

**Learning *from* Innovations in
Environmental Protection**

RESEARCH PAPER NUMBER 18

**ENVIRONMENTAL
GOVERNANCE in
WATERSHEDS**

THE IMPORTANCE OF COLLABORATION TO
INSTITUTIONAL PERFORMANCE

APPENDICES A-C

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Learning *from* Innovations *in* Environmental Protection:

THE RESEARCH PAPERS

This report is one in a series of independent evaluations of innovations in environmental management commissioned by the National Academy of Public Administration's Center for the Economy and the Environment. The entire series is available at the Academy's website, www.napawash.org, and will be available in print in late 2000.

The U.S. Congress initiated this study in FY 1998 when it asked the Academy to undertake an independent evaluation of some of the most promising innovations in environmental management. A panel of Academy Fellows and other experts is guiding the project. The panel selected the research topics and researchers, and encouraged the researchers to offer their own findings and recommendations. The reports in this series are the work products of the research teams; neither the Academy nor the project panel endorses their findings and recommendations. The panel will use the research reports as a foundation for its own report and recommendations to Congress and the U.S. Environmental Protection Agency later this year.

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Review of the Literature on Watershed Management and Collaboration

The ecosystem-based approach to natural resource management, while relatively new and still evolving, has received growing support from practitioners,¹ government officials,² and researchers.³ The shift away from managing individual resources to the broader perspective of ecosystems or watersheds and the use of collaborative decisionmaking has firmly taken root in government programs. Most environmental or land use planning initiatives in the U.S. now utilizes some form of collaborative decisionmaking.⁴ The last decade has also witnessed an expansion in the number of collaborative watershed-based governance efforts across the United States at all levels of government.⁵

The Environmental Protection Agency (EPA) is one federal agency that has embraced the “watershed approach.”⁶ The strategy is based on the premise that water quality and ecosystem problems (e.g., habitat protection) are best solved at the watershed level. It emphasizes targeting priority problems and promoting a higher level of stakeholder involvement. It also recognizes that complex problems often require complex solutions that require the expertise and authority of multiple agencies at different levels of government. Many EPA and state water quality officials also believe that this integrated approach to environmental management will help them to address problems like nonpoint source pollution and habitat loss and degradation that many believe are not adequately addressed by current programs.

In part, this trend is due to the failure of existing federal, state, regional, and local programs to adequately address some environmental problems such as nonpoint source pollution and habitat protection. It is also due to the fact that there are often overlapping government responsibilities, which can lead to inconsistent policies. Elmore (1985) observed that there is a tendency for policies and programs to accumulate around problems over time.⁷ This is certainly true in the environmental arena. The last 30 years have witnessed the development of a sophisticated framework of programs at the federal, state, regional, and local level. Each program tends to adopt parochial solutions, which rely on the policy instruments over which they have direct control. Unfortunately, there is no guarantee that the interlocking system of parochial solutions will produce desired policy outcomes. A variety of governance problems can result including: (1) the fragmentation and duplication of responsibility and authority; (2) poor use of existing information and resources; and, (3) the inconsistency of policies across and between levels of government. Consequently, some environmental problems are not adequately ad-

dressed while other more complicated problems such as NPS pollution requires numerous agencies to coordinate their efforts.⁸

Many watershed management programs, including those supported by EPA, tend to operate on the premise that no watershed is “managed” without having some form of centralized watershed management program. In developing these programs, heavy emphasis is given to science and the preparation of a detailed management plans using some sort of participatory planning process. Our view of watershed management programs is somewhat different. By definition, every watershed is “managed” by a wide range of governmental and nongovernmental actors, whose decisions influence the health and integrity of ecological systems. The challenge for a watershed governance program is to get this portfolio of actors and programs to work together more effectively. Watershed management should therefore be viewed as an effort to build, manage, and maintain interorganizational networks; in other words, to develop an institutional ecosystem.⁹ Thus, watershed management is a form of intergovernmental management (IGM). The implicit goal of watershed management is to improve resource management by changing decisionmaking processes and improving communication and coordination between the governmental and nongovernmental organizations.¹⁰ One tool that has been used to accomplish these objectives is collaboration among governmental and nongovernmental organizations. However, collaboration should involve more than just improved communication or coordination. Value should be added as a result of collaborative activities.

When viewed from this perspective, watershed management is as much a problem of “governance” involving multiple organizations at different levels of government, as it is a question of science and designing effective policies. The capacity (e.g., knowledge, power, and resources) to solve complex environmental problems is often widely dispersed across a set of actors located at different levels of government. “[I]t is often difficult for any one actor, or group of actors, to manage, or manipulate, the flow of problems and solutions onto the political agenda in the first place. Thus, there are complex multi-actor processes for both the identification, definition and resolution of policy problems, and for the implementation of policy.”¹¹ Unfortunately, most research on watershed management focuses on technical issues (e.g., modeling an estuarine system, ecosystem stressors, etc.) and the processes used to develop policies or programs rather than on the implementation of these programs. As a result, the administrative and institutional challenges surrounding watershed governance programs are often ignored or downplayed.¹²

The challenges confronting watershed governance programs can be formidable. In many respects, collaboration is a collective-action problem.¹³ There are often incentives for actors not to cooperate, share information, or develop consistent policies. There are a number of reasons why noncooperative behavior might be expected. First, government programs are subject to different statutory and budgetary responsibilities. This creates different constituencies, and can lead to competing programmatic priorities and objectives. Each program will also have different capacities for action such as regulatory authority and technical expertise. Changing responsibilities, priorities, or the capacity for collective action will often require institutional changes, which can create political conflicts. Second, organizations may need to change policies in order to implement a watershed management plan. The policy changes may be inconsistent with the present disposition of the implementors or come about only at great political or economic cost. Accordingly, it is reasonable to expect some federal, state, and local officials as well as private and nonprofit organizations to resist implementing policy changes that run counter to the organizations’ other interests. Finally, sharing information and coordinating programmatic efforts can be time-consuming and requires a significant commitment of organizational resources. If the collective-action problems associated with collaboration are to be overcome,

practitioners must pay attention to institutional design and maximize the incentives to cooperate while minimizing those that lead to noncooperative behavior. Unfortunately, researchers have largely ignored these challenges.¹⁴

Review of the Literature

This study draws off three distinct streams of research to provide the general theoretical foundation for guiding our inquiry, identifying potential cause and effect relationships, and answering this paper's research questions. These are: (1) the environmental policy research that examines ecosystem-based and watershed-based management programs; (2) the public administration research on collaboration and intergovernmental management; and (3) research on institutional analysis, specifically the institutional analysis and development (IAD) framework.

The first line of research is environmental policy research focused on place-based or community-based management. Of particular interest is the growing research on collaborative efforts that try to improve the governance of ecosystems and watersheds.¹⁵ The ecosystem-based approach has been applied in a variety of settings to address a wide range of resource management problems.¹⁶ It has been used to manage terrestrial habitat systems.¹⁷ Other researchers have focused on the management of fisheries¹⁸ such as those on Georges Bank¹⁹ and other large marine ecosystems.²⁰ There is also a great deal of research examining ecosystem-based management efforts for various estuaries²¹ and riverbasins²² such as the Chesapeake Bay,²³ the Great Lakes,²⁴ the Columbia River,²⁵ and Puget Sound.²⁶ There is also a growing literature on integrated environmental management,²⁷ integrated coastal zone management,²⁸ and adaptive management²⁹ that shares similar themes with this ecosystem-based management literature. Moreover, environmental policy research in diverse areas such as collaborative decisionmaking,³⁰ stakeholder involvement and public participation,³¹ and the role of science in the policy process³² also informed this analysis.

While the ecosystem-based approach is still emerging, it certainly appears to have a strong administrative and institutional orientation.³³ Common themes reflected in this research include:

- Approaching problems from an integrated or systems perspective;
- A strong focus on maintaining ecological integrity;
- Having a stronger scientific basis behind government policies;
- Improving the integration of government policies;
- Enhancing the coordination and cooperation of various governmental and nongovernmental organizations;
- Broad public participation;
- The involvement of key stakeholders in government decisionmaking;
- Adaptive management
- Organizational change; and,
- Improving institutional performance.

Unfortunately, while the concept of ecosystem or watershed management is appealing and may lead to improved resource management, there are a number of institutional and administrative challenges, many of which have largely been ignored in the literature.³⁴ For example, Grumbine (1994) found that the themes least referred to were organizational change, adaptive management, and the role that values play.³⁵ Moreover, while knowledge of organizational structure and behavior are essential to developing an effective watershed management program, researchers often ignore these issues.

To better understand these issues, this study builds upon a second stream of research, the growing public administration literature on collaboration³⁶ and IGM.³⁷ Much of this research focuses on interorganizational networks³⁸ and refers to the network phenomena in a variety of ways including issue networks,³⁹ implementation structures,⁴⁰ interorganizational policy systems,⁴¹ advocacy coalitions,⁴² and policy networks.⁴³ In addition, this study also builds on related research on policy formation and implementation,⁴⁴ interorganizational relations and organizational theory,⁴⁵ social networks,⁴⁶ and federalism.⁴⁷

Unfortunately, while the process of policy development and implementation in networked settings is clearly a practical concern, these processes are not well understood. Nor is the pragmatic concern of managing in this setting.⁴⁸ There is no consensus on definitions, concepts, or the methodological approach to studying the structure of interorganizational networks. Some approaches examine questions related to networks involved in policy formation and change while others focus on networks involved in policy implementation.⁴⁹ It is unclear how networks influence the behavior of actors within a network. It is also unclear how one “manages” or changes an interorganizational network. Moreover, it is unclear how one measures the performance or success of collaborative or networked programs.⁵⁰

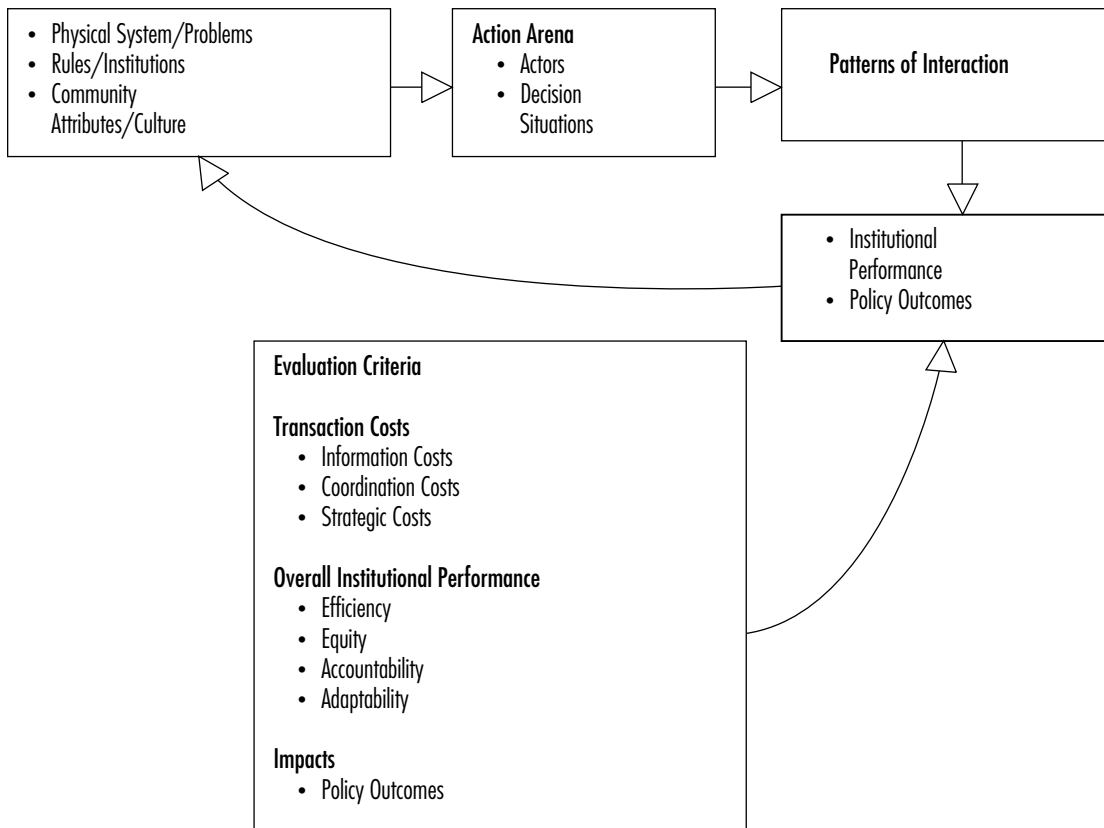
The final line of research is the institutional analysis literature. In particular, the study draws on the Institutional Analysis and Development (IAD) framework developed by Elinor Ostrom and her colleagues (Figure A 1).⁵¹ The IAD framework is a theoretical framework that is used to help structure the analysis of an institutional arrangement. Institutions are defined as “enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world. The rules, norms, and shared strategies are constituted and reconstituted by human interaction in frequently occurring or repetitive situations.”⁵² Institutions include families, churches, local governments, government agencies, and most organizations since they are defined by rules, norms, and shared strategies.⁵³ Institutions promote socially beneficial outcomes by helping actors resolve “social dilemmas” resulting when individually rational actions aggregate to produce socially irrational outcomes. Therefore, institutional arrangements provide the means to resolve collective action problems.⁵⁴

Several attributes of the IAD framework make it particularly useful for analyzing the collaborative arrangements associated with watershed governance programs. First, it recognizes the full range of transaction costs and strategic behaviors associated with implementing policies. Second, it draws attention to the contextual conditions (e.g., physical, biological, social, economic, cultural, etc.) that can influence collaborative programs and affect their performance. Third, it contains no normative bias with respect to the institutional arrangement used to implement these programs. In other words, the IAD framework does not presume that a centralized hierarchical arrangement is more effective than one that is decentralized or polycentric in structure. Fourth, it suggests using a variety of criteria to identify the strengths and weaknesses in the institutional arrangements used to implement policies. Finally, the focus on

rules rather than policies broadens the analysis to address a much wider range of organizational relationships. It also draws attention to how social norms and monitoring and enforcement mechanisms can influence institutional performance.⁵⁵

Of related interest is research on assessing implementation “success” and measuring institutional or network performance, whether it is defined in terms of institutional performance,⁵⁶ compliance,⁵⁷ feasibility,⁵⁸ effectiveness,⁵⁹ level of effort,⁶⁰ policy outputs,⁶¹ policy outcomes,⁶² or examines whether plans matter.⁶³ Of particular interest, is research on the results of implementation activities⁶⁴ and program outputs or outcomes⁶⁵ in coastal and watershed management programs.

FIGURE A 1: THE INSTITUTIONAL ANALYSIS AND DEVELOPMENT (IAD) FRAMEWORK



Source: Modified from Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, & Common-Pool Resources*. Ann Arbor, MI: The University of Michigan Press.

Research Design

Qualitative approaches are often recommended when you want to understand how a process occurs or how contextual factors influence the effectiveness of a process or program.⁶⁶ Qualitative approaches are also particularly useful when attempting to understand complex relationships between decisionmaking processes, physical settings, community characteristics, stakeholders' interests, existing institutional arrangements, availability of resources, and the capacities of state, regional, and local actors. Qualitative research employs an intense investigative process that contrasts, compares, replicates, catalogues, and classifies objects and events to provide decisionmakers with the information necessary to improve program performance.⁶⁷ As a result, qualitative evaluations tend to be descriptive and focus on explaining why a process is, or is not, effective and how different contextual factors influence the success of that process.

Case Selection

This analysis used a qualitative, comparative case study design to answer the questions specified in Table B 1. Specifically, the project involves developing, comparing, and contrasting the following six case studies that are described elsewhere in the report:

- Salt Ponds (RI)
- Narragansett Bay (RI, MA)
- Lake Tahoe (NV, CA)
- Delaware Inland Bays (DIB) Program (DE)
- Tampa Bay (FL)
- Tillamook Bay (OR)

The unit of analysis was not the watershed program developed for the watershed, but rather the collection of government programs that governed the watershed. The analysis then examined the extent to which the watershed management program improved the way this system of programs governed the watershed and whether the programs were able to demonstrate any environmental improvements.

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The selection of the cases was the product of five interrelated criterion. First, we wanted to select cases where nutrient or pathogen loadings from septic systems and stormwater runoff and habitat loss due to residential development were priority concerns. Second, we wanted to have programs that represented different scales both in terms of watershed area, population, and jurisdictional complexity. Third, we wanted to select programs that have made progress in addressing nonpoint pollution or programs where data are available to assess these efforts. Fourth, we wanted a mixture of successful and unsuccessful programs. For example, the Tampa Bay Estuary Program (TBEP) recently won a Bronze Award from the Environmental Protection Agency (EPA) for its efforts to develop their Comprehensive Conservation and Management Plan (CCMP) while the Delaware Inland Bays Estuary Program (DIBEP) almost failed to have their plan approved by EPA.

TABLE B 1: RESEARCH QUESTIONS

TOPIC	RESEARCH QUESTIONS
Setting and Measuring Goals	<ul style="list-style-type: none"> ■ What is the “state-of-the-art” in measuring and modeling water quality problems, especially the management of nonpoint pollution? What improvements in methods are foreseeable? Would these improvements enlarge the potential for watershed protection? ■ How important are TMDLs to effective watershed protection? What are the problems with TMDLs? Are there other techniques for doing loading assessments that are more effective? ■ Are existing legal provisions for classifying waterbodies and monitoring conditions adequate?
Defining Problems and Determining Watershed Boundaries	<ul style="list-style-type: none"> ■ Are there some problems that the watershed approach is not effective in addressing? ■ Does the scale of a program influence its ability to define problems, set goals, implement the plan, change institutional arrangements, use management tools, maintain accountability, or achieve results?
Institutional Arrangements	<ul style="list-style-type: none"> ■ Does coordination at the watershed level enable agencies to deploy traditional regulatory tools more effectively and efficiently? Is value added as a result of the coordination efforts? ■ Does coordination allow the agencies to deploy new management tools? ■ Does coordination at the watershed level permit agencies to address problems beyond the range of traditional regulation? ■ What are the most effective strategies for engaging multiple agencies and communities in joint efforts to design and implement watershed protection? Which strategies work best in different conditions? ■ What stage of the process should EPA or state agency staff become involved in community-based watershed protection efforts? ■ How should EPA or state agency staff become involved in individual community-based watershed protection efforts? ■ Are the institutional arrangements capable of bringing the stakeholders to the table and keeping them there throughout the implementation process?
Management Tools	<ul style="list-style-type: none"> ■ How effectively can EPA and state environmental agencies support effective watershed management without enhancing their legal authority to regulate nonpoint sources? ■ What combination of tools (e.g., cost sharing, technical assistance, education, etc.) is the most effective in reducing nonpoint pollution and accomplishing other environmental goals in different situations? ■ How can EPA or state environmental regulatory activities be usefully coordinated with state or local land-use regulation?

TABLE B 1: RESEARCH QUESTIONS (CONT'D)

TOPIC	RESEARCH QUESTIONS
Implementation	<ul style="list-style-type: none"> ■ What are the most important factors for effective watershed protection (e.g., statutory authority, current regulations, funding, staff skills, agency culture, organizational structure, etc.)? ■ What is the relationship between recent EPA “re invention” efforts (e.g., customer driven solutions, NEPPS, Project XL, etc.) and the watershed management programs? Do these efforts contribute to or reinforce watershed protection? ■ To what extent have the watershed management efforts changed laws, regulations, policies, or decisionmaking such that there is a reasonable expectation that environmental conditions will improve? ■ What role do demonstration projects and restoration efforts have in the implementation of an integrated watershed management program? ■ What role do nongovernmental organizations play in implementation?
Accountability	<ul style="list-style-type: none"> ■ How can EPA, state agencies, and the public be sure that watershed protection efforts produce the results that are planned, modeled, and promised? ■ How do core functions of environmental regulation fit into integrated watershed protection? ■ Do integrated watershed management programs help to improve the consistency between the goals, policies, and regulations of EPA, state agencies, and local governments?
Results	<ul style="list-style-type: none"> ■ Have the watershed efforts led to better environmental conditions than would have been achieved by traditional EPA programs alone? ■ What are reasonable expectations of what can be achieved by watershed protection? ■ What innovations or lessons might be transferable to other integrated watershed management or place-based environmental protection initiatives?

Finally, we wanted to keep costs down as much as possible. The selection of two Northeast estuary programs allowed one investigator to drive to the locations and another researcher has access to accommodations in the Delaware Inland Bays watershed. The selection of the cases also allowed the researchers to build on previous research. One of the investigators had done previous research on the Salt Ponds⁶⁸ and the Delaware Inland Bays. Four of the cases were also in the NEP, a program that has been subject of some research.⁶⁹ As a result, many of the background materials for the programs had already been collected. The investigators know many of EPA and estuary program staff in programs around the country. They are also familiar with the process used to develop and implement CCMPs.⁷⁰ Accordingly, this allowed the research team to move expeditiously in developing the case studies, which will help reduce project costs. Their familiarity with the programs also improved data analysis. In addition, there was some previous research and analysis of the Delaware Inland Bays,⁷¹ Lake Tahoe,⁷² Narragansett Bay,⁷³ Salt Ponds,⁷⁴ Tampa Bay,⁷⁵ and Tillamook Bay⁷⁶ efforts to draw upon.

The six programs clearly differed in several important respects that enhanced the comparative analysis. First, the state water quality agency has different roles in the programs. In some cases, it was the lead agency (e.g., Delaware Inland Bays) while in others (e.g., Salt Ponds) it was

one of many partners. Second, the programs are at different stages of maturity. The Salt Ponds has approximately 14 years of implementation experience and Lake Tahoe's program has been in existence since 1969 while Tillamook Bay's management plan is still under review by EPA. Other programs have undergone several cycles of planning. For example, the Delaware Inland Bays was preceded by several planning efforts and it is currently in the midst of a new basinwide planning process and is simultaneously undergoing a total maximum daily loading (TMDL). Third, the cases will allow the project team to examine differences in staff leadership and expertise. Some programs have maintained a single director since the start of the planning process while Tillamook Bay underwent major staffing change during the planning process and others changed staff as they moved from planning to implementation (Delaware Inland Bays and Narragansett Bay). Meanwhile, the Salt Ponds was developed by University researchers, which had little role in the plan's implementation. Fourth, having cases in six different states will enhance geographic diversity and allow the investigators to explore differences in the relationships between federal, state, and local governments. It will also help determine what role nongovernmental organizations (NGOs) played in the development and implementation of the watershed management programs. Finally, the cases included some diversity with respect to the role of TMDLs and other forms of modeling nutrient loadings. For example, Delaware Inland Bays recently adopted a TMDL while the Salt Ponds relied on different modeling techniques. The programs also have different experiences with developing and using computer models. We believe that these characteristics and others made the six programs ideal candidates for this study.

Each case study includes a description of each watershed management effort and an analysis of the factors that shaped these efforts at their inception and at key decision points over the life of the program. It also examines the other programs involved in governing nonpoint runoff and habitat protection in the watershed to explore how these programs interact with the watershed management program. Finally, the case study examined each of the research questions identified in Table B 1 and other questions posed by the National Academy of Public Administration. Each case study was then assessed using criteria provided by the Academy, which included risk-reduction, cost-effectiveness, certainty of effect, predictability of the process, equity, transparency to the public, effect on problem-solving capacity, the potential for short- and long-term gains, as well as other criteria as they emerged from the analysis. The data for each case study was then compared and the results of this comparative analysis are reported in this report while six detailed case studies were developed that support this report to the Academy.

Data Collection

This project relied on several data sources: (1) archival records and program documents; (2) field interviews with key stakeholders in the watershed management effort; (3) follow-up telephone interviews with other participants; and, (4) direct and participant observation. Examining different data sources is important because it allows the investigators to use a strategy of triangulation when formulating answers to the research questions. Triangulation involves using independent measures derived from different sources to support, or at least not contradict, a research finding, which helped improve the validity of the study.⁷⁷

Program Documents and Archival Records

Archival records and program documents provided an important source of data in this study. Documents examined include: state environmental agency management conference

agreements; governor's nomination packages; annual work plans; annual reports; correspondence files; minutes of meetings; characterization (status and trends) reports; draft/final CCMPs; comments on draft CCMPs; the estuary project's response to the comments on draft CCMPs; letters of commitment for final CCMPs; public outreach materials (e.g., newsletters, fact sheets, etc.); and, reports summarizing implementation activities and their success (e.g., monitoring data and annual progress reports). A bibliography of these materials can be found in Appendix C of this report. Newspapers and reports from other nongovernmental organizations within each watershed may also provide information on implementation activities. In some cases, academic research existed to support the development of the case studies. However, most of this research does not directly relate to this study's research questions. The collection and analysis of these materials has been an ongoing process over the course of the project. Watershed may also provide information on implementation activities. In some cases, academic research existed to support the development of the case studies. However, most of this research does not directly relate to this study's research questions. The collection and analysis of these materials has been an ongoing process over the course of the project.

Field Interviews

An important source of contextual information was field interviews with representatives of the major stakeholders involved in developing and implementing the watershed management efforts. Prior to conducting each site visit, a principal contact person(s) was identified to help arrange the site visit and select the interview respondents. Detailed entry interviews were conducted with the principal contact. Typical respondents included program staff (both past and present), state and local government officials, EPA and other federal agency officials, committee chairs (e.g., management, citizen advisory, science and technical advisory, and local government committee), representatives of the environmental groups, representatives of the major industry trade groups, representatives of the state CZM program, and a representative of the USDA programs (e.g., NRCS, Conservation District, etc.) at each site. A snowball sampling technique will then be used to identify others who are knowledgeable about implementation activities or could otherwise inform our inquiry.

At least 30 field interviews were conducted on-site for each case study. This number varied by case depending on its complexity, size, and number of key stakeholders. There was also some overlap between people interviewed for the four NEPs and the two Rhode Island cases, which provided an opportunity for respondents to make comparisons between programs. To the greatest extent practicable, all of the key stakeholders for each case study were interviewed during the site visit. EPA headquarters officials were interviewed during the scheduled trips to Washington, DC to meet with Academy officials. However, due to scheduling problems and other resource constraints some interviews and follow-up interviews with peripheral actors occurred by telephone. In total, more than 200 individuals were interviewed with a small number of these individuals being interviewed more than once. This does not include the numerous informal interviews that were conducted with members of the public, interest groups, and government agencies that occurred during our site visits as well. For example, meeting with some individuals informally before, during, or after a special event or public meeting that was attended during the site visit.

An interview guide was prepared and then modified for use in each case study. The interview guide was used to conduct the field interviews. The questions were open-ended and explored various aspects of the research questions contained in Table B 1. The interview guide

was revised periodically based on its use during each site visit. Each interview lasted approximately one hour and varied in length between 30 minutes and in some cases lasted over three hours. Field notes were prepared to record each interview. All interviews were then recorded on audiotape to ensure the accuracy of the data. Strict confidentiality was maintained both during and after the study. Follow-up phone interviews were conducted as necessary and recorded on tape as well. The audiotapes were then transcribed in either full or partial verbatim transcripts. Additional phone and email inquiries were used to verify and clarify information supplied during phone interviews. The field notes and transcripts provided an important data source that was coded and analyzed using the systematic procedures recommended by Miles and Huberman (1994).⁷⁸

Telephone Interviews

Resource constraints and scheduling problems prevented the research team from conducting field interviews with all of the stakeholders involved in developing and implementing each integrated watershed management program. It also will not be possible to visit each EPA regional office to interview the staff involved in each watershed management program. Accordingly, the project utilized telephone interviews to obtain data from these individuals. The interviews occurred in manner similar to the field interviews. The same interview guide was used. Interviews lasted approximately one hour. Detailed field notes will be prepared for each interview. All interviews were recorded on audiotape to ensure the accuracy of the data. Strict confidentiality was maintained both during and after the assessment. Follow-up phone interviews were conducted as necessary to clarify answers. The audiotapes were then transcribed. The field notes and transcriptions were then coded and assessed using the systematic methods recommended by Miles and Huberman (1994).⁷⁹

Participant and Direct Observation

The final source of data was direct and participant observation. An attempt was made to schedule site visits such that members of the research team could attend various events and meetings and interact with participants in an informal basis. Attendance at meetings provided an important source of data on coordination activities and the relationships between organizations. It also provided a glimpse of how these organizations functioned and made decisions. Detailed field notes containing our observations of the meeting(s) and any discussions that occurred before and after the meeting and during breaks were prepared. The data was then coded and analyzed using systematic procedures recommended by Miles and Huberman (1994).⁸⁰

Direct and participant observation occurred to some degree in all of the cases but was more pronounced in Delaware Inland Bays, Narragansett Bay, and the Salt Ponds. This was due to ongoing research in the Delaware Inland Bays that this project built upon. In Narragansett Bay and the Salt Ponds it was due both to the location of two members of the research team in close proximity to the watersheds as well as the authors' periodic involvement with several of the key actors involved in both the Narragansett Bay and Salt Ponds cases.⁸¹ Mark T. Imperial worked for the University of Rhode Island's (URI's) Coastal Resources Center (CRC) from 1989 to 1991 and the Coastal Resources Management Council (CRMC) from 1991 to 1994. Imperial also worked as a consultant to the CRC on two projects, including a project funded by EPA and the U.S. Agency for International Development (AID) from 1994 - 1995.⁸² This project exam-

ined the NEP to identify estuary programs that could be used as the basis of a training program for international coastal managers that was designed by the CRC. Tim Hennessey has periodically worked with CRC staff on various projects, worked as a consultant to the Environmental Quality Study Commission on a project that evaluated RIDEM and issued its report in 1990.⁸³

This involvement had certain benefits. Our previous involvement and ongoing research on the NEP actually improved access to the four NEP research sites and the Salt Ponds and enhanced our ability to collect data. Participant observation and direct observation are well established data sources for qualitative evaluations.⁸⁴ Observational data helps an evaluator understand the context within which a program operates, the institutions and how they function and interact, and politics that surround the actors involved in each watershed management effort. Firsthand experience also helps an evaluator be open, discovery oriented, and inductive in approach. Evaluators may also be in a better position to see things that routinely escape awareness among participants and staff. Thus, they may discover things that no one was ever really aware of. The evaluators may also learn things that respondents may be unwilling to talk about in interviews. It can also help the evaluators to understand selective perceptions and biases of the respondents they are interviewing and improve their judgments about the validity of the data that has been collected. Firsthand experience allows the researcher to use their personal knowledge and experience to aid in understanding, interpreting, and validating the conclusions drawn from the analysis of other data sources.⁸⁵

Our previous experience and research thus provided a measure of theoretical sensitivity that improved our interpretation and explanation of events that transpired in the six watersheds.⁸⁶ Accordingly, instead of as a liability, we believe that our previous involvement and utilization of this observational data enriched the analysis of the six case studies and the comparative analysis reported in the following sections of this report

Data Analysis

Systematic qualitative techniques such as coding were used to examine various documents, field notes, and interview responses. Examining different data sources was important because it allows the investigators to use a strategy of triangulation. Triangulation involves using independent measures derived from different sources to support, or at least not contradict, a research finding.⁸⁷ Accordingly, triangulation improved the validity of the study. The following sections briefly describe how the data for individual cases was analyzed to produce the six case studies (single-case analysis) and how the data was analyzed across the different cases (cross-case analysis). The results of the single- and cross-case analysis will provide the answers to the research questions contained in Table B 1 and the questions posed by the Academy.

Single-Case Analysis

Analysis of the data was an on going process. Data was analyzed following the site visit. Codes were derived both inductively and deductively from the data.⁸⁸ In addition, the codes were generated based on a start list derived from previous research. The start list was based on the research questions contained in Table B 1 and the evaluative criteria supplied by the Academy. Accordingly, the programs were evaluated based on their overall risk-reduction, cost-effectiveness, certainty of effect, predictability of the process, equity, potential for long-term gains, potential for short-term gains, transparency to the public, or potential to strengthen problem-solving capacity over time. Other factors critical to the success of these programs also emerged from the analysis and is discussed in the report.

As coding continued, patterns emerged. Pattern codes were identified that began to dimensionalize concepts.⁸⁹ The coding format was then modified as additional case studies were developed. When coding and recoding data, quotes and short vignettes were identified for inclusion in the case studies and the final evaluation report. This helped add context to the final report and provided additional support for observations and conclusions. Analytical memos and detailed outlines were used periodically throughout the data analysis process to help make sense of the data resulting from the coding efforts and to begin organizing the research findings.⁹⁰ These documents provided a mechanism to share observations and conclusions among the investigators. The project director also met periodically with each member of the team to discuss the findings and conclusions resulting from their independent analysis of the individual case studies in an attempt to evaluate the degree to which the findings in particular cases were transferable to other cases. This formed the basis of the preliminary cross-case analysis.

As data analysis continued, matrices and network displays were generated that identified patterns and trends. In some cases, similarities in the programs allowed some displays to be modified for inclusion in other cases, although the unique nature of each case and the availability of data limited our ability to do so. The displays began to provide answers to the questions contained in Table B 1. They also facilitated the process of triangulating the data. Further methods of inquiry were then employed to answer the questions generated from the initial round of matrices and displays (e.g., follow-up telephone interviews). The matrices and network displays were then used to identify variables that appeared to influence the effectiveness of these programs. Detailed timelines were sometimes developed to examine the sequencing of activities and to identify and evaluate potential cause and effect relationships. Written case studies were then developed based on this analysis. The case studies were pre-structured and designed to “tell the story” of the development and implementation of each watershed management program. Each case study examined:

- Nature of the ecological system and the problems confronting practitioners
- History of previous watershed planning efforts
- Institutional framework of programs that address problems due to NPS and habitat and loss and degradation
- Planning process used to develop the management plan or regulatory program
- Implementation structure used to oversee the program’s implementation
- Progress made to improve the governance of the watershed

The resulting technical reports were also structured in a manner that ensured comparability across the cases, ensured the Academy’s criteria and specific research questions were identified, and discussed the findings reported in this report:

- *Rhode Island’s Salt Ponds: Using a Special Area Management Plan to Improve Watershed Governance*
- *Narragansett Bay Estuary Program: Using a State Water Quality Agency to Implement a CCMP*
- *The Delaware Inland Bays National Estuary Program; Using a Nonprofit Organization to Implement a CCMP*

- *Tahoe Regional Planning Agency: The Evolution of Cooperation*
- *The Tampa Bay Estuary Program: Developing and Implementing an Interlocal Agreement*
- *The Tillamook Bay National Estuary Program: Using a Performance Partnership to Implement a CCMP*

Once a draft of the case study was complete, the field notes, transcripts, and selected archival records were reread to ensure that facts and findings reported in the case study were accurate. It was sent to between five and nine respondents knowledgeable of the program for factual verification. The case studies were then revised as necessary based on the comments received. EPA then reviewed the case studies as part of the Academy's review process, however, only comments on the Narragansett Bay case study were received.

Cross-Case Analysis

Prior to the completion of the case studies, the project team began work on the cross-case analysis. This ensured that the individual case studies would address issues raised in the cross-case analysis. One of the main reasons for cross-case analysis was to increase generalizability and determine the extent to which the findings extended beyond an individual case. The cross-case analysis also deepened our understanding of the strengths and limitation of these governance efforts. In particular, the analysis focused on conceptualizing how these programs operated to identify factors that influenced their effectiveness. The analysis also tried to draw lessons and identify innovations that might be transferable to other watershed management programs using the techniques recommended by Rose (1993).⁹¹ The analysis also identified lessons or innovations that could be transferable to other place-based efforts. Moreover, the analysis focused on identifying problems in existing programs and developing recommendations for Congress and EPA that could address these issues.

The basic approach was one of synthesizing interpretations and looking for themes that cut across the cases.⁹² The matrices and network diagrams used to prepare individual case studies were used to develop cross case displays and matrices. The data in the cross-case displays was then clustered and partitioned and subsequent cross case displays and matrices were developed. This allowed us to compare and contrast cases as well as to identify patterns, themes, and trends. It also provided a better understanding of the relationships between important variables. Accordingly, the cross-case displays and matrices allowed us to draw conclusions and provide answers to the research questions in Table B 1. Summary displays and matrices are included in this report.

Validity

Regardless of the methods employed, the findings must be valid if they are to be used in making recommendations to improve the implementation of these programs. One of the main threats to the study's validity was the accuracy of the data obtained from archival records, field interviews, telephone interviews, and observations. For example, one's data could be biased if accurate records of the interviews were not kept. The data could also be biased if the people interviewed are not knowledgeable of the program's efforts and activities. There is always the possibility that the person you are interviewing is not telling the truth. Our involvement with organizations in the Narragansett Bay and Salt Ponds presented another potential threat to the validity of the findings related to these case studies.

Strategies Used to Improve the Validity of the Findings

Several strategies were used to ensure that these concerns were addressed. All data was collected using the procedures recommend in the literature.⁹³ All sampling decisions and interview procedures were documented as were techniques used in the data analysis. All interviews were recorded on audiotape to ensure that there was an accurate record. Detailed field notes and transcripts were prepared for each interview. Strict confidentiality was maintained both during and after the study to encourage the respondents to provide accurate information. A snowball sampling procedure was used to uncover knowledgeable individuals that may have different perspectives on the activities reported in each case study. Follow-up phone interviews and email contacts were conducted as necessary until a complete picture of the integrated watershed management program emerges. The interview data and archival records were then be analyzed using systematic procedures recommended in the literature.⁹⁴ When a draft of the case study reports was completed, the field notes, transcripts, and selected program documents we checked and reread to ensure the accuracy of the findings. When the draft final report was completed the draft case studies were reread as well as selected transcripts and program documents to verify the reports conclusions. To further ensure that the record of events is accurate, between five and nine respondents were sent a draft of the findings for “factual” verification. These comments and any discrepancies of the facts reported in the cases was investigated further to ensure the reports were accurate.

To further ensure the validity of the study and its conclusions, the study used the strategy of triangulation to improve the overall validity of the results. Triangulation is one of the recommended strategies when using quantitative research methods.⁹⁵ Triangulation involves using independent measures derived from different sources to support, or at least not contradict, a research finding.⁹⁶ In many respects, our approach is analogous to doing good detective work.⁹⁷ Arguments and alternative explanations were contrasted against one another to identify logical inconsistencies and explore their consistency with the data that has been collected and analyzed. The chain of events was then examined to help determine causality. In some cases, this involved developing detailed timelines. Potential threats to the validity of the study’s conclusions were analyzed.⁹⁸

In the case of the Narragansett Bay and the Salt Ponds cases, additional steps were taken to ensure the objectivity and validity of the findings reported in this report and its supporting technical reports. These steps were further aided by the fact that the involvement has been limited in the case of Hennessey and occurred over six years ago in the case of Imperial. Much of the activity reported in these cases occurred after this involvement and neither author had any thing to gain by presenting a “biased” view of the events that transpired. First, we were careful to rely primarily on the data collected from archival records and interviews and used observational data primarily to verify these observations. This triangulation strategy helped enhance the validity of the findings reported in the case. Second, we maintained strict confidentiality for our respondents and often turned off the recorder when asked to do so by our informants. This is a standard practice when conducting qualitative evaluation research.⁹⁹

Third, we were aware that the Narragansett Bay case was highly controversial and that strong feelings existed. Therefore, when relying on interview data we were careful not to rely exclusively on the observations of a single individual or stakeholder group but rather gave more attention to observations reported by numerous individuals that represented more than one set of interests or perspectives. We believe that this minimized any bias that might have been present in the interview data. Special attention was also given to observations that were widely reported such as the failure of the original NBP partners to implement the CCMP and utilize

it as a viable policy document. We also tried to rely primarily on quotes from present and former NBP/NBEP, RIDEM, and EPA staff in these reports rather than comments from other stakeholders that might be more biased.

Fourth, our research assistant, Sally McGee, had no prior involvement with any of the stakeholders. She conducted the majority of the interviews and performed the initial analysis of the data for the Narragansett Bay and Salt Ponds case studies. Imperial was primarily involved in collecting the data and undertaking the analysis of the Delaware Inland Bays, Lake Tahoe, Tampa Bay, and Tillamook Bay case studies and only participated in the entry interviews and the cross-case analysis. McGee prepared the draft case study for Narragansett Bay while Hennessey prepared the draft Salt Ponds case study because he had less involvement than Imperial in this case study. In fact, the original intention was to limit Imperial and Hennessey's involvement in preparing these manuscripts. However, when the project fell behind schedule and McGee left the project for other employment after completing the draft case study. This forced Imperial and Hennessey to complete the draft Narragansett Bay case study. Despite this involvement, many of the findings in the Narragansett report are the product of McGee's independent analysis of the data rather than our own. Imperial's input to the Salt Ponds case study was limited to ensuring its consistency with the other case studies and the final report.

Finally, in order to ensure the accuracy of the findings, each case study was reviewed by a selected sample of knowledgeable informants.¹⁰⁰ These informants were typically those individuals with the "institutional memory" who had long histories of involvement with the watershed management efforts. They also included key actors such as program managers and representatives of key constituency groups as well individuals who we believed would provide a neutral and balanced review of the findings reported in the case study. Various EPA officials also reviewed and commented on this report pursuant to an additional review process administered by the Academy. These comments were then addressed and factual discrepancies were investigated further. In some cases, this report notes specific EPA comments pertaining to agency policy positions or alternative interpretations of the events described. These comments and our responses are included in either the text or the accompanying endnotes where appropriate.

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- 53 What differentiates institutional analysis from most forms of organizational analysis is the focus on rules. Rules are an implicit or explicit attempt to achieve order and predictability among humans (Ostrom, "An Agenda for the Study of Institutions"). Rules are prescriptions that forbid, permit, or require some action or outcome and the sanctions authorized if the rules are not allowed (Crawford and Ostrom, "A Grammar of Institutions"). Rules can be formal (e.g., laws, policies, regulations, etc.) or informal (e.g., social norms). Since "rules are not self-formulating, self-determining, or self-enforcing" (Ostrom, "Artisanship and Artifact," 312), they are formulated in human language and subject to problems of lack of clarity, misunderstanding, and varied interpretations. The stability of rule-ordered interactions therefore depends upon the development of shared understanding of rules (Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources*, 40). This often requires building trust by monitoring and enforcing rules. Enforcement can take the form of formal (e.g., cease and desist order, civil penalties, criminal penalties, etc.) or informal (e.g., a verbal comments or facial expressions demonstrating displeasure) sanctions.
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- 81 The Narragansett Bay and Salt Ponds technical reports represents much more than our recollection of events and our opinions. Imperial and Hennessey's involvement was simply too limited for this to have occurred since we had little knowledge or involvement in the NBEP's implementation efforts, the heart of this case study.
- 82 In 1989, Mark Imperial moved to Rhode Island where he was a graduate student in the URI's Marine Affairs Program. From December 1989 until approximately December 1991, Imperial worked as a research assistant for Timothy Hennessey and Donald Robadue at URI's CRC. The research was part of a larger project examining the governance of watersheds in the United States. Of particular interest was a new EPA program called the NEP. This project examined the legislative history of the NEP as well as the activities of a number of Tier I and Tier II programs. These research activities included attending numerous NBP and Buzzards Bay Project (BBP) meetings as an observer and interviewing, both formally and informally, project officials in various Tier I and II programs and various EPA officials. This research provided the foundation for his masters thesis research which examined public participation efforts in the Tier I and II programs (Imperial, *Public Participation in the National Estuary Program*). Collectively, this research resulted in two peer-reviewed articles and several other publications and conference papers (e.g., Imperial, Robadue, and Hennessey, "An Evolutionary Perspective on the Development and Assessment"; and, Imperial, Hennessey, and Robadue, "The Evolution of Adaptive Management for Estuarine Ecosystems").

In December 1991, Imperial was hired by the CRMC as a policy analyst, one of two in the agency at the time. Imperial was hired because his experience as a research assistant at the CRC exposed him various CZM and water quality management programs, including the NEP. He also was familiar with the NBP. Since the draft CCMP was being released, one of the first tasks Imperial had was to review the draft CCMP and assist with the preparation of the CRMC's comments. Imperial was not a member of the NBP's Management Committee (Narragansett Bay Project (NBP), *Comprehensive Conservation and Management Plan for Narragansett Bay Final Report*, State Guide Plan Element 714, Report Number 71 (Providence, RI: NBP and RIDOP, September 1992), xxxviii). Although, he attended all of the meetings with the CRMC's Executive Director and participated in Management Committee discussions in the same capacity as the support staff in other organizations. Moreover, despite the assertions of EPA and NBP/NBEP staff, Imperial did not have the authority to commit the CRMC to any actions nor did he have the authority to disregard previous commitments the agency had made. Instead, Imperial acted as any junior staff member on probation should act in this controversial atmosphere. He provided impartial analysis and advice to his superiors, the CRMC's Executive Director and 16 member Council of appointed officials, and then acted based on their directives.

Imperial's direct involvement with the NBP ended when the CCMP was approved by the State Planning Council in December 1992. Two factors ended his involvement. First, the NBP was inactive for a period of time and the CRMC pursued the activities stated in its letter of commitment included with the CCMP. These activities did not require my collaboration with NBP staff or other agency partners. Second, and more important, EPA and NOAA issued their guidance for the Section 6217 Coastal Nonpoint Source Pollution Control Program (CNPCP) in January 1993. Thus, most of Imperial's activity shifted to coordinating the development of the state's CNPCP with RIDEM's Section 319 Coordinator and participating in the rewrite of the state's Section 319 NPS Management Plan. Other activities included revising the CRMC's Section 309 strategy, writing the proposal that led to the funding for the rewrite of the Salt Ponds SAM plan, and revising other NPS and habitat protection regulations. Imperial left the employment of the CRMC in August 1994 to pursue a Ph.D. at Indiana University in Bloomington.

Other than this project, Imperial has had little contact with staff at the CRMC or RIDEM over the last six years. However, he has an ongoing relationship with Timothy Hennessey and has worked

periodically with staff at the CRC. Of particular interest to this project is Imperial's work as a subcontractor for the CRC from 1994 and 1995 on a project that was jointly funded by EPA and the United States Agency for International Development (AID). The project involved developing a training program for developing countries based on the experiences of the Tier I and II estuary programs. Imperial was responsible for doing the preliminary analysis of the NEP and identifying case studies that could be used as the basis for the training program. This involved interviewing various EPA Headquarters officials and working closely with them to ensure that the resulting report presented an accurate depiction of the NEP and the case studies (Imperial, *Developing Integrated Coastal Resource Management Programs*). The data collected during the preparation of this report was combined with other data to form another peer-reviewed article on the NEP that was co-authored with Hennessey in 1996 (Imperial and Hennessey, "An Ecosystem-Based Approach").

- 83 Timothy Hennessey's involvement has been more limited. In 1989, Hennessey worked as a subcontractor for Arthur D. Little, Inc., which had been hired by the Governor's Environmental Quality Study Commission and issued its report in 1990 (Environmental Study Commission, *Environmental Quality Study Commission Final Report* (Providence, RI: Office of the Governor, 1990). Hennessey has also worked periodically with researchers at the CRC. Several of his former students have worked for various organizations. Through his work at the university and his research, Hennessey has come to know many of the stakeholders. These contacts helped the research team gain access to data and information that otherwise might not be forthcoming.
- 84 For a discussion of the use of participant observation data in program evaluations, the advantages this type of data brings to an evaluation, and the strategies used to ensure the validity of the data see: Patton, *Qualitative Evaluation and Research Methods*, 202–219; Royce A Singleton, Jr., Bruce C. Straits, and Margaret Miller Straits, *Approaches to Social Research*, Second Edition (New York, NY: Oxford University Press, 1993), 324–327; Greene, Jennifer C., "Qualitative Program Evaluation: Practices and Promise," in Norman K. Denzin, and Yvonna S. Lincoln (eds.), *Collecting and Interpreting Qualitative Materials* (Thousand Oaks, CA: Sage Publications, 1998); Strauss and Juliet Corbin, *Basics of Qualitative Research*, 42–43; and, Yin, *Case Study Research*, 78–89.
- 85 Patton, *Qualitative Evaluation and Research Methods*, 203–205.
- 86 Strauss and Corbin, *Basics of Qualitative Research*, 42.
- 87 Miles and Huberman, *Qualitative Data Analysis*; and, Yin, *Case Study Research*.
- 88 Miles and Huberman, *Qualitative Data Analysis*; and, Strauss, Anselm and Juliet Corbin, *Basics of Qualitative Research: Grounded Theory Procedures and Techniques* (Newbury Park, CA: SAGE Publications, 1990).
- 89 Miles and Huberman, *Qualitative Data Analysis*.
- 90 Ibid.
- 91 Rose, Richard, *Lesson-Drawing in Public Policy: A Guide to Learning Across Time and Space* (Chatham, NJ: Chatham House Publishers, Inc., 1993).
- 92 Miles and Huberman, *Qualitative Data Analysis*.
- 93 Miles and Huberman, *Qualitative Data Analysis*; Maxwell, *Qualitative Research Design*; Patton, *Qualitative Evaluation and Research Methods*; and, Yin, *Case Study Research*.
- 94 Ibid.
- 95 Yin, *Case Study Research*; Rossi, Peter H. and Howard E. Freeman, *Evaluation: A Systematic Approach*, Fifth Edition (Newbury Park, CA: Sage Publications, 1993); and, Singleton, Royce A., Bruce C. Straits, Margaret Miller Straits, *Approaches to Social Research*, Second Edition (New York, NY: Oxford University Press, 1993).

- 96 Miles and Huberman, *Qualitative Data Analysis*; Yin, *Case Study Research*; and, Singleton, et al., *Approaches to Social Research*.
- 97 Yin, *Case Study Research*; and, Campbell, Donald T., "Degrees of Freedom and the Case Study," *Comparative Political Studies* 8 (1975).
- 98 Thomas D. Cook and Donald T. Campbell, *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. (Boston, MA: Houghton Mifflin Company, 1979).
- 99 We have also protected the identity of those that commented on the draft report. Selected portions of interview transcripts with the identity removed are contained in Appendix B to let the reader read some of the raw transcriptions that support some of the more controversial conclusions in this report.
- 100 This strategy is often recommended in the qualitative research literature and is viewed as an adequate way to verify the facts, not the conclusions draw from these facts. These comments can often provide an additional source of useful information. See: Yin, *Case Study Research*.

