

Analysis of Enabling Legislation

From A

Multi-jurisdictional Watershed Perspective

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To the Reader:

The Ohio Storm Water Task Force cooperated with the Ohio Environmental Protection Agency and the Water Quality Lab – Heidelberg College, to complete this research effort. The research was intended to look at legislation in Ohio and other states to help determine an effective approach to storm water management on a multi-jurisdictional, watershed basis.

The three components of the research include a review of Ohio’s Legislation and legislation of seven other states and thirdly, a presentation of a matrix for an evaluation of policy in establishing multi-jurisdictional watershed management. There does not appear to be a sure, guaranteed successful approach. The matrix discussion points out that there are a number of decisions that have to be made in making a watershed management policy work effectively.

The Ohio Storm Water Task Force will continue our efforts through contacts with legislators and supporting organizations. We realize that an effective approach to storm water management will require the cooperation from all levels of government and support of organizations closely associated with the issue.

If you are interested in participating in the activities of the Task Force, you may contact me at steve.boeder@oh.usda.gov. You may also visit <http://www.warrenswcd.com/> for updates on our activities and to download this report.

Thank-you for your interest and support.

**Steve Boeder
Chairman**

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“I am not an advocate for frequent changes in laws and constitutions, but laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times. We might as well require a man to wear still the coat which fitted him when a boy as civilized society to remain ever under the regime of their barbarous ancestors.”

THOMAS JEFFERSON

Introduction

Ohio Revised Code enables a multiplicity of special districts to manage the variety of water resource issues of current and historical concern. While many of these concerns continue to be met by one or more special districts, no single district has the charter or power alone to champion the water quality programs now emerging from the federal laws that created them even after lying dormant for many years.

For example, the Federal Water Pollution Control Act Amendments of 1972, also known as the Clean Water Act (CWA; Public Law 92-500), gave birth to several programs that are only now conspiring to reveal the institutional shortcomings within Ohio and other states for fulfilling the promise of this law for protecting public health. Programs of importance include the Total Maximum Daily Load (TMDL) program, Section 319 nonpoint source management programs, and a permit system called the National Pollutant Discharge Elimination System (NPDES) that includes the Storm Water Program to name just a few that have relevance here. These three programs will be briefly described below.

The TMDL program, section 303(d) of the CWA, is a regulatory mechanism for reducing both nonpoint source and point source pollution in watersheds throughout the country. A TMDL is essentially a pollutant budget for restoring impaired water bodies (e.g. streams, lakes) in order that they may fully attain their designated use(s) (e.g. aquatic life support, drinking water supply, fish consumption, primary contact recreation – swimming, and others). Regulations that the US Environmental Protection Agency (USEPA) set forth in 1985 and amended in 1992 remain in effect for the TMDL program.

The State of Ohio, like all other states, is compelled by law to assess the quality of state waters relative to their designated use(s), identify waters that are impaired for one or more of their designated uses, and develop a TMDL for remedial action where appropriate. The National Wildlife Federation (NWF; 2000) reviewed and graded all fifty state efforts at using TMDL watershed restoration plans as a Clean Water Act tool for addressing nonpoint source water pollution. The State of Ohio received a “C” grade from the NWF which was better than the vast majority of other states. Today, the Ohio Environmental Protection Agency (OEPA) is very active in developing TMDL’s. As of this writing, OEPA has produced sixteen final TMDL reports that have been approved by the USEPA, nine TMDL reports in draft form, and fourteen TMDL reports that are in preparation (OEPA, 2005).

When the CWA was reauthorized by the Water Quality Act of 1987 (Public Law 100-4), new emphasis was placed on the importance of controlling nonpoint sources of pollution. Section 319 of the CWA compels states to identify waters that are threatened by nonpoint sources of pollution and develop programs to reduce and eliminate this type of “poison runoff”. The State of Ohio is currently updating their nonpoint source pollution program. Section 319 also serves as a significant source of federal funding, channeled through the states, for programs (e.g. BMP adoptions) that are designed to reduce nonpoint source pollution. Currently, a state-endorsed watershed action plan (WAP) enhances eligibility for this and perhaps other sources of funding support such as Ohio EPA’s Water Resource Restoration Sponsor Program (see OEPA, 2004).

The NPDES Storm Water Program has been implemented in two phases. Phase II, whose Final Rule was published in the Federal Register on 8 December 1999 (64 FR 68722), expands the Phase I program by extending pollution control expectations to smaller municipal separate storm sewer systems (MS4s) and operators of small (i.e. 1-5 acres) construction sites. Expectations for pollution control center on implementation of programs and practices to control polluted storm water runoff through the use of NPDES permits. The Phase II program approach has the potential, among other matters, to facilitate and promote watershed planning and encourage implementation of the storm water program on a watershed basis (USEPA, 2000). Storm water management, therefore, will play an increasingly important role in both the planning and implementation of watershed action plans that aim to remediate impaired waterbodies.

Given the current and growing emphasis on water quality protection and restoration, questions are now being raised about institutions and mechanisms within the State of Ohio, if any, that might have the mandate, capacity, and legal authority for implementing these new programs and policies. In what follows, we begin our analysis with a review of this project’s purposes and then present the results of our inquiry along with discussion.

Problem Definition and Objectives

In the Request for Proposal, the Ohio Storm Water Task Force asked for "... an analysis of existing Ohio legislation to specifically identify the legal obstacles and opportunities for multi-jurisdictional watershed management programs." This research effort responds with the following problem statement/hypothesis that is careful not to define the solution into the problem (Bardach, 2000):

"the State of Ohio lacks legislation to enable comprehensive and multi-jurisdictional watershed management."

From the above, the following multi-scale objectives are suggested and provide guidance to this study:

- * Ultimate Objective – Protect and conserve the water resources of Ohio.
- * Intermediate Objective – Enable multi-jurisdictional watershed management
- * Immediate Objective(s) –
 1. explore existing policies and programs for opportunities and barriers to achieving the intermediate objective in Ohio,
 2. repeat immediate objective 1, but with a focus on seven other states, and
 3. outline a plan to evaluate trade-offs in selecting a policy alternative for implementing multi-jurisdictional watershed management using a future application of multi-criteria decision analysis .

Results and Discussion

State of Ohio Legislation and Approach to Watershed Management

Ohio Revised Code

A review of Ohio Revised Code (ORC) reveals eight special districts with a role in managing some aspect of water resources (Table 1). The following summary points can be gleaned from Table 1:

1. With the exception of the Special Improvement District, all districts feature a legal status and form of governance that should convey both authority and legitimacy for implementing particular objectives.
2. The Conservancy District and Watershed District are the only two of eight districts that are able to organize management activities by nontraditional watershed boundary.
3. Special district purposes vary from comprehensive to narrow, but the Watershed District's enabling legislation is unique where it speaks of "promoting the beneficial use of water."
4. No district that has been operational in Ohio has the mandate or history of activity that would make it an ideal candidate for implementing multi-jurisdictional watershed management with the possible exception of the Conservancy District.
5. Legislative language enabling the Watershed District seems uniquely suited for implementing multi-jurisdictional watershed management, but this district is not currently an operational entity and thus, its efficacy is unproven.

In addition to the eight special districts captured in Table 1, the State of Ohio is a party state to two compacts: the Great Lakes Basin Compact and the Ohio River Valley Water Sanitation Compact.

Table 1. General attributes of special districts in Ohio with a role in water-resource management.

	Soil and Water Conservation District	Conservancy District	Watershed District	Sanitary District	County Sewer District	Regional Sewer District	Special Improvement District	Ditch District
Ohio Revised Code	Chapters 1511-1515	Chapter 6101	Chapter 6105	Chapter 6115	Chapter 6117	Chapter 6119	Chapter 1710	Chapter 6131
Purpose / Description	Soil conservation, water conservation, soil erosion prevention, flood prevention, disposal of water, natural resource conservation / planning, constructing works of improvement	Flood control, water supply, conveyance management	Development and control of water resources for promoting the beneficial use of water, resolve water conflicts	Prevent / correct pollution of streams; clean / improve channels and flow regulation for sanitary purposes; sewage collection, disposal; public drinking water supply; garbage and other refuse collection / disposal; reduce populations of biting arthropods	Collection of sewage, other wastes; operate sanitary or drainage facilities	Supply water; provide for collection, treatment, disposal of waste water	Developing and implementing plans for public improvements and public services that benefit the district	Constructing, maintaining, repairing, cleaning, enclosing ditches
Geo-graphic Extent	Coextensive with the county	One or more counties, territory need not be contiguous; can conform to watershed boundaries	15-18 major river watersheds	One or more (just two?) counties	Within the county and outside municipal corporations	Unincorporated part of one or more contiguous counties or in one or more municipal corporations or both	Within the boundaries of any one municipal corp., any one township, or any combination of contiguous municipal corps. or townships; area to be contiguous	Within the boundaries of a municipal corporation
Legal Status	Political subdivision of the state	Political subdivision and public corporation of the state	Political subdivision of the state	Political subdivision and public corporation of the state	Authority vested in Board of County Commissioners and county sanitary engineer	Independent political subdivision of the state	Public agency / public authority (not at political subdivision) except to take advantage of free service or reduced rates (ORC 4905.34)	That of a municipal corporation including the ability to levy assessments
Operational ?	Yes, 1 for each county	Yes, 57 created, 19 active	No	Yes	Yes	Yes	Yes	Yes

Table 1 (continued). General attributes of special districts in Ohio with a role in water-resource management.

	Soil and Water Conservation District	Conservancy District	Watershed District	Sanitary District	County Sewer District	Regional Sewer District	Special Improvement District	Ditch District
Governance	Board of supervisors – elected and guided by the Ohio Soil and Water Conservation Commission within ODNR	Board of directors – appointed	Board of directors - appointed	Board of directors - appointed	Board of County Commissioners - elected	Board of Trustees – elected or appointed	Board of Trustees of a nonprofit corporation, known as the Board of Directors	Legislative authority of a municipal corporation
Advantages	Historical emphasis on conservation, ubiquitous throughout the State, enjoy some legitimacy	Successful model for dealing with a variety of water resource issues, flexibility in creating partnerships, can conform to watershed boundaries	Mandate to promote beneficial use(s) on a watershed basis, start with “clean slate”	Public drinking water supplier; mosquito “control”	Success with sewage treatment / point sources of water pollution; can address NPDES Phase II	Success with sewage treatment / point sources of water pollution; can address NPDES Phases I & II	A vehicle, for example, for enhancing older downtown areas to complete with shopping malls	?
Disadvantages	Not structured to address CWA programs, dominated by agricultural interests, not generally involved in urban/suburban storm-water management issues, organized by county not watershed	Unproven with CWA programs? extreme variability in geographic extent and/or purpose	Dormant program since enactment	Not equipped to address agricultural nonpoint source pollution and/or watershed management	Narrow focus, limited geographic extent	Narrow focus	Narrow focus and not necessarily concerned with water resources, limited geographic extent	(apparent) Narrow focus, limited geographic extent

Source: Anderson’s Ohio Online Docs. <http://onlinedocs.andersonpublishing.com/oh/lpExt.dll?f=templates&fn=main-h.htm&cp=PORC>

Great Lakes Basin Compact

The purposes of the Great Lakes Basin Compact include: to promote conservation of water resources, plan for the welfare and development of water resources, and maintain a proper balance among legitimate (and often competing) uses of the basin's water resources. The Compact created the Great Lakes Commission, an intergovernmental agency that has the power to recommend methods for conservation, recommend policies relating to water resources including matters of floodplain land use and other zoning laws, ordinances, and regulations. The Commission also has the power to recommend laws and/or ordinances to party states and their political subdivisions.

No action of the Commission, however, is promulgated with the force of law or is binding upon any party state. Thus, the Commission is an advisory voice rather than a regulatory agency. Nevertheless, the Commission has the responsibility to evaluate the water resources management landscape and promote policies that address problems or institutional shortcomings. The degree to which the Commission has promoted policies or legislation that will enable multi-jurisdictional watershed management is hypothesized to be low. In any event, a review of Commission action in this area would be beneficial.

Ohio River Valley Water Sanitation Compact

Ohio is one of eight party states to the Ohio River Valley Water Sanitation Compact (Ohio Compact). Although the guiding principal of the Ohio Compact has a focus on sewage and industrial wastes, ARTICLE I makes clear that each party state pledges "faithful cooperation in the control of future pollution and abatement of existing pollution" throughout all of the subwatersheds of the Ohio River Basin. Furthermore, ARTICLE I stipulates that each party state, "... in order to effect such object, agrees to enact any necessary legislation to enable each such state to place and maintain the waters of said basin in a satisfactory condition, available for safe and satisfactory use as public and industrial water supplies after reasonable treatment, suitable for recreational usage, capable of maintaining fish and other aquatic life ...". The obligation to protect beneficial uses from impairment appears to be implicit in ARTICLE I.

The Ohio Compact creates another special district, known as the Ohio River Valley Water Sanitation District (ORVWSD). Signatory states have created the Ohio River Valley Water Sanitation Commission (OVWSC) for purposes of managing the ORVWSD. The OVWSC has the power to prescribe, promulgate or adopt rules, regulations, and standards for carrying out the provisions of ARTICLE VI whereby a mandate for sewage and industrial waste treatment is issued.

One can reasonably argue that the spirit and intent of the ORVWSD and OVWSC are aimed at ensuring point-source pollution control. With the threat of nonpoint-source pollution now fully recognized, however, what authority does the OVWSC have for dealing with nonpoint-source pollution? ARTICLE VIII of the Ohio Compact, for example, compels the OVWSC to conduct a survey of district territory, "study the pollution problems of the district, and shall make a comprehensive report for the prevention or reduction of stream pollution therein." The Ohio Commission is also obligated, under ARTICLE VIII, to "...draft and recommend to the governors of the various signatory states uniform legislation dealing with the pollution of rivers, streams, and waters and other pollution problems within the district." It seems plausible,

therefore, for the Ohio Commission to be a proactive voice for new legislation to support multi-jurisdictional watershed management. It is unknown at present what steps, if any, the OVWSC has taken to fulfill the potential of this Ohio Compact as it might relate to nonpoint source pollution.

Neither the Great Lakes Basin Compact nor the Ohio River Valley Water Sanitation Compact has influence over the entire State of Ohio. Issues of geography aside, the former compact is purely advisory in nature, while the latter seems to have “teeth” for enabling multi-jurisdictional watershed management. On this last note, much will depend on an interpretation of the Ohio Compact’s enabling legislation. For the moment at least, the critical issue seems to be whether or not these compacts are fulfilling their obligations to promote new laws/policies/legislation for improving water resource conservation via multi-jurisdictional watershed management

Powers and Duties of State Agency Directors and Division Chiefs

Chapter 6111, Water Pollution Control, of the Ohio Revised Code makes clear the roles of the directors of environmental protection (i.e. Ohio Environmental Protection Agency (OEPA)) and natural resources (i.e. Ohio Department of Natural Resources (ODNR)) in developing comprehensive plans for the use, management, and protection of water resources. Ohio EPA, for example, oversees the State Water Quality Management Plan, a requirement of Section 303 of the CWA. OEPA has the additional authority to prepare a map and description of the proposed watershed districts within the state. Upon filing such map and description with the secretary of state and the board of county commissioners of each county contained partially or in whole within the territorial boundaries of the proposed watershed district, such a watershed district is created. These would be the first steps, but by no means the last, in making watershed districts operational in the state.

In addition to assisting in an advisory capacity to any “properly constituted” watershed district, conservancy district, or soil and water conservation district (and more), the chief of the ODNR, Division of Water, also has the authority to inventory the resources in each drainage basin and “develop a plan on a watershed basis that will recognize the variety of uses to which water may be put and the need for its management for those uses.” (Ohio Revised Code, Chapter 1521).

The chief of the ODNR, Division of Soil and Water Conservation, has a lead role in working with agricultural and silvicultural operations to abate water quality degradation. The chief of the Division of Soil and Water Conservation plays an identical role with respect to establishing management standards and conservation practices that pertain to other soil-disturbing activities on land used or being developed for nonfarm purposes. This latter point has implications for storm water management. This division chief has been given authority to establish procedures for administration of rules for both agricultural pollution abatement and urban sediment abatement. Enforcement of such rules, however, is limited to agricultural pollution abatement. With respect to this last point, one need only to direct a written complaint to the chief of the Division of Soil and Water Conservation regarding nuisances involving agricultural pollution to involve this division chief in the approval of an agricultural management and operation plan (Ohio Revised Code, Chapter 1511). Duties of the chief of Division of Soil and Water Conservation are subject to approval of the director of natural resources.

Ohio's State Water Quality Management Plan

The Ohio State Water Quality Management Plan (WQMP) is another requirement of Section 303 of the CWA. The Ohio EPA administers the state WQMP. Each state WQMP must address the following nine elements:

1. Total maximum daily loads (TMDLs)
2. Effluent limits
3. Municipal and industrial waste treatment
4. Nonpoint source management and control
5. Management agencies
6. Implementation measures
7. Dredge and fill program
8. Basin plans
9. Ground water

Topics 3-9 are also required features of CWA Section 208 plans or areawide waste treatment management plans. Such 208 plans are developed by governmental entities appointed by the Governor and are typically inclusive of highly urbanized areas with "substantial water quality control problems" (33 USC 1288). Government agencies responsible for 208 plans include:

1. Eastgate Regional Council of Governments
2. Northeast Ohio Four County Regional Planning and Development Organization
3. Ohio-Kentucky-Indiana Regional Council of Governments
4. Miami Valley Regional Planning Commission
5. Northeast Ohio Areawide Coordinating Agency
6. Toledo Metropolitan Area Council of Governments
7. State of Ohio (for the balance of the state including Columbus and surrounding suburbs.)

Additional information regarding these agencies, including a map, can be found at <http://www.epa.state.oh.us/dsw/mgmtplans/208GovernmentEntities.html>

Ohio Water Resources Council

The Ohio Water Resources Council (OWRC) was codified in state law in 2001 by way of House Bill 94 (124th General Assembly; Ohio Revised Code, Section 1521.19). The Council serves as the primary forum for policy development, collaboration and coordination among state agencies, and development of strategic direction with respect to state water resource programs. Council membership is composed of the directors of the nine state agencies. A State Agency Coordinating Group and an Advisory Group will assist the Council in achieving its goals.

The OWRC has drafted 10-year vision statements for five issues of strategic importance: data and information, education and outreach, watershed management, water quality, and water quantity. Each vision statement includes objectives and expected

results. The objectives for watershed management are, 1) Align state water resource programs by watersheds, and 2) Partner with all levels of water management players – local, state, regional, federal and international. The expected results for watershed management feature a reliance on improved integration of water resource goals and programs among existing agencies and “on a watershed basis”. The vision statement does not include reimagining of the state’s institutional structure for management roles and expectations. Additional details regarding the Council are available in the Ohio Water Resources Council: Four-year Strategic Plan (2002).

Ohio Lake Erie Commission

The Ohio Lake Erie Commission (OLEC) was formed in 1990, “for the purpose of protecting Lake Erie's natural resources, restoring degraded elements of the Lake Erie ecosystem and to promote economic development of Ohio's north coast.” (OLEC, 2005). The OLEC’s primary role is one of oversight regarding coordination of state agency policy and programs pertaining to water quality, coastal resource management, and toxins. Thus, OLEC members include the directors of six state agencies representing the interests in and the activities that affect the health and management of Lake Erie.

The OLEC does not possess the sort of authority and consequent staff resources to actively engage in multi-jurisdictional basin management such as can be found elsewhere in the country where a similarly significant resource is at stake (e.g. Chesapeake Bay, Puget Sound). The OLEC does provide, however, a forum for focusing state attention on the needs and issues of the lake. Furthermore, the OLEC sponsors the Ohio Lake Erie Protection Fund (LEPF). The Ohio LEPF is a mechanism for awarding grants to projects that address the strategic objectives that are outlined in the Lake Erie Protection and Restoration Plan (OLEC, 2000; 2004). In support of the strategic objective to “Reestablish more natural flow regimes to Lake Erie tributaries,” one of the Habitat Recommendations (H-3) is to “support local jurisdictions and conservation groups by providing funding and technical assistance for comprehensive watershed planning.” The ODNR, OEPA, and the Lake Erie Commission are the responsible parties for implementing this strategic action despite possessing a lack of authority for doing so as already mentioned above.

Ohio’s Watershed Coordinator Program

Beginning in year 2000, the Ohio EPA, Ohio DNR, and The OSU Extension have secured funding from the state legislature and federal government to allow local units of government and non-profit organizations to employ full-time watershed coordinators to work with local communities and other stakeholders to address water quality impairments and other resource concerns (ODNR, 2003).

Watershed coordinators are to work in concert with or in advance of TMDLs. The mechanism for doing so is a watershed action plan (WAP) for which there are specific guidelines to follow in their development (OEPA, 1997; 2003). The State of Ohio has also formulated a process for WAP endorsement as a central component for addressing the challenge of nonpoint source water pollution in Ohio (ODNR, 2003). An important element of the watershed coordinator program is gradually diminishing state

funding support over a six-year period at which time the watershed coordinator is to have become financially self-supporting. Depending upon the level of local support that a coordinator achieves, it is reasonable to assume that some coordinators will persist while others will disappear following the termination of state support for the position.

While not a part of the watershed coordinator program, the Clean Ohio Fund (House Bill 3, 124th General Assembly) was approved in July, 2001. The Clean Ohio Fund is a \$400 million bond program to be spent over four years to preserve natural areas and farmland, protect streams, create outdoor recreation, and revitalize urban areas by cleaning up brownfields and other sites that pose a threat to public health (State of Ohio, 2002). The Clean Ohio Fund is not focused on watershed management, but has provided an important source of funding to implement some strategies that are called for in watershed action plans. This source of funding, much like state support for the watershed coordinator program itself, will “sunset” long before the challenge of water quality impairments is fully met.

Failed Attempts at Legislation: H.B. 204, 120th General Assembly, 1993-1994

House Bill 204, introduced to the 120th General Assembly and sponsored by State Representative Rhine McLin and seventeen others, sought to authorize the establishment of storm water management districts and to set forth the powers and duties of those districts. The language of this bill proposed that storm water management districts be created within conservancy districts that create a plan for carrying out improvements for which the storm water management district was created. Initial authority would have rested with the board of directors of a conservancy district.

Following approval of the preliminary program plan, an independent political subdivision of the state, governed by a board of trustees, would emerge and constitute the new storm water management district. The primary purpose of the storm water management district was proposed to be one of enhancing drainage or flood control via facilities. A “watershed storm water management plan” for each watershed located wholly or partially within the boundary of a district was to be developed, but rules would focus on preventing or abating nonfarm wind and soil erosion only. As a result, such plans would fall considerably short of what is now expected of a watershed action plan.

The district boundary was to include existing jurisdictions exterior to the hydrological boundary and/or property lines, down to half-section lines or patent lines nearest to the hydrologic boundary of the proposed district. Thus, while being inclusive of the watershed(s) of interest, the district boundary would not appear to mirror that of a topographically-defined watershed.

House Bill 204 was the last of four attempts to pass storm water management district legislation sponsored by Rep. McLin. This sequence began with H.B. 42 introduced to the 117th General Assembly and was followed by H.B. 412 introduced to the 118th General Assembly, H.B. 389 introduced to the 119th General Assembly, and finally H.B. 204 discussed above. While cosponsorship of proposed legislation varied considerably over the course of these four failed attempts, H.B. 204 featured the most cosponsors along with bipartisan support as well.

Summary and Conclusions

Despite many recent calls for adopting a “watershed approach” to manage 21st century water resource issues, Ohio laws and programs continue to rely on a more traditional piecemeal approach where responsibility for water-resource management is spread across a multitude of special districts, areawide waste treatment management agencies (i.e. seven governmental entities responsible for Section 208 (CWA) planning in Ohio), and state agencies. Furthermore, ultimate authority rests at different scales of state and local government and with varying degrees depending upon the water-resource issue at hand. For example, authority for addressing point-source water pollution rests with OEPA who regulates through the NPDES. Authority for addressing agricultural nonpoint-source pollution rests with ODNR who, working through soil and water conservation districts, relies largely on voluntary efforts at the individual property/farm level. As an outcome of the Phase II Storm Water Program, county boards of commissioners have permitting authority to address nonpoint-source pollution from land used or being developed for nonfarm commercial, industrial, residential, or other purposes (see, for example, Sub. H.B. 411, 125th General Assembly). Thus, authority is dispersed horizontally among state agencies and vertically through various levels of state government.

Ohio is also without an intermediate level of management responsibility and authority that would otherwise operate between the state and the most local levels. Such a multi-tiered institutional structure is called for by Ruhl et al. (2003) and found elsewhere in the country. With rare exception, jurisdictional boundaries of districts listed in Table 1 mirror those of traditional political boundaries: counties, townships, or municipalities. Likewise, Section 208 planning agencies are comprised by groups of counties. While this is not likely to change for most existing special districts, watershed districts can be imagined to integrate with and/or overlay the extant structure of jurisdictional boundaries in a fashion so as to be both effective and complementary.

Watershed districts, as outlined in Ohio Revised Code, Chapters 6105 and 6111, seem to offer both a legal mechanism and some semblance of an institutional structure for enabling a true watershed approach to managing water resources; particularly as they might entail the effects of land-use activities on Ohio water quality standards. Figure 1 offers a hypothetical scheme of sixteen watershed districts in Ohio; thus meeting the geographic extent requirement enumerated in ORC Section 6111.42. As illustrated, decision rules for dividing up space are as follows:

1. divide the State of Ohio between the Lake Erie Basin and Ohio River Basin,
2. follow U.S. Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) boundaries when demarcating one district from another,
3. avoid creating a district that is either too large or too small relative to the others, and
4. delineate 15-18 districts according to the language of ORC Section 6111.42.

Figure 1: Map of Hypothetical Watershed Districts (HWD's) Superimposed Over Ohio Counties



NOTE: The reader is cautioned that the resulting HWD economic data is to be used only for the purpose for which it is devised.

Figure 1, therefore, is suggestive of one possible scenario whereby sixteen watershed districts are formed as regional management authorities to carry out the state water quality management plan. Such districts could reflect inescapable regional nuances as they seek to imbue state water quality goals into watershed action plans that are developed and implemented at the most local level. The HUC-11 watershed, Ohio's watershed assessment unit, is the local level where community-based watershed planning initiatives are typically asked to develop watershed action plans that address TMDLs and other local water resource problems. Thus, watershed districts could provide guidance and resources that are tailored for the regions they represent and most helpful for supporting local efforts. While the matters concerned with the most efficacious number of watershed districts and the resultant configuration await debate, we suggest that enlivening watershed districts will be a step towards creating a multi-tiered institutional structure whose authority moves closer to matching the scale of the problem: the watershed (see for example, Ruhl et al. 2003).

The State of Ohio may find that drafting new legislation that amends ORC, Chapters 6105 and 6111, in order that a modern law provide an effective solution to modern water resource problems, will strengthen the Ohio Water Resources Council's ability to bring about improved water resource management.

Watershed districts aside, the State of Ohio does have a few tools for moving towards a multi-jurisdictional approach to watershed management. The two interstate compacts, discussed above, seem to possess unrealized potential for promoting and/or improving the state's approach to managing water resources. Also, the OLEC could be expanded and given greater resources and authority for managing the Ohio Lake Erie Basin. Finally, the Watershed Coordinator Program is a fine example of an effort to develop community-based watershed planning initiatives. Regrettably, the funding is short-term for this particular program and inadequate for watershed management efforts in general. While bond issues like the Clean Ohio Fund provide a temporary boost, they are obviously not designed to be a long-term solution for funding an appropriate response to watershed management and the water resource problems this movement strives to solve. In this regard and others, the State of Ohio will benefit from looking at other state efforts and models for managing water resources as it considers new initiatives to protect and conserve state water resources.

Legislation and Approach to Watershed Management in Other States

Seven-state Review

State of Washington

In an effort to improve the protection of water quality statewide, the Washington State Department of Ecology initiated a new managerial framework in 1993. The Dept. of Ecology began a five-year transition to a Watershed Approach to Water Quality Management in order that both point and nonpoint source pollution problems and needs are addressed throughout the state.

Aiming to improve coordination of water quality oriented activities in addition to improving water quality itself, twenty-three Water Quality Management Areas

(WQMAs) were designated to serve as the state framework for planning and priority setting. Thus, the watershed approach synchronizes monitoring, inspections and permitting, and supports water resource protection activities on a hydrologically-defined geographic basis. Additional information including a map of WQMAs and an explanation of the five step – five year cycle is provided by the Washington Dept. of Ecology (2003).

Following the adoption of the Watershed Approach to Water Quality Management as the framework for state planning and priority setting, the Washington state legislature passed the Watershed Planning Act in 1998 (Revised Code of Washington (RCW) Chapter 90.82; ESHB 2514). The Watershed Planning Act mandates a local voluntary approach for watershed planning and thus, requires that county, city, or regional governmental authorities are designated the lead agency for water resource planning and river flow management.

The Watershed Planning Act provides guidance and funding for building local capacity to establish watershed communities and develop plans that address, primarily, existing water rights or matters concerned with water quantity. Optionally, such communities and plans can include issues of water quality, habitat, and in-stream flows. Thus, the law has created a process that engages units of local government and allows the citizens in a watershed to determine how best to manage their water resources.

These so-called 2514 Watershed Planning activities, named after the legislation's house-bill number, are centered in sixty-two Watershed Resource Inventory Areas (WRIAs) that are spatially similar, though not equivalent to, USGS HUC-8 watersheds. As of December of 2004, thirty-seven planning units representing forty-five of the sixty-two WRIAs have chosen to participate in the planning process. (WRIAs can join together for purposes of creating a single plan that represents more than one WRIA.)

The twenty-three WQMAs discussed above are, in fact, aggregations of the sixty-two geographically smaller WRIAs. The degree of synchronization between WQMAs and WRIAs, however, is much less than one might expect for two reasons: different purposes behind their establishment and thus, their agendas, and the ultimately voluntary nature of addressing nonpoint source water pollution (Ron McBride, TMDL Coordinator, Washington Dept. of Ecology, *personal communication*). WQMAs are the state planning units for water quality objectives (e.g. TMDLs) and ultimately must engage the public through interested groups of citizens and individuals that may or may not be involved with WRIA-related activities.

The WRIAs were created for reasons centered on providing local governments with a vehicle for establishing water-budgets. Even when a local WRIA planning unit chooses to adopt a water quality component, coordination with state WQMA planning activities remains loose due to lack of authority on anyone's part to mandate coordination or changes in behavior / land use that will lead to improved water quality. Despite perceptions and perhaps the reality of how watershed management activities are implemented in Washington, however, there appears to be a multi-tiered institutional structure in place to facilitate coordination from the state, through regional WQMAs, and down to the more local level of 2514 planning units or WRIAs.

The state of Washington is also in the process of updating its statewide plan to address nonpoint source pollution. Washington's Water Quality Management Plan to Control Nonpoint Source Pollution (Hashim and Bresler, 2005) represents a cooperative effort among many state agencies and groups that will also be implementing the actions identified in the plan. A "distinguishing characteristic" of this rewrite of the nonpoint

plan “is to support sustainable communities through the creation and preservation of relationships with local entities. This plan recognizes the role and effort that local governments play in water quality improvements and the importance of public participation in and understanding of nonpoint concerns.” (Hashim and Bresler, 2005, page vii). Here again, the Department of Ecology has the lead in writing this document. Perhaps the efforts behind implementation of this new nonpoint source pollution plan will lead to greater coordination between the WQMAs and WRIAs discussed above.

The Puget Sound Water Quality Protection Act, As amended in 1999 (Chapter 90.71 RCW), created an interagency mechanism for coordinating and implementing watershed management across multiple jurisdictions within the Puget Sound Basin. This significant piece of state legislation created the Puget Sound Action Team (PSAT) and the Puget Sound Council (PSC).

The PSAT, whose membership includes, but is not limited to the directors of state agencies, prepares a work plan and budget for inclusion in the governor’s biennial budget. Furthermore, the PSAT coordinates monitoring and research programs, is involved in permitting requirements related to watershed plans, resolves policy and rules conflicts among agencies represented on the action team, amends the Puget Sound Management Plan (Puget Sound Action Team, 2004), and much more.

The PSC, whose eleven members are mostly appointed by the governor, recommends to the PSAT projects and activities for inclusion in the biennial work plan and proposed amendments to the Puget Sound management plan. Local governments are required to implement local elements of the work plan subject to availability of funds and are held accountable for implementation progress.

Thus, a natural resource of both regional and national importance, Puget Sound is benefiting from a model of intergovernmental organization that is a product of innovative state policy. The PSAT partnership cuts across traditional political jurisdictions with a combination of authority, state funding and political support, and a detailed agenda for conservation and recovery .

Commonwealth of Kentucky

Title 401 of the Kentucky Administrative Regulations requires the Natural Resources and Environmental Protection Cabinet to manage water resources and provide for the prevention, abatement, and control of water pollution. Within this Cabinet, the Department of Environmental Protection (DEP), through the Division of Water (DOW), has launched the Kentucky Watershed Management Framework to coordinate activities throughout the Commonwealth. The Framework consists of five core components: 1) twelve basin management units aggregated into five basin management groups; 2) a basin management cycle consisting of five phases that sequence and repeat at fixed five-year intervals; 3) a statewide basin management schedule that focuses major efforts on one portion of the state at a time; 4) forums to support cooperative action among the three levels of activities: state, river basin, and watershed (HUC-11); and 5) basin management plans and watershed action plans that guide implementation efforts at both scales.

Activities at all levels are guided by the state’s Antidegradation Policy that safeguards surface waters for their designated uses, prevents new pollution, and abates existing pollution. The Kentucky watershed approach seeks to integrate both surface and ground water management as approximately one-fourth of the state features karst terrain.

Local Watershed Task Forces will be formed in HUC-11 watersheds where high-priority problems have been identified. This is the most local level where watershed action plans will be developed and implemented with the assistance of the River Basin Team.

On a more pragmatic note, key management activities at the state level have required the creation of a Statewide Steering Committee to address issues of coordination and policy related to the Framework, facilitate communication, and evaluate the efficacy of the Framework. Such coordination includes developing strong partnerships with regional, county, and local governments as well as business, other groups, and individuals for purposes of establishing a Partner Network. The Partner Network consists of those entities and others who are willing to commit time and resources to promote and implement watershed management throughout the state. The Steering Committee is also responsible for reviewing and revising, if necessary, the Rules of Operation that address membership (in the Steering Committee), coordination, decision making, and conflict resolution.

Each basin management group features a River Basin Team composed predominantly of federal and state agency staff. Each River Basin Team also features a Basin Coordinator. This person is typically an employee of the DOW or an employee of a partner organization that is funded by the DOW. Additionally and as funding becomes available, a Public Information Coordinator is also imagined for each basin management group. Thus, the state has fashioned an attractive organizational structure at the basin level for implementing the Framework. There is, however, no source of special funding to fulfill the promise of the Framework. The DOW and Watershed Framework are dependent on existing state appropriations to the DEP for implementation.

Other forums, such as the Tennessee Valley Authority (TVA), Kentucky River Authority, and Area Development Districts, will play complementary roles where appropriate and serve as a useful context and source of information for the other. Each will be discussed briefly below.

The TVA is the nation's largest public power company, encompasses a limited portion of Kentucky, and features at least one TVA Watershed Team in Kentucky. While the TVA is concerned first and foremost with power generation for portions of seven states, the primary emphasis with TVA Watershed Teams is shoreline protection.

The Kentucky River Authority (KRA), housed within the Kentucky Finance and Administration Cabinet, was established in 1986 to assume control over the Kentucky River Locks and Dams (5 through 14) from the US Army Corps of Engineers. The role of the KRA quickly evolved to include environmental management of the Kentucky River Basin and became the Commonwealth's first effort to protect water resources through watershed management. The KRA, therefore, was created for somewhat different purposes and enjoys a separate funding mechanism than the DOW's Watershed Framework (Margaret Shanks, Division of Water, Watershed Management Branch, *personal communication*). Furthermore, the KRA features the most comprehensive suite of management objectives of any of the five basin management groups.

Finally, Area Development Districts were created in 1967 by Executive Order of the Governor and divided the Commonwealth into fifteen multi-county regions for general planning purposes. Area Development Districts are partnerships of local units of government. Area Development Districts, therefore, are neither regulatory agencies nor are they able to force compliance with their plans. The plans and recommendations made by these special districts are advisory only.

State of New Jersey

The State of New Jersey features a comparatively rich variety of laws designed for water and other resource protection. Similarly, planning entities at multiple scales exist for land-use and/or watershed management. Activities promulgated by the State aim to ensure “clean and plentiful water”. Protecting and restoring the integrity of New Jersey’s waters and achieving the goal of “fishable and swimmable water” statewide are goals held in common with the federal Clean Water Act.

The Department of Environmental Protection (DEP) is charged with fulfilling the intentions of both the Water Pollution Control Act (NJSA 58:10A) and the Water Quality Planning Act (NJSA 58:11A). Details pertaining to implementation of both Acts are outlined in New Jersey Administrative Code, Title 7 – Department of Environmental Protection, Chapter 15 – Water Quality Management Planning.

Most significantly, the DEP receives millions of dollars each year from State Corporate Business Tax receipts to implement watershed management. An outcome of the Watershed Management and Protection Act of 1997, revenues generated from the Corporate Business Tax have funded planning actions (i.e. up to \$600k over four years) that have been undertaken in each of the twenty watershed management areas (WMAs) of the state. New Jersey, therefore, channels state resources including agency personnel support through each of the twenty WMAs to develop an areawide (i.e. WMA) water quality management plan and to foster development of local buy-in and implementation via community-based groups organized around the one-three HUC-11 subwatersheds that typically constitute a WMA. Watershed Management Areas vary in size from 165 (#5) to 885 (#17) square miles.

The Division of Watershed Management within the DEP is the lead state agency and is newly organized on functional versus geographic boundaries. Thus, the Bureau of Environmental Analysis and Restoration has as its primary mission the development of TMDLs and other technical tools needed for decision-making. The Bureau of Watershed Planning is charged with developing local partnerships and then working with such groups to implement water quality management plans. This Bureau has the lead in engaging the public for discussion of TMDLs and other planning measures. The Bureau of Watershed Regulation applies the regulatory tools available for watershed planning, assists with the preservation of important natural resources, and has the lead for storm water management. The Office of Watershed Education, Estuaries, and Monitoring coordinates internal and external watershed management efforts and plays the lead role in communications with and outreach to local government, local partners, and the general public. This Office also coordinates the National Estuary Programs of which there are three in New Jersey. The Water Resources Policy Office, much as the name implies, provides policy support for the Division goal of ensuring “clean and plentiful water for the residents of New Jersey and their descendents.” (Baier, date unknown; NJDEP, 2005a).

Overlapping state planning initiatives in the twenty WMAs are other planning entities that focus special attention on certain areas of the state. For example, The Pinelands Commission was created for stewardship of the Pinelands National Reserve, a 1.1 million acre region in southern New Jersey of special natural and cultural significance (New Jersey Pinelands Commission, 2005). The Pinelands is protected and its future development guided by the Pinelands Comprehensive Management Plan.

Another example is the Raritan River Basin Watershed Management Project co-managed by the DEP and New Jersey Water Supply Authority for purposes of addressing pollutant loads, water withdrawals, and land use. The project area includes three of the twenty WMAs and is located in north-central New Jersey. Further, three National Estuary Programs protect water quality in coastal areas of the state.

The Highlands Water Protection and Planning Act, signed into law in August, 2004, is designed to preserve open space, protect the state's greatest diversity of natural resources, and protect the water resources that supply drinking water to more than half of New Jersey's families (NJDEP, 2005b). The Highlands Act specifies the geographical boundary of the Highlands Region and establishes both the Highlands Preservation area and the Highlands Planning area. It also sets environmental standards in the Highlands Preservation Area to be administered by the DEP and creates a Highlands Water Protection and Planning Council to develop a regional master plan for the entire Highlands Region.

New Jersey has three levels of antidegradation protection in its Surface Water Quality Standards. The highest tier is assigned to waterbodies that qualify as Outstanding National Resource Waters. The next tier is Category 1 (C1). These waters are protected from measurable changes in water quality. Finally, the lowest and default tier is Category 2 where water quality can be lowered to levels that continue to support all existing beneficial uses based on socioeconomic justification. Augmenting laws and planning groups is the DEP's choice to designate an increasing number of stream segments as C1 for purposes of protecting drinking water and important habitat for threatened and endangered species or important recreation fish such as trout.

There exists throughout New Jersey, then, great potential for collaboration amongst the various groups charged with managing natural and water resources at variable geographic scales and at different stages in their development. The degree to which such collaboration is working has not been explored by this investigation. It is known that not all twenty of the WMAs have been productive in developing and implementing an areawide water quality management plan. Their success or lack thereof has been largely due to the strength or weakness of the community-based groups (i.e. local partners) who are ultimately key in following state guidance and implementing local actions (Ken Klipstein, Bureau Chief, Bureau of Watershed Planning, *personal communication*).

Commonwealth of Virginia

Chesapeake Bay has been and continues to be the major focal point of state, interstate, and federal efforts to reduce the impacts of land use (i.e. nonpoint source pollution) on the aquatic resources of this nationally important aquatic ecosystem. At almost 22,000 square miles, a little over one-third of the entire Chesapeake Bay Basin is in Virginia and constitutes 52% of the Virginia land area. Chesapeake Bay is North America's largest and most biologically diverse estuary and has shaped the regional economy and culture for over 300 years.

For example, the Chesapeake Bay Preservation Act was adopted by the Virginia General Assembly in 1988. The "Bay Act", as it is called, is a cooperative state-local program designed to include water quality protection measures in comprehensive planning, zoning ordinances, and subdivision ordinances that guide land-use change and

development activities with the Chesapeake Basin. The Bay Act also created a mechanism for designating Chesapeake Bay Preservation Areas that are especially critical to safeguarding the water quality of Chesapeake Bay (Virginia DCR, 2002a).

Another effort that aims to protect Chesapeake Bay is Virginia's nutrient and sediment reduction Tributary Strategies (Virginia Secretary of Natural Resources, 2005a). The Tributary Strategies, one for each of the four major river basins that drain into the Bay plus the eastern shore, are plans composed of a number of nonpoint source pollution reduction techniques that exceed Virginia's nitrogen, phosphorus, and sediment goals (Virginia DEQ, 2005a). The Tributary Strategies are ambitious and strive to achieve water quality conditions necessary to support the living resources of the Chesapeake Bay Watershed (Virginia Secretary of Natural Resources, 2005b).

Chesapeake 2000, a reaffirmation of the interstate Chesapeake Bay Program agreements of 1983 and 1987, is another commitment to the watershed approach to ecosystem management (Chesapeake Bay Program, 2000). Among its many goals, Chesapeake 2000 seeks to engage all citizens and promote individual stewardship through community-based watershed programs.

Other Virginia watershed programs include the Agricultural Stewardship Act (ASA), enacted in 1996 (Title 10.1, Section 559.1 et seq. of Chapter 5 of the Code of Virginia). The ASA offers a "positive approach" to addressing pollution from agricultural operations. The ASA is nonregulatory and "complaint-driven". The ASA is designed to solve water-pollution problems (i.e. sedimentation, nutrients, or toxins) by working one-on-one with farmers through local soil and water conservation districts (Virginia DACS, 2004).

There are several other programs related to watershed management in Virginia. The Virginia Coastal Resources Management Program was established in 1986 to implement coastal management laws and policies (Virginia DEQ, 2005b) much like in Ohio and other coastal states. A Coastal Nonpoint Pollution Control Program is required of coastal states by section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 to assess the need for developing management measures for sources of agriculture-related and other nonpoint source pollution (USEPA, 2003).

Regarding storm-water management, the 2004 Virginia General Assembly transferred regulatory authority of NPDES programs related to municipal separate storm sewer systems (MS4's) and construction activities from the State Water Control Board to the Soil and Water Conservation Board with oversight of these programs transferred from the Department of Environmental Quality (DEQ) to the Department of Conservation and Recreation (DCR) (Virginia DCR, 2005). Finally, the Bay Act, described above, outlines performance criteria for storm water management such that the water quality protection provisions of the Virginia Stormwater Management Regulations (Title 4 Virginia Administrative Code, Agency 3-Chapter 20) be satisfied for all development occurring in Chesapeake Bay Preservation Areas (Virginia DCR, 2002b).

Ground water is an important and growing source of water for many of Virginia's families (Virginia DEQ, 2005c). Thus, a Ground Water Protection Steering Committee (GWPSC), an inter-agency advisory committee, was formed in 1986 to promote coordination efforts aimed at ground-water protection. While not explicitly linked to other watershed or surface-water programs, ground water protection in Virginia is given a considerable amount of attention nonetheless. Furthermore, the GWPSC produces an annual report to showcase their activities and accomplishments (see GWPSC, 2005).

The Commonwealth of Virginia is also committed to restoring forested riparian buffers state-wide. A Riparian Buffer Implementation Plan was published to guide this effort as well as commit the Commonwealth to restore 610 miles of riparian forested buffers within Virginia's portion of the Chesapeake Bay Watershed (Virginia Riparian Forest Buffer Panel, 1998). The Virginia buffer plan is impressive in its scope. The buffer plan, for example, seeks to implement legislation that would authorize tax breaks for forested riparian buffer lands and exempt such lands from estate taxes. The buffer plan also seeks to use zoning ordinances and other creative programs to achieve the goal. The buffer plan is also notable for its emphasis on restoring forested buffers as opposed to grass buffers that are often preferred by many in the agricultural community.

It appears that in Virginia, concern for water quality and adoption of watershed-based programs for addressing such are driven largely by awareness of and concern for a resource of great significance: Chesapeake Bay. Given the monumental effort required to restore and/or protect the Bay and the fact that over half of the Virginia landmass is within the Bay Watershed, the Commonwealth of Virginia appears to be proactive, creative, and committed to reduce water pollution by aggressively managing the negative impacts of agricultural and urban land uses accordingly. Having the support of the federal government is helpful too.

State of North Carolina

The Department of Environment and Natural Resources (DENR) is the state agency charged with maintaining, protecting, and enhancing water quality within North Carolina. The state has adopted a non-regulatory watershed-based approach to fulfilling its water quality mission, The DENR Division of Water Quality is charged with protecting North Carolina's surface and ground-water resources and is developing or refining basinwide water quality plans for each of the seventeen major river basins. Basinwide planning entails three phases over a five-year period. All seventeen basins have completed two cycles and several have recently either completed or are nearing completion of a third cycle of planning (North Carolina Div. of Water Quality, 2005a).

The goals of basinwide planning are threefold: 1) restore full use to previously identified impaired waters, 2) identify and protect high-value resource waters, and 3) protect unimpaired waters while allowing for reasonable economic growth. The North Carolina approach is agency driven and thus "top-down" rather than a "bottom-up" approach that is typically initiated of late by a local community-based watershed planning initiative (North Carolina Div. of Water Quality, 2005b).

River basin water supply planning is conducted by the North Carolina Division of Water Resources and organized by the same seventeen major river basins. The goal is to work with local governments and other water users to develop fifty-year plans. Water supply plans are patterned after the successful Cape Fear basin plan published in January, 2001 (North Carolina Division of Water Resources, 2005). In addition to water supply planning, the Division of Water Resources provides technical and management support for the development and use of state ground-water resources.

Storm water management falls under the purview of the Dept. of Environment and Natural Resources. Senate Bill 1210, ratified in July, 2004, gives the Environmental Management Commission (EMC) within the DENR the authority along with guidance for implementing the more recent Phase II Program in North Carolina. The EMC

promulgates rules pertaining to the protection, preservation, and enhancement of air and water resources of the State. Information about water quality statutes, including the EMC, has been compiled by the North Carolina Division of Water Quality (2004).

As a coastal state, the DENR Division of Coastal Management carries out the state's Coastal Area Management Act of 1974 and the federal Coastal Zone Management Act of 1972. The state's Coastal Area Management Act (North Carolina General Statutes, Chapter 113A-100, et. seq.) is a cooperative program between local and state governments that gives local governments the lead role in planning. Coastal Area" is defined as the counties that in whole or in part share a boundary with the Atlantic Ocean.

Watershed management in North Carolina is a state-led effort much like other states, but does not appear to have fostered development of local watershed planning initiatives or to rely on such groups as local extensions of regional or river basin planning efforts. A possible exception to this observation is North Carolina's nonpoint source management program that features nonpoint source (NPS) basin teams. NPS basin teams do strive to involve local groups and representation and acknowledge the importance of local knowledge and support (North Carolina Division of Water Quality, 1996).

Commonwealth of Pennsylvania

The Bureau of Watershed Management within the Department of Environmental Protection is the lead state agency for water resources management. Water use planning, including storm water management, conservation districts, source water protection, nonpoint source pollution management and other assorted watershed support functions (e.g. monitoring, outreach, etc.) all fall within the purview of the Bureau of Watershed Management.

The Water Resources Planning Act of 2002 (Act 220 of 2002) calls for the State Water Plan to be updated every five years. The State Water Plan is also directed to include regional plan components: one tailored for each of the six major river basins in the state. The State Water Plan is to be developed such that it "shall include" guidance for addressing water supply/demand and availability/use issues. Water quality is mentioned only in the context of water supply agencies. Act 220 of 2002, however, mandates that the State Water Plan "shall consider" the water quantity and quality necessary to support reasonable and beneficial uses. Thus, water quality as it affects beneficial uses is given lesser stature than matters of water supply and availability.

Act 220 of 2002 provides formal recognition of the linkage between surface water and ground water resources and directs that these two types of water sources be considered together. Furthermore, the bill recognizes the need to plan and manage water on a watershed basis.

More recently, the General Assembly of Pennsylvania (Session of 2005) passed House Bill No. 2, The Growing Greener Environmental Stewardship and Watershed Protection Enhancement Authorization Act. House Bill No. 2 is a \$625 million bond issue, approved by referendum on May 17, 2005, the proceeds of which are for the maintenance and protection of the environment, open space and farmland preservation, watershed protection, abandoned mine reclamation, acid mine drainage remediation and other environmental initiatives.

Related to the nonpoint source management program and in cooperation with federal and other agencies, Pennsylvania has generated a Unified Watershed Assessment

(UWA) that defines watershed restoration priorities. Currently, there are four categories of watersheds identified in the UWA: watershed needing restoration (Category I), watersheds needing preventive action to sustain water quality (Category II), pristine or sensitive watersheds on federal or state lands (Category III), and watersheds with insufficient data to make an assessment (Category IV). All four categories include watersheds at the 8-digit hydrologic unit scale.

For each Category I watershed, a watershed restoration action strategy (WRAS) has been developed. As TMDLs are developed, they will be incorporated into updated versions of a WRAS. As of this writing, there are thirty-three State Water Plan Subbasins (i.e. watersheds) with a WRAS. These strategies address identified impairments, are relatively short documents (i.e. 8-21 pages), and have been updated within the last four years (most within the last two years). Among other information, each WRAS includes a listing of the “Citizen/Conservation Groups” that are active within the watershed.

Pennsylvania’s portion of the Chesapeake Bay Watershed is significant, contributing half of the fresh water to the Bay via the Susquehanna and Potomac River Watersheds (Pennsylvania Dept. of Environmental Protection, 2002). A signatory to the original Chesapeake Bay Agreement of 1983, Pennsylvania recently released its fourth Tributary Strategy that outlines habitat restoration goals and suballocates nutrient and sediment reduction goals among the thirteen DEP Watershed Teams within the Pennsylvania Chesapeake Basin. Pennsylvania’s Tributary Strategy relies on a “Bottom Up” approach that engages local communities, governments, and other stakeholders (Pennsylvania Dept. of Environmental Protection, 2004).

State of Michigan

The Michigan Department of Environmental Quality (MDEQ) is the lead state agency for protecting and enhancing Michigan’s environment and public health including water resources. The MDEQ Water Bureau has primary oversight of programs most closely related to water quality such as the storm-water program and the nonpoint-source pollution program. The nonpoint-source pollution program staff also includes people from two other MDEQ divisions: the Land and Water Management Division and the Environmental Sciences and Services Division.

Within the MDEQ, an Environmental Advisory Council (EAC) was formed in March, 2003. The EAC has as its primary mission the task of advising the MDEQ on its major programs and policies. Recently, the EAC recommended that the MDEQ form an interdivisional team to look at MDEQ watershed management activities and determine if there are ways to improve it. Insofar as the MDEQ’s nonpoint-source pollution program is currently under review, a review of watershed management activities will await the outcome of the nonpoint-source program review. The nonpoint-source review involves many of the same issues and parties that would be considered in the broader review of watershed management (Environmental Advisory Council, 2005). Thus, the Michigan approach to watershed management is in the process of undergoing a thorough review, but without evidence of multi-jurisdictional authority for accomplishing such.

From a policy aspect, two matters of some importance can be mentioned here. In 1994, the Michigan Legislature enacted the Natural Resources and Environmental Protection Act, also known as Act 451 of 1994. This voluminous law (1,125 pages in

length) updated a variety of laws pertaining to the environment and natural resources of the state. Act 451 provides for the establishment of a watershed alliance, composed of two or more municipalities and for purposes of developing watershed management plans to address surface water quality or water flow issues of mutual concern within that portion of the watershed located within their boundaries. Members of the watershed alliance pay a membership fee to fund planning and implementation activities. While governed by bylaws and able to bridge the jurisdictions of individual members, the geographic extent of a watershed alliance is limited to the combined boundary of municipality members. This requirement will have variable consequences with respect to natural watershed boundaries. For example, in more urbanized areas (e.g. suburbia), an alliance of several adjoining municipalities may well include a watershed of HUC-11 – HUC-8 extent. In more rural areas, where municipalities are situated like islands amidst an agricultural or forested matrix, there is low probability for a city or village to be similar to a watershed of spatial extent greater than HUC-14. Thus, Act 451 creates a mechanism for some degree of trans-jurisdiction watershed management, but not one that is comprehensive in the sense that it is coextensive with naturally occurring watershed boundaries across the state.

Secondly, the State of Michigan received voter approval on November 3, 1998 for a \$675 million bond initiative called the Clean Michigan Initiative (CMI). The CMI is designed to improve and protect the state's water resources by providing a major funding boost to such programs as the Clean Water Fund, Nonpoint Source Pollution Program, and Pollution Prevention Program to name just a few. The CMI funds programs that are administered by the MDEQ, Michigan Dept. of Natural Resources, and Michigan Dept. of Community Health (Michigan Dept. of Environmental Quality, 2005). The current emphasis on water resource protection, including efforts at watershed management, now enjoys a new source of funds to realize their potential.

Summary of state approaches to watershed management

The seven states reviewed here, plus Ohio, have adopted a variety of policy approaches and programs for managing water resources and implementing watershed management. Though it is beyond the scope of this study to evaluate the efficacy of each state's approach and thus, rank the states from most to least effective, a number of variables have emerged that might serve to either predict or explain successful state efforts (Table 2). They are as follows:

1. Recent legislation that emphasizes improved management of water resources.

While examples of relatively new (i.e. within the last twenty years) legislation can be found in six of the eight states including Ohio, they are wide ranging in terms of intention, spatial focus, and potential for impact on watershed management. Nevertheless, a preponderance of new laws is suggestive of state recognition that today's water resource issues require more modern laws to address them. Any scheme for drawing a rank comparison of these laws is purely subjective yet attempted below.

If one can imagine a hypothetical spectrum representing the potential degree of policy impact on enabling multi-jurisdictional watershed management, Michigan's Act 451 of 1994 might anchor the low impact end of the spectrum despite bringing sweeping reform to policies dealing with the environment and natural resources. What Act 451

does not feature is a mechanism for implementing trans-jurisdiction watershed management.

The Clean Michigan Initiative (Act 284 of 1998), however, is evidence that the state acknowledges the need to increase funding support for environmental protection. The same can be said for Pennsylvania (The Growing Greener ... Act / House Bill 2, Session of 2005) and Ohio (Clean Ohio Fund / House Bill 3, 124th General Assembly) as well. While time will eventually provide evidence of the impact of these policies on watershed management activities, they are viewed for now to reside in the higher impact half of our hypothetical continuum.

The Ohio Water Resources Council, a product of House Bill 94 in 2001, is attempting to address modern-day challenges with improved coordination among state agencies and hence, the status-quo structure of state government. The efficacy of the OWRC will be judged over time to come. Thus, the OWRC as viewed here is most appropriately placed somewhere in the middle of our hypothetical policy-impact spectrum.

Of the states reviewed here, laws passed in New Jersey and Washington feature the best evidence of a state-wide commitment to implementing watershed management. Authority for multi-jurisdictional management, however, is limited to Puget Sound, a resource of significance (discussed below) among the states reviewed. The Puget Sound Water Quality Protection Act, As Amended in 1999, therefore, rests on the high-impact end of the aforementioned policy spectrum and offers a model for an institutional structure with the capacity (i.e. authority, staff resources, source of dedicated funding) for implementing watershed management, albeit one with limited spatial extent.

Table 2. Variables for comparing state approaches to watershed management.

	Ohio	Washington	Kentucky	New Jersey
Institutional Structure: Planning Unit / Governance	<p><i>State Lead(s)</i> – Environmental Protection Agency, Dept. of Natural Resources, The OSU-Extension</p> <p><i>Region / Subregional</i> – aggregations of HUC-11 watersheds that constitute Ohio’s Five Year Basin Approach to biological and water quality monitoring and assessment</p> <p><i>Local</i> – HUC-11 subwatershed / voluntary “community-based” groups in lieu of a watershed authority</p>	<p><i>State Lead</i> – Dept. of Ecology</p> <p><i>Region</i> – 23 Water Quality Management Areas (WQMA)</p> <p><i>Subregional / Local</i> – 62 Water Resource Inventory Areas (WRIA) / County, city or regional authority (i.e. elected officials) designated “lead agency”</p> <p><i>Local</i> – several of various sizes and makeup</p>	<p><i>State Lead</i> – Natural Resources and Environmental Protection Cabinet through the Division of Water, Watershed Management Branch</p> <p><i>Region</i> – 12 river basin management units (HUC-6) aggregated into 5 basin management groups / Basin Coordinator (e.g. Div. of Water employee or partner org. employee funded by DOW) and River Basin Team (predom. agency staff)</p> <p><i>Local</i> – HUC-11 subwatershed / Watershed Task Force</p>	<p><i>State Lead</i> – Dept. of Environmental Protection through the Division of Watershed Management</p> <p><i>Region</i> – ad hoc: Raritan River Basin, national estuary programs, Highlands, Pinelands</p> <p><i>Subregional / Local</i> – 20 watershed management areas (WMA) each with a Technical Advisory Committee and Public Advisory Committee</p> <p><i>Local</i> – several of various sizes and makeup</p>
State Advisory or Coordinating Body / year of formation	Ohio Water Resources Council / 2001		Statewide Steering Committee / 1997	The Clean Water Council / 1967
Resource of Significance	<p><i>Resource</i> – Lake Erie</p> <p><i>Authority</i> – Ohio Lake Erie Commission</p> <p><i>Law / Rules</i> – House Bill 94 of 2001 / OAC, 1506.21</p> <p><i>Program</i> –</p>	<p><i>Resource</i> – Puget Sound</p> <p><i>Authority</i> – Puget Sound Action Team (PSAT)</p> <p><i>Law / Rules</i> – Puget Sound Water Quality Protection Act, As amended in 1999</p> <p><i>Program</i> – 2005-2007 Puget Sound Conservation and Recovery Plan</p>	<p><i>Resource</i> – Kentucky River Basin</p> <p><i>Authority</i> – Kentucky River Authority</p> <p><i>Law / Rules</i> – KYAR, Title 420</p> <p><i>Program</i> –</p>	<p><i>Resource</i> – 1) Highlands Region, 2) Pinelands National Reserve</p> <p><i>Authority</i> – 1) Highlands Water Protection and Planning Council, 2) Pinelands Commission</p> <p><i>Law(s) / Rules</i> – 1) Highlands Water Protection and Planning Act (2004), 2) Pinelands Protection Act (1979)</p> <p><i>Program(s)</i> – 1) Highlands Preservation Area, Planning Area, 2) NJ Pinelands Comprehensive Management Plan</p>
Funding mechanism for watershed management	Part of overall biennial appropriations to state agencies; Clean Ohio Fund (HB3), 2001-05	State Legislature – distinct biennial appropriations for both DEP’s Watershed Approach and the PSAT	Part of overall appropriation for the Division of Water	Percentage of corporate business tax (Watershed Management and Protection Act of 1997)

Table 2 (continued). Variables for comparing state approaches to watershed management.

	North Carolina	Pennsylvania	Virginia	Michigan
Institutional Structure: Planning Unit / Governance	<p><i>State Lead</i> – Dept. of Environment and Natural Resources</p> <p><i>Region</i> – seventeen major river basins</p> <p><i>Local</i> –</p>	<p><i>State Lead</i> – Dept. of Environmental Protection, Bureau of Watershed Management</p> <p><i>Region</i> – six major watersheds</p> <p><i>Subregional</i> – Unified Watershed Assessment watersheds (HUC-8)</p> <p><i>Subregional / Local</i> – State Water Plan watersheds (variable: HUC-8 to HUC-11)</p> <p><i>Local</i> – several of various sizes and makeup</p>	<p><i>State Lead</i> – Secretary of Natural Resources, Dept. of Environmental Quality</p> <p><i>Region</i> – four major river basins of the Chesapeake Bay plus Eastern Shore</p> <p><i>Local</i> – several of various sizes and makeup</p>	<p><i>State Lead</i> – Dept. of Environmental Quality, Water Bureau</p> <p><i>Region / Subregional</i> – watersheds of various sizes that constitute Michigan’s five-year rotating watershed monitoring cycle</p> <p><i>Local</i> – several of various sizes and makeup</p>
State Advisory or Coordinating Body / year of formation		Statewide Water Resources Committee / 2002	Watershed Planning and Permitting Coordination Task Force / 1997	(within MDEQ) Environmental Advisory Council / 2003
Resource of Significance	<p><i>Resource</i> –</p> <p><i>Authority</i> –</p> <p><i>Law / Rules</i> –</p> <p><i>Program</i> –</p>	<p><i>Resource</i> – Chesapeake Bay</p> <p><i>Authority</i> – Chesapeake Bay Commission (tri-state legislative commission)</p> <p><i>Law / Rules</i> –</p> <p><i>Program</i> – Chesapeake Bay Tributary Strategy; Chesapeake Bay Program</p>	<p><i>Resource</i> – Chesapeake Bay</p> <p><i>Authority</i> – Chesapeake Bay Commission (tri-state legislative commission)</p> <p><i>Law / Rules</i> – Chesapeake Bay Preservation Act (1988)</p> <p><i>Program(s)</i> – Chesapeake Bay Tributary Strategies; Chesapeake Bay Program; Riparian Buffer Implementation Plan</p>	<p><i>Resource</i> – Great Lakes</p> <p><i>Authority</i> –</p> <p><i>Law / Rules</i> –</p> <p><i>Program</i> –</p>
Funding mechanism for watershed management		Growing Greener ... Act (HB2) - approved by referendum on 5/17/05; Small Watershed Grants Program made possible by the Estuaries and Clean Waters Act of 2000 (limited to PA’s portion of Chesapeake Bay)	Small Watershed Grants Program made possible by the Estuaries and Clean Waters Act of 2000 (limited to VA’s portion of Chesapeake Bay)	Clean Michigan Initiative (Act 284 of 1998) - \$675 million bond approved on 11/03/98

2. *Significant resource as a focal point of conservation efforts.*

All water resources have value and are significant to one form of life or another. Proximity to a regionally important and/or a nationally significant resource such as Chesapeake Bay or Puget Sound has led some states to craft laws and develop programs that give an extra-high value resource a measure of extra protection. The Pinelands National Reserve and Kentucky River Basin provide other examples of nationally and regionally important resources, respectively, that have led to early and specific conservation attention.

These “special” resource management areas of regional, national or even international significance, serve as models for what’s possible with state laws and programs, and interagency, interstate, or state-federal cooperation. Furthermore, in each of the four examples listed here, states have created a distinct management authority for planning and implementation that is focused on the area/resource of significance. Such a management authority and designation of the resource itself are products of state laws that enable the effort and process. Thus, a willing state legislature is just as important as a functional relationship with the resource itself.

The so-called resources of significance identified here do not encompass an entire state. The Lake Erie Basin of Ohio, for example, captures about twenty-five percent of the Ohio land area (Sanders, 2002). Special conservation measures applied within the Lake Erie Basin, if successfully implemented, could be applied elsewhere in theory. Strict phosphorus limits on wastewater treatment plant effluent released within the Lake Erie Basin portion of Ohio is an example of how pollution-control regulations can be applied unevenly to reflect the need for added protection within a high-value resource area.

And what of states without an apparent “resource of significance” that might otherwise attract extra attention and protection? Will the country eventually come to feature model watersheds (e.g. Chesapeake Bay, Puget Sound, Lake Erie) that one day prove to bear the positive outcomes and hoped for effects from special laws and other provisions targeted towards resource improvement? If so, then one might imagine the tools that are developed and implemented for resource improvement in a spatially limited part of a state could be transferred for needed improvements elsewhere if proven to be efficacious. Alternatively, engaging in a disproportionate type of watershed management where some areas are clearly favored over others will risk having environmental “have and have-not areas” or cases that raise the issue of environmental justice.

3. *Dedicated source of funding for watershed management / conservation efforts.*

There are several water resource issues that currently confront all states: beneficial-use impairments and need for TMDL assessments, storm-water management, coastal management, and nonpoint source pollution to name just a few. It is generally agreed upon that these issues and other programs dealing with flood control or water supply can be addressed best by adopting a watershed approach. As states attempt to adopt a watershed approach to water resource management, the need for a level of funding that exceeds typical state agency appropriations has become apparent.

More than half of the states reviewed here have developed a noteworthy means for funding watershed management related programs. Sources of dedicated funding include the levying of a special tax (NJ), specific appropriation of funds for watershed management by the state legislature (WA), or obtaining voter approval for a multi-million dollar bond issue (MI, PA, OH). Regarding the later, such borrowed monies are

only available for a limited period of time. For example, the Clean Ohio Fund money will be spent over four years. While a dedicated source of funding for watershed program implementation does not guarantee success in and of itself, the extra resources brought to bear on water quality and other water resource programs undoubtedly gives a state a much greater opportunity for producing successful performance-based outcomes.

As Ruhl et al. (2003) have suggested, one of the design goals for a watershed-based political institution is an institutional structure that has the capacity – budget, staff, and expertise – to carry out the complex scientific, economic, and social analysis functions necessary for successful watershed governance. Such a capacity depends on a commitment of funding. Of the states reviewed here, New Jersey and Washington appear to have made the most solid commitments to funding watershed management activities.

4. State Advisory or Coordinating Body

Six of the eight states reviewed have created an advisory or coordinating panel, composed of state agency managers, industry representatives, or other people with interests in water resources to promote better coordination of state agency efforts, provide a forum for policy development, and/or to direct watershed management activities among stakeholders. The correlation between the existence of an advisory/coordinating body and a successful state watershed management program may well be tenuous or unknown. But as with newly enacted legislation discussed above, an advisory/coordinating body is indicative of state efforts to improve communication and coordination of water resource management activities. Five of the six advisory/coordinating bodies identified among the eight states studied have formed within the last eight years.

Here again, the focus of the advisory/coordinating body is somewhat variable among the states reviewed here. Additionally, some state bodies appear to provide more of an advisory role while others seem to be geared more towards an active coordination role. The Ohio Water Resources Council, as noted above, features both a State Agency Coordinating Group and an Advisory Group. Any effort to characterize a state body as either advisory or coordinating is less important than determining what makes for an effective group.

In theory at least, an advisory/coordinating body is in a position to judge the effectiveness of an existing institutional structure, the efficacy of attempts to improve program coordination, and potentially recommend changes in a state's approach to water resource management including changes to the institutional structure itself. That said, one must acknowledge the membership of such a body. If, for example, an advisory/coordinating body is made up solely of existing state-agency directors, as with the Ohio Water Resources Council, there is likely to be little or no interest in changing the status quo of the structure of state-agency management roles and responsibilities. In the case of Ohio, broadening Council membership to include additional perspectives and stakeholder groups will likely result in increased capacity for more objective thinking and recommendations.

5. Institutional Structure for Planning/Governance

No two states have quite the same political structure of governance for implementing basin management policies and programs. Likewise, it may be too early in the evolution of the watershed-management movement to judge if one state scheme is superior to another. In any event, it is instructive to consider the relationship between a state's institutional structure for implementing state watershed planning programs, and

desirable environmental outcomes such as delisting (i.e. Section 303(d) Clean Water Act) or proof of improvement in the ecological health of a resource of significance.

States do generally relegate watershed management programs and responsibilities to a single state agency and often to a designated watershed management bureau, division, or branch within that agency. By comparison, Ohio relies on two agencies and The OSU-Extension to share responsibilities and promote a watershed approach to water resource management.

Most of the states reviewed here have a regional or subregional management structure of designated watersheds that, while variable in size (e.g. HUC-11 to HUC-8 to major river basins), feature a watershed-defined scheme for organizing space and implementing state water resource management activities. Alternately, Ohio and Michigan use a five-year rotating basin monitoring strategy. Ohio sections the state into twenty-five hydrologic units that are aggregations of HUC-11 subwatersheds, the basic assessment unit for water quality monitoring. Michigan's five-year rotating watershed monitoring cycle features groups of watersheds that are highly variable in size. In both cases, Ohio and Michigan, the sectioning of space is primarily for purposes of conducting regularly scheduled monitoring that is directed by the state or a regional-agency office. This approach is in contrast to the other states that have a regional or subregional watershed management structure set up to implement a state plan and direct activities within their watershed area. While North Carolina recognizes seventeen major river basins within the state, it is not entirely clear how that partitioning of space affects the management structure. Nothing obvious emerged from this review that would suggest there is a hierarchical management structure in North Carolina.

At the most local level, a variety of voluntary community-based watershed planning groups are encouraged to get involved in and thus, create the link between individuals and other stakeholders and state / federal agency programs and personnel. It seems that there is much expected of these voluntary groups with respect to federal and state mandates to improve water quality. Here again, judgment of the efficacy of local voluntary efforts must held in abeyance. A state structure that includes a regional or subregional management team may be significant in terms of supporting more local efforts.

The Commonwealth of Kentucky features a Watershed Task Force at the scale of a HUC-11 subwatershed, but only for those subwatersheds deemed a priority for restoration of identified impairments. The Kentucky scheme provides some examples of a multi-tiered structure for watershed governance, but not one that is applied uniformly throughout the state given the aforementioned and restricted focus on priority areas at the most local level. New Jersey, too, albeit the smallest state (i.e. land area) of the group reviewed here, has brought a state management structure closest to the scale of HUC-11 watersheds with their twenty watershed management areas that are aggregations of one to three HUC-11 watersheds as discussed above.

In outlining the five design goals for a proposed institutional structure for watershed management, Ruhl et al. (2003) make clear the necessity for states to lead a comprehensive and coordinated effort that is implemented at "several levels of governance within each state" (pg. 935). In this review, states that feature a regional and/or subregional structure for management (if not governance) have taken a step towards having a nested hierarchy of authority thought necessary by Ruhl et al. (2003). Ultimately, this hierarchy of authority must extend down to (and up from) the most local

levels where accountability, including the full scope of compliance mechanisms, replaces purely voluntary efforts.

Applying Multi-Criteria Decision Analysis to Evaluate Trade-offs in Selecting a Policy for Multi- Jurisdictional Watershed Management

Objectives of this Section

Our Immediate Objective #3 is to: “develop a set of criteria for determining the feasibility of an ideal policy or program for achieving the Intermediate Objective of “enabling multi-jurisdictional watershed management.”

The Nature of the Decision Problem Facing the State of Ohio

Evidence from existing legislation in Ohio and from current legislation in other states presents us with a complex decision problem that can be stated:

Choose a course of action that best satisfies a set of *Criteria* applied to the projected *Outcomes* of a set of competing *Alternatives* to achieve the goal of “enabling multi-jurisdictional watershed management” for the State of Ohio.

The nature of the complexity facing decision-makers in Ohio relate to *Criteria* selection that, in turn, affects the decision-making method adopted. Traditional methods such as Cost-Benefit Analysis (CBA) or Cost Effectiveness Analysis (CEA) cannot effectively handle the complexities. The complexities are: (a) Many of the watershed decision criteria are qualitative, *e.g.*, “political acceptability” or “conflict resolution mechanism,” and are not directly comparable using CBA or CEA; (b) Some quantitative variables are cardinal but may not have the same metric. For example, some quantitative variables may be denominated in dollars (such as cost) while others may be measured in tons (such as pollutants removed). Economic tradeoffs are possible between quantitative characteristics with a different metric, but require a different decision-making technique than CBA or CEA; (c) Some variables are ordinal or qualitative. Economic tradeoffs are possible between qualitative and quantitative characteristics, but require a different decision-making technique than CBA or CEA; (d) Ohio, while not identical to any of the other states researched, is similar in trying to cope with non-point source pollution that emanates from a combination of agricultural land use and urban land use. Storm water management is now becoming a more recognized means for problem contribution/solution. This requires a more complex decision making method than CBA or CEA; (e) There are many affected constituents of a multi-jurisdictional watershed policy and they have different political, economic, and social values; (f) Finally, Ohio has had four failed attempts at passing watershed management legislation. It is believed that Ohio stakeholders have different values of which only some are financial in nature.

Decision-Making Procedure Recommended

The decision problem facing the state of Ohio, determining “enabling multi-jurisdictional watershed management,” for the above reasons, cannot be expressed in the traditional cost-benefit framework nor can it be expressed in a cost-effectiveness framework. How then can a rational decision regarding the Intermediate Objective be reached? Our research suggests that a tool well suited to our decision problem is Multi-Criteria Decision Analysis (MCDA) (Keeney and Raiffa, 1993; see also Dodgson et al. 1998). MCDA is a decision-making technique that works by systematically walking the decision-makers through a process that clarifies the choice of one alternative solution to a decision problem over competing alternative solutions. MCDA does not mechanically make a decision, but is a management tool that aids decision-making. MCDA assists decision-makers choose one *Alternative* that yields the *Outcome* that best satisfies a set of *Criteria*.

We have adapted an eight-step process used in policy analysis (Bardach, 2005) as a tool in implementing MCDA:

Step	Process
1	Establish the decision context
2	Identify the options
3	Identify the objectives and criteria
4	Describe the expected performance of each option against the criteria
5	Weight the criteria
6	Combine the weights and scores
7	Examine the results
8	Conduct a sensitivity analysis

Source: Adapted from (Bardach, 2005)

MCDA Applied to Ohio Watershed Management (Steps 1 – 3)

Application of the above eight-step process to Ohio Watershed Management can be broken into two phases; however, the two phases are not independent. Phase I comprises Steps 1 – 3 and Phase II comprises Steps 4 – 8. Phase I will be partially completed in this Report and Phase II is left as a recommendation for future action (see Recommendation section of this Report). Specifically, Phase I, Steps 1 – 3, of the MCDA will be, in this report, a trial run, using members of the OSWTF as the “decision makers.”

Step 1: The decision context

(Note to Reader: This step, the choice of Decision-Makers, is to be done in conjunction with members of the OSWTF. Also, see our Recommendations section for a complete process of determining the Decision Makers.)

Any decision-making technique adopted must be compatible with the *Ultimate Objective* to “Protect and conserve the water resources of Ohio” even though the ultimate objective is outside the scope of this research. For example, while the stakeholders in the Ultimate Objective include the Public, Agriculture, Industry and Commerce, and Government their interests, while not directly approached in this research must not be inconsistent with our results. The same argument can be applied to water usage whether recreational, health, or other uses.

The identification of decision-makers likewise covers a large number of persons. Even within the Immediate Objectives of this study, the number of affected groups is over 500. For example, we have identified 196 cities in Ohio that will be affected, 61 villages, numerous townships, and 88 counties as well as over 150 watershed support groups, representatives of Special Districts, and many others. See Appendix Table A-1 for a list of potential decision makers for the MCDA. The sponsor of this research, OSWTF, can simulate the role of the Decision Makers for purposes of experimenting with, and orienting themselves to, the MCDA technique.

Step 2: Option identification – alternative choice complexity

Based on our research of the multi-jurisdictional legislation in the states of Washington, Kentucky, North Carolina, New Jersey, Pennsylvania, Virginia, and Michigan along with existing legislation in the State of Ohio, we have identified the following three possible Alternative solutions to our decision problem of “enabling multi-jurisdictional watershed management”:

- **A1: CONTINUE WITH PRESENT WATER RESOURCES MANAGEMENT APPROACHES AND PROCEDURES IN OHIO**
 - At present, the State of Ohio approaches water resources management through eight special districts: Soil and Water Conservation District; Conservancy District; Watershed District; Sanitary District; County Sewer District; Regional Sewer District; Special Improvement District; and Ditch District. Each district has special attributes (see Table 1) designed to solve a few specific problems.
 - Advantages
 - Requires no legislative changes or actions
 - Trends in water quality and quantity are assumed unchanged
 - Requires no new budget or spending changes
 - Disadvantages
 - The scale of the Ohio response to impaired water quality does not seem to match the scale of the problem. Thus:
 - There is little reason to believe that improvements in watershed scores will be achieved by 2010 (state goal of 80 (average watershed score) by 2010).
 - The relatively passive (present) Ohio approach to remediation of state water quality will likely be too slow to make meaningful improvements and avoid future litigation.

- **A2: ORGANIZE OHIO WATERSHED MANAGEMENT ACCORDING TO AN AMENDED ORC CHAPTER 6105**
 - ORC6105 has the potential to enable multi-jurisdictional watershed management for the state of Ohio. One district, the Watershed District, has a broader mandate, but is non-operational at present. Also, is it a solution to our decision problem?
 - Advantages
 - Requires no new *de novo* legislation. Legislation is already on the books that defines: Mission and Organization
 - Disadvantages
 - Requires implementation
 - Funding sources are not defined.
 - Budget dependent on County Commissioners
 - Staffing and other resources are not clearly allocated

- **A3: DESIGN NEW LEGISLATION TO ENABLE COMPREHENSIVE MULTI-JURISDICTIONAL WATERSHED MANAGEMENT FOR THE STATE OF OHIO BY SEEKING TO ADOPT THE BEST OF THE ATTEMPTS BY OTHER STATES WHILE AVOIDING THE WORST?**
 - Other states have approached the protection of water quality from different perspectives. These perspectives vary widely in a number of variables such as: Institutional Structure, Planning Unit / Governance, State Advisory Body, State Coordinating Body, Specific Regional (area) Protection, Stream Protection / Special Designation, Funding mechanism for watershed management, Purpose(s), Conflict Resolution (see Table 2).
 - Advantages
 - New legislation would allow optimum design of watershed policy
 - Disadvantages
 - Requires writing new legislation
 - Requires implementation
 - Time delay
 - Possibility of failure. Four previous failed attempts

Step 3: Criteria and objectives identification

(Note to Reader: This step, the choice of Decision-Criteria, is to be done in conjunction with Decision-Makers selected in Step #1 above. See Recommendations section at the end of this Report.)

Proposed criteria to evaluate the outcomes (listed below) of each Alternative (listed above) will include *criteria* categorized as: Efficiency (*e.g.*, measured by: cost, # of people involved, etc.); Effectiveness (*e.g.*, measured by: TMDL, etc.); Equality/equity/fairness/“justice;” Freedom/Process values/Legality/Political acceptability; Administrative costs; Benefits; and Costs.

**Table 4: Criteria for MCDA (example)
(Primary Categories Only)**

Efficiency & Measurement
Effectiveness & Measurement
Funding Mechanism
Equality, Equity, Fairness, Justice, Freedom
Process values, Legality, Political acceptability/feasibility
Costs
Benefits
Organizational/Institutional Structure
Watershed Boundaries

Source: Statistical Appendix, Table A-2

A detailed table of criteria appears in the Appendix as Table A-2.

Data translation into HWD's. Enabling multi-jurisdictional watershed management for the State of Ohio will follow watershed boundaries that are not yet defined. For purposes of this research, we have defined boundaries we call Hypothetical Watershed Districts (HWD's). These are aggregations of HUC-8 watersheds. The procedure for defining HWD's used in this Report is explained on page 12. We have delineated 16 potential HWD's (Figure 1, page 13). Since HWD's do not follow political boundaries, a procedure had to be devised to translate the economic data into HWD's. The procedure can be summarized as follows:

1. Define HWD's as aggregations of HUC-8's (see pp. 7-8 for details),
2. Identify counties and portions of counties in each HWD,
3. Determine the proportion of a county in each HWD,
4. Collect economic data on a county basis, and
5. Allocate economic data to each HWD based on the whole counties and fraction of counties in each HWD

HWD economic data. The reader is cautioned that the resulting HWD economic data is to be used only for the purpose for which it is devised. The authors recommend development of a more sophisticated allocation method of economic data by watersheds that will allocate these data within portions of counties using economic criteria rather than being proportional to the area covered. Data sources are: Ohio Department of Job and Family Services (2005a; 2005b; 2005c), U.S. Census Bureau (2005), Ohio Department of Development (2005a; 2005b; 2005c; 2004a; 2004b; 2004c; 2002), and Ohio Department of Taxation (2005a; 2005b).

The resulting 16 HWD's display the following political boundary characteristics: (a) Eleven HWD's contain at least one whole county; however, five HWD's do not contain any whole counties (HWD4, 9, 10, 12, and 15). (b) The maximum number of whole counties in an HWD is four (HWD1); (c) One HWD contains 14 partial counties (HWD8). Two HWD's contain 12 partial counties (HWD6 and 11) and one HWD contains 11 partial counties (HWD6). Decision makers will need to take that into account when studying ORC6105.

Economic data was created for the sixteen HWD's for the following variables: Population, Taxable Value of Real Estate, Net Taxes Collectible on Real Estate, Sales Tax-Permissive Use, Income Tax-Individual, Total Covered Wages, Civilian Labor Force, Unemployment #, Unemployment Rate, Square Miles, Number of Whole Counties, Number of Partial Counties, and Total Number of Counties affected by an HWD.

Summary statistics for all sixteen HWD's including Median, Mean, Minimum, and Maximum appear in Table 5 below for all 13 variables:

Table 5: Summary Statistics of Economic Variables by HWD

	Median	Mean	MIN	MAX
Population	490,865	709,571	67,625	1,909,914
Taxable Value RE (\$'000)	\$6,456,476	\$11,672,303	\$609,665	\$34,596,779
Net Taxes Collectible RE (\$'000)	\$267,676	\$537,228	\$22,456	\$1,820,447
Sales Tax-Permissive Use (\$'000)	\$41,189	\$65,712	\$3,968	\$157,314
Income Tax-Individual (\$'000)	\$269,638	\$480,335	\$25,461	\$1,398,818
Total Covered Wages (\$'000)	\$1,589,241	\$2,857,089	\$156,872	\$8,712,387
Civilian Labor Force	239,495	364,156	29,755	948,450
Unemployed (#)	18,420	24,819	2,840	62,675
Unemployment Rate	7.49%	7.48%	5.67%	9.54%
Square Miles	2,877	2,802	659	4,896
Total Counties	10.5	10.1	4.0	16.0
Whole Counties	1.5	1.6	0.0	4.0
Partial Counties	8.0	8.5	4.0	14.0

Source: Computed from Table A-3 in the Statistical Appendix.

The sixteen HWD's we have identified vary in their economic characteristics. For example, the average population contained in an HWD is 709,571; however, the HWD's range from a low of 67,625 to 1,909,914 persons. In size, they average 2,802 square miles with a range of 659 to 4,896 square miles. Net taxes collectible from real estate averages \$537,228 thousand but has a range of \$22,456 thousand to \$1,820,447 thousand. Wage income in covered employment averages \$2,857,089 thousand with a range of from \$156,872 thousand to \$8,712,387 thousand. The unemployment rate ranges from a low of 5.67% to a high of 9.54% with an average of 7.48%. The civilian labor force ranges from a low of 29,755 to a high of 948,450 with an average of 364,156.

Funding Sources. Alternative A1 lacks an adequate funding mechanism. Alternative A2 allows for a funding mechanism to be attached to an amended ORC6105. While it is beyond the scope of our current research to recommend a funding source, we have analyzed some potential funding sources within the context of the HWD's developed in this study. Four taxes were initially analyzed: Real Property Tax; Individual Income Tax; Sales and Use Tax; and Corporation Franchise Tax. While many other taxes exist in Ohio, they are not all good candidates for funding watershed management in the state of Ohio. For example, "In FY 2003, the corporation franchise tax generated just under \$808.3 million in total (all funds) revenue. The franchise tax produces the third highest amount of revenue among the taxes that support Ohio's General Revenue Fund." (Ohio Department of Taxation, 2005a); however, the Ohio corporation franchise tax is not a good candidate as a permanent source of funding for watershed management

because of its negative effect on private capital investment in Ohio (Rennie, 1973) and hence on economic development of regions in Ohio.

Table 6 summarizes some potential tax sources of funding in the State of Ohio for Watershed Management. We do not make recommendations in this study either for a specific tax or even for a tax base support for watershed management. That is a decision the Decision Makers must make in their judgment to enable watershed management. The data is presented to give the reader a better understanding of the sixteen HWD's used in this study. Careful consideration must be given to funding sources that are fair, dependable, and sufficient for the task at hand. While the HWD's we have used for expository purposes in this report are not the only way of defining watersheds in Ohio, the reader can see the wide economic disparity that exists between regions.

	Median	Mean	MIN	MAX
Taxable Value RE (\$'000)	\$6,456,476	\$11,672,303	\$609,665	\$34,596,779
Net Taxes Collectible RE (\$'000)	\$267,676	\$537,228	\$22,456	\$1,820,447
Sales Tax-Permissive Use (\$'000)	\$41,189	\$65,712	\$3,968	\$157,314
Income Tax-Individual (\$'000)	\$269,638	\$480,335	\$25,461	\$1,398,818

Source: Computed from Table A-3 in the Statistical Appendix.

More detailed economic data organized by HWD 1 – 16 appear in Appendix Table A-3.

Step 4: Outcome / performance of options against the criteria

(Note to Reader: We outline Step 4 in this section; however, completion of Steps 4 – 8 would be the work of a future grant done in conjunction with the Decision-Makers selected in Step #1. See the Recommendations section of this Report.)

Projected outcomes from each alternative. Each Alternative A1 – A3 leads to outcomes. The magnitude of expected outcomes of each alternative are unknown at the present time. It is recommended that the selected decision makers will complete this in proposed Phase II. We can, however, categorize the potential outcomes according to the criteria determined in Step 2 such as: Rate of Listing/De-Listing, Stakeholder Effect (could itemize stakeholders and individual effects), Organizational ability to assist stakeholders reach consensus, Effect on Indicators of Designated Use Attainment, ...

The Decision Makers must complete a table similar to Table 7:

**Table 7 : Consequences Matrix Example
(Reduced version of Appendix Table A-4)**

A1	A2	A3
Continue with present water resources management approaches and procedures in Ohio	Modify ORC 6105	Design new legislation to enable comprehensive multi-jurisdictional watershed

- Efficiency & Measurement**
- Effectiveness & Measurement**
- Effectiveness in accomplishing goals**
- Funding Mechanism**
- Equality, Equity, Fairness, Justice, Freedom**
- Process values, Legality, Political acceptability/feasibility**
- Costs**
- Benefits**
- Organizational/Institutional Structure**
- Watershed Boundaries**

Source: Statistical Appendix Table A-4

Steps 1 - 3 complete the three Immediate Objectives listed for this study:

- explore existing policies and programs for opportunities and barriers to achieving the intermediate objective in Ohio,
- repeat immediate objective 1, but with a focus on seven other states, and
- develop a set of criteria for measuring the economic impact of an ideal policy or program for achieving the intermediate objective.

Recommendation: MCDA Phase II

MCDA, with a skilled leader, will help the decision makers determine tradeoffs between various criteria in such a way as to make the values of one criterion equal for each Alternative to which it applies. In such a manner, a criterion can be eliminated from further consideration. The MCDA process repeats the step until such time as the remaining criteria yield an obvious choice of Alternative.

Future research must focus on achievement of the Intermediate Objective: “Enable multi-jurisdictional watershed management”. One portion of this will be completion of Steps # 4 - #8 of the MCDA. Specifically, we propose creating a

workshop/forum of the Decision-Makers identified in Step #1. Revise Criteria and Objectives determined in Steps #2 and #3. The actual Workshop/Forum will then consist of going into great detail on the expected performance of each Alternative with respect to the stated Criteria. After eliminating Dominated Alternatives, if any, we would create a Ranking/Consequences Table. This will be followed by Step # 5 on weighting the criteria. This involves the critical step of “swapping” criteria values. Essentially this involves trade-offs determined by the decision-makers and results in “shadow prices” for both qualitative and quantitative variables in terms of each other. With the help of the research team, the Decision-Makers will combine the weights and score and reach a decision which will complete Steps # 4 - #6 of the decision-making process of MCDA. The results would then be examined for accuracy and consistency (Step #7). Finally, sensitivity analysis will be performed on the decision (Step #8). The final decision results are then ready for dissemination and further discussion, if necessary in preparation for proposing watershed management enabling legislation.

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APPENDIX A

Tables

Table A-1. Potential decision-makers (sample only) for MCDA	
Organization	Title
Soil and Water Conservation District	Board of supervisors
Conservancy District	Board of directors
Watershed District	Board of directors
Sanitary District	Board of directors
County Sewer District	Board of County Commissioners
Regional Sewer District	Board of Trustees
Special Improvement District	Board of Trustees of a nonprofit corporation, known as the Board of Directors
Ditch District	Legislative authority of a municipal corporation
Ohio Dept. of Natural Resources	Director
Ohio EPA	Director
Counties	Political boundary Chair County Commissioners
Cities	Political boundary Mayor City Council
Townships	Political boundary Trustees
Villages	Political boundary Mayor Village Council
Watershed Groups	Concerned citizens
Source: Compiled by the authors	

Table A-2: Criteria for MCDA (partial list example)
(Expansion of Table 2 in the Report)

Efficiency & Measurement

- Cost Allocation
- Number of persons involved (cost?)
- Personnel/Cost
- Time to accomplish goals (Cost? Benefit?)

Effectiveness & Measurement

- Effect on Indicators of Designated Use Attainment
- Stream Protection
- Stream Restoration
- Span of Control
- Number of Decision Makers
- Scale of TMDLs is a problem (segment by segment instead of on a watershed basis)- (TMDLs are developed for a HUC-11 watershed NOT on a river segment by segment basis. Water Quality sampling is done "segment by segment" in order to characterize the entire drainage network, but if a TMDL is deemed necessary, the assessment and proposed impairment reduction is assigned to the entire HUC-11 watershed.

Effectiveness in accomplishing goals

Funding Mechanism

- Improvability
- Ability to Secure a Budget (Tax? Annual appropriations?)
- Rate of Listing/De-Listing
- Facilitates Trading Economics
- Stream protection/Special designation

Equality, Equity, Fairness, Justice, Freedom

- Stakeholder Effect (could itemize stakeholders and individual effects)
- Stakeholder Representation
- Constituencies/Stakeholders served

Process values, Legality, Political acceptability/feasibility

- Political Risk
- Requires new legislation?
- Formation Authority/Difficulty
- Organizational ability to assist stakeholders reach consensus
- Authority
- Education
- Speed of implementation
- Coordination of efforts
- Conflict Resolution
- Stakeholder Buy-in
- Robustness under conditions of administrative implementation
- Data Access – Current
- Data Access – Future

Table A-2 (continued)

Costs

Administrative Costs

- Planning
- Implementation
- Enforcement
- Data Access - Current
- Data Access - Future
- Personnel/Cost
- Advisory services

Stakeholder Costs & Inaction Costs

- Stakeholder costs identification
- Cost of Inaction-Ohio EPA-final_2004_IR_a

Benefits

- Stakeholder benefit identification (Public=health & recreation)
- Health (public)

Organizational/Institutional Structure

- Institutional Structure:
 - Planning Unit / Governance
 - State Advisory Body
 - State Coordinating Body

Watershed Boundaries

- Specific Regional (area) Protection
- Stream Protection / Special Designation
- Funding mechanism for watershed management approach
- Purpose(s)

Table A-3: Economic Characteristics of Hypothetical Watershed Districts (HWD)

	Lake Erie Basin					
	HWD1	HWD2	HWD3	HWD4	HWD5	
Population	412,989	704,420	362,093	1,909,914	679,852	
Taxable Value RE (\$'000)	\$5,489,762	\$11,057,912	\$5,074,636	\$34,596,779	\$12,493,603	
Net Taxes Collectible RE (\$'000)	\$207,775	\$531,045	\$194,076	\$1,820,447	\$623,740	
Sales Tax-Permissive Use (\$'000)	\$37,316	\$93,198	\$37,235	\$157,314	\$56,870	
Income Tax-Individual (\$'000)	\$232,526	\$454,742	\$195,397	\$1,398,818	\$488,165	
Total Covered Wages (\$'000)	\$1,445,199	\$2,852,745	\$1,158,898	\$8,712,387	\$2,758,890	
Civilian Labor Force	208,405	356,165	189,235	948,450	343,645	
Unemployed (#)	13,340	27,340	15,260	62,675	23,050	
Unemployment Rate	6.40%	7.68%	8.06%	6.61%	6.71%	
Total Counties	14	9	11	7	6	
Whole Counties	4	3	3	0	1	
Partial Counties	10	6	8	7	5	
	HWD6	HWD7	HWD8	HWD9	HWD10	
Population	1,521,777	1,418,867	1,144,217	568,742	1,168,000	
Taxable Value RE (\$'000)	\$24,894,190	\$28,681,073	\$17,407,282	\$7,423,191	\$21,879,454	
Net Taxes Collectible RE (\$'000)	\$1,104,758	\$1,372,856	\$727,892	\$327,577	\$1,025,469	
Sales Tax-Permissive Use (\$'000)	\$156,244	\$123,567	\$54,485	\$41,243	\$150,286	
Income Tax-Individual (\$'000)	\$1,048,933	\$1,205,211	\$677,589	\$306,750	\$1,001,665	
Total Covered Wages (\$'000)	\$6,316,881	\$7,735,859	\$3,777,411	\$1,733,282	\$5,855,777	
Civilian Labor Force	798,100	801,015	587,145	270,585	617,595	
Unemployed (#)	50,550	45,395	41,610	21,580	36,720	
Unemployment Rate	6.33%	5.67%	7.09%	7.98%	5.95%	
Total Counties	14	13	16	6	10	
Whole Counties	3	3	2	0	0	
Partial Counties	11	10	14	6	10	
	HWD11	HWD12	HWD13	HWD14	HWD15	HWD16
Population	291,464	174,762	301,213	271,946	67,625	355,260
Taxable Value RE (\$'000)	\$3,377,265	\$2,441,107	\$3,190,015	\$3,071,537	\$609,665	\$5,069,383
Net Taxes Collectible RE (\$'000)	\$123,556	\$95,321	\$118,429	\$107,753	\$22,456	\$192,503
Sales Tax-Permissive Use (\$'000)	\$28,457	\$13,616	\$32,388	\$24,072	\$3,968	\$41,136
Income Tax-Individual (\$'000)	\$129,876	\$91,350	\$123,082	\$119,476	\$25,461	\$186,324
Total Covered Wages (\$'000)	\$739,643	\$352,148	\$679,784	\$477,049	\$156,872	\$960,592
Civilian Labor Force	137,125	91,600	136,960	128,340	29,755	182,380
Unemployed (#)	12,050	6,685	12,040	10,745	2,840	15,220
Unemployment Rate	8.79%	7.30%	8.79%	8.37%	9.54%	8.35%
Total Counties	14	5	9	11	4	13
Whole Counties	2	0	1	3	0	1
Partial Counties	12	5	8	8	4	12

The reader is cautioned that the resulting HWD economic data is to be used only for the purpose for which it is devised.

Table A-4 (expanded): Consequences Table Example

Consequences of Applying Criteria to Alternatives

Consequences/Outcome with Respect To:

	A1	A2	A3
	Continue with present water resources management approaches and procedures in Ohio	Modify ORC 6105	Design new legislation to enable comprehensive multi-jurisdictional watershed

Efficiency & Measurement

- Cost Allocation
- Number of persons involved (cost?)
- Personnel/Cost
- Time to accomplish goals (Cost? Benefit?)

Effectiveness & Measurement

- Effect on Indicators of Designated Use Attainment
- Stream Protection
- Stream Restoration
- Span of Control
- Number of Decision Makers
- Scale of TMDLs is a problem (segment by segment instead of on a watershed basis)- (TMDLs are developed for a HUC-11 watershed NOT on a river segment by segment basis. Water Quality sampling is done "segment by segment" in order to characterize the entire drainage network, but if a TMDL is deemed necessary, the assessment and proposed impairment reduction is assigned to the entire HUC-11 watershed.
- Effectiveness in accomplishing goals

Funding Mechanism

- Improvability
- Ability to Secure a Budget (Tax? Annual appropriations?)
- Rate of Listing/De-Listing
- Facilitates Trading Economics
- Stream protection/Special designation

Table A-4 (continued 1)

	A1	A2	A3
	Continue with present water resources management approaches and procedures in Ohio	Modify ORC 6105	Design new legislation to enable comprehensive multi-jurisdictional watershed
Equality, Equity, Fairness, Justice, Freedom			
Stakeholder Effect (could itemize stakeholders and individual effects)			
Stakeholder Representation			
Constituencies/Stakeholders served			
Process values, Legality, Political acceptability/feasibility			
Political Risk			
Requires new legislation?			
Formation Authority/Difficulty			
Organizational ability to assist stakeholders reach consensus			
Authority			
Education			
Speed of implementation			
Coordination of efforts			
Conflict Resolution			
Stakeholder Buy-in			
Robustness under conditions of administrative implementation			
Data Access – Current			
Data Access – Future			

Table A-4 (continued 2)

	A1	A2	A3
	Continue with present water resources management approaches and procedures in Ohio	Modify ORC 6105	Design new legislation to enable comprehensive multi-jurisdictional watershed
Costs			
Planning			
Implementation			
Enforcement			
Data Access - Current			
Data Access - Future			
Personnel/Cost			
Advisory services			
Benefits			
Stakeholder benefit identification (Public=health & recreation)			
Health (public)			
Stakeholder Costs & Inaction Costs			
Stakeholder costs identification			
Cost of Inaction-Ohio EPA-final 2004 IR a			
Organizational/Institutional Structure			
Institutional Structure:			
Planning Unit / Governance			
State Advisory Body			
State Coordinating Body			
Watershed Boundaries			
Specific Regional (area) Protection			
Stream Protection / Special Designation			
Funding mechanism for watershed management approach			