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**POLICY INSTRUMENTS TO MANAGE
NON-POINT SOURCE WATER POLLUTION:
COMPARING THE UNITED STATES AND ONTARIO**

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Abstract

Nearly 30 years after the introduction of water pollution legislation in Canada and the United States, water pollution remains an important public policy problem. In broad terms, water pollution can be divided into two types: point source and non-point source. Point source water pollution refers to inputs into natural ecosystems that come from easily identifiable sources such as industrial effluent and outfall from municipal sewage treatment facilities. Non-point source water pollution refers to inputs into natural ecosystems that come from multiple sources such as urban and agricultural runoff, overflow sewage inputs, and groundwater contamination. Although in many industrialized countries, non-point sources are recognized as the primary barrier to meeting water quality objectives, policy-makers have tended to limit the scope and focus of water pollution management to the more easily identifiable point sources.

Based on a doctoral dissertation, this paper outlines the intergovernmental institutional arrangements and policy instrument strategies that are being implemented in Ontario and three U.S. states (Wisconsin, Michigan, and New York) to abate non-point source water pollution. The paper summarizes an examination of three different policy instrument strategies (subsidy-based, regulatory, and tax-based) that are being used to deal with the unique character of this type of water pollution. Case studies, analysis of primary documents, and interviews with policy-makers form the foundation of the findings in this paper. In each of the case studies examined, the analysis focuses on the predominant use of one policy instrument strategy and its implementation, recognizing that a mix of instruments is often employed.

The findings summarized here indicate that the choice, design, and comparative effectiveness of different policy instruments depend largely on the way water pollution problems are defined and the capacity of the institutions that are designed to implement the solutions. More specifically, jurisdictions with greater vertical (intergovernmental), horizontal (cross-medium), stakeholder, monitoring and evaluation capacity are more likely to have effective policy instrument strategies to combat non-point source water pollution. Overall, the jurisdictions examined in the United States have greater institutional capacity than Ontario to manage this complex water pollution problem.

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1 Introduction

Water pollution can be divided into two broad types: point source and non-point source. *Point source* water pollution refers to inputs into natural ecosystems (such as creeks, rivers, and lakes) that come from easily identifiable ‘end-of-pipe’ sources – for example, industrial effluent and outfall from municipal water and sewage treatment facilities. *Non-point source* (NPS) water pollution refers to inputs that come from multiple sources – for example, agricultural waste and pesticide runoff, urban sewage overflow, nutrient and herbicide runoff from golf courses, and runoff of heavy metals and toxic substances that may contribute to surface and groundwater contamination. Streams, creeks, and rivers receive water from a variety of natural sources (including rain, groundwater seepage, springs, and glacial melting) as well as from a variety of sources associated with human use.¹ Natural events (such as rainfall) and management practices (such as irrigation) set in motion bacterial, nutrient, and other pollutants as they run off into surface waters and the soil column.

This paper summarizes the intergovernmental institutional arrangements and policy instrument strategies that are being implemented in Ontario and three U.S. states (Wisconsin, Michigan, and New York). Through case studies, analysis of primary documents, and interviews with policy-makers, this paper examines three different policy instrument strategies (subsidy-based, regulatory, and tax-based) that are being used to abate NPS water pollution. In practice, a dominant policy instrument is often used in combination with other strategies. For example, in most cases, the strategy includes the use of instruments that try to change behaviour using moral suasion, public education, and dissemination of information. The research indicates that the choice, design, and comparative effectiveness of different policy instruments depend largely on the way water pollution problems are defined and the capacity of the institutions implementing these instruments.

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¹ M. Overcash and J. Davidson, 1980, *Environmental Impact of Non-Point Source Pollution* (Ann Arbor, Mich.: Science Publishers), p. 171.

2 Defining the Problem

As early as the 1980s, research in the United States indicated that non-point sources were contributing as much as two-thirds of surface water pollution.² The largest contributor of NPS water pollution by volume in the United States is sediment runoff from agricultural land use. The second largest is nutrient loadings (primarily nitrogen, potassium, and phosphorous). And the third largest is pathogens such as coliform bacteria from livestock waste and human waste either in inadequately treated sewage or in sewage overflows.³ In addition, other toxic substances such as pesticides, herbicides, and heavy metals also find their way into surface waters and potential groundwater sources. Groundwater is water that has seeped into the soil and collected in an aquifer or groundwater recharge area (usually within a mile of the earth's surface). The major groundwater sources of pollution are septic tanks, underground storage tanks, abandoned waste and well sites, and NPS surface water contributions.⁴ No comparable data for NPS pollution are available for Canada or Ontario.

2.1 Non-Point Source Water Pollution

Three important aspects of NPS water pollution influence policy approaches and the choice and design of instruments: (1) scale, (2) complexity of sources, and (3) property rights. All three aspects are complicated by the lack of information about NPS water pollution and water resources generally.

2.1.1 Scale

The first important aspect of NPS water pollution – namely, scale – is common to all pollution problems. According to the ecosystem principle, biological and physical processes are interconnected at different scales. Pollution represents a ‘disturbance,’ or imbalance, of a given ecosystem at a given scale.

² U.S., Environmental Protection Agency (EPA), 1995, *Progress Report* (Washington, D.C.), p. 46. Data for 370,000 stream miles not meeting designated uses in 1986 indicated that 65% of surface water pollution was attributable to non-point sources. Municipal sources accounted for 17%, industrial sources 9%, and background and other sources 9%.

³ Ibid.

⁴ Ibid. See also U.S., EPA, Office of Water, 2000, *National Measures to Control Non-point Source Pollution from Agriculture*, Washington, D.C.: EPA.

Water quality is influenced by the scientific features of a given ecosystem at a given scale. Hydrology, typography, and seasonality all make pollution problems highly variable. The total land surface from which a system of streams receives its waters is termed the 'drainage basin' or 'watershed.' Lakes are often the receiving bodies downstream of a given watershed. Rivers, creeks, and streams are the upstream components of a given basin. Generally, NPS water pollution occurs in the upstream portion of drainage basins and significantly affects the water quality in the receiving body or groundwater downstream. This complexity and interdependence of ecosystems, with their multiple mediums and different scales, make the process of defining the problem challenging for policy-makers.

2.1.2 Complexity and Variability of Sources

In most jurisdictions water pollution management regimes have been developed and designed according to the *source* of the water pollution. The distinction between point source and non-point source water pollution can be viewed along a continuum.⁵ For example, some agricultural sources such as large manure management facilities can be regarded as point sources. However, given that a typical watercourse may contain numerous such sources, it can be difficult to identify and attribute specific sources to individual polluters. The sources of NPS water pollution, in comparison with point sources, are diffuse and extremely variable. Understanding the connection between land use and water quality is critical to understanding this dimension of NPS water pollution problems. Streams, creeks, and rivers are best viewed as fragile ecosystems that are easily affected by human use of land and water. "It has frequently been observed that streams are the collectors, concentrators and integrators of all the impacts of man on watersheds and they truly reflect whether we know how to manage our environmental affairs."⁶ Virtually any pattern of land use is reflected in the drainage basin. Watersheds are therefore important units of analysis in assessing NPS water quality problems and in implementing solutions.

⁵ C.S. Russell and J.F. Shogren, eds., 1993, *Theory, Modeling and Experience in the Management of Nonpoint-Source Pollution* (Boston: Kluwer Academic Publishers), p. viii.

⁶ Peter Larkin, 1974, *Freshwater Pollution: Canadian Style* (Kingston, Ont.: McGill-Queen's University Press), p. 14.

2.1.3 Property Rights

Property rights, which are related to the land-use–water quality source aspect discussed above, are a third important aspect of NPS water pollution. Property rights within a given ecosystem influence, in many ways, the type of institutional arrangements needed and available to manage NPS water pollution problems. In any given watershed, a number of individuals may own property close to a watercourse. Most watercourses can be classified as common pool resources (CPR). With CPR, one person's use directly reduces the common pool's value to others. Different bundles of property rights influence the motivations of individuals, their actions, and the outcomes they achieve.⁷ For example, if a farmer were using a creek running through his property as a water supply for his cattle and as a waste disposal site for his agricultural wastes, his use would directly reduce the quantity and quality of water for users downstream. If all the users of the creek decided to use the watercourse in the same way, the stream would become polluted, and collective action would be required to restore it or prevent a “tragedy” from occurring.⁸ This example illustrates the problem that arises when individuals do not cooperate to achieve a goal that is in both their collective and their individual interest to pursue – namely, water quality. The challenge of policy-makers is to alter the incentive structures or rules to better manage the creek ecosystem collectively.

A prevalent misunderstanding is that problems relating to property held in common, as a collective resource, lend themselves to solutions that either enhance private property rights or lead to state institutions playing a more active role in enforcing compliance with regulations.⁹ Research indicates that in terms of property rights, common property resources are not subject to a free-for-all but are governed by a variety of formal and informal rules. Many studies have demonstrated that there is a wide range of governance alternatives and self-governing institutional arrangements that can overcome these

⁷ Edella Schlager and Elinor Ostrom, 1992, “Property rights regimes and natural resources,” *Land Economics*, vol. 68, p. 256.

⁸ Garrett Hardin, 1968, “The tragedy of the commons,” *Science*, vol. 162, no. 1.

⁹ Bonnie J. McCay and James M. Acheson, 1987, “Human ecology of the commons,” in B. McCay and J.M. Acheson, eds., *The Question of the Commons: The Culture and Economy of Communal Resources* (Tucson: University of Arizona Press), p. 9.

problems.¹⁰ Although the rules of water pollution management in Canada and the United States are based on property rights that have evolved from common law, NPS pollution challenges this framework because there is no clear-cut relation or causal link between clearly identifiable polluters and those affected by the pollution.¹¹ Further complicating the setting of rules and standards for stream, creek, and river ecosystems is the difficulty of determining which land user or polluter is responsible – the problem of assigning responsibility.¹² The actions of the individual, or discharges caused by these actions, cannot always be observed directly, and thus regulation based on effluent standards is very difficult. In addition, monitoring NPS pollutants is in some cases technically infeasible and in many cases prohibitively expensive.¹³

3 Policy Instruments Used to Manage Water Pollution

A public policy instrument is an authoritative means that governments use to accomplish a certain end.¹⁴ A policy instrument strategy is a particular combination of policy instruments and the organization of their implementation.¹⁵ Typically, a combination of policy instruments and organizational strategies is employed to remedy complex public policy problems.¹⁶ The selection and use of certain policy instruments depend on the institutional arrangements available to implement the selected instruments as well as on their political and contextual appropriateness.

¹⁰ See Margaret McKean, 1992, "Success in the commons," *Journal of Theoretical Politics*, vol. 4; E. Ostrom, Roy Gardner, and James Walker, 1994, *Rules, Games and Common-Pool Resources* (Ann Arbor, Mich.: University of Michigan Press).

¹¹ Fritz Söllner, 1992, "The role of common law in environmental policy," *Journal of Contemporary Law*, p. 75.

¹² James S. Shortle and David G. Abler, 1997, "Non-point pollution," in *The International Yearbook of Environmental and Resource Economics 1997–98* (Lyme, N.H.: Edward Elgar Publishing), p. 114.

¹³ Marc O. Ribaud, Richard D. Horan, and Mark E. Smith, 1999, *Economics of Water Quality Protection from Nonpoint Sources: Theory and Practice*, Agricultural Economic Report No. 782 (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service), p. 26.

¹⁴ R.F. Elmore, 1987, "Instruments and strategy in public policy," *Policy Studies Journal*, vol. 7, p. 175.

¹⁵ E. Vedung, 1998, "Policy instruments: Typologies and theories," in M.L. Bemelmans-Videc, R. Rist, and E. Vedung, eds., *Carrots, Sticks and Sermons: Policy Instruments and Their Evaluation* (London, U.K.: Transaction Publishers).

¹⁶ Ibid.

3.1 Policy Instruments Used to Manage Point Source Water Pollution

Governments in many industrial countries have used similar policy instruments to deal with water pollution. Although these governments recognize that solving NPS pollution problems is increasingly important in meeting water quality objectives, authorities worldwide have tended to limit the scope and focus of pollution management to more easily identifiable point sources.¹⁷ Twenty-five years after legislative action and the development of regulatory regimes, the traditional point source framework is increasingly being criticized for failing to curtail further degradation of water resources. Policy-makers have thus been forced to consider alternative approaches and instruments. A trend that is evident in all areas of pollution management is the refining of country-wide regulations with rules and objectives for specific ecosystems and the exploring of alternative instruments and arrangements involving a variety of state and societal actors.¹⁸ This is not to say that end-of-pipe regulation and enforcement are not useful components of a comprehensive water quality management approach and cannot be improved; however, upstream water pollution inputs – a significant source – demand different public policy approaches and solutions. The challenges are, first, to match appropriate instruments and implementation institutions with the nature of the problems and, second, to shift the approach from treatment and remediation to prevention.

The policy instruments used in Canada and the United States to remedy point source pollution are very similar. The preferred instruments have been (1) public spending on the infrastructure for water and sewage treatment and (2) monitoring and regulation of large, stationary point sources. The most common instruments are regulatory regimes based on two types of water quality standards: ambient standards and effluent standards. *Ambient standards* are water quality standards that are established for receiving waters and that take into account different dilution capacities; they are based on an estimate of the amount of pollutants that a stream can safely absorb.¹⁹ *Effluent standards* restrict the amount of pollutants that can be discharged or specify the treatment required before release into receiving waters. Both types of standards can be developed for surface water and drinking water. Effluent standards for surface water can

¹⁷ Organisation for Economic Co-operation and Development [OECD], 1996, *Environmental Performance Reviews: Progress in the 1990s* (Paris: OECD).

¹⁸ Ibid.

¹⁹ Thomas. D. Waite, 1984, *Principles of Water Quality* (New York: Academic Press), p. 236.

be based on assessed risks related to human uses or to ecological uses such as fish habitat. The standards for drinking water are based on assessed risks to human health that are associated with different pollutants. Effluent standards have been the preferred standards used to regulate point sources. The limitations of these instruments become very apparent in relation to the distinct character of NPS water pollution.

3.2 Policy Instruments Used to Manage Non-Point Source Water Pollution

A variety of instruments and institutional arrangements can be used to deal with the unique aspects of NPS water pollution. Early studies of alternative policy instruments grew out of the agricultural economics literature. These studies focused (1) on the limitations of regulatory approaches in reducing non-point sources of water pollution and (2) on the way different instruments affected agricultural income and production.²⁰ The economics literature has focused more generally (1) on the economic limitations of traditional regulatory approaches in solving these water pollution problems and (2) on the variety of instruments available and their comparative performance.²¹ The environmental policy literature has focused more specifically on comparing the design features, institutional arrangements, and comparative performance of different instruments.²²

As in the case of point source water pollution management, many countries are using similar instruments to resolve NPS pollution.²³ They use a wide range

²⁰ See R.A. Kramer et al., 1984, "An evaluation of alternative policies for controlling agricultural nonpoint source pollution," *Water Resources Bulletin*, vol. 20, no. 6, pp. 841–46.

²¹ K. Segerson, 1988, "Uncertainty and incentives for non-point pollution control," *Journal of Environmental Economics and Management*, vol. 15; K. Segerson, 1990, "Liability for groundwater contamination from pesticides," *Journal of Environmental Economics and Management*, vol. 19; A. Weersink et al., 1998, "Economic instruments and environmental policy in agriculture," *Canadian Public Policy*, vol. 24, no. 3 (September).

²² William R. Lowry, 1992, *The Dimensions of Federalism: State Governments and Pollution Control Policies* (Durham, N.C.: Duke University Press); Evan J. Ringquist, 1993, *Environmental Protection at the State Level: Politics & Progress in Controlling Pollution* (New York: M.E. Sharpe); K. Eckerberg, 1997, "Comparing the local use of environmental policy instruments in the Nordic and Baltic countries: The issue of diffuse water pollution," *Environmental Politics*, vol. 6, no. 2; C. Johns, 2000, *Non-Point Source Water Pollution Management in Canada and the United States: A Comparative Analysis of Institutional Arrangements and Policy Instruments*, unpublished PhD dissertation, McMaster University, Hamilton, Ontario.

²³ See Eckerberg.

of instruments, including “sticks” in the form of regulation (of land use and agricultural practices – through permits, licences, and prohibitions), “carrots” in the form of economic instruments (subsidies, taxes, and tax incentives), and “sermons,” in the form of information or communicative instruments (moral suasion, education, and outreach).²⁴ The instruments vary in terms of coerciveness, intervention, and design features.

The most common instruments used to prevent NPS water pollution are different forms of cost-shared subsidies. These instruments are typically designed to subsidize the individual or firm in implementing best management practices (BMPs). BMPs attempt to reduce the likelihood of pollutants entering surface or groundwater by managing adjacent lands with ecologically sensitive practices (such as protection of stream banks, and proper manure and chemical storage) and encouraging alternative agricultural production methods. Public funding of BMP cost-sharing programs covers a variety of temporary and permanent water protection measures. These typically include improving waterway buffers, controlling nutrients and pesticides, stabilizing stream banks and grades to prevent erosion, upgrading wells, constructing and relocating manure storage facilities, erecting livestock fencing, upgrading stormwater runoff facilities, and constructing filtration units and detention and retention basins. The cost-sharing aspect of these instruments requires the individual or firm to partially fund the BMPs.

Since many NPS water pollution problems are directly related to land-use activities, land-use regulation is another instrument that has been used to address these water pollution problems – for example, regulatory limitations on the size and location of agricultural operations and land-use restrictions through protective zoning in areas close to sensitive watercourses and groundwater recharge areas. The coercive element of this approach often requires mandatory review, approval, permitting, and licensing processes for different types of current and proposed land uses in a geographic area. Typically, this instrument is implemented at the local level because of the variable nature of land-use patterns across jurisdictions. However, many jurisdictions have not directly linked this instrument to water quality protection and objectives for a number of reasons: the unique dimensions of these diffuse water pollution problems, the limitations of this instrument due to the large number of different land uses and users close to watercourses, and the monitoring and enforcement requirements for

²⁴ See Bemelmans-Videc, Rist, and Vedung.

implementation. Nonetheless, land-use regulation is one set of policy tools that policy-makers use to abate NPS water pollution.

Taxes are another set of instruments that have been used in the management of NPS water pollution. Negative taxes on certain types of undesirable behaviour are used in some jurisdictions (for example, Sweden, Norway, and Finland have a tax on chemical fertilizers);²⁵ but tax incentive schemes are more common. These instruments are less direct and attempt to achieve water quality objectives through income and property tax credits and deductions that encourage private protection and stewardship of land and water resources. These instruments are often connected to land-use or land-protection strategies such as conservation easements and covenants. Two-part schemes are applied in some jurisdictions: if pollutant levels exceed a certain limit, the polluter pays a tax on the excess; if the discharges are lower than the set limit, the polluter receives a subsidy or tax credit.²⁶ However, this scheme depends on information and monitoring, and becomes problematic when there are several polluters on a watercourse.

In practice, carrots combined with sermons are the preferred instruments to treat NPS water pollution problems. Policy-makers tend to create strategies made up of a combination of instruments and implementation arrangements. The case studies below indicate how three different policy instruments – namely, cost-shared subsidies, land-use regulation, and taxes – have been used to deal with NPS water pollution problems in Ontario and three U.S. states.

4 Why Compare U.S. and Ontario Policies?

Comparing U.S. and Ontario policies regarding pollution is instructive for a number of reasons: water pollution problems are broadly similar in these jurisdictions; ecosystems have similar biological, physical, and human-use functions at a number of different scales irrespective of whether they are in Canada or the United States; water pollution in the two jurisdictions results from both point and non-point sources; neither Canada nor the United States has met water quality objectives in many ecosystems; both these countries have federal systems of governance, with national and subnational governments sharing responsibility for environmental policy; both countries have used

²⁵ See Eckerberg.

²⁶ Segerson, 1988, p. 90.

traditional bureaucratic arrangements to implement environmental policy;²⁷ and finally, initial legislation and policy efforts in both countries have focused primarily on point source pollution control and remediation.

“Despite the overall similarity in approach, however, there are important differences between the two jurisdictions’ regulatory frameworks, reflecting each nation’s institutional arrangements and regulatory style.”²⁸ Comparative studies have clearly outlined the influence of the institutions in Canada and the United States on the evolution of policy implementation, policy styles, and the performances of each country in meeting water quality objectives. The Canadian policy style has been characterized as more closed, informal, and cooperative, whereas the U.S. policy style has been characterized as open, formal, legalistic, and adversarial.²⁹ Research suggests, however, that policy depends on the specific environmental area being dealt with and that both countries’ styles include elements of bargaining, legalism, and cooperation.³⁰ Although some similarities do exist in approach and instrument selection, comparative policy studies show that there is little sign of the policies converging.³¹ There is evidence, however, that both countries are attempting to improve intergovernmental collaboration through more cooperative policy instruments.³²

²⁷ Robert Phaelke and Douglas Torgerson, eds., 1990, *Managing Leviathan: Environmental Politics and the Administrative State* (London, U.K.: Belhaven); G. Bruce Doern and T. Conway, 1994, *The Greening of Canada: Federal Institutions and Decisions* (Toronto: University of Toronto Press); Walter A. Rosenbaum, 1989, “The bureaucracy and environmental policy,” in James P. Lester, ed., *Environmental Politics and Policy: Theories and Evidence* (Durham, N.C.: Duke University Press).

²⁸ G. Hoberg, 1992, “Comparing Canadian performance in environmental policy,” in R. Boardman, ed., *Canadian Environmental Policy: Ecosystems, Politics and Process* (Toronto: Oxford University Press), p. 254.

²⁹ Kathryn Harrison, 1996, *Passing the Buck: Federalism and Canadian Environmental Policy* (Vancouver: UBC Press); G. Hoberg, 1993a, “Environmental policy: Alternative styles,” in M. Atkinson, ed., *Governing Canada: Institutions and Public Policy* (Toronto: Harcourt Brace).

³⁰ Hoberg, 1993a. See also P.C. Fafard and K. Harrison, 2000, *Managing the Environmental Union: Intergovernmental Relations and Environmental Policy in Canada* (Kingston, Ont.: McGill-Queen’s University Press).

³¹ G. Hoberg, 1993b, “Sleeping with the elephant: The American influence on Canadian environmental regulation,” *Journal of Public Policy*, vol. 11, no. 1; M. Howlett, 1994, “The judicialization of Canadian environmental policy, 1980–1990: A test of the Canada–United States convergence thesis,” *Canadian Journal of Political Science*, vol. 27, no. 1.

³² Kathryn Harrison, 1998, Talking with the Donkey: Cooperative Approaches to Environmental Protection, paper presented at the Canadian Political Science Association Annual Meeting, June, Ottawa; W. Clinton and A. Gore, 1995, Reinventing Environmental Regulation (Washington, D.C.: Council on Environmental Quality); Scott Furlong, 1995, “Reinventing regulatory development at the Environmental Protection Agency,” *Policy Studies Journal*, vol. 23, no. 3.

The achievement of these two countries in meeting environmental objectives varies according to the differences in population and severity of the pollution. Some evidence exists that the United States has outperformed Canada in water pollution management.³³ However, the comparative findings on the features and success of water pollution policies in both countries have focused on point source water pollution. A study (published in 1995) of water pollution instruments and arrangements used in the Great Lakes basin shows that governments that adopt “integrated regulations” perform better than those that rely on “fragmented regulations.”³⁴ Comparative research (published in 1999) that includes Ontario suggests that U.S. states are far ahead of their Canadian counterparts in moving toward preventing pollution, integrating cross-medium policies, and measuring environmental outcomes more comprehensively.³⁵

5 Non-Point Source Water Pollution Management in the United States

5.1 History of National Institutions and Instruments

The rules governing water quality in the United States are based on common law and constitutional rules that have granted states and localities the legal authority to control water rights and pollution almost exclusively. The intergovernmental nature of environmental policy-making in the United States has been characterized as “conjoint federalism” – whereby state and federal authority blend and apply concurrently.³⁶ National goals drive regulatory programs, and federal and state agencies exercise concurrent enforcement authority. In fact, 18 of the 25 federal environmental laws passed between 1960 and 1980 asserted federal authority on matters that states previously controlled exclusively.³⁷

³³ Hoberg, 1992, p. 257.

³⁴ Barry G. Rabe and J.B. Zimmerman, 1995, “Beyond environmental regulatory fragmentation: Signs of integration in the case of the Great Lakes basin,” *Governance*, vol. 8, no. 1.

³⁵ Barry G. Rabe, 1999, “Federalism and entrepreneurship: Explaining American and Canadian innovation in pollution prevention and regulatory integration,” *Policy Studies Journal*, vol. 27, no. 2.

³⁶ David M. Welbourn, 1988, “Conjoint federalism and environmental regulation in the United States,” *Publius*, vol. 18; Daniel J. Fiorino, 1995, *Making Environmental Policy* (Berkeley: University of California Press), p. 85.

³⁷ Welbourn.

The *Water Quality Act* in 1965 initiated the federal government's role in setting standards with respect to water pollution, and established the Federal Water Pollution Control Agency (FWPCA) under the Department of Health, Education and Welfare. The replacement of the FWPCA with the U.S. Environmental Protection Agency (EPA) in 1971 signalled another important step for the federal government. This step also gave the emerging environmental bureaucracy responsibility for the significant functions of environmental research and technical policy-making.³⁸ However, it was not until 1972 that the *Water Pollution Control Act (WPCA)* made more substantial changes to the federal government's role under the constitutional powers relating to interstate waters. This legislation was enacted primarily to provide states and localities with funds for the construction of sewage treatment plants. The *WPCA* was implemented mainly through the National Pollutant Discharge Elimination System (NPDES), a permit program that targeted point source polluters. Under this program, state and federal regulators provide permits to all industrial and municipal facilities that discharge into public waterways.³⁹ Although section 208 of the 1972 *WPCA* did contain provisions to deal with NPS pollution through the development of wastewater management plans called "208 plans," few programs incorporated measures to control NPS pollution.⁴⁰

Several amendments to the *WPCA* gradually increased the federal government's "high vertical involvement" in water pollution management.⁴¹ State and local officials, enticed by federal dollars, gradually became more receptive to a federal presence in this policy area. Through its spending power and funds for the construction of sewage facilities, the federal government increased its role in water pollution policy. At the same time, a variety of forces led to greater reliance on states and local governments as regulatory agents in carrying out federal programs.⁴²

The Rural Clean Water Program, established in 1977 under federal legislation regarding clean water, introduced voluntary technical assistance – namely, cost-

³⁸ Rosenbaum, 1989, p. 213.

³⁹ By 1992, 38 states were implementing and enforcing the program. As outlined in section 301(a), the setting and enforcing NPDES permits remain the cornerstone of the national water quality effort.

⁴⁰ John H. Baldwin, 1985, *Environmental Planning and Management* (London, U.K.: Westview Press), p. 171.

⁴¹ Lowry, p. 58.

⁴² Cynthia Cates Colella, 1981, *Protecting the Environment, Politics, Pollution, and Federal Policy* (Washington, D.C.: Advisory Commission on Intergovernmental Relations).

sharing BMPs. This program indicated the federal government's interest in expanding its role in this area, but low levels of funding are said to have significantly weakened this policy effort.⁴³ Although improving municipal sewage treatment facilities remained a priority of federal policy, in the mid-1980s, increasing scientific evidence indicated that point source pollution management was only part of the nation's water pollution problem. The EPA began to recognize the importance of NPS water pollution problems and realize that these problems required new approaches. However, in contrast to federal involvement in the management of point source water quality, such involvement in NPS pollution control up to this point has been characterized as "so low that states acted rather autonomously."⁴⁴

With the election of Ronald Reagan in 1984, the federal government attempted to withdraw from involvement in water pollution control. However, by the mid-1980s, NPS pollution accounted for nearly two-thirds of the pollutants reaching U.S. waterways, and it was clear that regulations regarding point source pollution were not achieving water quality objectives.⁴⁵ In 1987, Congress passed the *Clean Water Act (CWA)*, nearly unanimously, over the veto of President Reagan. Although some authority to determine and administer water quality regulations was returned to the states, the EPA continued to play an active leadership role in determining policy directives and supporting state agencies and programs, technically and financially.

Under the legislation, the term 'non-point source' is understood to mean any source of water pollution that does not meet the definition of "point source" in section 502(14) of the *Clean Water Act*. That definition states:

The term "point source" means any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.⁴⁶

⁴³ Lowry, p. 100.

⁴⁴ Lowry, p. 89.

⁴⁵ Walter A. Rosenbaum, 1991, *Environmental Politics and Policy* (Washington, D.C.: Congressional Quarterly Press).

⁴⁶ U.S., EPA, Office of Water, 2000, *Non-Point Source Pollution Background* [online], [cited December 1, 2000], <www.epa.gov/owow/nps/MMGI/Chapter1/ch1-1.html>.

Section 319 of the *CWA* directly tackled NPS water pollution for the first time by directing states to assess non-point sources in their jurisdictions and to develop implementation plans with the assistance of the EPA.⁴⁷ Congress recognized the need to establish the federal Non-Point Source Management Program (NPS Management Program) in order to provide federal leadership and help focus state and local efforts on NPS pollution. Under the program, state and local units of government received grant monies to support a variety of activities, including technical assistance, demonstration projects, implementation of BMPs, and monitoring initiatives. The legislation also required states to submit plans for controlling NPS pollution to the EPA for approval. Federal grants of up to 60% of the cost of state management plans became available to approved states.⁴⁸ Funds are channelled to state governments, which in turn fund local NPS projects and initiatives. Although reporting requirements and financial aid are the most common mechanisms through which the federal government is involved in NPS water pollution management, federal involvement also exists through the EPA in the form of national BMP guidelines and technical assistance in implementing state management plans.

Although in 1988 only US\$400 million of the US\$18 billion⁴⁹ allocated federally for water pollution programs over four years was designated for NPS pollution programs, section 319 of the *CWA* redefined water pollution problems in the United States and prompted states to refocus their policies.⁵⁰ Under this legislation, states and local governments were encouraged not only to define their NPS water pollution problems more precisely, but also to develop institutional arrangements for action on a watershed basis. In 1990, the *Pollution Prevention Act* further augmented the federal government's mandate and role in adopting a pollution-prevention strategy. In 1991, the EPA took another step in this direction and released its pesticides and groundwater strategy. Until that time the NPS Management Program had focused on surface waters. The EPA continues to redefine its role in water quality management, given the importance of groundwater-surface water interactions.

Other federal departments and agencies have also assisted in reducing NPS water pollution. As agricultural runoff is the primary source of NPS water pollution in many ecosystems, the U.S. Department of Agriculture (USDA)

⁴⁷ Ringquist, 1993, p. 57.

⁴⁸ U.S., EPA, Office of Water, [2000] *Non-Point Source Management Program* [online], [cited December 1, 2000], <www.epa.gov/OWOW/NPS/index.html>.

⁴⁹ All dollar amounts in section 5 of this paper are in U.S. currency.

⁵⁰ Lowry, p. 101.

has administered several programs related to NPS water pollution management – for example, the Agricultural Conservation Program, the Water Bank Program, and the USDA-EPA National Strategy for Animal Feeding Operations.⁵¹ In partnership with farm organizations, the USDA has also helped to implement the voluntary Farm*A*Syst program. Like the NPS Management Program, the USDA's programs are based on two principles: voluntarism and localism.⁵²

In 1997, a new funding guideline decentralized the implementation of the federal NPS Management Program under nine eligibility criteria.⁵³ Fiscal year 2000 marked the tenth year of the state implementation of the NPS Management Program, and total program funding passed the \$1 billion mark.⁵⁴ Also in 2000, initiatives under the Clinton administration's Clean Water Action Plan doubled annual federal funding for the federal NPS Management Program from \$100 million to \$200 million.⁵⁵

In the late 1990s, the EPA moved toward integrating point source and non-point source efforts under section 303(d) provisions of the 1987 CWA, which attempt to reduce water pollution through a Total Maximum Daily Load (TMDL) framework.⁵⁶ This framework attempts to link efforts under section 319 to NPDES point source permit system requirements. Again, the emphasis is on integrating federal funding and regulatory instruments with state and local efforts – implemented under USDA and EPA programs – to improve water quality and restore watersheds.

5.2 Non-Point Source Water Pollution Management at State and Local Levels

Studies have shown that 'conjointness' varies according to the state in question, the type and severity of the environmental problem, the economic and political

⁵¹ U.S., Department of Agriculture–EPA, 1999, *Unified National Strategy for Animal Feeding Operations*, March (Washington, D.C.: the department and EPA).

⁵² Lowry, p. 100.

⁵³ U.S., EPA, Office of Water, 1996, *Non-Point Source Program and Grant Guidance for Fiscal Year 1997 and Future Years* [online], [cited October 1999], <www.epa.gov/OWOW/NPS/npsguide1.html>.

⁵⁴ U.S., EPA, Office of Water, 1999, *Supplemental Funding Guidance for Awarding of Section 319 Grants in Fiscal Year 2000* (Washington, D.C.: EPA).

⁵⁵ U.S., EPA, 1998, *Clean Water Action Plan* (Washington, D.C.: EPA).

⁵⁶ U.S., EPA, 2000, *Total Maximum Daily Load Plans* [online], [cited May 2000], <www.epa.gov/OWOW/TMDL/docs.html>.

capabilities of the state, and the organizational ability of interest groups.⁵⁷ Research also indicates that not only is there more federal involvement in water pollution than in air pollution, but federal involvement is significantly greater in point source than in non-point source pollution; such involvement also varies considerably by state.⁵⁸

Prior to the enactment of federal legislation in the 1970s, most land-use and water-related policies were the domain of state and local governments. Initially, NPS pollution management was largely left to individual states with little federal government involvement. By 1986, 33 of the 52 states ranked NPS pollution as their major water pollution problem.⁵⁹ To meet the federal legislative requirements, states had to undertake an NPS assessment process with partner agencies in the state. Each state required a designated lead agency to coordinate implementation with EPA officials. Shortly after the federal *CWA* amendment, many states amended their legislation and designated a lead agency to implement the federal NPS Management Program. They then inventoried and assessed all existing state programs regarding NPS water pollution management, identified all waters not meeting water quality objectives, and better defined their non-point sources.

After EPA approval, each state was eligible to receive section 319 grants that primarily funded state lead agency staff and implementation of the NPS Management Plans by local units of government. The guideline for section 319 funding clearly requires BMPs as a condition of funding. It also encourages states to identify priority watershed projects and to implement plans through cost-sharing agreements (CSAs) with landowners. The policy instruments selected for implementation are based on voluntarism, localism, and the required participation of community stakeholders. Typically, funds for implementation projects are awarded on the basis of watershed and project proposals from counties, municipalities, watershed councils, soil conservation districts, and

⁵⁷ A.H. Bacot and R.A. Dawes, 1997, "State expenditures and policy outcomes in environmental program management," *Policy Studies Journal*, vol. 25, no. 3; E.J. Ringquist, 1994, "Policy influence and policy responsiveness in state pollution control," *Policy Studies Journal*, vol. 22, no.1; J.P. Lester, 1986, "New federalism and environmental policy," *Publius*, vol. 16, no. 1; C.E. Davies and J.P. Lester, 1989, "Federalism and environmental policy," in Lester, ed., 1989; H.M. Ingram and D.E. Mann, 1989, "Interest groups and environmental policy," in Lester, ed., 1989.

⁵⁸ Lowry, p. 100. See also Environmental Law Institute, 1997, 1998, 2000, *Enforceable State Mechanisms for the Control of Non-Point Source Water Pollution*. (Washington, D.C.: Environmental Law Institute).

⁵⁹ U.S., EPA, 1995, *Progress Report 1995* (Washington, D.C.: EPA), p. 72.

resource conservation councils and departments. Partnerships with community stakeholders are explicitly encouraged as a condition of project funding.

By 1993, all states had complied with the section 319 requirements and were implementing NPS cost-shared programs. Some states continue to rely almost exclusively on federal funding for BMP programs, and others have state and local funding sources. Although the programs across states and localities differ significantly, there is some consistency in the current mix of policy instruments being implemented to reduce NPS water pollution. The federal reporting requirements and funding guideline institutionalized cost-sharing subsidy programs as the preferred policy instrument strategy across all states. The federal program is modelled on the policy instrument strategy that had been in place in Wisconsin since 1978.⁶⁰ Although most states and localities use cost-shared subsidies for BMPs as the primary instrument for dealing with NPS water pollution, a combination of instruments is typical in most states.

5.3 Cost-Shared Subsidies and Best Management Practices: The Wisconsin Case

As in the case of point source efforts, intergovernmental transfers (in the form of federal grants to state and local governments) have most directly supported the implementation of NPS water pollution policy across the United States. Several states had, however, introduced legislation and NPS programs before the federal NPS Management Program was initiated. Programs such as Wisconsin's Non-Point Source Pollution Abatement Program (NPS Abatement Program) essentially provided grant incentives to individual landowners and local governments to pay part of the cost of implementing BMPs.⁶¹ The federal program in Wisconsin was thus seen as complementary to the existing state program, and complying with the federal legislation was not onerous.

Wisconsin had already allocated state resources to its NPS Abatement Program and used federal resources primarily to top-up committed state resources. As a result of the federal legislation, the *Wisconsin Legislature Act 297* was amended

⁶⁰ Wisconsin had established its own Non-Point Source Pollution Abatement Program, also referred to as the 'Priority Watershed Program' because it was based on a watershed approach (Wisconsin *Statute 297*, section 144.25).

⁶¹ The original NPS program was replaced in 1999 by Wisconsin's *Runoff Management Program* [online], [cited December 1999], <www.dnr.state.wi.us/org/water/wm/nps.index.htm>.

in 1988 to make the Department of Natural Resources (Wisconsin DNR) the lead agency in the abatement of NPS water pollution – federally and on behalf of the state. The amendment also authorized the Wisconsin DNR to order the abatement of certain non-point sources when the party responsible could be identified. Until then, the NPS program had been totally voluntary. Although this was a new tool, “the NPS order was very rarely used.”⁶² The Department of Agriculture, Trade and Consumer Protection (DATCP) was also involved in the NPS Abatement Program from its inception. The state divided its priorities among 19 large state basins that were subdivided into 330 watersheds, of which 87 were given priority.⁶³ The program started as a rural initiative and expanded to include urban watersheds. The various cost-shared subsidy rates for different eligible BMPs are outlined in the Wisconsin DNR Regulation 120 (NR 120). BMPs are funded at different rates with different limits. For example, manure storage facilities are eligible for a maximum of \$35,000 per facility.⁶⁴ By 1999, Wisconsin was receiving \$2.7 million from the federal program and had a state allocation of \$38 million over two years for its own NPS Abatement Program.⁶⁵ Under the federal Clean Water Action Plan, Wisconsin’s federal allocation increased to \$5.1 million per year.⁶⁶

After nearly 20 years of implementation, the program underwent a major review in 1998. *Wisconsin Act 27* was added to chapter 281 of the Wisconsin statutes and specified the following requirements for the program: a more coordinated approach between the Wisconsin DNR and DATCP, greater emphasis on local government delivery, the establishment of performance measures, and a broadening of funding eligibility to make basin-wide and Targeted Runoff Management Projects eligible.⁶⁷ The program redesign under *Act 27* was approved in 2000. One of the most significant developments has been the

⁶² NPS Project Implementation Coordinator, Wisconsin DNR, 1998 (August), interviewed by the author.

⁶³ Wisconsin DNR, 1988, *Non-Point Source Management Report* (Madison, Wis.: DNR).

⁶⁴ Wisconsin DNR, 1999, *Priority Watershed and Priority Lake Program: NR Chapter 120, Section 18* (Madison, Wis.: DNR).

⁶⁵ Wisconsin’s Clean Water 2000 initiative committed the state to having all priority watershed projects underway by the year 2000 and committed funds annually to the NPS program through an earmarked surcharge on motor vehicle transfers.

⁶⁶ Director of the Runoff Management Section of the Wisconsin DNR, 1998 (August), interviewed by the author. See also U.S., EPA, Office of Water, 2000, *Supplemental Guidance for the Awarding of Section 319 Non-point Source Grants, Attachment A, Fiscal Year 2000*, Washington, D.C.: EPA.

⁶⁷ Targeted Runoff Management Projects are subsidy-based BMP projects developed to manage pollution at project levels smaller than a watershed; these projects are generally funded for three years – as opposed to eight years, which was the typical funding period for priority watershed projects.

establishment of performance standards, some of which are regulatory. The designation of “critical sites” indicates a movement away from a largely voluntary approach to a two-tiered approach. This performance-based approach is also being driven in part by the new federal push for action in terms of the TMDL framework.⁶⁸ The state statute requires that plans for all priority watershed projects in Wisconsin be completed by December 31, 2015.

In addition to statutory reform of the program, the institutional arrangements for implementation have also undergone restructuring since 1999. Under the Watershed Management Bureau in the Water Division of the Wisconsin DNR, the Stormwater Management Program and the Animal Waste Program (both more regulatory in character) were combined with the NPS Abatement Program in a new Runoff Management Section.⁶⁹

5.4 Land-Use Regulation: The Michigan Case

Land-use regulation to prevent NPS water pollution has been evident in some U.S. states only since the late 1990s. The regulation of land as private property is clearly articulated in the Fifth Amendment to the U.S. Constitution (which has similar counterparts in state constitutions). The Fifth Amendment states in part, “No person shall be deprived of life, liberty, or property without due process of law; nor shall private property be taken for public use, without just compensation.” The U.S. Supreme Court has interpreted this to mean that a regulation that restricts the use of property could constitute a taking for which the property owner must be compensated.⁷⁰ In the United States land is regarded as primarily a commodity and private property rights as paramount. Land is not viewed as an integral part of ecosystems or as a societal asset whose development can affect the entire community and its water quality.⁷¹

Again, there is a federal presence in what has traditionally been local jurisdiction. The *National Environmental Protection Act* of 1969 and subsequent state statutes called “little NEPAs” created a process by which the environmental impacts of a

⁶⁸ NPS Project Implementation Coordinator, Wisconsin DNR, 1999 (August), interviewed by the author.

⁶⁹ See Wisconsin DNR, 1999, *Organization Chart* [online], [cited October 1999], <www.dnr.state.wi.us/aboutdnr/orgchart/>.

⁷⁰ Elizabeth A. Watson and Judith LaBelle, 1997, “An introduction to planning and land use management in the United States,” *Environments*, vol. 24, no. 3, p. 66.

⁷¹ *Ibid.*, p. 70.

proposed development to be situated near classified environmental areas (such as wetlands, forests, and designated parklands) are assessed prior to development being approved. In some states ‘environmental impact statement’ (EIS) processes have also been adopted for developments that exceed a certain size limit (acreage, number of units, etc). These processes have become an important part of the development process and an administrative instrument to manage the relationship between land use and water quality. Beyond these specific cases of state and federal environmental assessment requirements, the city, county, and district governments still play an important role in determining if and how land-use regulation instruments can be used to achieve water quality objectives.

Michigan, like most states, has implemented BMP cost-shared programs, but has also attempted to use land-use regulation tools to better manage water quality – especially in priority watersheds that are facing increasingly intensive agricultural production and development pressures. For example, the Bear Creek Watershed in Cannon Township is close to Michigan’s second largest city, Grand Rapids. This proximity has made the Bear Creek Watershed area desirable for residential and commercial development. In addition to the BMP incentives, local governments have attempted to protect the watershed through land-use regulation. The regulations are designed to prevent soil erosion along creek banks, prevent sedimentation, preserve the vegetation along the creeks, and ensure adequate setbacks for buildings, structures, and septic systems.⁷² Ordinances are developed at the town and county levels, and administered by local zoning administrators and planning commissions.

Although several states and the EPA have developed model land-use ordinances that state and local governments can voluntarily adopt as part of their NPS management efforts,⁷³ land-use management tools continue to be developed and administered locally. These tools are weakly integrated as regulatory tools in Michigan’s overall Non-Point Source Abatement Program. Michigan’s approach to managing NPS water pollution is, like Wisconsin’s, based on voluntary BMPs and landowner education. Unlike in Wisconsin, the federal section 319 legislation stimulated programming in this area. Between 1988 and 1998, Michigan relied almost entirely on \$14 million in section 319 funding to implement its NPS

⁷² Michigan, Cannon Township, 1999, Ordinance 18, section 18.01.

⁷³ Some states, such as Wisconsin and Michigan, have developed model stormwater management ordinances, and the U.S., EPA’s Office of Water has developed model ordinances. See U.S., EPA, Office of Water [2000], *Non-Point Source Model Ordinance* [online], [cited May 2000], <www.epa.gov/OWOW/nps/ordinance.html>.

pollution management plan.⁷⁴ Only in the late fall of 1998 was state funding of \$50 million allocated to NPS programs in Michigan.⁷⁵ These funds have been earmarked primarily to implement BMP cost-shared programs.

5.5 Voluntary Tax Incentives, Easements, and Trusts: The New York State Case

Another important policy instrument strategy that has been used to deal with NPS water pollution in the United States is a system of tax incentives administered by non-profit trusts. At the local level, land trusts, water trusts, and conservancies are increasingly important vehicles for protecting water resources and managing the relationship between land use and water quality. Although land trusts vary significantly in structure and function, they are generally non-profit organizations involved in voluntary measures to manage land for environmental purposes. The primary tool used to do this in the United States is the conservation easement. "Conservation easements are essentially agreements which set out conservation obligations for a property that are then registered on the land title. As a result, landowners agree to be legally bound to these land use and conservation obligations, which can then be enforced against current and future landowners by the holder. For example, an easement might restrict the development of land, the cutting of trees, or require the maintenance of fences to keep livestock out of a stream."⁷⁶ Put another way: "Easements are like a bundle of rights ... different types of property rights are transferred to the land trust ... originally broad rights like right to develop or clear land ... but easements are getting very sophisticated ... including language limiting use of pesticides, types of farming etc."⁷⁷ In essence, the landowner gives up certain rights or agrees to certain practices in exchange for tax benefits.

Under common law, the first land trust in the United States was recorded in Massachusetts in 1892. However, it was not until the 1970s that many states

⁷⁴ Michigan, Department of Environmental Quality, 1998, *Nonpoint Source Program Update, August 1998* (Grand Rapids, Mich.: the department).

⁷⁵ Ibid. In November 1998, the Clean Michigan Initiative designated \$50 million of a \$675-million environmental bond (state-issued bond) initiative for NPS programs. Funds are targeted at implementing BMPs through watershed plans.

⁷⁶ Ian C. Attridge, 1997, *Conservation Easement Valuation and Taxation in Canada*, Report No. 97-01, prepared for the North American Wetlands Conservation Council and Environment Canada, Canadian Wildlife Service, Habitat Conservation Division (Ottawa: Environment Canada), p. ix.

⁷⁷ Director of New York Land Trust Alliance, Saratoga, 1998 (July 28), interviewed by author.

enacted into statute (1) the notion of transferring property rights to an independent organization and (2) the idea that the public could benefit from private conservation easements. By 1980, more than 40 states had passed legislation related to land trusts; by 1998, only two states did not have similar legislation.⁷⁸ Amendments to federal tax law in 1969, 1976, and 1980 form the foundation of the modern land trust in the United States. Since the final amendments in 1980, easements have qualified under section 170(h) of the *Internal Revenue Code* for an income tax deduction, and incentives have allowed property owners to use easements as tax and estate planning tools, as well as an environmental protection tool. In addition to federal income tax and estate incentives, some states have increased the deductions by integrating easement deductions with state income tax law and property tax law.⁷⁹ These provisions vary by state and locality. Progress with respect to property tax incentives has been slow because many local jurisdictions depend almost solely on property tax as a source of revenue.⁸⁰

Since 1980, as a result of both federal and state legislation, land trusts in the United States have proliferated. By 1998, there were 1,213 land trusts in the United States, protecting more than 4.7 million acres of ecologically sensitive land and 1.3 million acres by conservation easement.⁸¹ Easements have proven to be particularly flexible tools because they allow the owner to continue using the land and controlling its transfer by sale, gift, or bequest. As federal and state funding for land acquisition has declined, land trusts have stepped in to protect the land – and indirectly water quality too, because many of the lands with restricted uses under easements are close to watercourses.

Some land trusts have received funding under federal and state programs to deal specifically with water quality problems. Some have received section 319 funding in partnership with local agencies; and some have received the federal grants made available to states for programs under the *Safe Drinking Water Act*

⁷⁸ Ibid.

⁷⁹ Federal income tax law allows a deduction of up to 30% of adjusted gross income, which can be carried forward or spread over five additional years. Estate tax law allows property owners to place a conservation easement on the land during the landowner's lifetime or donate it by will. This lowers the value of the taxable portion of the estate. See Land Trust Alliance, 1996, *Conservation Options: A Landowners' Guide* (Washington, D.C.: Land Trust Alliance).

⁸⁰ Ibid; director of New York Land Trust Alliance, Saratoga, New York, 1998 (July 28), interviewed by author.

⁸¹ Land Trust Alliance, 1998, *National Land Trust Census* [online], [cited July 1999], <www.lta.org/aboutlta/census.shtml>.

(SDWA).⁸² New York has the most extensive system of land trusts and has been the recipient of this source of protection funding. However, land trusts are just beginning to formally acknowledge the connection between land use and NPS water quality management. Increasingly, local governments are realizing that land trusts can play a role in managing the relationship between land use and water quality. The integration of land-use regulation with county and local land-use planning, however, is weak and varies considerably. The emergence of water trusts in the United States may strengthen the use of easements and tax incentives in more directly addressing NPS water pollution.⁸³

6 Non-Point Source Water Pollution Management in Ontario

6.1 Overview of Federal Institutions and Instruments

Environmental problems related to water quality in Canada, as in the United States, have been defined primarily in the context of common law private property rights and constitutional rules.⁸⁴ At the federal level, the 1970 *Canada Water Act*⁸⁵ was an early ‘enabling’ law – rather than a ‘regulatory’ law – that established federal involvement in water pollution management.⁸⁶ The federal *Fisheries Act*⁸⁷ is the other important federal statute that has granted the federal government some authority in dealing with water pollution issues. These early laws enabled the federal government – with a minimal role in implementation – to make agreements with provinces and industries to control point source environmental

⁸² Land Trust Alliance, 1998, *Federal Funds for Protecting Local Watersheds* (Washington, D.C.: Land Trust Alliance), p. 1.

⁸³ The Washington Water Trust was established in 1998 to protect water quality and to preserve and restore rivers and streams in Washington through water rights programming. See Johns.

⁸⁴ Common law in Canada provides landowners holding land adjacent to or under a stream, lake, or harbour with legally enforceable rights concerning the quality of water they use. The basic principle is that every riparian proprietor is entitled to the water of the stream in its natural flow without alteration to its character or quality. This legal right means that an individual or owner upstream who changes the quality or level of water flowing past his or her land to the detriment of those downstream may be liable to a civil claim. See David Estrin and John Swaigen, 1993, *Environment on Trial: A Guide to Ontario Environmental Law and Policy*, 3d ed. (Toronto: Emond Montgomery Publications), p. 114.

⁸⁵ RSC 1985, c. C-11.

⁸⁶ Doern and Conway, p. 22.

⁸⁷ RSC 1985, c. F-14.

problems. In 1987 the Federal Water Policy reconfirmed the federal government's commitment to water quality research and to its support role in point source wastewater infrastructure. The 1988 and revised *Canadian Environmental Protection Act, 1999*⁸⁸ (CEPA) emphasize pollution prevention and an ecosystem approach. However, the focus on toxic substances and point source pollution and solutions remains unchanged. The federal role has been channelled primarily through other ecosystem-based efforts, such as remediation of water pollution in the 43 Areas of Concern on the Great Lakes under the *Canada-U.S. Great Lakes Water Quality Agreement*. NPS efforts under Remedial Action Plans have been limited because governments on both sides of the border have focused on the remediation of high-cost point source problems.

The federal government has not been actively involved in defining the problem of NPS pollution beyond Environment Canada's role in some basic research on selected watercourses.⁸⁹ Federal legislation and implementation efforts to date reflect the federal government's role in research and its emphasis on providing infrastructure funding to manage point source pollution. As described below, the federal government has also been involved in funding some agro-environmental initiatives. There is no indication that this policy position is changing.⁹⁰

6.2 Non-Point Source Water Pollution Management at Provincial and Local Levels in Ontario

Studies have revealed that water quality management in Canada is primarily the responsibility of provincial governments.⁹¹ Surface water quality and groundwater quality are mainly dealt with under provincial legislation. Although all provinces have legislation to regulate point sources of water pollution, only British Columbia has a five-year program to deal specifically with NPS water pollution – a program that was formalized only in March 1999.⁹² This program shares many instrument features with the programs in the United States. The economic costs of several NPS-related pollution events have resulted in the B.C. Ministry of Environment,

⁸⁸ SC 1999, c. 33.

⁸⁹ Canada, National Water Research Institute, Aquatic Ecosystem Protection Branch, 1998, *Non-Point Sources of Pollution Project* [online], [cited December 5, 1998], <www.cciw.ca/nwri-e/aepb/non-point>.

⁹⁰ Canada, Environment Canada, 2000, *1999-2000 Estimates: A Report on Plans and Priorities* [online], [n.d.] <www.ec.gc.ca/rpp/1999_e.pdf>.

⁹¹ M.H. Sproule-Jones, 1993, *Governments at Work* (Toronto: University of Toronto Press), chapter 9.

⁹² British Columbia, Ministry of Environment, Lands and Parks, Water Management Branch, 1999, *Non-Point Source Action Plan* [online], [cited March 1999], <www.env.gov.bc.ca/wat/>.

Lands and Parks taking responsibility for implementing the action plan under existing legislation.⁹³ Most other provinces, including Ontario, have only indirect instruments to deal with NPS water pollution.

Since 1972, the *Environmental Protection Act*⁹⁴ and the *Ontario Water Resources Act (OWRA)*⁹⁵ have been used interchangeably by Ontario's Ministry of the Environment (MOE) to abate water pollution through regulation of point sources, investments in sewage treatment facilities, and monitoring regimes.⁹⁶ The primary instruments used to deal with water pollution have been regulatory regimes and water quality objectives. Since 1986, the Municipal-Industrial Strategy for Abatement (MISA) program and Certificates of Approval have been the primary instruments under the provincial regulatory regime. The MOE has been responsible for implementing effluent standards where works discharge directly into watercourses.⁹⁷ The MISA program, like NPDES in the United States, regulates point source pollution through permits.

The two instruments that underpinned water pollution management in Ontario were the provincial Water Quality Objectives and Drinking Water Objectives. The Drinking Water Objectives were changed in August 2000 to the Ontario Drinking Water Standards, most of which were incorporated into the *Drinking Water Protection Regulation*.⁹⁸ The current drinking water standards are primarily monitored by the operating authorities of municipal water and wastewater treatment facilities and through the MOE's Drinking Water Surveillance Program.⁹⁹ The province has provided financing for water pollution management infrastructure, under the \$200 million Provincial Water Protection Fund announced in 1997.¹⁰⁰

⁹³ British Columbia, Ministry of Environment, Lands and Parks, 1999, *Tackling Non-point Source Water Pollution in British Columbia: An Action Plan*, Table I, ISBN 7726-3666-4 (Victoria: Ministry of Environment, Lands and Parks, Water Management Branch).

⁹⁴ RSO 1990, E. 19.

⁹⁵ RSO 1990, c. O-40.

⁹⁶ Estrin and Swaigen.

⁹⁷ Ontario, Ministry of the Environment, 1986, *Municipal-Industrial Strategy for Abatement: A Policy and Program Statement*, Toronto, June.

⁹⁸ O. Reg. 459/00, pursuant to the OWRA. These changes were part of Operation Clean Water, an action plan largely prompted by the water pollution tragedy in Walkerton, Ontario, May–June 2000.

⁹⁹ Operating authorities include municipalities and the Ontario Clean Water Agency; the latter operates approximately 25% of mostly smaller municipal water facilities. The Drinking Water Surveillance Program is a voluntary monitoring program administered by the MOE and participating municipalities. See Ontario, Ministry of the Environment, 2000, *Drinking Water in Ontario: A Summary Report 1993–1997* (Toronto: Queen's Printer).

¹⁰⁰ Ibid.

The provincial government also deals with water pollution in the key areas of environmental assessment under the *Environmental Assessment Act*,¹⁰¹ under the *Planning Act*¹⁰² (administered by the Ministry of Municipal Affairs and the Ontario Municipal Board), and through conservation authorities under the *Conservation Authorities Act*.¹⁰³ The Ministry of Natural Resources (MNR) plays a role in protecting wetlands, forests, and habitat through protection classification schemes. Of all the provincial agents responsible for water quality management, conservation authorities and municipalities are the most directly involved in managing local water resources.

Under the *Conservation Authorities Act*, conservation authorities manage watersheds in Ontario. Each authority consists of representatives of the provincial government and of each municipality within a watershed. Conservation authorities have a broad range of powers, including the ability to purchase, lease, or expropriate land. They may also make regulations related to flood-plain management within their jurisdiction. In addition, conservation authorities are involved in watershed planning, environmental assessment, and community stewardship of watersheds.

At present in Ontario, no specific policy instrument strategies have been initiated to address NPS water pollution problems; however, a combination of provincial and municipal policy instruments deal indirectly with this type of water pollution in the province.

6.3 Cost-Shared Subsidies and Best Management Practice Instruments in Ontario

Although no specific federal or provincial initiatives are available, indirect funding has supported NPS water pollution management primarily through agro-environmental policy schemes. As in the United States, in Canada BMPs generally form the foundation of the limited grant incentive programs targeted at the agricultural sector and implemented at the provincial level.

The MOE has focused its water quality managements efforts primarily on point sources through the MISA program and water quality standards. In the

¹⁰¹ RSO 1990, c. E. 18, as amended.

¹⁰² RSO 1990, c. P. 13.

¹⁰³ *Conservation Authorities Act 1990*, RSO 1990, c. C.27.

past, however, the MOE and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) were involved in NPS programs. The Land Stewardship program was initiated by OMAFRA in Ontario in 1989 to encourage farmers to make conservation farm plans by using grant incentives. In 1991, the MOE, in partnership with conservation authorities, launched a ten-year \$60-million program called Clean Up Rural Beaches (CURB). This program was cancelled in 1995.¹⁰⁴ In 1992, a movement by farmers – to take comprehensive action on the environmental impacts that farming has on land and water quality – gained momentum when the voluntary Ontario Environmental Farm Plan (EFP) was initiated.

The EFP was an initiative of the Ontario Environmental Farm Coalition, a coalition of farmers' organizations that included the Ontario Federation of Agriculture, Ontario Farm Animal Council, the Ontario Christian Farmers Federation, and AGCare (Agricultural Groups Concerned About Resources and the Environment). The voluntary program was designed to encourage farmers, through moral suasion and economic incentives, to implement BMPs.¹⁰⁵ The goal was to have all 40,000 farmers in Ontario develop and implement EFPs by the year 2000.¹⁰⁶ Funding for the program originally came from Agriculture Canada under the Green Plan and the *Canada-Ontario Environmental Sustainability Agreement*. A total of \$3.9 million, from federal Green Plan funding, was earmarked to provide up to \$1,500 per farm over four years to implement EFP Action Plans.¹⁰⁷ The Ontario Environmental Farm Coalition and the Ontario Soil and Crop Improvement Association are responsible for implementing and administering the program. On termination of the Green Plan in 1997, funding for EFPs in Ontario then came from the federal government's Canada Agricultural Adaption Council's CanAdapt Program. Provincial support for the program has been limited to OMAFRA's role in providing technical assistance and staff time to develop BMP guidelines and technical materials.

The EFP program, like BMP programs in the United States, can deal with variations at a micro level; however, initial interest by farmers in the plan-

¹⁰⁴ E. Montpetit and W. Coleman, 1999, "Policy communities and policy divergence in Canada: Agro-environmental policy development in Quebec and Ontario," *Canadian Journal of Political Science*, vol. 32, no. 4.

¹⁰⁵ Weersink et al.

¹⁰⁶ Ontario Environmental Farm Coalition, 1997, *Our Environmental Farm Agenda: What's Been Achieved 1992–1995* (Guelph, Ont.: Ontario Soil and Crop Improvement Association).

¹⁰⁷ Canada, Agriculture and Agri-Food Canada, 1996, *Background for the Environmental Farm Plans* [online], [cited October 1999], <http://res2.agr.ca/london/gp/efp/efp_back.html>.

preparation workshops has tailed off over time – even though the program is technically sound.¹⁰⁸ A 1997 report indicated that federal funding had supported \$3.4 million in grants and that farmers' contributions were estimated at more than \$10 million.¹⁰⁹ By March 2000, a reported 16,000 farmers had participated in the workshops, 9,700 had undertaken the peer review process, and 3,000 projects had been completed and funded through the incentive part of the program.¹¹⁰

6.4 Land-Use Regulation to Manage Non-Point Source Water Pollution in Ontario

Planning and land-use management in Canada are, according to the Constitution, the exclusive jurisdiction of the provinces. Thus federal involvement in land-use management and regulation is virtually non-existent (except for the tax incentives discussed in the next section). Pursuant to provincial enabling legislation under the *Planning Act*, municipalities in Ontario manage land use on behalf of the provinces through approved “official plans” (OPs).

‘Lower tier municipalities’ are also actively involved in land-use regulation through local bylaws and regulation of land-use designations by means of OPs. Where two tiers of government exist, the lower level OPs must conform to regional official plans (ROPs) developed by ‘upper tier municipalities’ or regional governments to ensure that planning features and significant areas that require protection through ROPs are considered at the regional level. In addition, special regional planning authorities – for example, the Niagara Escarpment Commission and the Greater Toronto Services Board – deal with planning issues on a larger scale. In some cases, the policies of these authorities take precedence over regional and local planning decisions. In Ontario, conservation authorities also have specific statutory mandates in watershed management and flood-plain management. Ecologically sensitive areas, including water resources, are protected through the land-use planning and approvals system. Certain lands have provincial protection through designations such as

¹⁰⁸ For a detailed review of the EFP program, see Johns, chapter 7.

¹⁰⁹ Ontario Soil and Crop Improvement Association, 1997, *EFP Closes in on Milestone*, August. (Guelph, Ont.: the association).

¹¹⁰ J. Fitzgibbon et al., 2000, *Environmental Farm Plan Indicator Survey* (Guelph, Ont.: Ontario Farm Coalition).

“Provincially Significant Wetlands,” “Areas of Natural or Scientific Interest” (ANSIs), and “Natural Heritage Areas.” Many ROPs also include designations that regulate development in or close to Environmentally Sensitive Areas (ESAs). ESAs are designated ecological areas that are protected on the basis of certain ecological criteria – many of which relate to water quality. Operational rules require that development in, or close to, ESAs undergo environmental assessment prior to development approval. In some cases, approval of development or a land-use change may be accompanied by conditions or measures designed to protect water quality – for example, setback, buffers, and water quality protection measures during construction. In addition, the *Planning Act* provides for the establishment of environmental advisory committees composed of volunteers to monitor, review, and report to municipal or regional planning staff and councillors. These land-use tools are, however, only indirectly connected with provincial water quality objectives.

Nevertheless, some municipalities and conservation authorities do undertake surface water quality monitoring through watershed and subwatershed studies. In 2000, the Ontario Municipal Board upheld a municipal zoning bylaw passed under section 34(1) of the *Planning Act* permitting municipalities to regulate large or intensive livestock operations.¹¹¹ The bylaw allows for limits on the number of livestock units permitted on one site or regulation of manure storage facilities until a nutrient management plan is completed.

6.5 Tax Incentives to Manage Non-Point Source Water Pollution in Ontario

The Canadian federal government has been slow to use tax instruments to strengthen environmental policy and abate water pollution. Federal income tax and provincial property tax legislation have largely failed to encourage effective land conservation and water quality management.¹¹² In 1995, the minister of finance announced the federal government’s commitment to encourage the protection of ecologically sensitive lands in Canada. The government’s interest in exploring the alternative environmental policy instruments recommended by several influential reports (including the 1994

¹¹¹ Michael E. Mitchell, 2000, “OMB decision: Municipalities can use zoning bylaws to restrict intensive livestock operations,” *Municipal World*, October.

¹¹² Attridge, p. xv.

Final Report of the National Task Force on Economic Instruments and Disincentives to Environmental Practices) resulted in revisions to income tax law.¹¹³

Although income tax legislation permitted donations of land to non-governmental registered charities and municipalities, before 1997 donors of such gifts were restricted to a maximum tax benefit of 20% of their income each year over a period of six years. Through changes to section 110.1(d) of the *Income Tax Act*¹¹⁴ in 1997, the 20% annual limit for ecological gifts was increased to 100% of income; this can be used against the donor's income all at once or carried forward for up to five years.¹¹⁵ The basis of calculating these benefits is the appraised market value of the donated land.¹¹⁶ The primary recipients of ecological gifts are municipalities and registered charitable organizations. Under the amended legislation, Crown agencies were also given recipient status. Organizations such as conservation authorities and their spin-off foundations are the primary recipients in Ontario.¹¹⁷ Implementation agreements between the federal government and several provinces have been developed, but in Ontario federal officials continue to administer this initiative.¹¹⁸ In 1999, the federal government announced a 50% reduction in capital gains tax payable on donations of ecological gifts (capital gains do not exist as a disincentive under U.S. income tax legislation).¹¹⁹

Land trusts and privately held conservation easements are a rare but emerging instrument in Ontario and other parts of Canada. These types of non-profit organizations may, as a result of the tax revisions, contribute to efforts to protect water quality in the future. The incentive for landowners to participate lies in

¹¹³ See M. Denhez, 1992, *You Can't Give It Away: Tax Aspects of Ecologically Sensitive Lands* (Ottawa: North American Wetlands Conservation Council); and T.M. Silver et al., 1995, *Canadian Legislation for Conservation Covenants, Easements and Servitudes: The Current Situation* (Ottawa: North American Wetlands Conservation Council).

¹¹⁴ RSC 1985 (5th Supplement), c. 1, as amended.

¹¹⁵ Tax credits for "gifts to the crown" are deductible against up to 100% of annual income. While the exact terms of the act are complex, donors receive a federal tax credit of 17% of the first \$200 and 29% of the remaining value of the gift. Further benefits accrue through reduced federal surtaxes and provincial taxes, which may increase the tax benefit to more than 50% of the fair market value of the donated property.

¹¹⁶ Attridge, p. ix.

¹¹⁷ Canada, Environment Canada, Canadian Wildlife Service, 1997, *Ecological Gifts: Implementing Provisions of the Income Tax Act of Canada* (Ottawa: Environment Canada), p. 6.

¹¹⁸ Environment Canada, Canadian Wildlife Service, 1998, *Ecological Gifts: Implementing Provisions of the Income Tax Act of Canada*, rev. ed. (Ottawa: Environment Canada).

¹¹⁹ Canada, Environment Canada, 2000, "Eco-gifts are good for nature and for taxpayers," news release, October 4.

the tax system. Communicating these new provisions to landowners with properties close to watersheds is also an important part of this policy instrument strategy. Direct promotion of these tax measures is still very much linked to land and habitat protection rather than to water quality management. This is also the case provincially.

In Ontario, the *Ontario Heritage Act*¹²⁰ and the *Conservation Land Act*¹²¹ also provide for use of tax instruments. The Conservation Land Tax Incentive Program administered by the MNR has been in existence since 1988 and was revised in 1997 under the *Ontario Fair Municipal Finance Act*.¹²² Between 1988 and 1997, the program was based on a property tax rebate. Since 1998, it has been based on a property tax exemption. The MNR determines which lands are eligible, the Ontario Property Assessment Corporation's Regional Assessment Office identifies landowners, and the Ministry of Municipal Affairs and Housing sends landowners an application.¹²³ On approval, landowners receive a full property tax exemption.¹²⁴ Landowners and organizations such as conservation authorities and land trusts can also receive property tax exemptions for the lands they own. In 1999, a total of 11,000 landowners – covering 158,000 hectares in Ontario – were receiving property tax exemptions under this program.¹²⁵ Lands under conservation easement, however, do not qualify, and the use of easements for land and water quality management has not been a popular tool for municipal governments and conservation authorities in Ontario.

7 Comparative Analysis

Both Canada and the United States have used institutional arrangements and traditional policy instruments to deal with most water pollution problems. In both countries, point source water pollution has dominated water pollution policy. Although they have chosen similar policy instruments to reduce NPS

¹²⁰ RSO 1990, c. O.18.

¹²¹ RSO 1990, c. 28.

¹²² SO 1997, c. 29.

¹²³ Ontario, Ministry of Natural Resources (MNR), Lands and Natural Heritage Branch, 1999, presentation at the annual conference of the Ontario Nature Trust Alliance, November 13.

¹²⁴ Ontario, Ministry of Natural Resources, 1999, *Guide to Conservation Land Tax Incentive Program* (Toronto: the ministry).

¹²⁵ Ontario, Ministry of Natural Resources, Lands and Natural Heritage Branch.

water pollution, their institutional arrangements and style of implementation have differed significantly.

Overall, land-use policies are not well integrated with the water resource management policies required to solve NPS water pollution problems. Furthermore, each medium (water or land) tends to be treated separately with respect to pollution and policy instrument strategies, although U.S. institutions seem to be building the capacity to manage NPS water pollution. The institutional arrangements in both countries continue to reinforce a medium-based approach, which hinders innovation of policy instrument strategies. The capacity to monitor and evaluate water quality, while more evident in U.S. jurisdictions, remains a significant problem in analyzing instrument effectiveness in terms of water quality.

7.1 United States

The U.S. government has taken a more active role in NPS water pollution management – as is evident from the cost-shared, subsidy-based instruments using BMPs – than the Canadian government. The role of the U.S. government can be partially explained by the comparatively high level of federal government involvement in water pollution management generally. In many ways, the institutional capability and intergovernmental cooperation that evolved for the management of point source pollution made such involvement in NPS water pollution efforts easier. This institutional capability stems in part from the legislative, technical, and administrative abilities of the EPA. In general, federal funding has increased moderately since 1987, and state and municipal funding have been encouraged by federal funding incentives. Research and technical support for BMPs have become more centralized at the national level, but states and localities have been granted more autonomy in implementation.

Federal leadership has also fostered state management of NPS water pollution and resulted in a diffusion of preferred instruments across states. For some states, federal involvement in this policy area only added to state efforts that were already underway; however, for many states, the federal NPS Management Program under section 319 provided the stimulus for action. In contrast to the conjoint approach to point source water pollution management – whereby states simply implement policies in accordance with federal standards – NPS

water pollution management is more cooperative and is based on voluntary state implementation stimulated by federal incentives.¹²⁶ Policy-making and implementation based initially on “coercive incentives” evolved into implementation based on “cooperative incentives.”¹²⁷ Although a combination of instruments is evident in the jurisdictions examined, clearly the preferred instrument is voluntary, cost-shared subsidies for BMPs. As a condition of federal funding, an instrument composed of subsidies for BMPs – implemented through state-society partnerships – is currently the preferred policy instrument strategy in the United States.¹²⁸

While some land trusts have received federal and state support to deal with NPS water pollution, these non-profit organizations, which primarily use tax incentives to protect land, have only indirectly contributed to water quality efforts. Nonetheless, their institutional potential could be tapped. Of all the instruments available to U.S. government agencies to deal with non-point sources of water pollution, land-use regulation is the weakest instrument because it is not integrated with other NPS water pollution efforts. The constitutional primacy of property rights and local control of this instrument mean that there is virtually no federal and state involvement in land-use regulation, particularly for the purposes of water quality protection and improvement.

In summary, intergovernmental cooperation in the United States to resolve NPS water pollution problems is comparatively high. Arguably, the character of these problems requires implementation to shift from federal to state and local levels and from bureaucratic agencies to community-based partnerships. However, the evolution from a centralized approach to a more cooperative, decentralized approach was most likely fostered by the maturation of capability at the state and local levels¹²⁹ and by broader public sector reform efforts under the Clinton administration.

¹²⁶ John Kincaid, 1996, “Intergovernmental costs and coordination in US environmental protection,” in K.M. Holland et al., eds., *Federalism and the Environment: Environmental Policy Making in Australia, Canada and the United States* (Westport, Conn.: Greenwood Press).

¹²⁷ Ibid.

¹²⁸ See Johns, concluding chapter.

¹²⁹ James P. Lester, 1990, “A new federalism? Environmental policy in the States,” in Norman J. Vig and Michael E. Kraft, eds., *Environmental Policy in the 1990s* (Washington, D.C.: Congressional Quarterly Press).

7.2 Canada

As in the United States, water pollution management in Canada was initially focused on point sources. Water pollution is still defined predominantly in these terms. Federal involvement has been both low and indirect. “In striking contrast to the United States, the Canadian federal government has not subsidized provincial administration of environmental programs, either conditionally or unconditionally.”¹³⁰ The federal government has only indirectly dealt with NPS water pollution – through research, some Areas of Concern under the *Great Lakes Water Quality Agreement*, low levels of funding for agro-environmental programs, and the rhetoric of pollution prevention and the ecosystem approach. To date, ecological gift tax provisions have not been linked to water quality objectives, and the federal approach remains medium-based.

As is the case with the states in the United States, provincial efforts to deal with NPS water pollution vary. Only British Columbia has a province-wide action plan to deal with NPS water pollution in the context of water quality goals. Ontario has no explicit policy regarding NPS water pollution. Although sector-specific programs, such as the Ontario Environmental Farm Plans, are tackling non-point sources such as agricultural runoff through voluntary participation and small incentives that promote BMPs, it remains to be seen if and how this program will contribute to water quality objectives. Although institutional arrangements do exist to use land-use planning and regulation to control NPS pollution, at present these tools are weakly integrated with water pollution management efforts. Compared to the other policy instruments examined (and particularly when compared to the U.S.), tax incentives, easements, and non-profit land trust instruments are the least developed instruments for dealing with NPS water pollution in Ontario.

8 Conclusions

The research on which this report is based indicates that an important determinant of instrument choice, design, and comparative effectiveness is

¹³⁰ Harrison, 1996, p. 41.

institutional capacity. Jurisdictions are more likely to have effective policy instrument strategies if

- they have higher levels of vertical (intergovernmental – federal, provincial/ state, and municipal) and horizontal (cross-medium arrangements that integrate land-use and water quality policies) capacity;
- the state actors have the ability to involve non-governmental actors; and
- the authorities have the capacity to monitor and evaluate water quality (data collection on surface and groundwater quality).

The research provides evidence that policy-makers in the United States have developed greater institutional capacity to manage NPS water pollution problems than policy-makers in Ontario and the rest of Canada. This capacity also varies across different policy instrument strategies.

Of the instrument strategies compared, the U.S. voluntary, cost-shared subsidies for BMPs is the most effective policy instrument strategy to date. The instruments and institutional arrangements developed to implement that strategy exhibit higher levels of vertical, horizontal, stakeholder, monitoring, and evaluation capacity than other policy instrument strategies. The institutional regimes are cross-medium in character (integrating land-use and water quality management policies as well as the initiatives of agricultural and environmental agencies); they allow for customized adaptation at the local or watershed level; they are based on stakeholder involvement; and they attempt to build local monitoring and evaluation capabilities. The comparable policy instruments in Ontario are less developed.

The Wisconsin case illustrates that identification of critical sites can be incorporated to target and add an enforcement dimension to cost-shared, subsidy-based instruments. This case also indicates that the TMDL framework may be worthy of further research. The EFP program in Ontario, while technically and educationally very well designed and developed, and having the broad-based support of farmers' organizations, incorporates a significantly smaller incentive for voluntary participation. Moreover, besides developments in the Grand River watershed since 1999, the EFP program is not integrated with the efforts of other agencies, such as municipalities and conservation authorities that are involved in land-use and water quality initiatives.

Ontario has a greater ability than the jurisdictions examined in the United States to use land-use regulation as a policy instrument. This instrument is currently being used in Ontario to modify land use and protect ecologically sensitive areas, which often include water resources. There is room, under existing legislation and intergovernmental institutional arrangements, for land-use and water management policies to be more fully integrated. The voluntary model ordinance approach used in the United States may serve to encourage a more explicit linkage between land-use regulation and water quality management goals. This would require a lead agency to develop model land-use regulations for municipalities or conservation authorities in Ontario to adopt and adapt to local circumstances.

The combination of tax incentives, easements, and trusts is a weak but emerging instrument strategy in Ontario and elsewhere in Canada. These institutional arrangements are, however, not well developed – even for land conservation. Existing legislation covering federal income tax, provincial conservation tax, and municipal property tax offers little as a water quality management tool. U.S. jurisdictions have recognized the potential of this instrument strategy to deal with NPS water pollution.

Instruments, institutional arrangements for implementation, and the way water pollution problems are defined are linked in policy instrument strategies. Ultimately, the way policy-makers define public policy problems influences which strategies and instruments are used to solve these problems. In addition to grappling with the complexities and scope of defining the problems, policy-makers face the challenge of designing new instruments, adapting existing instruments, and reforming institutional arrangements within a context of limited resources. Effective water pollution policy in the future will depend on the way (1) water pollution problems are defined and (2) jurisdictional authority is allocated and coordinated in the context of federalism. Policy-makers are realizing that water pollution problems vary on a number of different and complex aspects: scale, scientific character, and risk (human health and ecosystem health). Arguably, as the definition of the water pollution problem shifts to incorporate both point source and non-point sources, and as a prevention approach is adopted, provincial and local governance structures will become increasingly important if policy-makers want to protect water quality in Ontario. As the U.S. cases illustrate, the federal government, intergovernmental relations, and the engagement of non-governmental policy stakeholders will also play a significant role in determining the capacity of provinces to meet these policy challenges. Events in Walkerton demonstrate the need to consider the aspects of water pollution management discussed above.

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