would be the best method for re-establishing the Elwha’s ecological integrity.

As of 2006, over 500 dams of various sizes have been removed across the country.

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516 McCool, supra note , at 1907.


Other federal agencies have also begun to embrace aquatic ecosystem restoration as a priority. The Corps of Engineers, for example, one of the lead federal agencies on the Everglades Plan, has adopted Environmental Operating Principles to inform its decisions and Congress has expressly identified environmental protection as a central mission for the Corps. More specifically, the Corps is authorized to conduct an ecosystem restoration project if it "will improve the quality of the environment and will be cost effective."

Indian tribes have been active on the restoration front as well. Within the past decade or so, tribes have entered into numerous cooperative agreements with the federal government to prevent losses to fisheries and adverse cultural impacts. One example arose out of the federal review of operations for all 14 dams on the Columbia River Power System in the 1990s. Impacts on traditional cultural properties were analyzed and the federal agencies “committed to develop and implement, in full cooperation with affected Tribes and agencies, agreements, plans, and actions for management of the impacts of system operations on cultural resources.”

When restoration goals require alterations in water supply, holders of vested water rights can act as an impediment or as a cooperative partner. In California, a large-scale effort known as CALFED brought over twenty state and federal agencies together with representatives of agricultural, environmental, commercial and municipal interests in the Sacramento and San Joaquin River Delta to address ongoing water supply problems and violations of the CWA and the ESA. When it became clear that no single institution

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522 Lawrence, supra note 282. Recent ESA litigation will likely become a driving force in the restoration effort on the Columbia and Snake Rivers. See National Wildlife Federation v. National Marine Fisheries Service, --- F.3d ----, 2007 WL 1040032 (9th Cir. 2007).

could address complex, interrelated problems of water quality, watershed protection, instream flows, water conservation and flood control, the participants joined forces to craft a comprehensive management paradigm.524 Under the CALFED plan, water suppliers are experimenting with new methods of operating pumps within the Central Valley Project to better satisfy urban and agricultural needs while providing water for endangered species and ecosystem needs.525 The partnership has been stymied, however, by a lack of resources, and while water users are enjoying relatively reliable flows, Delta fish populations continue to suffer.526 Although fewer federal resources have been dedicated to the CALFED effort than to Everglades restoration, by authorizing participants to buy and sell water rights through the CALFED consortium as a broker, water may eventually be allocated to more efficient uses and ecological restoration.

There are legitimate concerns about each of these restoration projects. Beyond the perennial funding shortfalls, the expansion of restoration priorities within the existing legal framework is not clearly authorized by any given statute, so restoration has been “ad hoc” and “uneven.”527 Meanwhile, either the Corps of Engineers or the state fisheries management agencies jealously control the science, and even when they do share it with other stakeholders, decisionmakers have been unable to translate scientific findings into sustainable management decisions.528 As for the Everglades, ecologists claim that too much attention has been paid to restoring historical depths of water while too little attention is paid to natural or historic flow patterns.529 In other regions, a lack of

526 Gleick, supra note , at 7; Gary Pitzer, The CALFED Plan: Making It Happen, Western Water 4-13 (January/February 2004); Hank Shaw, $100M in Delta Funds May Sink, Stockton Record, 9 May 2005. See Heikkila and Gerlak, supra note (“CALFED in particular has been mired in political wrangling about budgetary allocation”).
527 Tarlock, supra note , at 1308-1309.
monetary resources, political fortitude or both has threatened to undermine restoration plans.\textsuperscript{530}

Despite their shortcomings, each of the restoration efforts have solidified cooperative partnerships among governmental and private actors, and have helped foster an unprecedented prioritization of scientific understanding and adaptive management approaches.\textsuperscript{531} Existing restoration initiatives are laying the groundwork for achieving restoration successes for the next generation. It should come as no surprise that the restoration mentality will take time to catch on. After all, by calling for the reversal of hydrologic alterations once viewed as beneficial, restoration entails a fundamental policy shift in U.S. water policy -- a transition from maximum multiple-use development to integrated management aimed at sustainability over the long term.

Conclusion

Economic development and westward expansion were the overriding goals of much of the nation’s pre-1970 water-related jurisprudence and legislation. Modern federal pollution control and resource management statutes adopted a new direction, but the promise of those statutes remains unfulfilled. Significant gains have been made in reducing chemical pollution, and the overall picture of environmental quality in the nation’s waterways is far brighter than in past decades. Many watersheds, however, remain impaired by toxins and nutrients from industrial and agricultural discharges. Meanwhile, threats to the physical and biological integrity of freshwater ecosystems persist due to structural impairments and non-point source pollution.

Why do these threats persist, when compared to many other nations of the world the United States has the greatest technologies and financial resources at its fingertips? The answer lies, at least in part, in the nation’s fragmented approaches to water resources law and environmental law. Integrated management of the nation’s waterways continues to elude decisionmakers at both the federal and state level.

The cooperative federalism structure of modern environmental laws has facilitated pollution control efforts, but tensions between private, state, tribal and federal actors continue to pose impediments to long-lasting, resilient solutions. Opportunities for

\textsuperscript{530} Id.

\textsuperscript{531} Tarlock, supra note , at 1308-09.
leadership, innovation and harmonious management should be greatest in the area of water law, which provides a fertile ground for legal evolution due to the essential nature of water for our very survival. Watershed planning must involve more than just a technical exercise conducted by federal engineers behind closed doors.\textsuperscript{532} It must bring affected communities and earth scientists, particularly ecologists, into the process, both to generate new learning and information and to disseminate that information in a readily accessible fashion to all interested parties. As we have learned over the past two centuries, there is no magic silver bullet. A combination of rigorous enforcement of uniform environmental standards, coupled with innovative restoration partnerships and reinvigorated common law remedies for environmental harm, hold the key to future successes in next-generation management efforts.

\textsuperscript{532} Id.