

Retrospective Governance Analysis for the Narragansett Bay Watershed and Airshed project

Eleven Governance Stories in the Narragansett Bay Watershed

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Eleven Governance Stories in the Narragansett Bay Watershed

These 11 governance stories provide illustrative vignettes about action that has been taken to achieve change, with examples of how management approaches can be applied. They provided the initial input for the discussions leading into initial analysis.

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Accompanying these stories is a comprehensive timeline of events (timeline of policies and actions). This timeline captures the references for each story across a range of different events including legal, operational and focusing events.

SELECTION OF THE 11 CASE STUDIES

In the initial work plan for the watershed governance history project, the idea of integrative summaries was proposed as a device for reaching “agreement on what these will include and how they will be presented. The summaries are meant to illuminate key lessons across time and provide textured stories about the impact and implications of policy action or inaction and will draw from the categories provided in the contract.” Including air quality and land management as themes made it all the more important to prepare such summaries on representative themes. The summaries proved to be an important way to bridge the overarching themes of interest to the U.S. Environmental Protection Agency (hereafter referred to as EPA) Atlantic Ecology Division with the linear approach implied by the preparation of timelines of key governance events and milestones.

Initial thoughts on top 10 watershed stories.

Early in the project, during the fall of 2013, the research team discussed and agreed to identify 10 stories that would be the basis for the summaries. The stories would highlight major changes that illustrate the evolution of the governance system for the Narragansett Bay watershed and included ideas such as:

- The original River and Harbor Commission.
- Managing shoreline growth.
- Metals, electroplating, technology and best practices.
- The 1947 Walter Shea Report to the Department of Health, zoning the bay for water quality management purposes.
- Waste water collection and treatment in the Providence metropolitan area and the emergence of the Narragansett Bay Commission.
- Nonpoint source abatement as exemplified by the Greenwich Bay and Salt Pond Special Area Management Plans of the Rhode Island Coastal Resources Management Council.
- The role of land use commissions; comprehensive planning and harbor plans.
- Some issue of concern related to the airshed, perhaps deposition (acid rain) — the research group wondered if there was a synoptic write-up of this already.
- Recounting attempts at bi-state watershed management such as the New England River Basins Commission.
- Sub-watershed governance efforts, specifically the Taunton River, where EPA was making ongoing efforts to assist local and regional leaders.

Ultimately, these summaries were to be the basis for the final analysis, which would draw upon common themes and lessons.

The list of stories that emerged by the end of 2013

1. Before and after the Comprehensive Conservation and Management Plan for Narragansett Bay.
2. Blackstone, Rhode Island/Massachusetts cooperation and conflict on waste water loadings.
3. Consent decrees and narrative water quality criteria.
4. Fields Point and the golden age of public health.
5. Greenwich Bay fish kills.
6. Narragansett Bay and the Shea Report.
7. Taunton River watershed stewardship.
8. The mercury total maximum daily load and metals in the bay.
9. The Narragansett Bay Commission.
10. The 1975 Southeastern New England Study and the end of river basin planning in New England.

The categories of insights that were to guide the write-ups included:

11. Institutional development: collaborative organizations and shared policies across organizations — the National Estuary Program’s Comprehensive Conservation and Management Plan and its successors have done some of this.
12. Policymaking involves knowledge sharing, resource sharing, and shared policies, regulations and norms — the Narragansett Bay case made some progress on knowledge sharing.
13. Operational collaboration can involve steps to physically improve environmental conditions, educate decision makers and the public, and share in monitoring and enforcement.

The research team had also previously suggested using Kingdon's¹ policy streams and focusing events framework as another way to help categorize and make sense of the various stories. This evolved into a framework for augmenting the master list of timeline entries, where each event or report was classified within the framework.

Final selection of 11 governance stories for Narragansett Bay

In April 2014, a consensus emerged, based in part upon discussions with the EPA Atlantic Ecology Division’s management team for the project, as well as early results of creating an expanded timeline through the device of research into 12 stories. The research team decided to

¹ Kingdon, John W. 2003. *Agendas, alternatives, and public policies*. New York: Longman.

combine the Fields Point story of the early 1900s (story #10) with that of its modern day counterpart, the Narragansett Bay Commission and added regional land use planning and 208 comprehensive planning to the stories.

Story	Key Points/ Questions
1. Narragansett Bay and the Shea Report	Parallels in Massachusetts influenced by regional efforts.
2. Before and After the Comprehensive Conservation and Management Plan for Narragansett Bay	No parallels in Massachusetts. Updated, added precedents.
3. Blackstone, Rhode Island/ Massachusetts Cooperation and Conflict on Waste Water Loadings	Covers deep history, viewed nationally as exemplar of regional approach in heritage corridors.
4. The Southeastern New England Study 1975 and the End of River Basin Planning in New England	Evokes entire story of regionalism in New England; largely seen as failure, however, it is a major inflection point in Federal-States relationships.
5. Taunton River Watershed Stewardship	Parallels to the Blackstone River, success of Wild and Scenic Rivers, issue of difficulty in addressing growth as well as urban redevelopment and rehabilitation of old sewage systems.
6. Regional Land Planning	Builds on stories #3, 4, 5 to show larger picture of approaches to land conservation/ planning.
7. 208 Comprehensive Plans in Rhode Island and Massachusetts	208 was a useful but odd requirement of the Clean Water Act; reflects struggle between U.S. Congress and EPA/environmentalist approaches.
8. Consent Decrees and Narrative Water Quality Criteria	The nutrient total daily maximum load is in the Blackstone, 208 stories; Brayton Point; the role of the early 'conferences.'
9. The Mercury Total Daily Maximum Load and Metals in the Bay	Example of regional cooperation . . . mentioned in early control plans . . . industries were changing by 1970.
10. Fields Point and the Golden Age of Public Health	There are parallel stories in Massachusetts for Worcester, Taunton, Fall River.
11. Greenwich Bay Fish Kills	The story goes deeper than the name implies.
12. The Narragansett Bay Commission	Regionalization and combined sewer overflows have parallels in Worcester, Taunton, Fall River, etc.

Stories not selected and application of the approach to other watersheds

Three frequently occurring storylines were not included as stand-alone essays. The Pawtuxet River has its watershed completely internal to Rhode Island, so did not possess a bi-state

characteristic. However, it has a rich and very long history that is interwoven with the City of Providence. The Ten Mile River is a bi-state example of a very much unfinished agenda that is mentioned only in the context of total maximum daily loads but would benefit from a fuller treatment. The most prominent early success regional story is that of the Wood-Pawcatuck River watershed, which was home to the initial pilot project for regional water quality standard setting. However, this story was not included as that watershed does not discharge into Narragansett Bay.

For other estuaries, the legislative history of state water pollution control and land management laws is probably the best place to start, since the politics stream will be associated with a problems stream and policy streams (using Kingdon's metaphor). This should include state engagement in federal clean water legislation as well as early federal clean water programs that asked states to assess their waters by the mid-1960s. Another source would be major municipal and industrial pollution control controversies and institutions within sub-watersheds, the organizational narratives of citizen groups, and core documents required in the early 1970s, especially those identified through 208 planning and subsequent amendments to federal law and regulation which were then filtered down to the state level. State water quality management agencies have done an increasingly good job of making water quality planning documents available online, at least for state-of-the-state waters type overviews as well as special studies. Nexis-Lexus databases exist for many metropolitan newspapers. The Providence Journal is fully digitally indexed and has full digital content available online since 1981, predating the "Reagan Revolution" and the peak and decline of federal water pollution investments. Simple search strings can retrieve hundreds or thousands of articles on specific subjects related to watershed issues. Newspaper coverage is important to provide political and citizen perspectives on events and milestones, which are typically not incorporated into official public documents.

1 "A Sensible Approach to a Complicated Problem" [1918 to 1973]

Regional efforts to set interstate water quality goals began in the 1930s when the New England Interstate Water Pollution Control Commission began helping states to prepare a scheme for the Pawcatuck, Blackstone and Taunton Rivers/Narragansett Bay. This was long before federal clean water laws were enacted. Conditions have improved a great deal since the early assessments, and definitions of the criteria in each use category have become more quantitative. Modern day total maximum daily loads are based on the earlier concept of pollution control for use attainability in river and coastal segments. In spite of these advancements, it appears that progress in and aspirations for making continued improvements to water quality may have plateaued.

Since enactment of the Federal Water Pollution Control Act (hereafter referred to as the Pollution Control Act) of 1948, the United States has greatly expanded its commitment to improving and protecting the quality of the nations' surface waters. This includes conducting environmental and technological research, setting water quality and discharge standards, providing financial support for state and local water quality planning, awarding construction grants for municipal wastewater treatment facilities and federal enforcement of pollution control rules against both private and public dischargers. The 1965 and 1966 amendments to the Pollution Control Act led to a massive increase in financial support to municipalities and states. Between 1965 and 1971, pollution control spending by the federal government increased from less than \$100 million per year to \$1 billion. To qualify for these funds, states had to establish water quality standards and identify pollution control priorities. Rhode Island had already set these standards and priorities in 1946 and by 1967 had seen little need for changing them.

The problems of Narragansett Bay, which forms the geographic center of Rhode Island, have their origins in the industrial and population growth of the 19th century. These were dramatically manifested by the early 20th century in the form of nuisance water quality conditions, a loss of fish and shellfisheries habitat, and growing restrictions over harvesting of shellfish for interstate sale. While state involvement in fisheries management dates from the 1800s and pollution control from 1920, scarce funds and weak regulatory authority forced the state to identify and focus on a limited number of priorities. An example was persuading municipalities to collect and provide primary treatment and disinfection of municipal and industrial wastewater in order to protect bay uses and resources.

"The reason we have a major, damaging, intolerable pollution of Rhode Island's waters, fresh and salt, is because the people have been befuddled and flimflammed. The years run on, and people grow tired of waiting for clean waters in their lifetime."

George Hull. "Haggling, Politics Block Solution to R.I. Problem." Providence Journal Bulletin. April 1, 1945.

The time of this statement was not Earth Day 1970, but some 25 years earlier. Nearly 30 miles of Narragansett Bay's shoreline were put to use in service of the war effort. A farm at Quonset Point, on the Bay's West Passage, served as a naval air station for pilot training and ship and

aircraft maintenance. Just to the north, channels had been dredged to create Davisville, the staging area for the Navy's construction battalions. Meanwhile, naval strategizing, officer training, fleet support and torpedo construction were taking place at the Newport Naval Base, which stretched north from Newport through Middletown to Portsmouth. However, even before World War II ended, Rhode Island was turning its attention once again to pre-war public concerns such as the pollution of Narragansett Bay. A key player in helping shape the state's future progress in water pollution control was Walter Shea in his 1946 "Report to His Excellency John O. Pastore, Governor of Rhode Island: on the Pollution of the Waters of the State."

Shea's brief diagnosis and recommendations for controlling water pollution in Rhode Island's streams and in Narragansett and Mount Hope Bays is a mere 14 pages of text. Yet the document set the stage for perhaps the most dramatic progress in the state's pollution control before establishment of the Narragansett Bay Commission in 1980. The report followed on nearly two decades of political wrangling between Rhode Island and the City of Pawtucket, which refused to invest in sewage collection and treatment for its 1930 population of 77,149 in defiance of a 1928 legal action by the Board of Purification of the Waters of the State. The discharge of largely untreated human sewage from the Providence metropolitan area and vast volumes of industrial waste from industry in the urban area and its watershed had caused pollution that reached farther down Narragansett Bay than ever, causing extensive damage to natural resources (Shea, 1946, p.13) and compromising the use of these waters for recreation, water supply, fisheries and industrial water uptake.

The war years prevented the taking of remedial measures because of governmental restrictions on the use of scarce materials for such work. This has magnified the problem to a degree which makes immediate action to abate pollution an urgent necessity. (Shea, 1946)

The innovative policies set out by Shea had their antecedents in the work of the Central New England Drainage Basin Committee on Classification of Waters. This classification system utilized an A, B, C, D designation for classifying highest use and minimum acceptable quality, as directed in 1941 by the National Resources Planning Board. In 1948, the Pollution Control Act established the New England Interstate Water Pollution Control Commission, which strongly promoted and refined the overall waterbody classification scheme and negotiated interstate agreements, including those for the Taunton River and Mount Hope Bay, Ten Mile River and Blackstone River.

The classification scheme pointed out large swaths of waterbodies with impaired uses along the Blackstone River and the estuarine Providence River as far south as Conimicut Point. Other highly degraded areas included the Warren/Bristol waterfront, much of Mount Hope Bay and the areas surrounding the recently constructed military installations at Quonset Point/Davisville, and the entire western shore of Aquidneck Island, including Newport Harbor.

Shea's proposed plan was succinct. It involved a major expansion of sewer lines as well as modern waste water treatment facilities for the entire Providence metropolitan area, Newport, and other smaller municipalities around the Bay. Much of this was accomplished within little more than a decade through strong public and political support, state voter support for related

bond issues, major infusions of federal funds for planning and construction, and creation of the Blackstone Valley District Commission. The capstone was the upgrading of the Bucklin Point treatment plant to secondary treatment facility in the early 1970s — more than 40 years after the state had taken legal action against the City of Pawtucket on this matter. Unfortunately, this same scenario repeated itself beginning in the late 1970s when the City of Providence failed to comply with federal and state requirements for municipal pollution control facilities. Once again, the state took over the facilities with even larger-scale public and rate-payer investments.

In the four decades following Shea's proposed classification scheme for planned uses and conditions, little changed in the scheme itself and there was little improvement in water quality conditions overall. As Shea himself acknowledged, simply addressing organic loadings and bacterial contamination from urban sources was not enough. In addition, it was necessary to address oil pollution and other discharges from ships and boating and to look at sources of massive industrial waste. He also pointed out that sewer systems that combined both stormwater and sanitary sewage presented challenges to achieving higher water quality standards. Nevertheless, Shea wrote:

“Examinations of the Blackstone River made over a long period of years indicate that the pollution that river receives in passing through the State of Massachusetts has largely disappeared when the river reaches Rhode Island. Its condition on reaching Rhode Island is not such that it prevents a solution of the problem within the state.”

Unfortunately, in the longer term, Shea's assessment of the Blackstone waters did not prove true. In the 1970s, great effort went into understanding and addressing the issues of the then highly degraded Blackstone and to put in place waste water treatment solutions and subsequent upgrades to address nutrient controls in the river's upper waters. This included struggling with the issue of wastewater from the Worcester metropolitan area. [See 3 Blackstone River Valley story].

One role of the New England Interstate Water Pollution Control Commission was to resolve or prevent conflicts across state boundaries in pollution control matters. Hence, there was urgency to complete a bi-state classification of water quality in the Blackstone, Ten Mile and Mount Hope Bay/ Taunton watersheds. In addition, this Commission was to address a range of other issues such as industrial waste and the need to develop better information on sources, loadings and technically-viable approaches to prevention and treatment; and on the issues of oil pollution, radiation and boating wastes.

2 Before and After the Comprehensive Conservation and Management Plan for the Narragansett Bay Estuary [1918 to 2013]

The first phase of this 95-year period focused largely on scientific studies, the number of which increased substantially in the early 1980s. The second phase was focused on governance and developing best practices. This phase found it difficult to build broad-based consensus on major Bay issues and solutions. The third phase was a long, post-1992 period of low level implementation of the Comprehensive Conservation and Management Plan. Although there were some small scale collaborations, it was also a period of transition. First, control of the Rhode Island program was turned over to the New England Interstate Water Pollution Control Commission and then to the legislation-created Rivers and Bays Coordinating Council.

This is the story of using a Rhode Island state water quality agency to implement the Narragansett Bay Comprehensive Conservation and Management Plan. The core of the timeline is based on the writings of Imperial and Hennessey, while the extended timeline draws upon the history of how Narragansett Bay was selected as one of the four first tier estuaries. The Southeastern New England Study story (see Section 4) and the Shea Report (see Section 1) provide extensive additional background on what now seems to be nearly a century of governance efforts at the watershed level. Among the earlier efforts, several studies also provide useful background. One is a 1937 study by the New England Regional Planning Commission entitled “Water Resources of New England,” and another is the 1970 “North Atlantic Regional Water Resources Study” by the U.S. Army Corps of Engineers. However, the one earlier study that stands out as especially informative is the “Gold Books,” a massive, 1955 New England-New York comprehensive study, “The Resources of the New England-New York Region Report on the Comprehensive Survey,” prepared for the New England-New York Interagency Committee. This study presents a unified water quality classification scheme for the Narragansett Bay watershed. The master timeline tab for this story (EPA_MasterTimeline_FINAL June 26 2016b.xlsx) attempts to capture the first 20 years following adoption of the Comprehensive Conservation and Management Plan, which ends with a roll-up of the Narragansett Bay Estuary Program into the New England Interstate Water Pollution Control Commission. It was the commission that in 1948—through an interstate compact—started the watershed approach to pollution control. It was also at this time that EPA and regional stakeholder groups began a “Southern New England Coastal Watershed Restoration Project,” targeting nearly the same geographic area as that covered in the Southeastern New England Study.

The Comprehensive Conservation and Management Plan, the Narragansett Bay Estuary Program, the Narragansett Bay Commission and the Partnership for Narragansett Bay — which was funded by the US Department of Housing and Urban Development in the early 2000s — all struggled to attain a workable bi-regional governance perspective and operations. Each began with different legislative or regulatory purposes and distinct funding sources. Under the 1987 amendments to the Clean Water Act, Narragansett Bay was nominated for inclusion in the EPA National Estuary Program, having been identified as one of the four original estuaries of national significance. Its initial funding for research dated to 1985 via the Narragansett Bay Project and it had a relatively broad mandate via a management conference that led to the Comprehensive Conservation and Management Plan at a cost estimated at \$11 million in EPA funds over seven

years. The Narragansett Bay Commission was already well underway with metropolitan Providence facility planning and wastewater treatment projects, dating to regulatory and legal action in the late 1970s and an \$87.7 million bond issue passed by Rhode Island voters in addition to user fees. The Narragansett Bay Estuary Program, established to oversee implementation of the Comprehensive Conservation and Management Plan, was funded initially at about \$300,000 annually, primarily from EPA, and had to be highly opportunistic leveraging additional non-state funds for a number of small follow-up projects. The Partnership for Narragansett Bay was a much shorter lived initiative, funded with \$100,000 from the U.S. Department of Housing and Urban Development in 2001-2003.

While difficult to capture those groups' individual or collaborative operations and activities from 1993 to 2012, one key assignment for them was to update the Comprehensive Conservation and Management Plan and track its implementation. This important task was not undertaken, however — at least not as originally envisioned. The updated plan that exists today makes little reference to the original document and appears to have been crafted practically anew.

Another feature in the timeline is the extraordinary effort that the State of Rhode Island, and later EPA, undertook to fill the leadership void left by the Narragansett Bay Estuary Program. It took years of work by the Rhode Island legislature to create the Rhode Island Bays, Rivers and Watersheds Coordination Team — an entity very similar-looking to the Narragansett Bay Estuary Program and yet according to that program's own reporting, an entity that eventually proved difficult to cooperate with. As a result, creating the revised Comprehensive Conservation and Management Plan required taking a very different approach.

The red flags raised by Metcalf and Eddy at the outset of the Massachusetts Bays Program, based on lessons from Southeastern New England Study and the 208 water quality programs of the 1970s, continue to echo through the entire story of the Comprehensive Conservation and Management Plan. On the one hand, it is very fortunate that more than two decades of some level of funding continues to be provided to the Rhode Island estuary programs. That said, the Southeastern New England Study discussed in Section 4 (New England River Basins Commission. 1975. *How to Guide Growth in Southern New England*. Report of the Southeastern New England Water and Related Land Resources Study, SENE. Boston, MA: New England River Basins Commission) and other regional planning efforts for water quality and landscape management raise important questions for the Rhode Island Comprehensive Conservation and Management Plan effort. One such question is the extent to which such programs are tolerated by line agencies such as the Narragansett Bay Commission or the Rhode Island Coastal Resources Management Council — agencies that are charged with detailed planning and implementation decisions, and which have done exemplary work on the issues covered in the Comprehensive Conservation and Management Plan.

Another critique of the Southeastern New England Study is that its boldest recommendations on growth management and conservation of critical areas (it did not see the need for new pollution control laws or programs) were at a local scale and aimed at addressing problems that stakeholder groups did not see as requiring “fixing” at the regional level. By example, sub-basin level efforts, such as in the Blackstone River Valley corridor or the Taunton River, have fostered and benefited from regional cooperation (and the power and funding of the Clean Water Act and

other federal programs). But, they are largely seen as successful because they mainly address problems and fulfill needs that are both clear and supported at the local level. For many decades, many have not seen the issues of the bi-state Blackstone River nor the Taunton River basin/Mount Hope Bay as having much relevance to/impact on Narragansett Bay. In addition, the condition of Narragansett Bay was of little concern to those living upstream.

Before and after the flurry of construction grant funding and associated planning in the 1950s through the 1980s, individual states, the Interstate Compact and EPA have returned to the earliest ideas about the need for a watershed approach — defining goals in waterbodies and reducing loadings to the extent necessary to attain those goals. Recent decades (as far back as the Southeastern New England Study) have emphasized the need to know which water bodies are water quality limited (i.e., technology-based pollution control standards are not sufficient to attain uses) and the need to calculate total maximum daily loads for a suite of pollutants. Today, however, there is also the demand to link this scientific information with human use and quality goals (including for habitat and ecosystem services). The focus of planning and management within the watershed and waterbody classification framework worked well in the 1970s, when states prepared 303(e) basin plans to qualify for construction grant money. Those plans, in a more sophisticated form, are an important and focused way to address issues even today.

The Blackstone River and Taunton River stories (sections 3 and 5 respectively) will cover these points in greater detail and shed additional light on the Shea Report, the Southeastern New England Study, 208 planning, the Comprehensive Conservation and Management Plan, and other efforts.

3 Blackstone River: Two Centuries of Conflict and Cooperation in Watershed Management and Narragansett Bay [1823 to 2014]

Woven throughout the history of the Blackstone River are issues of industrialization, pollution, urban decay, and a several decades-long period of renewal across state borders. Economic development and urban renewal in this area have been inspired by the Lowell, Massachusetts model of a National Heritage Corridor, and by the U.S. Supreme Court-upheld nutrient reductions in support of improvement in the Blackstone River and Narragansett Bay water quality and uses. Throughout the decades, Rhode Island and Massachusetts state governments have also intervened in order to make progress in municipal wastewater treatment and more recently in attaining the uses specified by interstate water quality goals.

The timeline for this story dates to the creation of the Blackstone Canal. It touches on — without going into detail — a history that includes facing a wide range of issues from industrialization to river modification; pollution; urban and suburban growth; the long struggle to collect and treat industrial, domestic and nonpoint wastewater, runoff, and solid waste; flooding; fresh water supply; economic decline and renewal efforts; habitat restoration and the challenge of contaminated sediments behind dams created during the Blackstone Valley’s economic heyday.

For almost a century, Rhode Island and Massachusetts have been working together on bi-state/regional water-quality and water supply and management-related issues. This includes working with municipalities such as Worcester, Central Falls, Woonsocket and Pawtucket to get industrial and domestic wastewater collected and treated. Beginning as early as with the outset of World War II, a regional effort began to classify the interstate waters for pollution conditions and desired conditions. Walter Shea’s plan for Rhode Island (see section 1) was based on this effort, which subsequently became the responsibility of the New England Interstate Water Pollution Control Commission. A massive study, the New York-New England Study (Gold Books), included a consolidated version of this classification scheme for the Narragansett Bay/Taunton/Pawtucket area and indicated the dire condition of these waters (see map pg. 16). Concern about organic waste loadings, combined sewer overflows, and metals and other industrial effluents dates to the 1920s. The Worcester municipal situation during the 1940s and early 1950s parallels those faced by the Blackstone Valley District Commission. The regional commission established to correct Worcester’s problems in 1936 was reorganized as the Upper Blackstone Commission in 1968, anticipating perhaps the inevitable Rhode Island creation of the Narragansett Bay Commission and its subsequent takeover of the Blackstone Valley District Commission. The combined sewer overflow problem and treatment of wastewater in the lower Blackstone River in Central Falls and Pawtucket is, for the most part, seen as a Narragansett Bay not Blackstone River issue, with leadership and programs by the Narragansett Bay Commission as the main planner and implementer of actions to address the problems. By the late 1960s, concerns about flooding and pollution control spawned both government and citizen action.

The Blackstone River Valley, by virtue of the desire in the 1800s to have a connection to the sea via a canal, has probably been economically, socially, and to some degree environmentally more connected and associated with Upper Narragansett Bay than the Taunton River and its watershed is linked to the situation in Mount Hope Bay (the Taunton River timeline elaborates). As recently

as the 1950s, the lower Blackstone River was seen as being able to absorb the input from the Massachusetts portion, although both Shea's 1946 map and the 1955 New England study map indicate a continuous line of impairment across the border. Flood control studies by the U.S. Army Corps of Engineers have always looked at the broader region of the Pawcatuck to eastern Massachusetts as the logical unit of analysis for issues related to hydrology. From a regional cooperation perspective, a watershed approach made scientific, technical, and to some degree political sense in a context that, before the 1970s, federal-regional-state relationships were seen as highly problematic and the New England states plus New York saw benefit in a more unified approach.

As the Blackstone River Valley has more and more frequently come to be seen as an asset worth cleaning up, protecting and conserving *in its own right*, governance efforts around its environmental quality and economic renewal appear to be less dependent (or non-dependent) on the events, impacts and values of Narragansett Bay. The 1975 Southeastern New England Study was perhaps the first effort to bundle together regional and basin-specific recommendations to accompany its overarching findings on growth, water supply, pollution, recreation and flooding. Ever since, the Rhode Island and Massachusetts basin-oriented work — tied to permits, construction grants, flood hazard mitigation, pollution control including total daily maximum loads, recreation and economic development, best practices for land development and nonpoint source control — has had overlapping policy cycles that span long periods of time. Large-scale studies such as the Southeastern New England Study and the Comprehensive Conservation and Management Plan, and to some degree the Section 208 and 303(e) basin plans, can provide us glimpses into the discussions and debates of a given time period even when they are not closely tied to implementation funding. However, in practical terms, what matters most about regional cooperation (e.g., the Narragansett Bay Estuary Program projects to study and restore the Blackstone), is that it shares funding and shares technical information that otherwise might be/have been more difficult to obtain.

The goal of the Clean Water Act to achieve fishable/swimmable waters in all states by 1983 has long passed without being achieved. However, water quality criteria continue to play a dominant, useful role in unifying state and regional efforts to clean up the nation's waters. This is especially true as policies have tightened to involve numerical standards as well as narrative standards, as water bodies are categorized as "effluent" or "water quality limited," as total daily maximum loads are computed for more and more river segments, and as hundreds of permits are adjusted when meeting federal effluent limits is not enough.

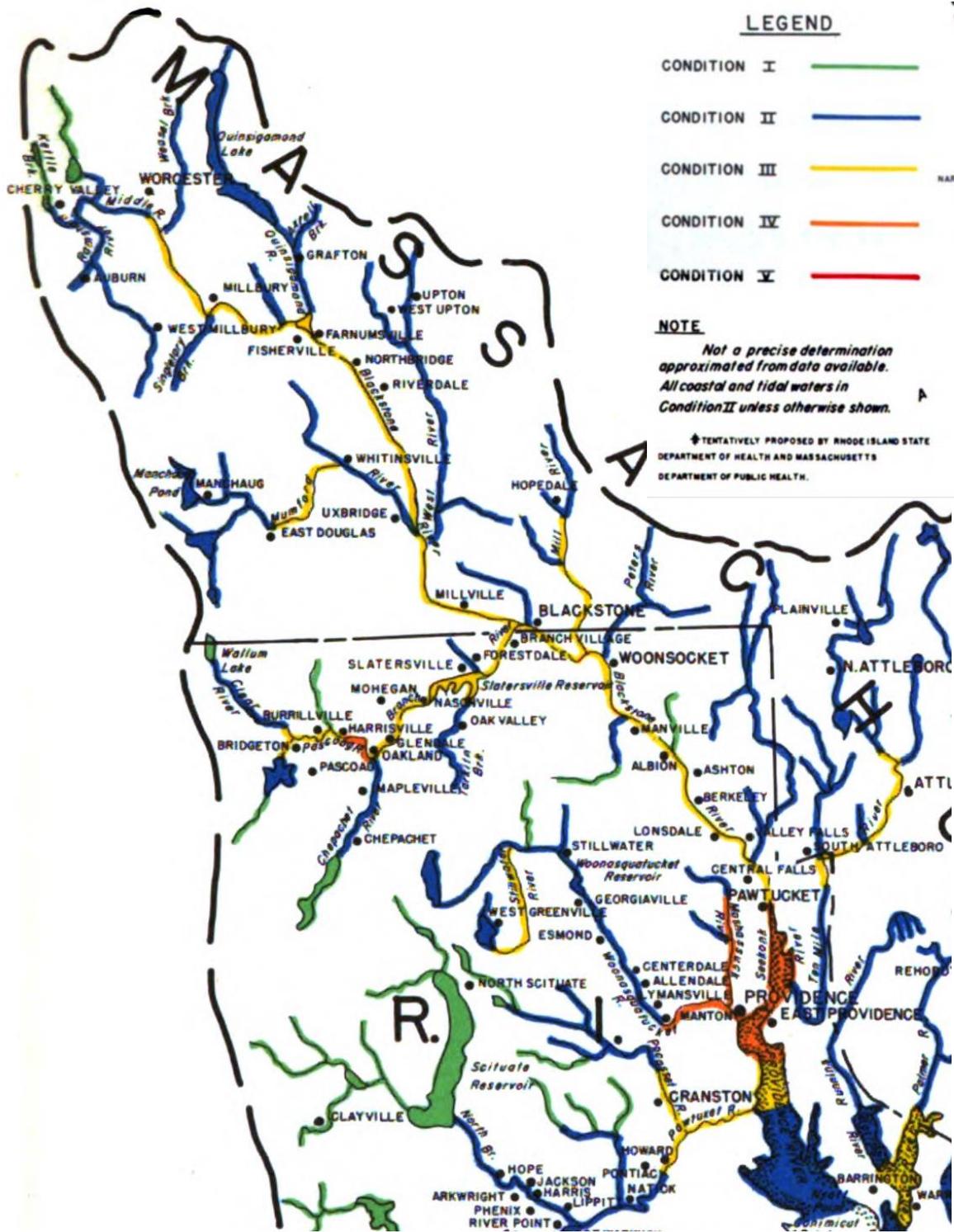
It would be a daunting, albeit possible, task to cross reference and trace whether policies and proposed actions that emerged from one of the regional planning efforts/studies were put into place at some point later in time. The Coastal Resources Center at the University of Rhode Island did produce a cross-tabulation to track implementation of the Comprehensive Conservation and Management Plan for use in its tri-state work for the Partnership for Narragansett Bay. However, no retrospective of this type was provided in the 2012 Comprehensive Conservation and Management Plan update. It would appear that key implementing actors participate enough to keep tabs on the planning effort in order to neutralize or block unwanted policy proposals. At the same time, they are conservative in offering their cooperation or too many resources. For example, the Southeastern New England Study recommended a costly effort to separate sewers

in Worcester, but no action was taken to implement that recommendation. In contrast, several point dischargers in the Blackstone Valley have reduced their nitrogen discharges as a result of scientific work performed in the 1980s sponsored by EPA and the National Oceanic and Atmospheric Administration. Most notably, and upheld on May 13, 2013 in case No. 12-797, the U.S. Supreme Court let stand a 1st U.S. Circuit Court of Appeals decision from 2012 requiring additional treatment for nitrogen. (*Upper Blackstone Water Pollution Abatement District. v. U.S. Environmental. Protection Agency*, No. 11-1474 (1st Cir. 2012).

The longstanding interest of New England states and federal agencies in taking a watershed/landscape perspective has been accompanied by both conflict and collegiality over time, reflecting the evolving mosaic of federal, regional, state and municipal governance institutions and their sometimes divergent interests. Although the Commonwealth of Massachusetts took legislative action against pollution discharges from the City of Worcester in the late 1880s, including prescribing a regional approach, the understanding and expectations of Walter Shea and many others through the 1960s was that the impacts of pollution in the upper watershed in Massachusetts did not reach the lower watershed or Narragansett Bay.

Even with much improved scientific understanding since the 1970s, however, there has not been sufficient traction for a strong bi-state governance institution to emerge. The 2003 Partnership for Narragansett Bay/Coastal Resources Center proposal for a tri-state entity did not appear to solve any common problem from the perspective of Massachusetts. At times, but not always, a state's efforts on landscape and water resources planning continue to leave out information from adjacent state(s). At the operational level, restoration or pollution control projects in a single municipality seem to function on their own. In the Blackstone, stronger watershed-based governance may be hampered to some degree by the fact that EPA Region 1 (New England) still manages the end-of-pipe National Pollutant Discharge Elimination System permitting program in Massachusetts, while Rhode Island has managed its own program for a number of years under EPA Regional Office review and approval. At other times, regional efforts at watershed advocacy are successfully galvanizing agency and citizen interest within the watershed itself. For example, the John H. Chafee Blackstone River Valley National Heritage Corridor has served as a catalyst for regional initiatives since its creation in 1986. Also, a number of bi-state, Blackstone Valley-wide initiatives are currently underway to protect and preserve the resources associated with the Blackstone River Valley and to improve recreational access and opportunities (National Park Service, 2011. *Blackstone River Valley Special Resource Study*).

The above timeline gives a broad brush of the main events, studies and some of the key disputes and resolutions in the Blackstone River. However, more thinking is required on what to make of the overarching governance developments. Projects and initiatives in both states proceed in fits and starts as money becomes available or is withdrawn; as a crisis-scale event such as a major flood occurs; or as authorities lose patience with a discharger and press harder to enforce permits or upgrade them. It may be in the Blackstone that the loss of the Level B planning capacity originally offered in the Clean Water Act (see section 4) has had its strongest adverse effect and forced a networked governance approach to fill the gap.



Map of the condition of the Blackstone River. 1955 The Resources of New England-New York Region General Report on the Comprehensive Survey. NE NY Inter-Agency Committee

Condition I is excellent, roughly corresponding to “A” classification, Condition V corresponds to an “E” condition which is nuisance, not supporting any desired uses.

4 The Decade of Environmental Planning: Southeastern New England Study (Level B Plan) and the New England River Basins Commission Story [1911 to 2013]

Massachusetts used the Southeastern New England Study as a cautionary tale on regional approaches not to be repeated in its work on the programs it subsequently undertook in the east and southern coast. The study shares the entire story of regionalism in environmental planning and pollution control in New England — i.e., while the effort was largely seen as a failure, it remains a major inflection point in understanding federal-state relationships.



The 1971 Southeastern New England Study, initiated by the fledgling New England River Basins Commission, with sister projects in Long Island Sound and several other basins in New York/New England, is the most ambitious comprehensive planning effort to have taken place in the region. It is also among the least well-known of such studies. Although funded under Title II of the Water Resources Planning Act of 1965, the study's main report is titled "How to Guide Growth in Southern New England." This title placed the challenges of land use development and natural resources protection squarely at the center of water resources planning and pollution control. The study area covered the region from the Massachusetts North Shore to Pawcatuck, Connecticut.

The effort tackled the following as its main overarching issues:

- Guiding Growth
- Water Supply
- Water Quality
- Outdoor Recreation
- Marine Management
- Flooding and Erosion
- Locating Key Facilities
- Protect Natural Resources

Much attention was also provided to a watershed-based approach. The study includes volumes of information on overall regional policies as well as detailed studies and maps for 10 planning areas, which are watersheds and their included municipalities.

Given the study is a water resources plan, its cover of land use development and areas of critical concern was unique and extensive. It is regarded by regional experts such as Julius Fabos as "one of the earlier examples of the land-use allocation model being combined with a landscape supply or a landscape planning approach" (1986 p. 139). On the other hand, issues of areawide importance from a pollution perspective are scarcely mentioned in the Southeastern New England Study—issues such as nonpoint pollution, nutrients, mercury, and water quality classification policy. At the state level, Section 303(e) basin plans (required for construction grant disbursement) and Section 208 areawide plans, were to get underway shortly after the release of the Southeastern New England Study documents. When examining the import of the study's experience (see notes by Metcalf and Eddy below), the Massachusetts Comprehensive Conservation and Management Plan program saw many warning flags that it sought to avoid as it got underway. Perhaps the most dramatic of which was what happened shortly following the *only full-scale, collaborative* Rhode Island and Massachusetts planning effort — i.e., the architect of that effort, the New England River Basins Commission, was terminated just five years after the release of the Southeastern New England Study and other major basin plans.

Linked to the story of the Southeastern New England Study is the story of the birth, life and death of the River Basin Commission as a means for planning and decision making on water resources and pollution control. New England has had nearly a century of efforts at regional planning and coordination and is seen as particularly well suited for such interstate, bi-regional collaborations. The red flags raised by experts and advocates in the 1960s in terms of the likely longevity and impact of the river basin approach (among many forms of coordination discussed through the decades) were by and large borne out over the short, intense life of the New England River Basin Commission. Foster's almost diary-like recounting of the commission's years reveals an ambitious, well-led organization that reacted to a variety of issues in a way that the New England Interstate Water Pollution Control Commission could not, for example. While Massachusetts sought from the outset to learn from prior efforts, the Narragansett Bay Comprehensive Conservation and Management Plan did not and thus repeated many of its earlier mistakes. EPA Region I recently reactivated elements of the concept in its Southeastern New England Coastal Watershed Restoration Project.

In comparing the two states planning efforts, Massachusetts included more extensive representation from water resources agencies, while Rhode Island participants were mainly from the state's Statewide Planning and the Coastal Resources Management Council. Also, EPA was not extensively engaged and, as Foster (1984) recounts, did not offer the Commission much of a role in its projects and initiatives.

In exploring the Southeastern New England Study's basin planning documents as compared with the state and bi-state basin plans produced for the Taunton and Blackstone River stories, several observations emerged. The fact that planning was decoupled from decision making and implementation quickly sank the Southeastern New England effort, even though states and municipalities eventually carried out many of the recommendations and actions set out in the plans. For the Southeastern New England Study, the Comprehensive Conservation and Management Plan and other broad-based, bioregional planning efforts, the question is whether working at a regional scale on a broad array of issues without any corresponding decision and implementation authority, mandate, or resources makes much sense.

An overarching conclusion from the story of the Southeastern New England Study (and the river sub-basin stories to come) is the importance of "going local," while also ensuring there is a great deal of federal and/or state financial support. The paradox that always has and continues to plague water quality management is this. How do you maintain federal interest and a sense of responsibility strong enough to get resources flowing, while at the same time building more and more capacity closer to the source of the problems and the beneficiaries of the solutions?

5 Watershed Stewardship for the Taunton River and Mount Hope Bay [1850 to 2013]

This story parallels that of the Blackstone River in many ways. The exception is that in the case of the Taunton River, success was attained because of its Wild and Scenic River designation. As noted by the 1975 Southeastern New England Study, a continuing issue is the difficulty in addressing growth and urban redevelopment and the need to rehabilitate old sewage systems in declining urban areas. In recent years, understanding of the complexities of the watershed system has improved. As a result, in terms of water planning, the Mount Hope Bay and its immediate coastal sub-basins are now considered separate from the Taunton River. The emergence of civic associations to protect land and promote conservation, as well as collaboration with Rhode Island-based groups, is noteworthy.

The Taunton Basin story starts in the late 19th century, in a massive, nearly 500-page report by Kirkwood on the Taunton River basin's pollution problems. The even more massive 1955 New England-New York Study provides a broad picture of water quality conditions and desired results, sources of pollution to the Taunton River, its tributaries and Mount Hope Bay. Like the Southeastern New England Study conducted 20 years later, it addresses a wide range of landscape and coastal issues and offers some simple plans. The Taunton history shares many similar challenges to those of the Blackstone — i.e., industrial and domestic sewage control challenges, changes in policy and implementation due to the emergence of the Clean Water Act, legal actions by EPA, citizen advocacy, facilities planning and construction, industrial pollution control, and combined sewer overflow. Unlike the Blackstone, however, the Taunton was never channelized for navigation or dammed for hydropower. It also was not an area as intensely industrialized or in need of as much rehabilitation. As the New England-New York and the southeastern New England Studies anticipated, the Taunton River basin was instead to become the locus of suburban development. Of critical note is that as pollution sources have been cleaned up, the region has secured federal designation of much of the river and its tributaries as a Wild and Scenic River. Meanwhile, the Blackstone gained recognition as a Heritage Corridor.

Mount Hope Bay is a shared waterbody between Rhode Island and Massachusetts. While interstate water quality goals were set in 1955, there have always been variations between the states in terms of how the marine waters are zoned and on policies regarding access to shellfish resources. The two states have shared concerns as well over the siting of major energy facilities located along state waters. One example is the series of coal-fired power generation facilities located at Brayton Point, Massachusetts built starting in the early 1960s, and now about to be decommissioned. Another is the dispute in Rhode Island over proposals in the 1970s for siting of a liquefied natural gas terminal and oil refinery along or near coastal waters. Both citizen advocacy groups and EPA are impatient with the very slow pace of construction of wastewater treatment facilities and the degree of treatment to be required. In an early enforcement action, the EPA national enforcement director held a “conference” on Mount Hope Bay pollution, which began with a confrontation between state officials and federal authorities over these questions. Over time, substantial efforts have been made to deal with point and nonpoint pollution.

Across time, it is easier to track the ebb and flow of Massachusetts' programs than those of Rhode Island. In Massachusetts, while watershed initiatives seem to come and go, there has been a degree of constancy in citizen advocacy for a wide range of goals. Over the years, there has also been cross-watershed collaboration with Save The Bay, the Narragansett Bay Project, and regional groups such as the Conservation Law Foundation, the Southeastern Regional Planning and Economic Development District, the Wildlands Trust, researchers at Bridgewater State University and the University of Massachusetts Dartmouth and other groups. Taking a longer-term perspective, some of the confrontations that nongovernmental organizations and EPA have had with cities such as Fall River over the timing of their cleanup efforts and the extent to which urban runoff sources need to be eliminated seem less important than the impressive accomplishments that have been made. This includes unifying the region to get the Wild and Scenic Rivers designation and in attending to the struggle to address land development, which is chipping away at the remaining landscape ecology and generating more impervious surface and its contaminated runoff.

As noted earlier, while the New England-New York and the Southeastern New England Studies looked uniformly across the Narragansett Bay/Taunton River basin landscapes, in recent years, studies and planning efforts separate the Taunton River basin from the narrow watersheds that most directly impinge on Mount Hope Bay. There are many questions that could be asked and researched, if there were interest and funding to do so. These could include the following. Track the evolving water quality standards to illustrate how use designations and numerical criteria have raised the bar for pollution control from point sources. Research how far local residents are willing to go in supporting more stringent pollution controls and in paying for them. Compare ideas from communities in the Taunton basin about what they want to preserve or restore in terms of landscape, and how to go about it. Note that the Southeastern New England Study recommended a number of critical areas for municipalities to protect, but these recommendations received considerable push-back. While many of these ideas were implemented over time, others were rejected and never acted upon. More recent landscape analysis using geographic information systems could also emphasize a different set of priorities (case in point is the analysis of the current poor condition of the riparian areas along the Wild and Scenic Rivers). Interestingly, while it would seem that a continuing challenge to water management issues would be economically struggling communities throughout the basin, in Rhode Island — and likely in Massachusetts as well — voters continue to support bond issues for capital construction for water pollution projects.

6 The Evolution of Open Space and Regional Land Capability Planning [1850 to 2014]

In the 19th century in both Rhode Island and Massachusetts, the idea emerged that critical areas needed to be purchased and conserved either as part of a metropolitan park system or as critical habitats. Much progress was made on these fronts in the 1900s. The first effort to provide an overview of those critical areas and collective efforts to address them was the 1975 Southeastern New England Study, which produced watershed-scale maps of high priority lands of concern. A few years later, the Rhode Island 208 water quality study called for a large fraction of critical areas to be conserved. The conclusion was that existing laws would be sufficient to make this happen. Unfortunately, events in both Massachusetts and Rhode Island proved the reality to be otherwise. Massachusetts was, at one time and especially in the 1970s, seen as a major innovator in land use management. However, by the turn of the 21st century, the state was being heavily criticized for failing to control suburban sprawl — a key fear that had been raised repeatedly during much of the 20th century. In response, Massachusetts introduced new legislation in 2013 to address this and a number of other land use management weaknesses.

Concern about protecting open space, wildlife habitat, water supplies, and recreational opportunities in Massachusetts and Rhode Island dates back more than a century. It encompasses statewide park planning in Massachusetts, the founding of Audubon societies in Massachusetts and Rhode Island, and the establishment of the Massachusetts Forests and Parks Association and a Metropolitan Park System for Rhode Island. Massachusetts enacted its first zoning law in 1925. (RI legislation was in 1921). And, in response to the contamination of the Pawtuxet River, then Providence's main water supply, Rhode Island created the Scituate Reservoir thereby also creating a highly protected patch of landscape within the urbanized watershed.

In both Massachusetts and Rhode Island, land conservation policy was a matter of land acquisition and creating urban parks, rural campgrounds and seaside facilities. As early as 1902, Charles Eliot designed a regional plan for the Boston metropolitan area, and in 1928 Massachusetts adopted a statewide landscape plan. The state role in forest management and open space investments was meant mainly to meet the needs of growing urban populations and later to protect ecosystems such as wetlands and associated wildlife habitats.

As part of the New Deal in the 1930s, federal attention was drawn to the economic potential of New England's natural resources. This led to comprehensive regional studies and the identification of various infrastructure investments and discussion of how to invest and manage resources such as water supply, energy and transportation. The work of the Civilian Conservation Corps in the 1930s laid the groundwork for many public outdoor recreation facilities and camps.

In tandem to federal efforts, New England undertook its own initiatives to form interstate compacts and agreed to participate in the seminal New England-New York Interagency Committee — only when it had gained assurances that it had equal representation to the federal actors. The creation of the Cape Cod National Seashore and the Water Resources Act of 1965

were among the prominent federal-led investments in land conservation and in linking water supply and pollution control to land management. More typical of the New England approach was the heritage area model pioneered to revive Lowell, Massachusetts in the 1970s. This, in turn, inspired the successful Blackstone River Heritage Corridor. Both Massachusetts and Rhode Island voters have been remarkably supportive of open space acquisition bonds. Both states have also long identified wetlands as an issue of concern, with Massachusetts in 1962 adopting restrictions on the use of privately owned wetlands. Both states also fostered the implementation of municipal conservation commissions to address habitat and landscape issues.

The 1975 Southeastern New England Study, which produced watershed-scale maps of high priority lands of concern and the Rhode Island 208 water quality study called for a large fraction of critical areas to be conserved. It was concluded that existing laws would be sufficient to make this conservation happen. Unfortunately, events in both Massachusetts and Rhode Island proved the reality to be otherwise. Massachusetts was, at one time and especially in the 1970s, seen as a major innovator in land use management. However, by the turn of the 21st century, the state was being heavily criticized for failing to control suburban sprawl — a key fear that had been raised repeatedly during much of the 20th century. In response, Massachusetts introduced new legislation in 2013 to address this and a number of other land use management weaknesses. Meanwhile in 1998, Rhode Island's National Estuary Program released a blistering critique of its efforts in land management in terms of its inability to reduce nonpoint sources of pollution. On a positive note, both Rhode Island and Massachusetts have very active Grow Smart movements that are attempting to address a broad range of land use concerns, of which environmental conservation is only one facet.

Three regional planning councils cover the Massachusetts' portion of the Narragansett Bay watershed, and these do not have identical authorities or responsibilities as those of Rhode Island's Office of Statewide Planning. The strength of local control over most land use is balanced by efforts to introduce a citizen-led as well as state-engaged watershed approach to areawide and sub-basin issues. Taunton's successful campaign to get a Wild and Scenic Rivers designation is an example of a case where politics and civic engagement aligned. The case of the Blackstone River Heritage Corridor is similar.

However, areawide planning is episodic, driven by the mandates of different funders and often occurs in patchy efforts that rely heavily on volunteer effort. Both past and present there are many parallels between initiatives in Rhode Island and Massachusetts. And, new data collection and geographic information systems work has greatly advanced the potential for seeing watershed lands and environment in a unified way. Still, progress in tackling watershed problems using an integrated, bi-state approach does not always happen as the two states rarely share information on land use or land cover in the adjoining areas with the exception of projects addressing impaired waters and total daily maximum loads.

7 Section 208 Comprehensive Water Quality Management [1868 to 2013]

Since the mid-1900s, comprehensive planning has been a hallmark of state approaches to pollution control. Yet, the requirements in Section 208 were seen as a useful but odd requirement of the Clean Water Act. Inconsistent application of the provisions reflects the struggle between the U.S. Congress and EPA/environmentalist approaches. This is especially the case after the early 1980s, when there were drastic federal funding cuts for programs focused on river basin management and comprehensive water pollution control.

Unlike what happened with other plans, including the Comprehensive Conservation and Management Plan, in 1982 Statewide Planning developed an implementation update to its original comprehensive plan that was completed in 1978 but never adopted. Curiously, in that update, any mention of the 208 comprehensive plan was eliminated. By the mid-1980s, the spotlight was on the Narragansett Bay Commission and the Comprehensive Conservation and Management Plan dominated every front imaginable from the mid-1980s to early 1990s. Meanwhile, nonpoint source pollution had become the focus of its own plan by 1989.

Today, it is difficult to locate a copy of Rhode Island's comprehensive plan for water quality management. In 1975, the idea had been to treat the state as the designated comprehensive planning area for the new Clean Water Act requirements. The reasoning was that Rhode Island was already preparing watershed plans and municipal facility plans as well as the overarching Southeastern New England regional basin plan. The 208 plan covered issues of water quality from both a municipal and overarching themes perspective, including issues of land use, sewage, the condition of the Providence and Pawtuxet Rivers (the latter considered the worst case in the state since the 1960s), urban runoff, sewage sludge disposal, septic disposal, landfills, road salt, erosion and sedimentation, and marinas. Arguably, this is an issues-based plan and was led by Rhode Island Statewide Planning, not the fledgling Rhode Island Department of Environmental Management. The plan also had strong land use and runoff components, although the term 'nonpoint source' appears only four times in the document compared to 351 times for 'runoff.' The Rhode Island water quality classification scheme also is barely mentioned in the document, even though that scheme was the focus of Shea's plan and the regulations prepared by the Department of Health in the 1960s. There is, however, a comprehensive — albeit brief — overview of the pollution control needs of the state (reported by watershed) in 1967.

The timeline above does not fully trace prior or subsequent comprehensive treatments of the issue of water quality management. Combining it with a review of Walter Shea's 14-page plan and the emergence of the interstate approach to setting pollution control goals could create a more detailed story on the trajectory of comprehensive planning for water quality issues at a given moment of time. Some other pieces of the story that are worth noting follow. In the early 1980s, federal funding for Level B planning was cut as was the construction grants program for municipal point sources and support for big-picture planning. The Department of Environmental Management took on the National Pollutant Discharge Elimination System program's task of classifying and studying impaired waters, then eventually the watershed approach, total daily maximum loads for impaired segments, and the Narragansett Bay Program. As such, the Department of Environmental Management was able to combine public health and natural resource protection perspectives, including offering municipalities guidance on how to redo land

policies and best practices. Meanwhile, Statewide Planning continued to oversee state level and municipal comprehensive planning. Current total daily maximum loads for impaired waters have some of the attributes of a comprehensive approach to water quality management. However, the policy levers are mainly technical and expressed through permits of point sources and more recently the stormwater permits. The documents are extremely technical and lack the context and multi-issue treatment that municipal plans provide.

Many Rhode Island and Massachusetts municipalities are incorporating water quality and wetlands conservation elements into their comprehensive plans. While the regulators at the Department of Environmental Management in Rhode Island or the Department of Environmental Protection in Massachusetts may possess the insights into the whole picture, and may see how all the policies, implementation programs, regulations and actions fit together, it is not clear that the community-based watershed groups or local citizens and officials have such a clear understanding. Reading the documentation available leaves questions on the true coherence and integration of our approaches to our water bodies.

8 Total Daily Maximum Loads and Nutrient Controls for Narragansett Bay [1524 to 2014]

Nutrient control to protect habitat uses and aesthetics in Narragansett Bay and its tributaries has been a decades-long concern in pollution control efforts. While loadings from wastewater treatment facilities have been increasingly subject to controls, total daily maximum loads for waterbody segments in streams and lakes impacted by nonpoint sources have been a major feature of pursuing water quality goals.

This story covers the difficult transition in Rhode Island from pre-1972 Clean Water Act approaches to water pollution control to the National Pollutant Discharge Elimination System, construction grants, and the current focus on use attainability and total daily maximum loads for impaired segments.

The emphasis is on pollution control and use protection for the Ten Mile River watershed, which is shared by Rhode Island and Massachusetts and the municipalities of North Attleboro, Attleboro, Plainville, Seekonk, Pawtucket and East Providence. In telling the story, a useful case example is that of the appeal made by Attleboro of its nutrient limits for nitrogen and phosphorus, which ended in a dramatic rebuke by the EPA Appeals Board. The reasons for using this case are several. The area in question is relatively small, a total daily maximum load has been prepared by Rhode Island (not Massachusetts), a degree of cooperation has existed between the communities and the state agencies, pollution is linked to issues in the Seekonk River and Narragansett Bay, the loading limitations have been adjudicated and enforced, the U.S. Army Corps of Engineers has completed the first stages of fish passage improvements in a water body that previously had no hope of seeing fish runs return, and greenway bike and blueway paddle trails have been established. Also, all of the municipalities recognize the role of the watershed and wetlands, the river's quality, flooding issues, and the recreation value of the overall greenway. Further, the total daily maximum load has been recently published and is representative of the others prepared so far in the Rhode Island Department of Environmental Management schedule. While it is not exactly readable, is a good example of the genre.

Also included is the recent history of the dispute over nutrient loadings limitations for the Upper Blackstone Water Pollution Abatement District, which ended in a court battle and loss in the U.S. Supreme Court (see section 2). On May 13, 2013, in case No. 12-797, the U.S. Supreme Court let stand a 1st U.S. Circuit Court of Appeals decision from 2012 requiring additional treatment for nitrogen (Upper Blackstone Water Pollution Abatement District. v. U.S. Environmental. Protection Agency, No. 11-1474 (1st Cir. 2012)). Both this case and the Attleboro case were settled only recently and share in common the history of scientific research on nutrient loadings and impacts to the Providence and Seekonk Rivers and Narragansett Bay. Both nutrient loading cases and the respective total maximum daily loads are built on one set of experiments conducted in the early 1980s by University of Rhode Island Graduate School of Oceanography researchers Scott Nixon and Candace Oviatt, among many others in the Marine Ecosystem Research Laboratory mesocosm, originally funded as an EPA Center of Excellence. Also contributing to the case were the findings from numerous studies and debates over nutrient loadings from anthropogenic sources and the possibility that current stringent policies on nitrogen are going to have unanticipated impacts on a changing bay ecosystem.

Early on, at the turn of the 20th century, concern was on the toxic impacts of ammonia on the bay. As wastewater treatment improved, attention shifted to the role of nutrients in causing eutrophication and depressed levels of dissolved oxygen, and since the 1980s, on the role of nonpoint sources of nitrogen on the bay. Phosphorus levels rose and declined, based in part on consumer acceptance of low phosphate detergents in a push-back against the once innovative and popular alkyl benzene sulfonate-based detergents that fostered problems at wastewater treatment facilities and in receiving water bodies.

Total daily maximum loads prepared by Rhode Island Department of Environmental Management also addressed metals, pathogens and oxygen demand. Up until the 1972 Clean Water Act, Rhode Island and Massachusetts set pollution control levels based on attaining uses set out in interstate water quality classification policies and assessments of whether uses were being attained. As recently as the late 1960s, the Blackstone, Ten Mile, Taunton, Providence and Seekonk Rivers; the Mount Hope and Greenwich Bays; and other waters near urban areas were far out of compliance with rather modest use goals, with large sections of receiving waters in class D and E condition. The Rhode Island Department of Health and its counterpart in Massachusetts remained focused on shellfish sanitation and public health issues. They expressed relatively low concern for impacts on recreational use and fish habitats and, in general, deferred to the economic concerns of municipalities and industries. They noted steady progress since the 1940s even though, by its own records, the situation was dire and headed for many future performance failures.

While nonpoint source controls were identified during the 208 planning process in the 1970s, a fully detailed nonpoint source control plan did not emerge until 1995. Total daily maximum loads to deal with the specific impairments of segments of streams, rivers, lakes and coastal waters followed from this. Arguably, the total maximum daily load for the Ten Mile River was not adopted until after the Attleboro wastewater treatment facility permit limits were set and in dispute. However, from a layman's perspective, the need to define extra pollution control measures based on the need to address specific waterbody impairments, especially those imputed to Narragansett Bay — many miles away from local waters — is in some ways a return to the use attainment orientation enabled by water quality criteria and classifications, combined with the hammer of enforcement through the National Pollutant Discharge Elimination System.

9 The Mercury Total Maximum Daily Load and Metals in the Bay [1969 to 2014]

This is an example of regional cooperation as mentioned in early control plans. Industries were changing by 1970. Recent agreements achieved at the New England regional level and within New England states are also looking to reduce loadings from midwestern sources.

This is an example of successful regional cooperation to essentially solve the mercury pollution problem in terms of reducing current and future sources within New England waters to near-background levels and to tackle the problems of out-of-region air deposition from U.S. sources as well as global sources. The Clean Water Act forced industries to stop the emission of mercury in industrial production, with the most notorious case of this being the Imperial Chemical Industries plant in Dighton, Massachusetts. Imperial had used and discharged mercury between 1953-1970, contaminating Muddy Brook, the Taunton River and Mount Hope Bay. The Taunton River was closed to fishing in 1970 because of high levels of mercury in finfish. Pioneering studies in Lake Champlain and Vermont found evidence of mercury in fresh water fish as well as identified atmospheric sources of contamination. Studies by the U.S. Army Corps of Engineers found mercury in Mount Hope Bay sediments, and the issue was featured in the 1971 conference on pollution in interstate waters of the bay. At the time, the Food and Drug Administration claimed it had no legal authority to deal with the issue. It was not until 2010 that a cleanup plan for the abandoned industrial site involving sediment removal was put forward.

In the early 1970s, the New England Interstate Water Pollution Control Commission took an interest in supporting research led by the state of Vermont, and also at the University of Rhode Island. Rhode Island's 208 Water Quality Management Plan noted that of 155 segments studied, mercury levels exceeded aquatic life criteria. The belief at the time was that drinking water standards could still be met with minor adjustments in discharges. However, by the end of the decade in the late 1970s, there was concern about sources of mercury such as contaminated sediments, disposal of mercury in landfills leaching into groundwater, urban runoff, and contamination from atmospheric sources. Meanwhile, state and regional officials were frustrated that data collection on the accumulation of mercury in fish was difficult to fund.

Events/actions worth noting in the 1980s include the following. East Providence was an early example in Rhode Island of instituting an effective industrial pre-treatment program — cited in 1984 as one of the six best such programs in the United States. The Narragansett Bay Commission emerged as a leader that made strong inroads to reduce wastewater sources of metals such as mercury, tightening its rules and enforcement by 1987, with Fall River citizens pressuring their municipality to follow suit. Further, during the 1980s, Save The Bay and other groups took legal action to ensure that companies discharging to Narragansett Bay Commission facilities pretreated their waste. To emphasize and raise public awareness of the issue, the Narragansett Bay Project prepared a film documenting cautionary tales from New Bedford about mercury-contaminated fish. The Narragansett Bay Commission also imposed a \$220,000 fine on one large noncompliant plating manufacturer to force the company to pretreat its wastes. The Providence Journal provided extensive coverage of the metals issue, and in 1988 the Narragansett Bay Project reported on mercury levels in bay waters and sediments. Airborne

sources of mercury were a concern in a proposed large scale waste-to-energy facility proposed (but never built) at Quonset Point Industrial Park. Massachusetts discovered that it ranked second in the U.S. in terms of emission of mercury per square mile, with the major source being solid waste incinerators. Scientists at the University of Rhode Island, evaluating the World Prodigy oil spill, expressed the opinion that metals contamination of sediments, including mercury, deserved more attention than the short-lived effects of that one spill.

The 1990s saw continued and increased attention to the issue. The 1992 Comprehensive Conservation Plan for Narragansett Bay proposed that Rhode Island and Massachusetts should work to further reduce loadings and emissions of metals including mercury to 50 percent of their 1989 levels by the year 1995. Narragansett Bay Estuary Program reports showed that mercury levels in quahogs was of marginal concern. A new wastewater permit for Woonsocket specifically mentions the need to address mercury. Massachusetts issued an “Interim Freshwater Fish Consumption Advisory” that “pregnant women should be advised of the possible health risk from eating fish from Massachusetts freshwater bodies in order to prevent exposure of developing fetuses to mercury.”

A 1995 report to Congress found that the Northeast Corridor of the U.S. was affected by atmospheric mercury depositions more than any other region. This spurred the New England Interstate Water Pollution Control Commission to undertake a study to ‘fine tune’ EPA data. This set into motion a dramatic regional initiative to coordinate mercury loading reductions. This included setting the first regional total daily maximum load for a pollutant, following on the example set by the state of Minnesota that activated an as yet unused provision of the Clean Water Act, namely Section 319(g).

EPA studies released in 1996 of levels of mercury and other contaminants in fish in the Woonasquatucket, Blackstone and Pawtucket Rivers garnered widespread attention, and a national group, the American Oceans Campaign, praised the Department of Environmental Management, the Narragansett Bay Project funded by EPA, and Save The Bay for highlighting the metals contamination issue. The following year, the Conference of the New England Governors and Eastern Canadian Premiers charged its Committee on the Environment to “continue to advance the understanding of mercury in this region,” leading to the preparation of a regional Mercury Action Plan that both set emissions limits far more stringent than federal requirements, and also set out an aggressive source control effort. The Mercury Action Plan was adopted regionally in 1998, and its 2003 implementation goals were surpassed by state efforts. This involved stepped-up efforts to collect mercury from the waste stream, including old thermometers, dental waste and other sources. Massachusetts proposed stringent new restrictions on mercury and other pollutant emissions for power plants, including Brayton Point, which has coal burning units as well as waste ash contaminated with mercury. A “Quicksilver Caucus” was formed in Congress to help address the issue.

Moving into the next decade, in 2001, Rhode Island did its share for the regional effort by adopting the Mercury Reduction and Education Act, issuing rules to implement it the following year. Mercury briefly entered the Rhode Island Governor’s race as an issue in 2002 as well. The New England Zero Mercury Campaign praised the Narragansett Bay Commission for its efforts in keeping dental amalgam out of the waste stream. The Rhode Island General Assembly revisited implementation issues with the Rhode Island mercury program in 2003, while EPA

awarded the effort in Rhode Island that removed 727 pounds of mercury and in the effort in Massachusetts that kept 1,747 pounds of mercury out of the environment.

Mercury remained an issue in both states throughout the decade, both in terms of source controls and the dangers of contaminated sediments, placing roadblocks in the way of projects that required dredging, such as a proposed (but never built) liquefied natural gas terminal in Fall River and plans to expand the Brayton Point power plant. EPA rejected an attempt by Massachusetts to evade using the total maximum daily load process for dealing with water segments contaminated by mercury and other metals. In a turn-around, by 2006, Massachusetts had changed course and strengthened its state laws on mercury. Rhode Island did the same.

At the same time, the New England Interstate Water Pollution Control Commission proposed to its member states that preparing a regional total maximum daily load scheme would help states deal with a major issue standing in the way of achieving individual state load limits — atmospheric deposition from Midwest power plants. This set into motion some path-breaking events. In 2007, EPA released guidance on how to use impaired water lists, specifically subcategory 5m, to highlight the fact that some uses could not be attained due to air emissions from out-of-state. In the same year, it approved the regional total maximum daily load for mercury crafted by the New England Interstate Pollution Control Commission, following the precedent set in Minnesota. To enforce the total maximum daily load, the commission petitioned EPA in 2008 to convene the first ever conference of parties to manage atmospheric mercury. It updated its regional inventory of mercury source deposition to bolster the case. The conference was held in Philadelphia in 2010, but had mixed results and did not lead to further action. A 2013 study by the U.S. Government Accountability Office pointed out two issues facing the mercury conference. First, a significant source of mercury was global, i.e., outside the jurisdiction of the U.S., and needed United Nations engagement. Second, “even if a conference is held, there is neither a requirement that an agreement to address the problem be reached nor is there a requirement that any agreement that is reached be binding.”

Another major roadblock was the promulgation of Mercury and Air Toxics standards in 2012, which were challenged in federal court and revised in 2013. Fortunately, the District of Columbia federal appeals court upheld EPA’s power to issue and enforce these standards in the case of White Stallion Energy Center, LLC, Petitioner V. Environmental Protection Agency. EPA won yet another victory in 2014 through a 6-2 decision by the U.S. Supreme Court that upheld EPA authority under the Clean Air Act to implement a rule targeting air pollution that crosses state lines.

10 Prelude and Epilogue to the 2003 Fish Kill in Greenwich Bay

[1830 to 2013]

Greenwich Bay in Warwick, Rhode Island is a microcosm of the saga of water pollution degradation during industrialization and suburbanization, episodic massive failures that drew public attention to the problems and delayed but finally successful efforts to implement pollution control measures. However, ambitions for the future quality of the embayment and its tributaries may outstrip the ability of source controls and nonpoint source management.

Greenwich Bay is reputedly among the most studied embayments of Narragansett Bay, with flurries of collaborative research efforts following each water quality episode of recent decades. Because of the early history of agricultural and industrial development dating to the 1800s and earlier, the EPA Atlantic Ecology Division selected Greenwich Bay for its 2012 case study on exploring how past land use and development can be seen in the sediment records and the changes in land and seascapes.

Greenwich Bay and its coves have a long pollution control and governance history that parallels overall developments in the Narragansett Bay watershed due to the industrial and urban development of its inner coves. For many decades, those studying Greenwich Bay have made the links between land use and population growth. The slow rate of sewerage in Rhode Island's suburbs, especially in Warwick, are also part of the dynamic, with the Greenwich Bay Special Area Management Plan prohibiting homeowners from installing individual sewage/septic disposal systems when sewers were available at their property line. The continuous upgrades to the wastewater facilities systems in East Greenwich and in Warwick (which discharges to the Pawtuxet River, but collects waste out of the Greenwich Bay watershed) parallel the greater drama of Fields Point and Fall River and more recently, the total maximum daily loads.

Added to the Greenwich Bay story are the many regulatory decisions on coastal development permits, marina expansion in the coves, the pulses of effort to deal with the decades of crises beginning in recent times with the sanitation closure of the Greenwich Bay and the anoxic event in 2003 that lead to a large fish kill that alarmed the public and generated, scientific, political and administrative agency responses and echoed prior events such as the great fish kill in 1898. The Rhode Island Department of Environmental Management pointed out that this was part of a much larger event occurring in Greenwich Bay and other parts of Narragansett Bay during this year and that the low oxygen even affected not only menhaden, but also other finfish, eels, crabs and in particular soft shell clams, the latter also in locations north of Greenwich Bay. Its resolution required tackling a broader set of pollution problems in the Upper Bay.

The water quality goals and classifications have remained relatively constant over time. The Department of Environmental Management documents reductions in nutrient loadings in the 2012 303d report. It is somewhat less clear whether beach and shellfish bed closures are meeting expectations. If they were/are, then the stream segments would not be subject to the total maximum daily loads.

The “Imprint of the Past” book prepared by EPA is a readable history with a number of small pieces of research and information integration. However, it is largely missing the post-World War II governance storyline, which this story can fill in.

11 Fields Point and Narragansett Bay Commission: *A tale of two successes* *Fields Point and the Golden Age of Public Health, and the Emergence of the Narragansett Bay Commission [1854 to 2014]*

There are parallel stories to the Fields Point case in Rhode Island and in the cases of Worcester, Taunton and Fall River in Massachusetts. This is a century-long story of crisis, success, failure, political will led by citizen support, technical savvy, governance achievements and tangible successes that continue to pay dividends.

This story spans a century and a half. It is the story of every coastal metropolitan area struggling with industry, population growth and a lagging infrastructure, and an estuary worth restoring. If there are heroes to be honored, they are Samuel Gray at the start of this story, and Paul Pinault, longtime director of the Narragansett Bay Commission, at the other end.

The City of Providence was a water quality pioneer at the beginning of the 20th century; a villain by the late 1970s and early 1980s; and once again a pioneer early in this present century acknowledged for its award-winning pretreatment programs, treatment facilities, alternative energy use, and massive combined sewer overflow storage tunnels in a phased program that is still to be completed.

The Narragansett Bay Commission followed the political saga and administrative model of the Blackstone Valley District Commission, which was a state takeover of a failing municipal effort to address sewage and combined sewer overflow problems. The Blackstone Valley District Commission was then itself taken over by the Narragansett Bay Commission in 1991. The City of East Providence, however, ended up privatizing the management of its treatment facilities.

Part of the fascination with the “golden era” story of Fields Point is how it traces the growing understanding of public health risks from water pollution and the impacts on the economy and uses of the upper part of the bay. After World War II and Walter Shea’s Report, renewed civic interest and political support emerged for a decade-long effort to make significant improvements. Sadly, this was followed by a period of neglect in the 1960s and early 1970s that ran headlong into both federal law and Rhode Island civic pressure. In addition to the drama of yet another struggling city unable to manage or invest in its waste treatment, a political battle erupted between then Providence Mayor Vincent Cianci and Rhode Island Gov. Joseph Garrahy. The drama culminated in 1980 with a knock-out victory by Garrahy and overwhelming voter approval for creating the Narragansett Bay Commission.

At a glance, the Narragansett Bay Commission story since the 1980s seems to be one of endless accomplishments and accolades. The renovation of the wastewater treatment facilities, the hugely successful industrial pretreatment program, and public acceptance of a massive combined sewer overflow capture and treatment investment is all the more remarkable because it has occurred in an economically struggling metro area located in one of the areas of the country most severely affected by the 2008 recession and economic collapse. The Narragansett Bay Commission leadership has shown savvy and self-sufficiency, with active efforts to monitor and research water quality issues and carry out a strong public information program. It exhibits technical competence that has contrasted sharply with municipal mismanagement. That said, in

addition to its successes, the Commission has also faced its share of challenges, including sustaining the income/revenue flows needed to operate a continuously expanding program and facilities, especially in determining how to address and fund the stormwater runoff needs of the entire metropolitan area. (A parallel story is the story of the creation of the Upper Blackstone Water Pollution Abatement District to deal with pollution from the Worcester metro area and its impact on the Blackstone — see section 3.)