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The Clean Water Act in Maine: Goals and Financing

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Goals and Financing

by Andrew Fisk

Andrew Fisk gives an overview of the history of the federal Clean Water Act and of Maine's efforts to improve the quality of the state's lakes, rivers and streams. He describes how the Clean Water Act works and how its provisions are implemented. While the quality of Maine's water bodies has improved greatly, much work still remains to be done in the areas of rain and stormwater runoff and mercury pollution, and in having adequate financing and infrastructure over the long term.

Maine is a water-rich state with an exceptionally valuable natural resource base. The more than 6,000 lakes and 41,000 miles of rivers and streams are a significant contributor to our multi-billion dollar tourism economy. There is ample evidence of the value of clean water to many parts of our economy. Water quality affects property values (Holly, Boyle and Bouchard 1996; Tylka, Bell and Webster 2007), our choices about how and where we recreate (Nordstrom 2007), and many elements of our natural resource economy from recreational angling to lobster catching, to shellfish harvesting, to fish farming. In 2004 almost $700 million was expended on recreational tourism, and there is little doubt that water quality figured prominently in many of those experiences (CenTRO 2007). From our own experiences out of doors most of us intuitively know, or at least believe, Maine water quality compares favorably to the rest of the country. National data bear out this intuition in a number of ways. Recent Environmental Protection Agency data from a statistically derived monitoring program that assessed the biological condition of perennial streams show that nationally 42 percent are in poor condition (U.S. Environmental Protection Agency 2006). Similarly, summary data compiled from individual state reports show that nationally more than 40 percent of river and stream miles require clean-up plans in order to meet their water-quality standards. Comparably, excepting the statewide mercury pollution of our waters, only 3.5 percent of Maine's river and stream miles require such plans (Maine Department of Environmental Protection 2006).

Maine began the task of water-quality improvement in the 1940s, well before the federal Clean Water Act (CWA), but our state laws could not have accomplished what the Clean Water Act has compelled us to accomplish in the last 35 years. Although Maine has made significant improvements to its water quality, our lakes, rivers, streams, and coastal waters still face substantial, and expensive, water-quality problems. This work warrants broad public discussion because not only do we all own our waters, but the CWA was written to provide individual citizens the authority to sue to enforce provisions of the Act if they felt government or dischargers were not meeting the law. The broad and powerful role provided to the average citizen in this law, combined with the strong attachment most Mainers have to our state's natural environment, adds vitality to the otherwise very technical and detailed business of water quality.

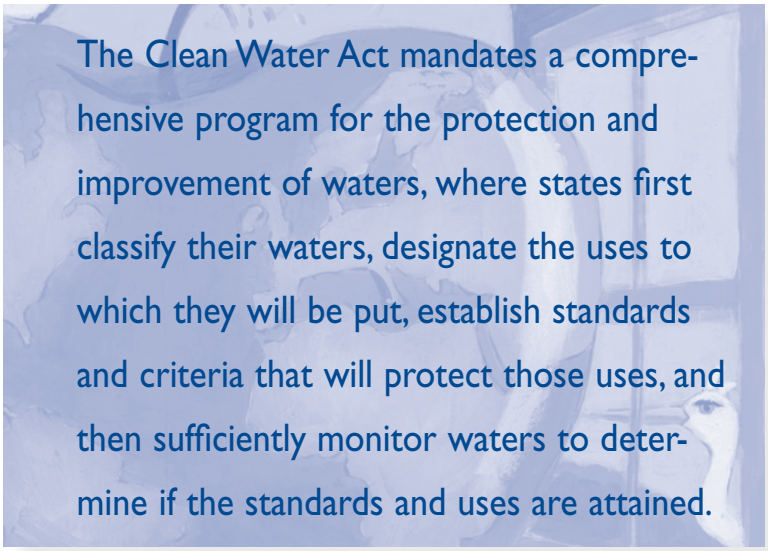
At root, the CWA [Clean Water Act] is a technically sound and legally robust framework that compels states to restore and protect their waters.

Senator Edmund Muskie's role as chair of the Committee on Public Works and floor manager for the 1972 passage of the Clean Water Act has meant that Maine's water quality program at the Department of Environmental Protection is held to high standards to ensure his legacy and oratory matches our work. Like many environmental laws, the CWA has framed a complex combination of objectives that requires bureaucrats, politicians, citizens, and dischargers to use their heads and hearts in making decisions. At root, the CWA is a technically sound and legally robust framework that compels states to restore and protect their waters. This article reviews the development of the Clean Water Act in Maine and explores three areas of work where policy questions are actively being debated: the regulation of stormwater runoff, the control of mercury contamination of fish, and the financing of wastewater infrastructure.

THE ACT'S AMBITIOUS GOALS

The Clean Water Act did not spring whole-cloth from Congress in 1972, but was built upon prior federal and state legislation from the 1940s, 1950s, and 1960s, which provided for the creation of water-quality standards for state and interstate waters and some funding for treatment plants. Maine's water law from the 1940s and 1950s set standards and prohibited certain potato and wood wastes from being discharged and established a permitting requirement for discharges. The state's Sanitary Wastewater Board was given authority to permit new dischargers in 1945. In 1967, around the time that Senator Muskie began

his campaign to enact the Clean Water Act, Maine created the Environmental Improvement Commission as the board's successor. The commission was charged with bringing all state waters up to standards by 1976. While Maine's state laws prior to the CWA were more comprehensive than others, they did not have the teeth of the new federal law. Contemporary assessments of Maine's water-quality laws recount the many loopholes or exceptions for existing discharges or river segments and overly vague classification standards that protected the status quo (Legislative Research Committee 1970).



The federal CWA created a rigorous national framework of data collection, goal setting, and effluent limitations designed to meet specific water-quality standards and uses of the nation's waters. The CWA did not undershoot its expectations. The overall purpose of the act was to improve and restore water quality so we could swim and fish everywhere. To meet this, the Act set out an ambitious (and still unmet) goal of eliminating all discharges to U.S. waters by 1985. This was to follow making all waters safe for fishing, wildlife, and swimming by 1981 (Federal Water Pollution Control Act [FWPCA] §101). Just to be clear, that means no discharges—no pipes anywhere—within 14 years of 1972. To show how far off we still are in reaching that goal, Maine has 400 licensed municipal or industrial facilities on our rivers and coastal waters that treat millions of gallons of water each year to specific water-quality requirements.

So why did Congress enact what many now see as an unrealistic goal? Was this just misplaced enthusiasm or was it muddle-headed political posturing in the beginning of the environmental movement? Rather than discount or disregard this central part of the Act, I think it well illustrates the fundamental character of our work in water quality. This goal is a result of both the serious high-mindedness of the bill's advocates and the absence, at the time, of a detailed understanding of what effluent limits, or dollars, would be required to make all waters fishable and swimmable. The Act itself refers to the "lack of essential knowledge" about discharges and water quality (FWPCA §301). At the time, the nation's water-quality problems were both so compelling and so technically daunting that legislators, policy analysts, economists, and scientists acted passionately and idealistically in the belief that if something was not done, the degradation of our nation's waters might not be reversible. Because they were not certain what limits or controls would be needed to meet the fishable and swimmable goal, the crafters of the bill felt that we should aim for the elimination of all discharges, which would solve the problems if effluent or discharge limits did not. Senator Muskie noted in his floor statement on the pending legislation in 1971 that "the 1985 deadline…for achieving no-discharge of pollutants is a policy objective. It is not locked in concrete. It is not enforceable. It simply establishes what the committee thinks ought to be done on the basis of present knowledge" (Association of State and Interstate Water Pollution Control Agencies 2004). Where Congress clearly engaged its head in creating technical requirements and standards, it used its heart to inspire political change in building the Act and in declaring an end to discharges.

To make all of our waters fishable and swimmable, we will craft limits and standards based on our best current scientific understanding. There may be instances, however, where those limits or standards will not be enough, and a pipe may have to go. Indeed in Maine we have eliminated all discharges to our lakes

TABLE 1: **Current Statutory Standards for Maine's River and Stream Classifications**

	Numeric Criteria		Narrative Criteria	
	Dissolved Oxygen	Bacteria (*E. coli*)	Habitat	Aquatic Life (Biological)
Class AA	As occurs naturally	As occurs naturally	Free flowing and natural; no dams or discharges	As occurs naturally
Class A	7 ppm or 75% saturation	As occurs naturally	Natural; "equal to or better discharges"	As occurs naturally
Class B	7 ppm or 75% saturation	64 cfu/100 ml geometric mean	Unimpaired; well-treated discharges, dams allowed	Support all aquatic species indigenous to the receiving water; no detrimental changes to the resident biological community
Class C	5 ppm or 60% saturation; 6.5 ppm 30-day avg	126 cfu/100 ml geometric mean	Habitat for fish and other aquatic life; well-treated discharges, dams allowed	Maintain the structure and function of resident biological community

and ponds because we determined in the mid-1980s that there were not defensible nor practicable limits that would allow a lake to be fishable and swimmable. On the other hand, we have crafted technically sound pollution limits that allow for discharges to rivers to continue while the receiving water is now fishable and swimmable and supports a full range of aquatic life. These two contrasting examples of how we handle discharges leaves an ambiguous impression of the law and begs the question: are we really going to try and pull all these pipes one day?

HOW THE CLEAN WATER ACT WORKS

The Clean Water Act mandates a comprehensive program for the protection and improvement of waters, where states first classify their waters, designate the uses to which they will be put, establish standards and criteria that will protect those uses, and then sufficiently monitor waters to determine if the standards and uses are attained. The teeth in the law come from the prohibition on discharging to U.S. waters without a permit, where either the Environmental Protection Agency or a state that has been delegated authority to administer the Act is the permitting authority. Maine has been granted this authority since 2001. To issue a permit, the permitting authority must determine that water-quality standards will be met as a result of any effluent limitations or conditions imposed in the permit. For those waters that do not meet their classification (or are "impaired" in the terminology of the law), a permit can be issued provided the discharge would not cause or contribute to the impairment. The CWA also authorizes the Army Corp of Engineers to regulate the filling and dredging of wetlands and other bodies of water through a separate permitting program. Given the scope of additional issues, the regulation of wetlands under this law as well as a related state wetlands law are appropriate for another discussion.

Classification and Uses

In some respects, the CWA works like a zoning ordinance, where a state must determine what uses it wants its waters to support and then create a zoning, or in this case, classification scheme. Just as state law and legal precedent in land use require that a municipality must provide for certain uses (such as residential group homes), the CWA requires two uses—fishing and swimming—for all waters. Other uses are designated at the discretion of the individual state. As a zoning ordinance considers soils and drainage when establishing uses, a water classification scheme considers the waterbody type. Distinguishing types of bodies of water is important because rivers and streams have hydrology, biology, and chemistry that are different from lakes and marine waters and distinct requirements for attaining their designated uses. A river is not made fishable in the same manner as a lake or estuary.

As described in the Table 1, Maine's present classification as enacted in 1986 for rivers and streams

begins at C and proceeds upward in quality to B, A, and then AA. Marine waters have a similar classification of SC, SB, and SA. Lakes are all in one classification that requires they be free of human-created algae blooms and any new direct discharge of treated or untreated pollutants and that they have stable or declining levels of nutrients. Similar to lakes, a common element of all the "A" classifications in rivers, streams, and marine waters is that these waters are to be "as naturally occurs." They cannot have new discharges, and existing discharges are allowed only until a practical alternative exists (Maine Revised Statutes [MRS] Title 38 §465). State law further clarifies that all state waters should support indigenous fish, which means cold-water species such as pollution-intolerant trout and salmon (MRS Title 38 §465). The AA classification of rivers and streams provides that these waters be free-flowing and prohibits the creation of any dams or impoundments. The range of uses beyond fishing and swimming designated in the classification scheme includes hydroelectric power in all but AA waters; drinking water after disinfection; industrial process water (but not waste disposal, which would undermine the purpose of the law); navigation; and habitat for fish and aquatic life (MRS Title 38 §465).

Interpreting and deciding compliance with narrative standards is an interesting and intellectually demanding part of the Act. To determine whether the narrative standard that the "structure and function of the resident biological community" is maintained in a particular body of water, a sophisticated in-stream macroinvertebrate (insect) sampling and statistical model was developed. The sampling program has worked to gather more than 20 years of data across all ranges of water quality conditions around the state. These data were compiled into a statistical model that can assess whether an observed sample of aquatic insects in a particular stream match those that would be expected to live in a water body meeting the standards of its classification. Using such a biological tool to determine whether a water body is meeting standards is more robust than simply measuring dissolved oxygen or other chemical parameters. Macroinvertebrates integrate the complete characteristics of the water column over a much broader period of time than do chemical analyses of a water-quality sample (Courtemanch 1995). The closest analogy would be to compare using a snapshot versus a full-length film to tell a story. The film conveys much more information about a particular situation than a snapshot, just as a statistical description of the macroinvertebrate community structure does compared to a dissolved oxygen reading.

History of Maine's Classification Scheme

The state's original classification scheme, developed in state law in the 1950s and revised several times over the next three decades, was much less goal directed than the federal act. Even the state's post-1972 framework, before its overhaul in 1986, did not wholeheartedly embrace the goals of the CWA. Before 1986 Maine had classifications that did not meet the CWA's interim requirement of making waters fishable and swimmable. The pre-1986 designations for rivers and streams of Class C or D (or even E in the 1950s) recognized waters that had been severely affected by untreated discharges and significant urbanization. In the case of Class D waters, there was concern that they might not even be restorable. A 1950 proposal for Class E rivers allowed these waters to sustain "objectionable" levels of odor, color, scum, floating debris, sludge deposits, and turbidity and still have not necessarily be a public nuisance (Maine Department of Health and Welfare 1950). Maine's restrained expectations for its waters are well described in this same 1950 report on water quality, where the state determined that "Kenduskeag Stream is somewhat of a public nuisance in the vicinity of its mouth at Bangor where the sewage of an estimated 15,000 is discharged untreated to its waters" (Maine Department of Health and Welfare 1950). Somewhat indeed. At that time, the state expected Class D waters, including portions of the Little Androscoggin River, to have at least two parts per million of oxygen and not cause an undue health hazard. By most accounts, fish need at least three parts per million to stay alive. In 1977, 19 lakes were recognized as having the capacity to receive treated discharge and still meet a second-tier classification that supported fishing and swimming.

In hindsight there were no ambitious goals here, just what now looks like a significant degree of pessimism or resignation. So what happened?

Like most good problems, when you throw enough money and political will at them, things change, ideally for the better. This money and political will established high-minded goals, specific technological benchmarks, and enforceable controls. What soon became clear was that the mandatory investments made in wastewater infrastructure in the 1970s for industrial facilities and municipalities produced significant changes in water quality that exceeded the expectations of the existing law (FWPCA §301). The rate of construction of new or upgraded treatment facilities throughout the 1970s was impressive and occurred in large part as a result of federal construction grants for municipalities along with industries facing a fixed date and legal consequences from a federal law. These positive water-quality changes, so quickly following the initial investments, strongly and positively reinforced the still somewhat-restrained state framework. These early successes prompted the more ambitious changes made to the state framework in the mid-1980s. Success encourages success.

The CWA provides direction for ambition and optimism in setting water-quality goals. A state may establish a classification for a water body that does not meet the proposed standard. But the law also puts a backstop against that goal and requires that it be met. Classification goals are enforceable. A good example can be seen in the last complete overhaul of Maine's classification framework in 1986. Maine eliminated the Class D river and class GPB lake categories even though river segments such as parts of the Androscoggin or lakes such as Sebasticook did not yet meet the higher standards. Sebasticook Lake was upgraded in 1986 on the hope that it would meet GPA standards when the Corinna wastewater treatment plant discharge was removed from upstream of the lake. This finally happened in 2005. As a result, the lake-water quality has in fact improved, but there are still algal blooms almost 20 years after its GPA classification. This is also the case for portions of the Androscoggin River that do not yet meet their Class C designation because of insufficient dissolved oxygen. Although it is disturbing that significant time has elapsed and these waters do not yet meet standards, the ambitions in the goal classifications should be seen as powerful statements about our willingness to not let the status quo define our expectations.

PENDING POLICY QUESTIONS IN IMPLEMENTING THE CLEAN WATER ACT IN MAINE

It is clear we have moved past the era of pipes that spewed noxious, toxic, and often untreated pollution. Our rivers are no longer blanketed in foam; they run the color of water, not textile dyes. Our pulp and paper mills no longer discharge dioxin, and pollutants such as phosphorus have dropped to nationally significant discharge levels. Additionally, we have built new wastewater treatment plants with skilled operators who routinely treat pollutants to single-digit numbers when national benchmarks are set at double digits.

Does this mean we are finished? Unfortunately not. Among the work still to be done are the matters of rain and stormwater runoff, mercury, and the tab.

The CWA provides direction for ambition and optimism in setting water-quality goals.

Stormwater Runoff

Soon after the CWA began to make progress in building public wastewater treatment works and licensing large industrial dischargers, water-quality scientists realized that stormwater runoff was a significant contributor to pollution. By the middle 1980s, the EPA projected stormwater was responsible for approximately half of the nation's water-quality problems. In 2006 stormwater polluted more than 440 miles of rivers and streams in Maine (Maine Department of Environmental Protection 2006). The 1972 version of the law did not have a precise framework for regulating stormwater, and in the 1970s and 1980s point-source discharges from municipalities and industry were

more important problems. It was not until 1987 that Congress enacted revisions to the law which required certain stormwater dischargers to obtain a permit. Even then it took three attempts to get past President Ronald Reagan's veto. His veto statement illustrates the anxiety of some that stormwater control was altogether different from outfall pipes and treatment plants. He thought the 1987 changes made the EPA "able to intrude into decisions such as how and where the farmers must plow their fields…determine where families can do such basic things as build a new home. That is too much power for anyone to have, least of all the Federal government" (Association of State and Interstate Water Pollution Control Agencies 2004).

The CWA regulates stormwater that is discharged into municipalities' storm sewers, runoff from construction sites with more than one acre of disturbed area, and a wide range of industrial and commercial facilities. Maine began regulating these facilities and towns directly in 2001 when the state received authority from the EPA to issue CWA permits. This stormwater permitting authority complements a parallel 1997 state law that requires the control of stormwater at new developments of certain sizes.

[A] significant pending policy question is how to fix impaired bodies of water that are polluted by stormwater runnoff.

These programs are now well developed and considered routine in their requirements for managing runoff, unlike a relatively obscure provision of the 1987 amendments that can apply to existing commercial development. Before evaluating the question of how existing shopping malls, parking lots, or other structures might fall under the CWA, it is best to discuss how stormwater runoff affects water quality and how it can be treated.

The objective of stormwater regulation is to control both the volume and quality of stormwater leaving a construction site. Stormwater affects water quality and habitat by scouring streams and water courses if volumes are larger than the natural stream channel can sustain. This scouring can erode banks and fill in stream bottoms with sediment that eliminates spawning and feeding habitat for fish and insects. There are also many chemical and nutrient pollutants picked up in runoff when rainfall runs over parking lots, roofs, or bare soil. Runoff can also be much warmer than the receiving stream or water body, which can significantly alter habitat.

The impact of stormwater is controlled by slowing the flow of runoff and mechanically and biologically removing pollutants. In the last decade, a number of different stormwater treatment technologies have been developed. These treatments range from traditionally engineered "hard" systems that are installed at development locations within piped collection systems to "softer" and "greener" strategies that include maintaining buffers of existing vegetation or increasingly more sophisticated landscaping that holds rainfall, removes contaminants, and either slowly releases it to surface water sources or infiltrates it to groundwater. These landscaping treatments, called "bio-retention cells" or "rain gardens," treat runoff through the use of mixtures of soil, organic material such as shredded bark or compost, and particularly sized sand and fine gravels.

Neither form of stormwater treatment can be designed or operated at the level of a conventional municipal or industrial wastewater treatment facility. There is not the same treatment precision in an engineered stormwater system that allows for the application of a specific effluent limit as there is in a conventional treatment plant. Furthermore because stormwater treatment is applied at many different locations throughout a watershed on many different individual properties, each with varying capacities for oversight, there is not the same degree of understanding about what changes in water quality will occur as a result of stormwater controls. Considering these attributes of stormwater control and the adage about an ounce of prevention, the EPA instituted requirements for education of the general public and municipal officials about how stormwater pollution could be prevented in the first place. The regulatory

framework was adjusted to allow talk about education, behavior, and prevention, instead of just concentrations, limits, or standards, an important innovation for a traditional command and control scheme.

When Maine began implementing the federal stormwater program for municipalities in 2003, the state refined the preexisting federal educational component to ensure that information on changing behaviors about lawn fertilizing, street sweeping, littering, or dog walking, was not simply distributed as fliers or public service announcements. Rather, the DEP and municipalities worked closely together to implement social marketing strategies, using focus groups and surveys to help to refine the most effective messages, words, and phrasings. These educational strategies sought to gauge people's understanding of basic issues regarding stormwater and to focus work on the problems that people really believe are problems. The results were initially surprising, with surveys showing that fewer than 21 percent of 3,600 respondents indicated that they live in a watershed (everyone does). More than one-third of respondents thought stormwater infiltrated completely into the ground and did not affect surface water. A significant number of people, however, did relate fertilizer use to water-quality problems (Maine Department of Environmental Protection, data available at www.maine.gov/dep/blwq/doceducation/nps/outreach.htm).

As a result of this initial work, the state launched educational campaigns in 2004 and 2005 (available at www.thinkbluemaine.org). Following these outreach efforts, DEP staff assessed the campaigns with detailed surveys to determine whether and how behaviors and perceptions changed on such topics as vehicle washing over storm drains or lawn fertilizing. Survey data indicate that 26 percent of Maine's adult population had or would take some action on stormwater control, and an impressive 14 percent recalled the television and radio campaign that was aired in 2004 (Maine Department of Environmental Protection, data available at www.maine.gov/dep/blwq/doceducation/nps/outreach.htm).

Another significant pending policy question is how to fix impaired bodies of water that are polluted by stormwater runoff. Among its polluted waters, Maine has 32 streams located in urban areas that do not meet their standards because of uncontrolled runoff from parking lots, roofs, and roads. In the 1987 CWA revisions, Congress provided the EPA and authorized states the discretionary authority to require a permit for any existing development whose stormwater runoff "contributes to a violation of a water quality standard or is a significant contributor of pollutants" (FWPCA §402). Such strict standards have been used sparingly throughout the country. A recent decision by the EPA in response to a petition filed by the Conservation Law Foundation, a New England advocacy organization, under the provisions of the CWA, has created a regulatory framework for existing development in the Long Creek watershed in South Portland, Portland, Scarborough, and Westbrook, which includes a great deal of commercial and industrial development including the Maine Mall. The EPA's decision is founded on a now widely understood correlation between the amount of impervious surface in a watershed and the failure of water-quality standards (Center for Watershed Protection 2003). We know here in Maine that when a watershed exceeds between eight and 15 percent coverage in impervious surfaces, a stream will no longer be able to support the legally required assemblages of aquatic life. To meet the requirements of the EPA decision, stormwater treatment strategies need to be implemented in a planned fashion across many different individual properties. These requirements will be implemented by the DEP through Clean Water Act permits.

When implementing such requirements for parking lots, roofs, and other impervious surfaces, we are presented with several policy decisions that require careful thought. The most significant are decisions about equity and cooperation. If there are several hundred properties in the watershed of an impaired stream, how do you choose who does what? While larger properties with five or more acres of asphalt and roofs are reasonably considered to be a significant source of the pollution and so should assume responsibility for treatment, the many smaller properties cumulatively may contribute as much or more. Not all properties due to their size, location, or configuration, however, would be able to reasonably accommodate treatment systems. There may also be instances where

several properties in a watershed each present an opportunity for treating more than their own runoff and can function as treatment systems for several others or adjacent small properties can jointly install one stormwater control located on all their properties. These are different situations from the conventional point-source regulation where a permit simply calls for a treatment plant to operate to a defined set of limits.

For example, to create an equitable regulatory framework for Long Creek, the DEP has funded a planning process managed by the four municipalities. The plan has produced a detailed set of action steps describing which properties should have which types of treatment and whether joint contracting for measures such as routine street sweeping are recommended. The plan developed initial cost estimates for these treatments where approximate costs for retrofitting some properties could approach $50,000 per acre. The four municipalities, in consultation with the affected landowners and the public, evaluated more than 200 recommendations.

Any regulatory framework for fixing Long Creek must be built around such locally crafted plans, where projects are logically staged in increments over perhaps a 10-year timeframe and extensive monitoring of the stream is undertaken to gauge progress. To control costs and implementation strategies, the DEP will carefully assess stream conditions. The regulations will also allow for locally driven decisions on financing to enable the creation of utility districts or other mechanisms that fairly allocate costs across the watershed and communities.

Mercury and Making Fish Safe to Eat

Although the Clean Water Act is a robust and comprehensive statute, it has its limitations. Because most environmental laws are structured around a particular medium or resource—air, water, or land—there can be significant discontinuities in jurisdiction when pollutants cross media. One such gap is between the regulation of air and water with regard to mercury. Due to excessive mercury concentrations found in fish tissue—in some instances fish have been measured with more than five times the levels deemed safe to eat—Maine has determined that all its waters are impaired by mercury contamination and has set consumption limits to protect human health. These advisories mean that our waters are not meeting the law's minimum standard.

Sources of mercury contamination in the environment are widely distributed and include air emissions from municipal waste combustors, fossil-fuel combustion (ranging from coal to home heating oil), dental amalgam, and a variety of mercury-containing products such as batteries. The majority of mercury does not enter our environment via a discharge pipe, so action to fix this problem must occur figuratively upstream from the outfall. Since 1998, in coordination with the other New England states, Maine has enacted legislation to prohibit a wide range of mercury-containing products, to establish strict air-emission limits, and to require the use of equipment in dental offices to prevent mercury amalgam in fillings from entering the wastewater stream. Because of these initiatives, Maine's mercury emissions have dramatically decreased since 1998. Combined with what other New England states have accomplished, this means that mercury emissions attributed to sources within this region have been reduced by 74 percent between 1998 and 2003. In absolute terms this is more than 1,500 kilograms of mercury no longer being released into New England's environment each year.

So why is mercury still a problem in our waters? To eliminate the fish consumption advisories, national and international mercury reductions must equal New England's accomplishments. The dilemma is that the Clean Water Act clearly tells states they must list all of impaired waters and create clean-up plans (called total maximum daily loads or TMDLs) for all listed waters (FWPCA §305[b]) yet states are only authorized to control pollution loads within their borders.

Clean-up plans are mandatory, and the courts have supported the law with a national 2013 deadline for completion of these plans. Maine and the Northeast are on track with our commitments for these plans for all manner of water pollutants. As further demonstration, in October 2007 the six New England states and New York submitted the nation's first regional clean-up plan for mercury-impaired waters. This plan was modeled on innovative work first completed in Minnesota in 2006, and it established for the first time the amount of mercury reduction needed to make fish

safe to eat in the region (New England Interstate Water Pollution Control Commission 2007).

In the case of mercury, a large unresolved part of the problem originates from existing and planned coal-fired power plants outside the region along with other global sources. The New England region needs between an 85 percent and 94 percent reduction in human-caused atmospheric emission of mercury, yet the region only has authority to ensure compliance on facilities within its states' borders. Controlling just our own sources of mercury will not make fish safe to eat. To address this problem, the seven states have jointly submitted the regional clean-up plan, stipulating more strictly regulated air emissions than present levels under the controversial Clean Air Mercury Rule adopted by the EPA in 2006. These highly contested rules, which were thrown out by a federal appeals court in early 2008 as a result of a lawsuit filed by Maine and other states, were designed to reduce mercury emissions by only 75 percent at some point beyond 2018. The region's mercury clean-up plan, however, notes that a 90 percent reduction is technically feasible and can be accomplished in a much shorter time frame. Despite the contested federal rule, a number of states, including those in the Midwest, have begun adopting more stringent standards that match our regional clean-up plan's requirements, a positive development for mercury-impaired bodies of water.

This jurisdictional gap for mercury is similar to the problem of acid rain, where air emissions of a variety of pollutants from outside the region were causing serious water-quality impacts to high-elevation lakes. Following significant public debate about the problems of acid rain, the Clean Air Act was amended in 1990 to regulate these air emissions. It is uncertain how this mercury gap will be closed, but New England and New York are presently arguing that a less tortured interpretation of the feasibility of existing technological controls and the Clean Air Act requirements than is presently being advanced under the Bush Administration's Clean Air Mercury Rule would close it well enough for now.

Infrastructure and Financing

So what's the tab for the citizens of Maine? The state has 169 publicly owned treatment works that are significantly different in size. Our largest facility is licensed to discharge more than 19 million gallons a day, our smallest, just 2,000. These facilities are the bulwark of the public's investment in clean water, and they cost money not just to run, but to maintain and upgrade. A core question that Maine citizens face is exactly the one we face concerning our transportation infrastructure—how do we keep it going? The answer is easy to state, but harder to implement: Maine needs to develop a long-term financing strategy to ensure that we are maintaining our now substantial water infrastructure to protect the successes made to date.

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The Clean Water Act continued a decades-long federal initiative to construct publicly owned wastewater treatment facilities by awarding grants to municipalities. The first grant program was authorized in the 1940s, and Congress continued to appropriate grant monies that provided up to 75 percent of the cost of constructing a facility until 1990. Between 1973 and 1990, the federal government appropriated almost $51 billion for the construction grants program, with annual levels ranging between $2 and $4 billion (Copland 1995). By contrast, the federal appropriation for infrastructure in federal fiscal year 2006 was $886 million.

In 1987 in response to both budget deficits and a sense that a majority of the nation's clean water infrastructure had been built to the goals of the original act, Congress replaced the grants program with the Clean Water State Revolving Loan fund (CWSRF). The CWSRF loan program provides $5 in federal dollars for every $1 matched by states. These funds are required to be placed in a dedicated revolving loan fund to provide loans to municipalities for water-pollution-control projects at below-market interest

rates. Congress has authorized this program until 2013 on the assumption that by then individual state funds would be large enough to generate loans for all needed projects.

Maine's program, administered jointly between the DEP and the Municipal Bond Bank, charges an interest rate that is two percent below market rate and has made more than $400,000,000 in loans to 92 communities since the program began in 1989. The CWSRF program allows states to determine what interest rates they will charge, including the opportunity for zero-interest loans. Maine's fund is presently able to make between $25 million and $40 million available to communities across the state each year. Because of the below-market rates, these loans provide a significant subsidy to municipal facilities. A loan from Maine's program provides an average subsidy of 18 percent of the total cost of construction projects compared to the cost of the project if funded with market-rate loans. With construction costs increasing by 10 percent or 20 percent in any given year, an almost 20 percent discount on the cost of the project is a significant benefit to ratepayers and taxpayers.

Administration of the Clean Water Act is similar to many other environmental statutes in that it requires equal parts head and heart.

Successes aside, there has been a significant decline in support for the CWSRF at the federal level, with funding dropping by almost 50 percent in the last four years. Since the program began in 1989, the value of CWSRF appropriations has declined by 39 percent in inflation-adjusted dollars (Northeast-Midwest Institute 2006). The debate on the 2008 federal budget has included discussion about restoring the funding levels as a result of the widespread understanding in Congress that needs are far outstripping available funding. The recent reductions in absolute dollars between 2003 and 2007 have meant that the money available to Maine to build its loan fund to a permanently sustainable basis has declined from $10.6 million to $5.3 million, annually. This reduction combined with a standing need of more than $300 million in improvements to wastewater infrastructure over the next five years makes it unlikely that Maine's loan fund will be large enough before federal support ends to meet our subsequent annual needs without some other means of support. Since 1987 Maine has applied consistent fiscal policies that have allowed our fund to grow at a rate that is significantly higher than most other state funds. Nationally the average amount of money returned to CWSRFs over the life of the fund is $1.7 million; Maine, by contrast, has returned more than $35 million directly to the fund by running an efficient operation and ensuring that interest on loans is always used for funding additional projects (U.S. Environmental Protection Agency 2007). Other states' contributions are lower because they used interest earned on loans as the state match for federal dollars. Maine has consistently used general obligation bonds as state match, which allows interest earned on the revolving loans to enlarge the fund at a rate faster than most others in the country.

Given that Congress has signaled that federal investments in state CWSRFs will end around 2013, if not before, it is time for the state and municipalities to begin thoughtful analyses about whether federal contributions will need to be replaced by some other revenue stream to supplement the interest earnings on the loans. It is likely at this time, based on preliminary fiscal modeling done by the DEP, that there will not be enough money circulating in our state loan fund to support our infrastructure needs if the federal support is stopped in 2013. There is no clear national consensus yet on how to replace the existing funding program, but there is a growing agreement that some form of trust fund similar to what supports transportation infrastructure would be a logical model to sustain wastewater needs. Determining what will constitute the revenue stream will obviously be the political difficulty of an otherwise straightforward idea.

Since state resources will likely always be limited and the needs will outweigh the dollars for some time to come, are our publicly owned treatment works adequately maintaining their investments? Or are they

being "run into the ground?" As with all capital investments, it is sound policy to have management systems that demonstrate industry standard maintenance and replacement schedules are in place, as well as established reserve policies that provide for routine replacement of obsolete and worn-out equipment. There is presently no state or federal requirement that such asset-management systems be implemented by utility districts or municipalities. With tight dollars, it is inevitable that appropriators, regulators, and members of the public will ask whether their money is being well stewarded through a careful system of maintenance, repair, and financial reserves. This concern for stewardship does, however, runs up against the concern of ratepayers to keep their rates as low as possible. Districts often find it difficult to sustain support for appropriate replacement and maintenance schedules and setting aside money for future capital investments because these decisions can affect rates. A requirement to implement asset-management systems and to maintain sufficient reserve accounts would be politically difficult for utility districts or towns, but would, if structured correctly, reduce future costs to both ratepayers and taxpayers.

Because of the cost of wastewater infrastructure and because many of Maine's districts serve small populations, the legislature has appropriated grant money in addition to the matching funds for deposit into the CWSRF. The competition for these grant funds is strong because not only is the money free, but it can be the deciding factor in whether a project gets built. It is important to consider how the state should dispense grant funds in addition to the money that is allocated to the CWSRF for these low-interest loans. Infrastructure costs can be daunting for local budgets and household incomes in small communities. When upgrades or replacements are required, costs can quickly overwhelm a community's ability to finance them.

The DEP presently uses a policy benchmark: when wastewater infrastructure costs exceed two percent of the median household income (MHI) of the area served by the system, those costs above the benchmark should be borne as a state or federal grant. This policy makes sense and carries forward the intent of the CWA's original work to fund between 75 percent and 90 percent of the cost of building the original treatment plants throughout the state. But this grant threshold, while sensible in its apportionment of loaned money versus free money, means that communities that routinely make infrastructure improvements in annual increments and with regular investments can have project costs that keep them below their MHI threshold. These communities feel that the present system "rewards failure" by allocating grant dollars disproportionately to systems that need total or complete overhauls and that did not follow an asset-management program. These communities will point to an infrastructure program such as New Hampshire's where the legislature provides a 20 percent grant to all users of their CWSRF program.

Our limited resources for infrastructure investment also highlight the need to align our aspirations and our financial abilities. An informal survey in 2006 on utility indebtedness showed that districts or communities have indebtedness levels that average 34 percent of their annual revenue, with the percentages ranging from six percent to 55 percent. We need to manage both sides of this water-quality ledger with equal clarity and expectations so we continue to responsibly invest in water quality. These investments pay off, but only when we make prudent decisions that align financial capacity and water-quality goals. This statement should not be read as a "we can't afford environmental quality" shibboleths. We can, and we have, but these investments have to be calibrated not only to our goals and ambitions, but to our capacity. One way to establish this alignment is to match our classification system with the capital investment plans of municipalities and utility districts. These two processes have not communicated enough with each other in the past.

CONCLUSION

Administration of the Clean Water Act is similar to many other environmental statutes in that it requires equal parts head and heart. To reach our goals, we must develop precise data sets and models that accurately reflect environmental conditions, understand a wide range of industrial processes, and engineer and operate complex technology. It is not, however, always a cerebral exercise. We must also

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maintain a commitment to the values of our natural environment and care deeply about making our state a remarkable place to live. If we do not continue to care, the goals of the CWA will lose their meaning. These goals were built on our aspirations and expectations for what we wanted Maine to become. The Clean Water Act was created as a result of Ed Muskie's heart-felt commitment to Maine, and it continues to rely on the heart-felt commitments of the citizen, engineer, treatment plant superintendent, bureaucrat, politician, and scientist.

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