



North Coastal Watersheds Five-Year Action Plan

Prepared for Vandana Rao and John Clarkeson,
Massachusetts Executive Office of Environmental Affairs
by Jesse Gordon,
Perot Systems Government Services,
Environmental Information Division

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EXECUTIVE SUMMARY

This 5-Year Watershed Action Plan will serve as the strategic environmental planning document for the North Coastal Watersheds (NCW) Team for calendar years 2004-2008. It is intended to provide a long-term vision for the watershed and to describe a set of overall goals and objectives. The goals of the NCW team and the Action Plan are:

1. **Open Space:** Foster Sustainable Development (people-oriented).
2. **Habitat:** Conserve habitat and wildlife (nature-oriented).
3. **Water Quality:** Improve water quality and water-related human health.
4. **Water Quantity:** Better water management / flood control.
5. **Recreation:** Foster recreational use of natural resources and economic growth related to recreation.
6. **Outreach:** Local capacity building, outreach, and education.

The Action Plan was developed in conjunction with representatives of a wide array of public watershed interests, via input at public meetings, on a website (www.NorthCoastal.net), through newspaper articles, and through videotaping at public events. The Action Plan identifies existing conditions and unresolved issues, and then develops priorities for action.

The Action Plan recommends concrete actions for the next five years to work towards those goals. Formerly, EOEAs' Massachusetts Watershed Initiative would have overseen the implementation of the Action Plan. With the dissolution of that Initiative, implementation will be accomplished in a more decentralized manner – primarily via local watershed groups, with some oversight and input from EOEAs and other Watershed Team representatives. For the NCW, the Watershed Team still meets, as an information-sharing source for its constituent watershed groups, and EOEAs continue to embrace the Watershed Initiative's goals and methods via the NCW Watershed Team. The Action Plan in that context becomes a reference source for use in grant applications by the local watershed groups. The recommendations of this Action Plan are:

- ? A. Study and rehabilitate closed coastal shellfish beds
- ? B. Initiate and develop a salt marsh recreational and ecological survey
- ? C. Reestablish beach maintenance & develop area beach management plans
- ? D. Expand river and lake cleanups
- ? E. Publicize and reduce contaminated stormwater runoff
- ? F. Restore and Protect Water Quality/ Reduce Pathogens
- ? G. Protect, evaluate, and restore sensitive habitat
- ? H. Maintain natural water flow regime
- ? I. Restore anadromous fish habitat
- ? J. Watershed-wide flood planning
- ? K. Watershed-wide open space planning
- ? L. Preserve and protect farmland
- ? M. Implement the Grow Smart North Shore Open Space Plan
- ? N. Direct outreach to communities / build sense of stewardship
- ? O. Liaison for grant opportunities
- ? P. Meet watershed goals via other projects

The protection and restoration of the North Coastal Watersheds' resources will take the combined efforts of many communities: citizens, local governments, environmental groups, state and federal agencies, and business. The success the Watershed Team has in bringing these communities together will in large part determine the success of the North Coastal Watersheds Action Plan. The 5-year Watershed Action Plan should thus be considered "a living document" that will change as new issues and needs are identified, and new partners join the Watershed Team.

The results of the Action Plan include a 30-minute video intended for distribution to high schools, libraries, and local cable TV stations. For those interested in reading more than the brief video can provide, this Action Plan will be distributed to the same locations. In addition, the website www.NorthCoastal.net contains a record of numerous public input as well as a reference library of numerous relevant documents. That website will be maintained indefinitely.

Saugus River drains the ecoregion along its northern boundaries. Experts place the number of *natural communities*, rare species and habitats within the Boston Basin at 38.¹

The NCW has been described as a study in contrasts, marked by extensive areas of open space, rural towns and highly urbanized communities with all or portions of 27 communities dispersed over its 168 square miles. The glacial history of the area combined with the low relief has resulted in the formation of numerous wetlands, lakes and ponds and swamps along the main river valleys through out the watershed. The topography of the watershed is characterized by small hills, which reach altitudes of about 350 feet above sea level, and low stream gradients. The rivers within the watershed are comparatively small, tidal and historically have been heavily exploited. Some of the major rivers are the Essex, Annisquam, Danvers, Saugus, Pines, and the North River. The Watershed is “naturally” divided into subregions: The Saugus/Pines River Estuary, Nahant Bay, Salem Sound, Cape Ann, and portions of Salisbury and Amesbury.

Physical Features

Barrier islands and salt marshes: Starting in the northern reach of the watershed, portions of the extensive Hampton and Seabrook Marshes of southern New Hampshire extend southward into Amesbury and Salisbury. Barrier island beaches make up a significant portion of the North Coastal Watersheds coastline and include Salisbury Beach, Cranes Beach, Wingaersheek, and to the south, Revere Beach. The salt marshlands located behind these barrier islands are extensive. Of particular value is the 15,000-acre Great Marsh that extends over portions of four watersheds including the Merrimack, Parker, Ipswich, and North Coastal (the Cape Anne portion of NCW). The Great Marsh is the largest contiguous salt marsh north of Long Island, New York.

Saugus River: Notable features within the southern reaches of the watershed include Reedy Meadow, a distinctive 540-acre freshwater marshland, which along with Lake Quannapowitt (in Wakefield) form the headwaters of the Saugus River. At the mouth of the Saugus is the equally important 900-acre Pines River/Saugus River Marsh locally known as Rumney Marsh.

Rocky peninsulas: The predominant shoreform of the North Shore coastline consists of rocky peninsulas interspersed with embayments, pockets of salt marsh, and estuaries (drowned river valleys) fronted offshore by rock islands. Cape Ann provides Massachusetts with some of its most distinctive rocky coastline.

Lakes and ponds: Within the NCW boundaries there are a total of 85 lakes and ponds, 39 of which are greater than 10 acres. Lake Quannapowitt in Wakefield is the largest at 254 acres followed by Chebacco Lake in Essex at 209 acres. Twenty of the lakes and ponds have been designated either as Outstanding Resource Waters per (314 CMR 4.00) or as Areas of Critical Environmental Concern (ACECs) per MGL Ch. 21A § 2(7). Lake Wenham (on the Beverly-Wenham line) is hydrologically outside the watershed, but is included in this study because it is a major source of drinking water for the watershed.

Water quality: The DEP DWM has conducted water quality surveys in the NCW since 1975, most recently in 1997-1998. The previous surveys were conducted in 1987-1988 for Salem and Beverly Harbors and their tributaries, Salem Sound and Marblehead Harbor, Manchester Harbor, Gloucester Inner and Outer Harbors and a segment of the Annisquam River. Data from the 1987 survey indicated that high coliform bacteria densities and/or low dissolved oxygen impaired the North River, Goldthwait Brook, South River Channel, Crane River, Bass River, Salem Sound (at the WWTP outfall) and several coves of Inner Gloucester Harbor. Results of the 1988 survey indicated that the waters of the NCW generally did not support their designated uses.² Twenty-five waterbodies within the North Coastal Watersheds, both fresh and marine are listed on the Federal 303d list of impaired waters (see Appendix F). The comprehensive 1997/1998 survey³ focused on water quality and fishery resources. It included:

- ? Water chemistry measurements and detailed nutrient analyses at river and marine stations on 18 dates
- ? Survey of soft-shell clam habitat
- ? Summarized available catch data for recreational and commercial fisheries
- ? Limited comparisons were made of the study results to the 1965 DMF estuarine study of Salem Sound.

¹ BioMap Guiding land conservation for biodiversity in Massachusetts NH&ESP, MDF&W 2001.

² MA DEQE 1989

³ See “The Marine Resources of Salem Sound 1997”, published 2002 by the Massachusetts Division of Marine Fisheries. Abstract and contact information at <http://www.mass.gov/dfwele/dmf/programsandprojects/salemsnd.htm>

Resource industries: The abundance of open beaches, coastal wetlands and harbors are used by residents and non-residents in support of a host of outdoor recreational activities including swimming, fishing, boating, hiking, and hunting. The dominant *resource industries* include commercial fishing for finfish, lobsters and shellfish particularly within upper North Shore communities of Essex, Ipswich and Gloucester.

Social Setting

One of the NCW's foremost assets is its "quality of life." This asset is derived from the unique juxtaposition of historic towns, intact open spaces and neighborhoods with densely populated urban areas. However, in a recent survey,⁴ NCW residents responded that:

- ? The most important problem facing their community today is development and "sprawl" (42%);
- ? "Too much development" is the primary concern (44%), especially around traffic issues (30%);
- ? The quality of life has gotten worse in the last 3 years (46% "worse" versus 21% "better").

After nearly 400 years of intensive human influence, the NCW's resources, while not always pristine, provide home to nearly 500,000 people, support vibrant communities with clean drinking water and a diversity of natural, historic and recreational opportunities. Today the character and resources of this watershed are under increasing threat from "low density sprawl." Habitat fragmentation is considered by many to be one of the most serious threats to maintaining biological diversity. The watershed's natural resources are increasingly being required to serve a multitude of conflicting uses.

Subregions of the NCW face unique sets of issues. Addressing the numerous, diverse and often competing problems across the watershed requires a range of solutions. In the non-sewered areas primarily to the north in Gloucester and Essex, the main issues are:

- ? controlling and managing growth;
- ? concerns with enforcement of regulations controlling subsurface waste disposal (Title V);
- ? excessive demands on local water supplies; and
- ? closed shellfish beds.

In the Salem Sound area concerns are primarily:

- ? nonpoint source pollution on Salem Sound's streams and coastal waters
- ? degraded recreational and commercial coastal resources, i.e., contaminated fishing areas, closed shellfish beds, beach closures, and invasive species;
- ? maintaining and enhancing open natural spaces, i.e., estuaries, stream buffers and forests;
- ? protecting and conserving the drinking water supply;
- ? fostering sustainable growth and redevelopment.

Problems facing the Saugus River and Nahant Bay/Broad Sound systems include:

- ? water shortages;
- ? low flows in the Saugus river;
- ? flooding;
- ? Combined Sewer Overflows; and
- ? closure of public beaches due to bacterial contamination.

The primary concerns in the Salisbury area relate to:

- ? controlling and managing growth;
- ? enforcement of regulations controlling subsurface waste disposal (Title V);
- ? localized flooding and coastal erosion; and
- ? the closure of shellfish beds.

⁴ Boston Metropolitan Area Planning Council survey, referred to as "MAPC survey." The MAPC area includes 101 towns with overlap to NCW. The MAPC survey was conducted on-line within NCW via the *Salem News* and the *Gloucester Times*. The partial survey results were downloaded as of May 20, 2004, prior to survey completion, to meet publication deadlines. 767 people responded from NCW towns. A table of the downloaded results appears in Appendix M.

1B. HISTORICAL CONTEXT

The North Coastal Watersheds are a place “where people have always wanted to live.” Since its earliest beginnings people have moved into and occupied the land. For thousands of years, the relationship of the Native American populations to their environment revolved around the wheel of the seasons.

Pre-industrial agriculture: A dramatic change in land use occurred in the 1620s with the arrival of European settlers who were attracted in part by the area’s abundant and varied natural resources. This period saw the replacement of the traditional native seasonal village system, with its shifting agriculture and its hunter/gatherer activities, to permanent villages employing agricultural practices that raised crops and managed domesticated animals. Ultimately, English property systems encouraged colonists to regard the products of the land and sea, not to mention the land itself, as commodities. Over time as the population of colonists increased, the resources in their immediate reach became depleted. However there existed a seemingly endless bounty of new and unexploited resources. The rural economy of New England thus acquired a tendency toward expansion.⁵

Industrialization: America’s Industrial Revolution began in Massachusetts and neighboring Rhode Island. The development of mills powered by water transformed many of the Commonwealth’s water bodies by converting them from free flowing to impoundments with controlled releases. By the early 19th century, the North Coastal area became one of the nation’s major centers for shipping, shipbuilding, and trading with Europe and Asia. During the latter half of the 19th century, the creation of modern industrial infrastructure made possible the formation of large industrial-based cities such as Lynn, Salem, and Peabody. Industrialization also spurred the growth of the fishing industry as railroads and later the road systems allowed the shipment of fresh fish to inland markets. The industrial economy placed immense stresses on the environment as factories and municipal sewage systems discharged huge concentrated flows of all forms of waste into the waters of the Commonwealth. By the 1870’s deforestation reached its peak with only 10% of the state remaining under a wooded condition. The integrity of the region’s abundant and remarkably diverse collection of natural resources, working landscapes, historic villages, cities and towns became increasingly threatened due to over-exploitation, pollution, and an ever-increasing population.

Conservation: During this same period of industrialization, the North Shore’s scenic coastline and abundant natural resources attracted an increasingly mobile public, becoming one of America’s first summer resorts. The combination of environmental pressure and public interest sparked some of America’s earliest conservation activities. Visionaries such as Alice Town Lincoln and Charles Eliot sought to guard against indiscriminate development, to protect scenic and historic places, and established protective institutions such as The Trustees of Reservations, the first land trust in the world, established in 1891. Changes internal and external to New England brought about significant changes as the major industries of tanning, shoe making and chemical manufacturing closed or departed for other areas.

Suburbanization: While the North Shore has been historically one of the slower growing areas, its exceptional scenic and cultural resources are now threatened by unplanned patterns of growth. In the 1950s through 1980s much of the region evolved into a suburb of Boston, as commuter rail service and highway construction linked the North Shore with Boston and to the rest of the nation’s population centers. Recently the North Shore has since become increasingly attractive as bedroom communities for the region’s burgeoning high tech industries.

Sprawl: A host of new changes and threats are currently presenting themselves. Often referred to as “sprawl,” unplanned growth results in a decentralized and incoherent pattern of development that consumes large amounts of open space, overburdens existing infrastructure and resources, and damages our environment. Between 1950 and 1990, the population of Massachusetts grew by only 28% while the amount of developed land grew by 188%. Sprawl usually results in the abandonment of our historic urban and village centers accompanied by the consumption of land for poorly planned development in our growing suburbs and rural communities. The negative impacts of sprawl on our communities extends beyond the aesthetic. Sprawl affects quality of life in ways that are both alarming and often irreversible, including:

- ? the destruction and fragmentation of important wildlife habitat;
- ? increases in traffic and air pollution;
- ? water supply degradation due to polluted runoff from paved surfaces and disturbed soils;
- ? water shortages in our rivers, streams, ponds and aquifers as groundwater recharge areas are developed; and
- ? an increase in local taxes to pay for greater infrastructure such as sewer lines and school buildings.

⁵ excerpted from *Changes in the Land*, W. Cronon, 1983

Clearly, sprawl is a direct threat to the quality of our water and air, the beauty of our landscape and the character of our communities. It also jeopardizes our long-term economic well-being by squandering natural resources needed to support economic development while increasing the cost of infrastructure and community services. As housing tracts and strip malls replace open spaces and critical wildlife habitats, resource-based industries, such as farming, forestry, fishing, tourism, and recreation also suffer. Ironically, as the impacts of sprawl accumulate, communities may begin to react negatively to growth proposals and foster “anti-growth” sentiments in which innovative, appropriately sited and economically beneficial development projects are spurned or discouraged. Our natural resources are limited and physically finite yet are increasingly being required to serve a multitude of conflicting and competing uses. The key to protecting the NCW’s exceptional natural and cultural heritage is ongoing interaction between environmental stewards, government representatives, and the general public.

1C. THE MASSACHUSETTS WATERSHED INITIATIVE

Formerly, EOEAs Massachusetts Watershed Initiative (MWI) would have overseen the implementation of the Action Plan. With the dissolution of that Initiative, implementation will be accomplished in a more decentralized manner – primarily via local watershed groups, with some oversight and input from EOEAs and other Watershed Team representatives. For the NCW, the Watershed Team still meets (on a monthly basis at the Mass Audubon headquarters in Beverly), as an information-sharing source and funding-opportunity source for its constituent watershed groups. EOEAs lauds the Team members for doing so on their own initiative, and directs interested parties to contact them (see list in Appendix B).

Despite the organizational changes at EOEAs, the principles of watershed management are still adhered to by EOEAs and the continuing development of watershed based action plans underscores that commitment. The ultimate goal, the improvement of the environmental health of all 27 watersheds, is just as achievable today as at any other time. The principle of shared responsibility for our watershed health was a key element of the Initiative and remains critical to the success of any watershed based action plan. This watershed action plan is designed to outline those priorities for adoption not only by government organizations but businesses and private citizens as well.

The Initiative achieved a major milestone by bringing together local citizens, government representatives and active environmental organizations. These stakeholders’ continuing interaction provide testimony to their commitment for watershed health and proof that people can work together to face the watershed issues they share. Moving forward on their recommendations made in this Plan will prove their ability to make significant improvements without the need for continuing state intervention.

Many funding programs, sponsored by the Commonwealth and others, remain to support these local efforts – details appear in Appendix G. EOEAs remains committed to improving and supporting watershed health throughout the Commonwealth. More details concerning the previous functioning of the Massachusetts Watershed Initiative appear in Appendix A1. It is the intent of this document to be utilized as a strategic planning document for the North Coastal Watersheds Team and its constituent members for calendar years 2004-2008.

The priority project list represents the Watershed Team’s consensus judgment on projects that should receive prioritized funding through the various funding mechanisms available to local watershed groups. The goal is to facilitate locally based problem identification and problem solving and coordinate implementation activities among all parties. The specific program goals of this action plan are (with their corresponding MWI program elements):

- 1. Open Space:** Foster Sustainable Development (people-oriented).
- 2. Habitat:** Conserve habitat and wildlife (nature-oriented).
- 3. Water Quality:** Improve water quality and water-related human health.
- 4. Water Quantity:** Better water management / flood control.
- 5. Recreation:** Foster recreational use of natural resources and economic growth related to recreation.
- 6. Outreach:** Local capacity building, outreach, and education.

2. ISSUES AND STRATEGIES

In this section we outline the issues and strategies for each of the six goals. The purpose is to introduce the issues and strategies, to provide context for the prioritizations in Section 3. More details on the issues appear in Appendix C, "Issues Background." The previous round of goals appears in Appendix D. Corresponding previous accomplishments appear in Appendix E.

2A. Open Space: Sustainable Development

Goal 1: Foster Sustainable Development (people-oriented)

Issues: The *Grow Smart North Shore* report serves as the NCW comprehensive Open Space plan. It is available on the NCW website, www.NorthCoastal.net.

The more general goal of sustainable development raises numerous transportation-related issues. The Blue Line (MBTA) is proposing to expand through Rumney Marsh to Lynn; and a reconstruction project of Rt. 1 is planned. Both construction projects will potentially impact the ACEC area and other parts of Rumney Marsh.

Strategies Several years ago the Metropolitan Area Planning Council (MAPC) and its North Shore Task Force (NSTF) sponsored a Harvard School of Design project to investigate the potential to create a metropolitan open space system for the Greater Boston Metropolitan region and adjoining areas of Eastern Massachusetts. The final report entitled *Mass Bays Common* proposed a network of large protected natural resource systems. As a natural progression from this larger effort, the NSTF commissioned a similar effort for the 15 communities in the North Shore area. The report entitled *Grow Smart North Shore* proposes:

- ? a network of interconnected existing preservation areas, new preservation areas, riparian corridors setbacks and a harbor walk as the means to consider the needs and character of the region's resources and people;
- ? address the needs of the regional ecology; address the issues of water quality and quantity; address the rich cultural heritage of the region; and
- ? create a realistic, regional open space reserve on the North Shore and Cape Ann.

Several NCW team members were active in the formulation of this project and the subsequent presentations to local officials and the public. It was the consensus of the team that *Grow Smart North Shore* could effectively serve as the NCW comprehensive Open Space plan. Planning for growth and community preservation has been an active component of the Watershed Team's activities.

"Open Space Residential Design" (OSRD) is a rezoning method intended to implement greater open space within the same population density. Numerous documents on OSRD methods, bylaw changes, and zoning concepts are included on the website, under the heading of "Conservation Subdivision Design."

Some NCW team members were active in programs to support local agriculture on the North Shore and Cape Ann, that protects farmland as wildlife habitat, as open space, and as cultural and historic resources.

2B. Habitat Conservation

Goal 2: Conserve habitat and wildlife (nature-oriented)

Issues The long history of development and alteration within the watershed has placed much of the natural resources at risk. The Team has identified as a priority the restoration of degraded wetlands and the reopening of productive shellfish resources. Estimates compiled for the EOEA 2002 Report "*The State of Our Environment – A Special Report on Community Preservation and the Future of our Commonwealth*" indicate that the Commonwealth will have about 9.75 million people at buildout, or about 3.5 million more than today. Massachusetts is zoned for an additional 2.4 billion square feet of commercial and industrial growth at buildout. This is the equivalent of about 17,000 Wal-Marts.

The primary concern is that the ongoing land fragmentation, resulting from continuing economic development, more specifically housing growth, will seriously endanger the biodiversity within the Commonwealth and the North Coastal Watersheds. The Natural Heritage Program of the Division of Fisheries and Wildlife examined the entire landmass of the Commonwealth, reviewed all existing data on the native species that live in

Massachusetts, and produced a map that identifies those areas that need to be preserved and managed. The BioMap⁶ places some 40 natural communities within the NCW at risk.

Strategies The extensive alteration of the waterbodies and landscapes within the watershed often precludes the ideal application of land acquisition and establishment of protected conservation easements. Often these sensitive habitats require the imposition of remedial measures to restore some of their biological and ecological functions to better reflect a more natural condition.

- ? The NCW team is generally supportive of the concept of “The Natural Flow Regime.”⁷ This approach recognizes the importance of natural streamflow variability in maintaining healthy aquatic ecosystems.
- ? Integrate the concept of biodiversity into the MWI program elements (which are still supported by EOE).⁶
- ? Promote a thorough review and study in and around both surface and groundwater water supplies to insure that drawdowns needed for water supply protection cannot be so great that they wipe out the wetlands and in-stream flows to maintain biodiversity.
- ? The NCW team will support on-going projects and foster new projects in the watershed targeted to restoring or remediating degraded streams, wetlands, reopening productive shellfish beds and promoting conservation of eelgrass beds.
- ? In the past, support has largely been in the form of site assessment and the writing of endorsement letters to the various funding sources. However, future projects do not preclude involvement in active restoration or remediation projects.

2C. Water Quality Improvement

Goal 3: Improve water quality and human health issues

Issues: The waters within the North Coastal Watershed generally do not support their designated uses. Water quality problems are pervasive throughout the watershed often the result of cumulative impacts from point and nonpoint sources. The most likely causes are exceedances of standards for bacterial contamination excessive nutrients/low dissolved oxygen, invasive species and priority pollutants. A complete list of NCW impaired waters appears in Appendix F (updated as of 2002, with older lists for reference).

Sections of the North Coastal watershed have extensive areas of impervious surfaces created by dense housing developments, roads and commercial parking areas. The runoff from these areas alters the water quality and biological integrity of areas once noted for anadromous fish runs, swimming and shellfishing. In the more urbanized areas of the NCW, particularly in the Salem Sound and Saugus River subwatersheds, contaminated urban sediments is also an issue.

Thermal discharges from two major NPDES permittees located on opposite shores of the Saugus River Estuary may adversely impact fish migration as well as egg and larval development. A total of 25 waterbodies both fresh and marine are listed on as impaired waters (DEP 1996 303d list) (See Appendix D).

The North Coastal Watershed has five municipal sewage treatment facilities and several large industries, all of which are classified as major dischargers under the NPDES permitting program. Record keeping and updates on the actual number and status of minor NPDES permits needs to be updated. DEP/DWPC/NERO was responsible for overseeing a number of Administrative Consent Orders filed against municipalities and business for noncompliance with both State and Federal Water Quality Laws and Regulations. Changes in program management and personnel had lead to a lack of “up to date oversight.”

Human health issues relate not only to water quality but to air quality as well. Several community members cited air emissions as a potential cause of illness. While this report focuses on water-related issues, the comment section of the website and the associated video include discussions of other health issues.

Hence the term “health” in this category means both human health and healthy aquatic systems. That includes anadromous fish issues, for example. This category should be interpreted broadly, to include aesthetics as well.

⁶ which is tied to the aforementioned Massachusetts Ecological Regions Project: *Griffith, Glenn E. et al., for U.S. Environmental Protection Agency and Massachusetts Department of Environmental Protection, Corvallis, 1994*

⁷ LeRoy et al, 1997, Richter et al 1996

Strategies: Develop a plan and financing to supplement the monitoring efforts of DEP/WSM, DMF, SSCW and SRWC by engaging additional partners, providing communication linkages between the respective programs and expanding the list of water quality parameters.

- ? Provide direct technical assistance for DEP/DWPC/NERO compliance activities by the collection of water quality samples, biological assessments and flow measurements.
- ? Promote the coordination and pooling of all federal, state and NGO efforts and tailor some of the sampling. This would enhance the individual group efforts towards meeting their targeted goals and provide a more comprehensive assessment of conditions within these targeted areas.
- ? Find resources to assist DEP and EPA in the review and comment of compliance reports, daily reporting requirements, and previous studies, update files and follow up on previous permit recommendations and requirements to issue protective NPDES permits for the nine major NPDES permittees.
- ? NPDES permits should contain specific limits and monitoring requirements for pollutants that impair water quality. The limits should be set so that the receiving water meets applicable water quality standards.
- ? NPDES permits should conform to EPA's guidance document: Watershed-Based - National Pollutant Discharge Elimination System - (NPDES) Permitting Implementation Guidance - August 2003 - Draft
- ? Develop and implement a plan to provide subwatersheds with comprehensive condition assessments and plans to maintain or improve the water quality and quantity.
- ? EOEAs should issue its Revised Water Policy as soon as possible.
- ? The EPA's TMDL loading limits, while sometimes criticized as onerous, do provide specific numeric goals for demonstrating water quality improvement. The Watershed Team in the past identified four subwatersheds in which to target efforts and resources – they were selected on the basis of being dispersed across the watershed; because they had common problems, and because they had active group(s) of communities in support; and because progress and improvements are readily demonstrated.

2D. Water Quantity Management

Goal 4: Better water management / flood control

Issues The NCW does not have a unified water supply or well field located within the watershed. A number of communities have access water rights to the Ipswich River. Some communities can also access water from Massachusetts Water Resources Authority (MWRA) and from privately owned wells. The numbers and locations of private wells and amounts withdrawn are not well documented. Droughts have plagued the region in the past.

The high population density places demand on the water supply resources in the drainage basin, even though several municipalities actually derive their water supply from surface or groundwater sources outside of the North Coastal Watershed. Projected water demand at buildout for municipalities will exceed presently permitted supply by 12,600,000 gallons per day (gpd). Data compiled from (EOEA 2002 *The State of Our Environment – A Special Report on Community Preservation and the Future of our Commonwealth*).

An area of significant concern is the Saugus River, a system that is affected by low flow conditions caused in part by registered and permitted water withdrawals by the Lynn Water and Sewer Commission. Water is diverted from the Saugus River mainstem into Hawks Pond, part of the LWSC Water Supply Reservoir system. Permitted and registered withdrawals of 10.21 MGD by the City of Lynn and a permitted withdrawal of 0.28 MGD by the Colonial Golf Course in Lynnfield contribute to a section of the Saugus River being dry (Cashins 1997).

The town of Rockport is seeking to expand its water supply by the establishment of a new reservoir and the diversion of three intermittent streams.

Salisbury officials are concerned that large scale withdrawals by neighboring Seabrook NH maybe impacting Salisbury wellfields

Strategies:

- ? DEP/Drinking Water Supply personnel need to update files and permits issued to all registered water users.

- ? Develop and implement a plan to protect watershed lands around water supplies. But the drawdown needed for water supply protection cannot be so great that they wipe out the wetlands and in-stream flows that maintain the Commonwealth's biodiversity. Watershed plans must employ a better balance between public water supply demands and designated uses such as Aquatic Life.
- ? Water suppliers need a program to help them in securing funds for Watershed Protection.
- ? Encourage public water suppliers and DEP regulators to implement water conservation measures such as leak detection installation and calibration of water meters. While providing a valuable resource to the communities at great cost savings, water conservation measures also help communities meet one of the general water conservation practices under their Water Management Act permits.
- ? Develop and implement a flow monitoring program to provide accurate and reliable data on flows in most of the subbasins. Subwatershed assessments and plans are needed to provide the basis for protecting these resources.
- ? Suggest inclusion of flow monitoring as a standard parameter during all water quality assessments.

2E. Recreation as Economic Resource

Goal 5: Foster recreational use of natural resources and economic growth related to recreation.

Issues: The team had not previously identified the element of recreation as a specific priority issue to be addressed by the team. Often it is embedded or included in open space planning and habitat issues. It is currently included because of the large number of people who participate in water-based recreation in the NCW area and because of the large number of public comments that were recreation-related.

In particular, the NCW includes several of the Boston area's most popular beaches (Revere Beach, Singing Beach in Manchester, Crane's Beach in Ipswich, Salisbury Beach, etc.) In terms of fresh water, the NCW contains several large lakes (Lake Quannapowitt in Wakefield, Chebacco Lake in Essex) which are potentially available for recreation.

Strategies. Because of the many popular beaches in the NCW, the Watershed Team includes economic issues in this section as well. High-use beaches provide financial resources for local communities, but in addition, the recreational benefit accrues to local residents directly. More usable beaches and waterways provide greater recreational benefit – and many of the best recreational resources in NCW are degraded. Their improvement would have an immediate economic benefit and could be the basis of several economic studies. For example, cleaning Lynn's coastal waters sufficiently to reopen the shellfish beds would provide a local recreational activity (clamming) which was the tradition for decades. Some past activities at the local level in this area include:

- ? In 1999, the Watershed Team participated in a series of workshops and presentations with DCR (DEM) and Salem State College on a study of Chebacco Lake.
- ? Beginning in 1999, the **Friends of Lake Quannapowitt** has held a watershed awareness program with an outdoor classroom for all children that graduate the public school system.
- ? In 2003, the Chebacco Lake Association wrote a series of articles in the Hamilton-Wenham Chronicle to publicize the issues about the lake. The lake has high mercury levels and problems with noxious plants including nonnative plants (fanwort).
- ? While the two goals of clean beaches suitable for swimming and shellfishing is admirable, the two activities are not compatible in the same time period. Water quality monitoring and publicizing the results as well as sanitary surveys by MDMF can make this a reality.

2F. Capacity Building & Outreach

Goal 6: Local capacity building, integration between groups, outreach, and education

Issues: The North Coastal Watershed enjoys an active citizenry often organized at the local level and generally dealing with specific or regional environmental issues. It was discovered that there is no single environmental issue affecting all of the citizenry—rather, the issues and concerns are localized. Virtually all of the environmental agencies under EOEA have a significant presence in the watershed. Communication between the various levels of government, sister agencies and local community partners is inconsistent. The Department of Environmental Protection through its

regulatory authorities plays a central role in protecting and improving environmental conditions for a host of issues, such as water pollution control, wetlands protection, water supply, solid waste management, and hazardous waste management. Particularly successful at interacting at the grassroots level were, DFG (DFWELE) through their Stream Team Program and **CZM/NS** which provides proactive leadership and assistance in growth management, outreach programs and grants management.

Three Local Governance Committees (LGCs) **Salem Sound Coastwatch (SSCW)**, **Eight Towns and the Bay (8T&B)**, and **Metropolitan Boston Local Governance North Shore** were organized under the Massachusetts Bay National Estuarine Program during the 1980's and 1990's. The LGC's missions differ in response to the directives of their core constituency. The **Saugus River Watershed Council (SRWC)** founded in 1991 and **Save Waters in Massachusetts (SWIM)** have established regional constituencies. The Essex County Buy Local program promotes local agriculture and education about buying locally. In addition there are many other smaller constituent groups. Limitations in technical expertise, personnel, or inconsistent funding hamper their ability to address complex problems. The diverse nature of the watershed sometimes works against them, since they often must compete for funds or resources.

Strategies: Identify the *communities* working in the North Coastal Watersheds. Channel outreach and education efforts through the local governance organizations and environmental groups, strive to develop a pattern of reciprocal communications. Model outreach efforts employed by DFG (DFWELE), **Massachusetts Audubon Society** and **CZM/NS** to fit NCW needs. Maximize the exchange of information between team members and collaborative through electronic mail systems. As contacts are established with local officials invite them to join the team. Prioritize problems within the sub-regions, map out strategies to effect positive change, solve problems at the sub-watershed level and make the North Coastal Team relevant to the needs of all constituencies.

Rather than focusing on establishing a "NCW team identity", a choice was made to facilitate existing programs wherever possible and provide additional resources to supplement or augment existing *community* efforts:

- ? Support and encourage growth of local constituencies.
- ? Keep all groups apprised of appropriate grants and other funding.
- ? Encourage the development of working partnerships between team members.
- ? Provide letters of support for funding opportunities consistent with the watershed team's objectives.

Where possible, the watershed team will support local activities such as river clean-ups. In the opinion of the previous Watershed Team Leader⁸, this was the single most effective outreach tool employed, when the watershed team was able to link this with evidence of anadromous fish spawning. This was the case in the North River cleanup, and with wildlife sightings in and around Town Line Brook – which resulted in validation of the volunteers' efforts and incentives for doing more.

The Watershed Team should consider itself the central information source for coordinating activities between local watershed and community groups. The NCW contains many such groups that would benefit from coordination, particularly information-sharing and funding source information.

As a result of this project, the NCW Watershed Team will produce a video about the watershed. It will be appropriate for periodic broadcasting on local cable stations, at high school environment classes. The intent is to distribute the video to libraries and high schools as a means of outreach.

Public Input Process

The public input detailed in Section 3, while topical and of interest to the public, does not necessarily reflect the views of the Watershed Team. In general, the public is much more concerned with health issues and recreational issues. Similarly, city and town officials are generally most concerned with local flooding and water flow issues. Watershed groups are generally most concerned with water quality issues and ecological issues.

Our recommendations attempt to reconcile the needs of all three groups. The most likely users of the recommendations, watershed groups, can interpret the recommendations about topics primarily of interest to the public as a means to improve public outreach.

⁸ Larry Gil, communication of June 29 2004

3. PUBLIC INPUT

- ? The Watershed Team collected input from the Team members directly; from comments by members of watershed organizations at their meetings; from website comments solicited at meetings and in newspaper articles; from surveying newspaper articles in local newspapers; from videotaping at environmental events and at recreational sites; and from the previous version of the Action Plan draft.
- ? The issues were summarized into 117 specific tasks, or general concepts if a task was not yet defined. These 117 issues are listed in the following table. The issues are divided into topics for ease of reference only (the topics do not associate with the goals). Within each topic, the issues are listed alphabetically. The issues are numbered from 1 through 117 for ease of reference. Details about the issues can be found in Appendix C, as well as on the website www.NorthCoastal.net. In most cases, the website documents the source of the comments—readers should interpret any data which is undocumented in this report as from the website comments section.
- ? The Watershed Team determined the six goals of the Action Plan via discussions over a period of several months.
- ? Each of the 117 issues is evaluated as to how they fulfill each of the six goals. The members of the Watershed Team reviewed the evaluations to come to a reasonable consensus. The rating system is:



The issue has a **negligible effect** on the goal.



The issue has a **side effect** on the goal.



The issue has **some effect** on the goal.



The issue has a **direct effect** on the goal.



The issue has a **major effect** on the goal.

In addition to the six goals, each issue was evaluated on the same scale for “Level of Public Concern.” This was measured by the number of citations of the issue. Since every issue was raised at least once in order to be placed on to the list, there are no “negligible” ratings for this column. We consider this category to be a proxy for the political importance of an issue. While we recognize that this method favors those who simply show up to address our meetings, or those who take the time to write a newspaper article, we also recognize that such activism is a valid measure of political support.

The final column is “Resource cost,” which we use as a means of incorporating a cost factor or a factor for difficulty of implementation. The scale for cost is reversed, so that the more expensive or more difficult to implement an issue, the fewer points it receives. The “resource cost” means the additional cost to the Watershed Team, either financial or people’s time. Hence if a task would be done anyway, there is a low cost of associating the NCW Team with that task. For issues where there is no specific task, we evaluate the cost for initiating a study, or for seeking funding for a study. The rest of the scale for resource cost is interpreted as:



Implementation is **prohibitively expensive** or prohibitively difficult.



Implementation is **expensive** or difficult, likely requiring a grant.



Implementation has a **reasonably inexpensive** or easy method.



Implementation is **inexpensive** and/or would require only adding to an existing project.



Implementation is being done anyway and hence has **no net cost** to the Watershed Team.

There are no point totals assigned to the evaluations, because the Watershed Team deemed that method of evaluation inappropriately specific. The discussion section following the grid discusses all the highly evaluated tasks as priorities – those issues best fulfill the stated goals of the Watershed Team. Of course, the evaluation system is somewhat arbitrary, so the prioritization is only loosely based on evaluations – it is intended for guidance rather than determining a sequence of priorities.

North Coastal Watershed Action Plan – Issues from Public Input

Goals ?
vs.
Issues ?

- 1. Foster sustainable development
- 2. Conserve habitat / wildlife
- 3. Improve water quality / health
- 4. Better water management / flooding
- 5. Foster recreation / economics
- 6. Build capacity / outreach
- Level of public concern
- Resource cost

Waterways

1	Chebacco Lake cleanup							
2	Hydrological study of North River							
3	Ecosystem Restoration Project for Reedy Meadow and Saugus River – as part of GI RECONN proposal.							
4	Implement Town Line Brook Watershed Restoration Project to restore habitat, improve water quality and address flooding.							
5	Implement Phase II MS4 compliance in all municipalities in the watershed.							
6	Implement recommendations of DEP's 1997/1998 Water Quality Assessment of the North Coastal Watershed							
7	Lake Quannapowitt algae cleanup							
8	Lake Quannapowitt arsenic cleanup							
9	More river/lake monitoring							
10	Reissue NPDES permits with monitoring requirements included							
11	Saugus River sediment study							
12	SRWC river cleanup							

Non-point sources

13	Contaminated runoff - fertilizer							
14	Contaminated runoff - herbicide							
15	Contaminated runoff - road salt							
16	DDT in Swampscott lakes							
17	Establish low road salt areas and safe salt storage locations within Saugus River watershed.							

Goals ? vs. Issues ?

Non-point sources (continued)

	1.Sus.Dev.	2.Habitat	3.Wat.Qual	4.Flooding	5.Rec.	6.Outreach	Level	Cost
18 Implement NPS BMPs within Town Line Brook subbasins								
19 Investigate and address sources of high bacterial pollution to Mill River								
20 Investigate and address sources of high bacterial pollution to Shute Brook, Saugus.								
21 Road salting study								
22 Removal of fly ash Wenham Lake								

Development

23 Blue Line extension study								
24 Evaluate impact of windfarms								
25 Evaluate Linden Brook crossing under Rt1								
26 Health effects from Salem power plant emissions								
27 Promote locally-grown food (Essex County Buy Local, e.g.)								
28 Protect buffer zones to rivers, streams, marshes and other wetlands throughout Watershed.								
29 RESCO ash landfill - Ensure closure as required by DEP Consent Order.								
30 RESCO expansion study - Prevent expansion of waste incinerator within an ACEC								
31 Rt. 1 widening-effect on Town Line Brook								
32 Rumney Marsh canoeing survey								
33 Thermal discharge impact study in Saugus River estuary.								

Marine

34 Assist MDMF in sanitary surveys of the Rumney Marsh shellfish beds								
35 "Take the Beach Back" in Revere; beach maintenance throughout the watershed								
36 Conduct study of marine resources in the Saugus River estuary.								
37 Implement Beaches Bill to provide timely monitoring and protect the public health.								

Goals ? vs. Issues ?

Marine (continued)

	1.Sus.Dev.	2.Habitat	3.Wat.Qual	4.Flooding	5.Rec.	6.Outreach	Level	Cost
38 Promote fishing rules	●	●	●	○	●	●	●	●
39 Restore shellfish beds in Rumney Marsh/Saugus River estuary.	●	●	●	○	●	●	●	●
40 Salem Sound boating - recreation economic analysis	●	●	●	○	●	●	●	●
41 Shellfish bed - closure survey and/or economic study	●	●	●	○	●	●	●	●

Wastewater

42 Develop funding mechanisms for Phase II storm drainage improvements per Project # 01-09	●	●	●	●	●	●	●	●
43 Eliminate CSOs in Gloucester - sewer separation	●	●	●	●	●	●	●	●
44 Eliminate CSOs in LWSC - sewer separation	●	●	●	●	●	●	●	●
45 Eliminate CSOs in LWSC - sewer separation	●	●	●	●	●	●	●	●
46 Eliminate sewer discharges to Saugus River	●	●	●	●	●	●	●	●
47 Monitor stormwater drainage from Stacy Creek onto MDC Kings Beach	●	●	●	●	●	●	●	●
48 Upgrade drainage infrastructure of Saugus River downstream of LWSC Diversion	●	●	●	●	●	●	●	●
49 Wastewater - Gloucester	●	●	●	●	●	●	●	●
50 Wastewater - Nahant	●	●	●	●	●	●	●	●
51 Wastewater - Revere	●	●	●	●	●	●	●	●
52 Wastewater - Saugus	●	●	●	●	●	●	●	●

Water supply

53 Chronic flooding of Reedy Meadow	●	●	●	●	●	●	●	●
54 Citizen members on Salem-Beverly Water Board	●	●	○	●	●	●	●	●
55 Drinking water quality - Middleton Pond, Danvers	●	●	●	●	●	●	●	●
56 Evaluate flooding control in Mill R.	●	●	●	●	●	●	●	●
57 Flooding plans - Peabody	●	●	●	●	●	●	●	●
58 Flooding plans - Revere	●	●	●	●	●	●	●	●
59 Limited dredging of Town Line Brook for flood storage	●	●	●	●	●	●	●	●
60 Monitor streamflow in the Saugus River.	●	●	●	●	●	●	●	●

Goals ? vs. Issues ?

Water Supply *(continued)*

	1.Sus.Dev.	2.Habitat	3.Wat.Qual	4.Flooding	5.Rec.	6.Outreach	Level	Cost
61 Promote water conservation throughout Saugus River watershed.								
62 Reduce water withdrawals from Saugus River, particularly during fish spawning periods.								
63 Repair self regulating tide gates at Route 1/Town Line Brook								
64 Revisit MAS/NS water supply report card								
65 Study West Pond, reservoir in Magnolia, for volume of water and means to reduce dam failure.								
66 Watershed wide assessment of DEP's Survey of Public Water Supply								

Land Use

67 Composting sites								
68 Fund comprehensive assessment of land use at subwatershed scale								
69 Open space - Essex County Buy Local program								
70 Open space - High Rock Park								
71 Open space - Loeb Estate								
72 Open space - Nahant CPA								
73 Rezoning for OSRD								

Invasive Species

74 Conduct removal of water chestnuts - Reedy Meadow, Pillings Pond								
75 Evaluate and remove phragmites - Saugus River watershed.								
76 Evaluate purple loosestrife eradication								
77 Invasive species - Salem Sound								
78 Invasive species survey - coastal/marine								
79 Invasive species survey – inland								
80 Phragmites proliferation in Smallpox Brook								

Goals ? vs. Issues ?

Ecology

	1.Sus.Dev.	2.Habitat	3.Wat.Qual	4.Flooding	5.Rec.	6.Outreach	Level	Cost
81 Anadromous Fish restoration in Saugus River, North River, Crane River (rainbow smelt)								
82 Bike trail development								
83 Coyote survey at Town Line Brook								
84 DEP Wetland program applications								
85 Designate Reedy Meadow as ACEC								
86 Develop TMDLs for NCW targeted subwatersheds.								
87 Enhance spawning habitat for anadromous fish in Saugus River.								
88 Evaluate feasibility of fish ladder installation along Saugus River at LWSC Dam.								
89 Evaluate potential fish spawning habitat in Saugus watershed, upstream of LWSC Dam.								
90 Ground truth Sites-of-Concern data base								
91 Habitat restoration project assessment teams								
92 Host focus groups on open space								
93 Identify large parcels for conservation								
94 Implement marsh restoration projects included in the Rumney Marshes ACEC Salt Marsh Restoration Plan.								
95 Land acquisition plan								
96 List 21E Soils and contaminated sediments.								
97 Permanent protection of ACEC habitat								
98 Quantify economic benefits of open space								
99 Watershed-wide open space plan								

Goals ? vs. Issues ?

Outreach

	1.Sus.Dev.	2.Habitat	3.Wat.Qual	4.Flooding	5.Rec.	6.Outreach	Level	Cost
100 Attend MCM/NS monthly workshops for Boards of Health and Conservation Commissions.								
101 Attend monthly meetings of regional planning organizations where possible.								
102 Conduct outreach to schools, local communities, businesses and residents to prevent illegal dumping in the Saugus watershed.								
103 Contact major industries within watershed								
104 Dialogue with local Chambers of Commerce - include conservation groups								
105 Distribute NCW video to libraries and schools								
106 Earth Day activities								
107 High School outreach programs								
108 Include existing groups in Watershed Team								
109 Info on grant opportunities								
110 Liaison from HealthLink								
111 Liaison with Ipswich River reps re: Lake Wenham & drinking water								
112 Provide logistical / technical support for local activities.								
113 Publicize EPA bacterial survey of Smallpox Brook								
114 Publicize grant funding opportunities from CZM, EPA, EOE, DEP, and others								
115 Regional training sessions for local ZBAs & Planning Boards								
116 Support circuit rider positions for local boards of health, conservation commissions								
117 Visioning conferences: Saugus River, Salem Sound, agricultural land, other topics								

4. RECOMMENDATIONS

Based on the evaluations of the 117 issues in Section 3, the following are the recommended priority issues and/or tasks for the NCW Watershed. Most issues and tasks are combined into grouped recommendations, with item numbers referring to the public input list from Section 3, along with which goals from Section 2 each recommendation most addresses. These recommendations are intended as guidelines for seeking funding for community groups. They are in rough order of priority but related recommendations are juxtaposed for coherence.

4A. Study and rehabilitate closed coastal shellfish beds

The NCW's shellfish beds along most of the NCW coast have been closed for many years, but clamming on the beaches was once an integral part of those communities. Shellfish bed health can serve as a proxy for general marine health, and would be a very visible indicator of improvement. The loss of eelgrass is a related issue. Some NCW shellfish beds remain open, in Gloucester and Essex for example, while those which are in closer proximity to contamination sources and population centers have remained closed.

We recommend a study noting which beaches once had shellfish beds, and what is needed to return them to safe sources of food. Only older residents now remember the traditional shellfish beds, and documenting that tradition would serve as public outreach as well as an impetus for cleanup. Shellfish could generate millions of dollars and has one of the strongest economic multipliers of any business, and hence closed shellfish beds is as much about job generation as about ecology. The study might include an economic component of the recreational and financial value of shellfishing in the past and the potential value of reopening shellfish beds. We also recommend working with DMF to prioritize the shellfish beds by their potential economic importance and the amount of effort required to reopen them. A related survey might include which beaches are closed to swimming, for what percentage of each summer.

Prioritization could be based on quality of the resource -- i.e. marketable quantities of shellfish, likelihood of success, etc. In some cases it may be possible to re-open shellfish beds just for restricted digging such as harvesting of bait. (Public Input Items 34, 39 through, 41; Goals 1, 2, and 5).

4B. Initiate and develop salt marsh recreational and ecological survey

Salt marshes in Salem Sound have been reduced from 185 acres to 65 acres since 1960. Rumney Marsh to the south and the Great Marsh to the north face similar problems.

Rumney Marsh is an under-utilized recreational resource, especially for canoeing, kayaking, birdwatching, and perhaps other activities. Rumney Marsh is also the site of a potentially very large project, the Blue Line extension. A recreational survey, perhaps with a species catalog of flora and fauna, would publicize the issues of what are the potential problems of a major construction project in a fragile ecosystem (which is also an ACEC). The previous plan for Rumney Marsh included a species list along with a list of projects dedicated to restoring flow and habitat, and a follow-up could be done with recreational focus. Similar efforts should be done for the Great Marsh and for smaller marshes in NCW, with a focus on restoration, mitigation and enhancement.

The same could apply to the potential expansion of Route 1 at nearby Town Line Brook. A more general study might encompass transportation growth needs in general, in relation to protected wetland areas. The potential expansion of Route 1 in this region is an opportunity to correct some of the long time drainage and flooding problems associated with Town Line and Linden Brook, including upgrading the Town Line flood gates to make them safer to operate. (Public Input Items 23, 31, 32, 63; Goals 2 and 1).

4C. Reinstitute beach maintenance & develop area beach management plans

The NCW includes some of Massachusetts' finest beaches, but the beaches in the more densely populated areas are not as well maintained as the popular beaches on Cape Anne. With the advent of the Blue Line extension to Lynn, the beaches near there will likely become as popular as Revere Beach, which already has a Blue Line station. Revere Beach itself, despite its history as America's first public beach and its current heavy usage, is not treated as a community-wide resource. Older residents throughout the watershed recall when public high school

students cleaned the beaches as a weekly routine. Reinstating that sort of practice would generate public awareness and would increase membership for the sponsoring organization, as well as promote cleaner beaches at less public expense. Regular beach cleanups might also identify sources of water pollution and other beach contaminants. Several local watershed groups already run river cleanups. A regular beach cleanup would be well within their scope. Management plans might include community-based beach cleanup but might also include less maintenance, such as not removing bird-feeding materials (Public Input Items 35, 37, 47; Goals 5 and 3).

4D. Expand river and lake cleanups

Existing programs of regular river cleanups should be extended to other rivers in NCW and to some of the larger lakes as well. The lakes in particular are not viewed as recreational resources, and an event that focused on their cleanliness would serve to change public awareness (most polluted lakes are open to swimming and boating at least part of the year) as well as increase awareness of what needs to be done to foster more healthy lakes and rivers.

Specific issues include fly ash in Wenham Lake; algae buildup in Lake Quannapowitt; water quality issues in Chebacco Lake; and the general annual cleanup of the Saugus River by SRWC and smaller river cleanups by SSCW. While the fly ash and algae cannot be removed by volunteer labor on a weekend, they can perform regular cleanup and be made aware of the more difficult environmental issues. River and lake cleanups serve at several levels: they can generate publicity; they improve both the quality and the aesthetics of the resource; and most important the power citizen involvement. Regular cleanups might lead to additional studies on addressing pollution sources, analyzing the surrounding area's hydrology, etc. (Public Input Items 7 through 12; Goals 3, 5, and 6)

4E. Publicize and reduce contaminated stormwater runoff

Non-point source pollution is a major source of problems in NCW lakes, rivers, and ultimately beaches. The major sources are:

- ? fertilizers and herbicides from lawns;
- ? pet waste (as well as animal waste from semi-tame Canadian geese);
- ? leaching from contaminated soils and groundwater, from historical industrial activity;
- ? nutrients from on-site septic systems; and
- ? runoff of sediment, road salt, petroleum products, and heavy metals from impervious surfaces.

The target of this recommendation is the general public and local officials. The general public is generally unaware of the connection between their activities and water pollution. Local officials are often unaware of inexpensive practices that would greatly reduce contaminated runoff. Some specific sub-recommendations:

- ? Citizens are generally unaware of the connection of their lawn maintenance (fertilizers and herbicides) on water quality in nearby lakes, so the primary issue is publicity about them. A brochure on lawn fertilizers can be found at <http://www.mass.gov/dep/brp/wm/files/fertiliz.pdf>
- ? Citizens are generally unaware of the connection between pet waste and water quality as well. A brochure on this subject can be found at <http://www.mass.gov/dep/brp/wm/files/petwaste.pdf>
- ? Establishing buffer zones along lakes with nearby lawns (such as Lake Quannapowitt) would be effective, especially where no buffer zones exist at all.
- ? Educate communities to consider permit and development strategies that address stormwater runoff – implementing BMPs that reduce runoff, beneficial stormwater recharge, buffer zones, and Low Impact Development (LID) in general.
- ? Problems caused by roads and impervious surfaces in general will increase in the future, and a base study estimating current runoff quantities of each pollutant would be valuable for future comparison.

MassGIS has been planning an “impervious surface layer” for some time – its completion would provide data about the issue in NCW relative to the rest of the state. (Public Input Items 13 through 22; Goals 3 and 6)

4F. Restore and Protect Water Quality/ Reduce Pathogens

This general recommendation applies to the NCW's rivers, streams, lakes, and ponds, as well as coastal marine waters. Eliminating point sources of pollution (primarily CSOs) and reducing non-point sources (detailed in 4E) make for a starting point.

Some of the recommendations of DEP's 1997/1998 Water Quality Assessment of the North Coastal Watersheds remain unimplemented. We recommend continuing and expanding stormwater monitoring through regular bacterial sampling of streams and outfalls in the Salem Sound watershed and elsewhere in the NCW. Some specific sub-recommendations:

- ? Innovative use of the State Revolving Fund for septic improvement.
- ? Better use (via publicity, perhaps) of the income tax credit for septic improvement. Current tax credit is \$6,000 for correcting failed septic systems.
- ? Fix illicit sewer connections to reduce pathogens and monitor existing and fixed systems.
- ? Rehabilitate old sewer systems (for example, Salem's was built in 1906!)
- ? Communities need guidance in evaluating upgrades of sewer systems (septic vs. town systems). A useful manual is at <http://www.epa.gov/region1/topics/assets/pdfs/OWTSFactSheetFINAL.pdf>.
- ? Better use of "Watershed Aquifer Protection" for legal protection upstream-to-downstream.
- ? Aquifer protection extends to drinking water protection, management, and planning. A buildout analysis appears in Appendix M to assist with analysis, for determining where additional protection is appropriate.
- ? Address / publicize pet cleanup as a water quality issue
- ? Reduce public geese feeding, especially along lakes (such as Lake Quannapowitt) where geese and people both congregate. Goose waste is a major source of bacterial runoff.

This general recommendation is related to the more specific recommendation above regarding contaminated runoff. Details about the numerous issues involved with both these recommendations are provided in Appendix C, in three related topics areas: C12, contaminated stormwater issues; C13, impervious surface runoff; and C14, wastewater issues. (Public Input Items 28, 42 through 52, and 13 through 19; Goals 1 and 3).

4G. Protect, evaluate, and restore sensitive habitat

The ecological integrity of the NCW is at risk because of numerous sensitive habitats throughout the watershed which are under development pressure from population growth. At-risk habitat should be protected where intact, evaluated where lost, and restored once evaluated. This general recommendation covers numerous subtopics:

- ? Wingersheek Beach contains the only sand dunes off Cape Cod (other than the demise of dunes along Revere Beach the geology of the intervening areas probably does not support barrier beaches or dune formation)
- ? Heath lands and grasslands in Lynn Woods and Cape Anne
- ? Eelgrass habitat in shallow marine areas of Nahant, Beverly, and Manchester provide marine juvenile nursery habitat
- ? Vernal pools are a unique habitat which are under-catalogued in NCW
- ? Direct habitat loss affects salt marshes and other wetlands
- ? Marine and terrestrial invasive species are a major issue especially in Salem Sound
- ? Marine invasives primarily from ballast water and shipping and food production

Invasive species are a major threat in the NCW to sensitive habitat. While invasive species are recognized by ecologists the issue is mostly unknown to the general public. This researcher saw numerous examples of general acceptance of invasive species as normal – from bouquets of phragmites to calendar photos featuring purple loosestrife. Groups should consider including them as part of other grant proposals instead of as the main focus. Including invasive species as part of a general category of "sensitive habitat" would be a more effective means of educating the public on this issue. (Public Input Items 74 through 80; Goal 2).

4H. Maintain natural water flow regime

Low river flow is the source of many problems in NCW. Maintaining an adequate – and preferably natural – water flow would improve aquatic ecosystem viability, would help with base flow flood control, would ensure viability of the drinking water supply, would help ensure public safety via fire control water pressure, and would improve aesthetics and recreation. An improved flow would also aid with anadromous fish restoration as detailed in the next recommendation. Some specifics for water flow:

- ? Reduce or eliminate flow manipulation wherever possible.
- ? Consider dam removal where feasible.
- ? Reduce intra-basin transfers including wastewater.
- ? Beneficial infiltration to maintain base flow.
- ? Alleviate tidal restrictions.
- ? Promote Low Impact Development (LID).

(Public Input Items 4, 53, 56 through 60, 62 through 65; Goals 4 and 2).

4I. Restore anadromous fish habitat

Anadromous fish restoration is needed in several rivers in the watershed, especially the Saugus River, where the focus is on river herring (alewife). In general, low flow is the problem, and maintaining adequate flow would help fish runs. All data points to major loss of viability of anadromous fish populations, and that the number of spawning adults is down.

In the absence of adequate flow, and in the presence of dams, fish ladders would assist anadromous fish runs. Studies of this issue would include: fish ladder feasibility studies, fish counts, study of spawning habitat. The goal would be to restore the last century's fish runs of thousands, all the way up to Lake Quannapowitt, but the water has to be there for any projects to work. (Public Input Items 4, 9-11, 62-65, 81, 87-89, 91; Goals 2 and 4).

4J. Watershed-wide flood planning

Flood protection and flood planning was independently cited as an issue in several different communities around NCW. Besides focusing on individual solutions to each flooding issue, we recommend a watershed-wide focus on information sharing and lessons-learned from flood control, both from elsewhere in the NCW and from other watersheds. The Watershed Team (or a specialist in flood control who traveled to the several towns listed) could serve as an information source on BMPs and on establishing the need and benefit for flood control.

A related sub-recommendation is: Improve the watershed's physical characteristics and functions by specific flood prevention. Physical watershed functions should be addressed in an ecologically sensitive way, avoiding drastic and permanent solutions like the multi-mile wall proposed by the ACE, known as "The Great Wall of Saugus."

In general, hydrological studies are partially complete but their recommendations remain unimplemented. The ecological benefits of flood control also should be more integrated into other flood planning. Flood control measures should account for anadromous fish migrations. (Public Input Items 53 through 63; Goal 4).

4K. Watershed-wide open space planning

Several local groups focus on "greenbelts" and parks in one area. There is an additional need for information sharing between those groups, which could be served through the Watershed Team. The NCW Team, or a traveling specialist, could host focus groups on open space issues. These focus groups would include examples of successful open space conservation from other nearby towns, bylaw and zoning changes for implementing "Conservation Subdivisions," information about conservation easements, etc.

The focus groups should start with Conservation Commissioners and Zoning Board members, but should also include Planning Board members, city staff responsible for open space planning, representatives from permit-granting authorities, as well as elected officials and their staff. The purpose should be education on the conservation and ecological goals of open space planning as well as input from focus group participants on their goals.

(Public Input Items 67 through 73, 92, 98, 99; Goals 2, 1, and 6).

4L. Preserve and protect farmland

Farmland represents large parts of the open space remaining in the NCW. Farms also provide habitat, but are currently being reduced by seven to 15 acres per day⁹ statewide. Fostering “buy local food” initiatives provides a financial boost for local farms. This recommendation includes an education and outreach aspect. (Items 27, 68, 69). Some specific sub-recommendations:

- ? Foster “Agricultural Commissions” on a regional basis if possible, or on a town basis. Purpose would be to inform the public, elected officials, and their staff about agricultural issues, analogous to Conservation Commissions.
- ? Provide information on direct financial benefit of farms (local food, local jobs) as well as the indirect benefits such as wildlife habitat, historical resources, and open space.
- ? Make tie-in to other environmental issues, especially CO2 reduction, by reducing food transportation due to local purchasing. Farmland also provides CO2 sequestration.

(Public Input Items 27, 69 98, 117; Goals 1 and 2).

4M. Implement the Grow Smart North Shore Open Space Plan

The Watershed Team endorses the Grow Smart North Shore Open Space Plan as its open space guidance. The recommendations there should be considered recommendations of this action plan as well. The Open Space plan is available on our website, www.northcoastal.net/new/Docs/GrowSmartNorthShore.pdf.

Some of the Grow Smart recommendations are outdated, so some specific recommendations focus supporting sustainable growth and planning and implementation for that support:

- ? Support the Green Neighborhood Alliance.
- ? Plan for adequate water supply to meet growth in demand.
- ? Conduct a watershed wide assessment of DEP’s Comprehensive Survey of Public Water Supply.
- ? Redevelop abandoned and under utilized properties.
- ? Support local Open Space Committees and an Open Space Committee network.

(Public Input Items 54, 61, 67 through 73, 92, 95, 99; Goals 6 and 1).

4N. Direct outreach to communities / build sense of stewardship

Environmental groups and watershed teams tend to “preach to the choir,” and hence there is a need for public outreach. Outdoor public Earth Day activities, and focusing on high school students, are good solutions to this problem. The to-be-produced NCW video would serve well as an introductory tool for both those audiences as well as others. (Public Input Items 104 through 107). Including greenbelt organizations, chambers of commerce, and major industries would widen the watershed dialog to other stakeholders.

There are numerous effective watershed groups, conservation groups, and open-space groups throughout the watershed but they often do not work together towards mutual goals. This reflects in part the diverse geography of the watershed and also reflects in part the lack of MWI impetus. Several of the recommendations focus on watershed-wide actions – in general, including chambers of commerce, major industries, boards of health, Conservation Commissions, as well as local environmental groups would gain. (Public Input Items 100 through 117).

The NCW region has little cohesive identity, since it lacks the unifying river that most watersheds have. Hence liaison activity with other North Shore watersheds – specifically the Ipswich River Watershed, the Merrimack River Watershed, and the Parker River Watershed – should be considered the larger-scale version of this recommendation. (Public Input Items 100 through 117; Goal 6).

⁹ Mass Audubon estimates seven to fifteen acres lost per day, based on the 1997-2002 census, in its publication “Losing Ground”. The 2002 Census of Agriculture estimates up to 32 acres per day loss, based on somewhat different criteria.

40. Liaison for grant opportunities

The NCW Team should establish itself as a prime information source for grant funding news. This can be accomplished via the website and/or an e-newsletter. In the post-MWI situation, this is an important need for local groups. The local groups should send representatives to the NCW Team meetings for the purpose of liaison with other groups and to be more aware of grant opportunities. In particular, we recommend regularly inviting new participants to NCW Team meetings and making it worthwhile for them to attend by distributing grant-writing materials from fresh grant sources. Also, several Ipswich River-based groups (e.g., Wenham Lake groups) might be included as well, because of the high cross-basin transfer between NCW and Ipswich. (Items 108 through 111, 114). A list of federal and state grant opportunities appears in Appendix G. (Public Input Items 101, 108, 109, 114; Goal 6).

4P. Meet watershed goals via other projects

In previous watershed action plans, the specific recommendations were directed toward the Watershed Team, to be implemented and funded over the subsequent five years. With the dissolution of the MWI, that goal can be met in concept by encouraging the implementation of the watershed initiative's goals via other funding sources, in conjunction with other projects, and by citing the general goals of this report as evidence of ecological needs.

The Grow Smart North Shore Open Space Plan should be considered a good example of the watershed team's goals being well represented via other projects. Other regional and local planning documents should be encouraged to do the same. In particular, two regional documents are forthcoming which would benefit from NCW and other watershed team input: the MAPC (Metropolitan Area Planning Council) plan and the MVPC (Merrimack Valley Planning Commission) Plan. Both should include the interests of NCW, since they are seeking bottom-up input and representation on their Steering Committee. Most immediately, the MAPC "Metro Futures" steering committee meets in summer 2004.

The same concept applies to planning documents on a smaller scale than the watershed level. Community planning, as well as sub-watershed planning, should include NCW concerns goals. In particular, 401 Certifications are a good venue for including watershed concerns. In general, NCW team members should use this report as a means to include those concerns and goals in community planning documents. (Public Input Items 5, 66, 73, 100, 104, 110, 115; Goals 6 and 1).

A VISION FOR THE WATERSHED

There will be a continuing need for additional data collection in the watershed, to enhance our ability to conduct a more comprehensive assessment of watershed conditions. Other general ongoing tasks include:

- ? An assessment of the composition and overall functioning of the Watershed Team, and implementation of appropriate changes to increase stakeholder representation, participation of team members in watershed activities, and the overall efficiency and effectiveness of the Team;
- ? Identification of additional watershed stakeholders and recruiting new Team members;
- ? An accounting of the measurable successes of the Team to date;
- ? Identification and prioritization of watershed issues and concerns as this report becomes outdated;
- ? Assuring active Team participation in the development of important documents, such as the new 303(d) list;
- ? Working more with watershed partners in securing grants;
- ? Development of a periodic watershed e-mail newsletter;
- ? Further development of the watershed website, both as a means of information dissemination, and for soliciting stakeholder input on watershed and Team activities and issues.

We will also employ a multi-pronged approach that adjusts to the availability of resources, provide an effective means of adjusting to opportunities in funding, new initiatives, community interest and sufficient flexibility to adjust to the vagaries of time and resources. Recognize that meaningful change will not necessarily be exhibited in the short term speaking either in a spatial or temporal sense. Our key strategies are to implement efforts at the subwatershed level. Wherever possible we recommend utilizing pilot projects to test certain assumptions and practices and evaluate their effectiveness in different locations. Understand that in many cases a variety of resources maybe needed to accomplish long term goals and where possible the need to combine the attributes of programs, resources and communities to augment the process. Our focus will be to:

- ? ***Integrate*** activities, responses and assistance to local communities and citizens with team members where ever and as often as possible,
- ? ***Work in increments*** many of the issues will not be solved by the success of single action but require several actions,
- ? ***Project*** local successes through collaborative demonstrations to other communities.

Appendix A: Organizational Background

A1. The Massachusetts Watershed Initiative

The Massachusetts Watershed Initiative is a broad partnership of state and federal agencies, conservation organizations, businesses, municipal officials and individuals. Begun in 1996 by the Executive Office of Environmental Affairs (EOEA). The Watershed Initiative is an innovative, result-oriented program. Multi-discipline watershed teams are charged with providing comprehensive watershed protection in each of the 27 major watersheds in the Commonwealth. 20 full-time team leaders who report directly to the Secretary of Environmental Affairs manage the 27 interdisciplinary watershed teams. Watershed Teams form the foundation of the state's watershed protection efforts by providing direct watershed-specific linkage between agencies and the community. They effectively serve as the "eyes and ears" of the Environmental Secretariat. The watershed teams also assist watersheds in overall planning and implementation through the development of a five-year watershed action plans and annual work plans. The Five Year Watershed Action Plan serves as the strategic planning document for the Watershed Team, while the Annual Work Plans developed by the team detail the significant environmental issues within the watershed, a summary of the previous years activities and a list of prioritized projects.

The priority project list represents the Watershed Team's consensus judgment on projects that should receive prioritized funding. Such funding previously was supplied directly through the various funding mechanisms available to the Executive Office of Environmental Affairs. Watershed teams would submit annual work plans to a "Roundtable" comprised of senior level managers under EOEA and Community partners. The Roundtable was the mechanism by which to ensure that agencies are allocating their resources – both people and money – according to the priority issues and actions identified by the teams. The Roundtable serves as a clearinghouse and priority setting group for the Watershed Initiative to review annual work plans, ensure consistency of service, and reconcile competing demands for allocation of resources while supporting the needs of each watershed. Resource needs of the teams are communicated and addressed directly by top management, by-passing the many layers of bureaucracy that stand between our front line staff and communities and the ultimate decision makers. The goal is to facilitate locally based problem identification and problem solving and coordinate implementation activities among all parties along seven program elements (these seven program elements correspond to the six goals of this Action Plan, with outreach and education combined into one goal):

- ? Outreach and Education.
- ? Local Capacity Building
- ? Water Quality
- ? Water Quantity
- ? Habitat
- ? Open Space
- ? Recreation

One of the central tenets of the MWI is that the most effective environmental decisions occur when scientifically sound solutions are vetted through a process of public involvement that supports appropriate regulatory actions. The Watershed Initiative employs an iterative 5-year program with a targeted activity for each year of the program.

- ? Year 1 – Outreach
- ? Year 2 – Research
- ? Year 3 – Assessment
- ? Year 4 – Planning/Implementation
- ? Year 5 – Evaluation

It was further determined that in order to successfully implement the Watershed Initiative Approach it would take time to both harness and distribute available resources. Accordingly, the full 27 watersheds would be progressively phased in to complete a full 5year planning cycle there by avoiding the over taxing of critical resources.

A key objective of the MWI is the integration of community interests and regulatory programs for the protection of our environment. A "*watershed*" defines the geographic landform where the surface and ground water

flow downhill to a common point, such as a river, stream, pond, lake, wetland or estuary. We have chosen to define “communities” as the set of entities whose collective interests have a common goal of a healthy environment. Ecological researchers have also employed the terms “*Natural Community*” and “ecoregions” to describe the interacting assemblage of plant and animal species that occur together and which share a common environment. The concept of ecoregions was employed in the development of the Massachusetts Ecological Regions Project: *Griffith, Glenn E. et al., for U.S. Environmental Protection Agency and Massachusetts Department of Environmental Protection, Corvallis, 1994*. The success we have in bringing these “communities” together to protect and enhance our “natural communities” will in large part determine the success of the North Coastal Watersheds Action Plan.

The voluntary, grassroots work done by *local community* partners is critical to the success of the Watershed Action Plan. However, it is not sufficient unto itself to deal with all of the issues. While certainly not unique to NCW, the combination of water quality problems, degree of urbanization, extensive industrial history and stressed natural resources have resulted in a high degree of environmental regulatory activity. It is beyond the intent of this plan to provide a complete history of federal and state legislation, the regulations or the agencies dedicated to environmental protection. Appendix L highlights some of the critical legislative authorities, programs and regulations administered by federal state and local authorities that will be used in support of the *North Coastal Watersheds Action Plan*. We will also highlight where appropriate key phrases and language found in the legislative authorities, programs and regulations that we have into our Action Plan. Appendix P contains many acronym definitions, including programs that have changed name under the new Administration. For more detailed information regarding environmental regulations within the Commonwealth of Massachusetts please consult the web page <http://www.mass.gov/portal/index.jsp> and related links.

A2. Watershed Teams and Community Action

Each of the *communities* within the watershed has its own unique mission and resources. Acting individually, they frequently do not possess all of the skills and resources necessary to solve the wide range of complex problems facing the watershed.

Examples include: The problem of contaminated stormwater emanating from street drainage systems along highways and local roads requires the coordinated involvement of municipal, state and federal authorities to achieve meaningful reductions in pollution loading. Managing sustainable growth must involve local and state officials, planning boards, regional planners, citizens, and developers.

The resources of any one of the communities cannot solve these complex problems. Complex multifaceted problems often require the bringing together of resources of disparate *communities* to craft effective solutions. The Action Plan will adopt the strategy that draws upon the unique set of resources and expertise of each *community* to articulate a set of shared goals and objectives, culminating in the development of solutions that enjoy the benefits of all available resources. The Plan will foster true partnerships between municipal officials, non-profit organizations, citizens, businesses and government agencies, achieving the best possible protect to, and restoration of our threatened resources of land and water.

A3. Watershed Team Structure and Process

In order to effectively deal with these often complex and conflicting problems, the North Coastal Watersheds Team will follow the structure and process developed by the **Massachusetts Watershed Initiative**. The key features of the Mass Watershed Initiative are:

- ? The co-leadership roles of the state, watershed associations or other citizen groups, the business community, and municipalities in implementing the watershed approach;
- ? 27 interdisciplinary watershed teams managed in the past by 20 full-time team leaders, and currently by committed individuals who work full-time in other state positions;
- ? Watershed-based outreach, resource assessment, planning and implementation involving all stakeholders;
- ? Annual watershed workplans as the vehicle for integrating specific activities in each watershed.
- ? Subwatershed problem identification and action plan development;

- ? Target limited dollars to watershed priorities, so they are used where we can achieve the most environmental protection;
- ? Support local action and empowering local people to protect their local resources.

The Initiative evolved after it became apparent that no single entity (*community*) had all of the resources necessary to manage or resolve all of the environmental issues within the Commonwealth. In order to adequately protect the natural resources and quality of life of the Commonwealth these sometime disparate *communities* would have to come together. A unique attribute of the Watershed Initiative is the realization that often, it should be the local municipalities and the citizenship's decision as to what should be the priorities and resources that need the most protection. At the very least they should be active participants in the process. Each of these issues therefore may take on varying degrees of importance at the subregional and subwatershed levels within the North Coastal Watersheds as determined by the specific needs, availability of resources and efforts of the community partners. The design of the Watershed Initiative provides mechanisms for integrating the strengths of each community into demonstrable success. As of 2003, the Massachusetts Watershed Initiative no longer funds full-time team leaders. However, the Massachusetts Executive Office of Environmental Affairs, the original sponsoring agency, still adhere to the goals and methods of the MWI.

A4. North Coastal Watersheds Team History

The North Coastal Watersheds Team came into existence in calendar year 1997. Initially the team consisted of personnel from the various state and federal regulatory programs. Larry Gil, the first North Coastal Team Leader, sought to expand membership by reaching out to a list of the region's local contacts. He first visited with local community groups at their respective locations, inviting all to attend the first North Coastal Watersheds Team Meeting in March 1997. The list of attendees is significant since it verifies the breadth of the communities within communities, the commonality of some problems and the diversity of interests. See list of community groups in **Appendix B**. At the close of the meeting the group reached the following conclusions:

- ? Local governance committees, non-profit organizations, effectively service the North Coastal Watersheds. "Grassroots" organizations are localized, often well established, have varied interests and are well tuned to the communities and citizenry that they serve.
- ? Federal, state, and local authorities do not often pool their resources and the authorities provided by their regulations to address environmental problems.
- ? Communication and coordination of authorities across and between regulators needs to be improved. Effective communications involves maintaining frequent contacts, establishing dialogue and engagement in solving problems.
- ? The attendees agreed to serve on a watershed team.

After much discussion, four critical points emerged to guided the team's efforts over the next several years:

- ? More interagency coordination / communication and involving locals in state environmental work.
- ? Increased teamwork on current subregional and local efforts rather than rebuilding the wheel.
- ? Coordinate DEP's regulatory requirements and sampling with the basin schedule.
- ? Greater conservation of critical resources by working with interconnected ecological regions rather than a patchwork of cities and towns.

The team determined that the most productive use of our limited resources was to work collaboratively on specific new projects while continuing to support ongoing projects. The North Coastal Watersheds is blessed with an active citizenry. Each *community* representative comes to the meeting with the understanding that the integrity of their individual missions as proactive stakeholders will be honored thereby fostering an environment of mutual trust between the communities. Each plays a pivotal role in organizing and promoting citizen involvement within their respective spheres of influence. The linkage between the respective *communities* serving in the North Coastal Watersheds has been through the development of annual workplans and the implementation of priority projects. Priority projects represent the team's consensus judgment as to where limited resources should be best directed to

address the MWI program elements. The North Coastal Watersheds team has employed the following selection sequence to identify its priority projects.

- ? Team members are requested to submit draft descriptions of priority needs not being addressed to the team leader, or via the website http://www.northcoastal.net/ncw/forum_main.asp
- ? The team leader compiles and then distributes the draft project descriptions to all team members;
- ? The projects are further refined and crafted into scopes of work;
- ? A finalized list of all the priority projects is presented to the team membership;
- ? The membership ranks all of the projects based on the quality of the content, perceived need, consistency with targeted work plan activities.
- ? Based on the cumulative team votes the selected priority projects are submitted with the annual work plan to the Roundtable. (This will likely not exist while unless the MWI is re-instituted).

The result of this approach has been a successful multi-year collaborative effort based upon the various stakeholders coming together to address issues relevant to the North Coastal Watersheds. The team has a core constituency that includes representatives and/or major stewards from:

- ? Department of Conservation and Recreation (DCR, formerly DEM and MDC)
- ? The Department of Environmental Protection's Northeast Regional Office
- ? Department of Fish and Game (DFG, formerly DFWELE).
- ? Eight Towns and the Bay (8T&B)
- ? Essex County Greenbelt Association
- ? Friends of Lake Quannapowitt (FOLQ)
- ? Friends of Lynn Woods (FOLW)
- ? Lynn Water and Sewer Commission (LWSC)
- ? The Metropolitan Area Planning Council (MAPC)
- ? Mass Audubon Society North Shore (MAS/NS)
- ? Massachusetts Department of Agricultural Resources
- ? Massachusetts Office of Coastal Zone Management North Shore Office (MCZM/NS)
- ? Safer Waters in Massachusetts (SWIM)
- ? Salem Sound Coastwatch
- ? The Saugus River Watershed Council (SRWC)

Membership on the NCW Team continues to broaden with the inclusion of community and business partners, however their participation is generally focused on specific issues. Please consult the team membership page for a current list of team participants including state and federal agency membership. The NCW Team meets on a regular basis (monthly for much of the year).

A5. Seven Years in Review

For the first four years the team had an annual program budget of roughly \$100,000, all of which was used to fund as many as eight projects each year. Projects that crossed watershed boundaries were undertaken in partnership with neighboring watershed teams providing maximum leverage of limited resources. The North Coastal Watersheds began 1997 as Year 2 in the five-year cycle - Information gathering. Much of that first year was focused on the collection of water quality monitoring data. Near the end of 1997 and extending into 1998, the team progressed to the Year 3 focus of Assessment.

Throughout the first years, the team worked to:

- ? **Integrate** activities, responses and assistance to local communities and citizens with team members where ever and as often as possible.
- ? **Work in increments** many of the issues will not be solved by the success of single action but require several actions.

- ? **Project** local successes through collaborative demonstrations to other communities as examples of the Massachusetts Watershed Initiative Approach to address problems.

The first four years of the North Coastal Team provided a solid foundation from which to develop an effective 5-Year Action Plan for the North Coastal Watersheds. The writing of the 5-Year action plan began in 2001. A first draft was completed in 2002. EOEА contracted with Perot Systems Government Services in 2003 to seek public input and finalize the draft – the final version is scheduled for release in mid-2004.

The following sections contain summaries of the issues addressed and strategies employed for each of the seven MWI program elements with highlights of North Coastal Watersheds accomplishments, significant events, and significant partners. **NCW Team members** are highlighted in **bold** as are **priority projects**.

Appendix B: NCW Team Members

Active or historic members of the North Coastal Watersheds Team 2002-2004. Active members are **bolded**.

Last Name	First Name	Organization
Barber	Judy	DEP Municipal Assistance Program
Blair	James	DEP/DWM Monitoring Coordinator
Blanchard	William	EOEA & MDAR (DFA)
Cademortori	Emilie	8 Towns and the Bay
Cassotis	Rebecca	Project Assistant, North Coastal Watersheds Team EOEA
Chase	Bradford	DFWELE (DFG) Division of Marine Fisheries
Cleaves	Sam	Regional Planner, Metropolitan Area Planning Commission
Comeau	James	DCR (MDC) Right of Way Agent
Cooper	Andrea	MA CZM North Shore
Davis	Rebecca	Wakefield Conservation Agent
Dawe	Richard	Lynn Water and Sewer Commission
Della Pena	Craig	Rails to Trails
Delpapa	Cindy	DFG Riverways Program
Dunn	Cynthia	Salem Sound Coastwatch
Ferris	David	MA Division of Water Pollution Control
Fortier	Scott	EOEA Office of Technical Assistance
Galazka	Marzie	Planner, City of Everett
Gil	Lawrence	Former North Coastal Watersheds Team Leader (EOEA)
Glenn	Kathryn	CZM North Shore Regional Office and SRWC
Gough	Rob	Salem Sound Coastwatch
Hall	Andrew	Lynn Water and Sewer Commission
Harris	Annie	Essex County Heritage District
Heath	Doug	Friends of Lake Quannapowitt
Hill	Michael	EPA, Region I NCW liaison
Hopkins Young	Karen	Salem Sound Coastwatch
Hutchins	Eric	National Marine Fisheries Service
Inglefinger	Franz	TTOR regional ecologist

Johnson	David	Chief Environmental Officer, GE Aircraft Engines, Lynn
Johnston	Patrick	Everett Police Marine Unit
LeBlanc	Joan	Program Director, SRWC
Marler	Linda	Geologist, DCR (DEM)
Marx	Lise	MWRA
McQueen	Mark	National Resource Conservation Service, USDA
Mieta	Bob	Lakes and Ponds program
Millhouse	Christine	Environmental Engineer, City of Gloucester
O'Connell	Nathanial	MET
Pahlavan	Dominique	Mass GIS and EOEA
Phippen	Peter	8 Towns and the Bay
Port	Andy	Dept. of Community Dev. and Planning City of Peabody
Purinton	Tim	Massachusetts Audubon Society North Shore Chapter
Rasmussen	Christine	Ward 5 Councilor, City of Gloucester, and Essex County "Buy Local" project manager
Richards	Todd	DFWELE fish counts
Smith	Timothy	Circuit Rider, Wetlands Banking and Restoration Program
Sorenson	Elizabeth	DCR (DEM) ACEC Program Coordinator
Straub	James	DCR (DEM) Lakes and Ponds Program
Stringi	Frank	Planner, City of Revere
Warren	Barbara	Salem Sound Coastwatch
Watson	Gregory	Planner, City of Malden
Wollenhaupt	Rosalia	DEP/NERO, North Shore Grant Coordinator
Wrynn	Kathy	President, Saugus River Watershed Council

Community Groups

The following list of community groups were contacted during the course of writing this Action Plan. Website references are included where available. Groups that are not included on the Watershed Team Member list above should be considered potential Team Members for the future.

Community Group	Web site
Chebacco Lake Association	David Lash, president; David Kerr, former president
Coastal Zone Management – North Shore Regional Office	http://www.state.ma.us/czm/NS.HTM
Eight Towns and the Bay	http://www.8tb.org/
Essex County Buy Local Program	http://www.buyfresh.org
Essex County Greenbelt Association	http://www.ecga.org/
Friends of Lake Quannapowitt	http://www.wakefield.org/folq/folq.htm
Friends of Lynn Woods	http://www.flw.org/
HealthLink – North Shore Citizens Environmental Group	http://www.healthlink.org/
Ipswich River Watershed Association	http://www.ipswichriver.org/
Massachusetts Audubon Society	http://www.massaudubon.org/index.php
Nahant SWIM, Inc.	http://www.nahant.org/community/swim.shtml
National Marine Fisheries Service – Northeast Regional Office	http://www.nero.noaa.gov/ro/doc/nero.htm
Salem Sound Coastwatch	http://www.salemsound.org/
Saugus Iron Works – National Park Service Historic Site	http://www.nps.gov/sair/
Saugus River Watershed Council	http://www.saugusriver.org/
The Trustees of Reservations – Northeast Massachusetts Region	http://www.thetrustees.org
Wenham Lake Watershed Association	http://www.wlwa.org/templates/homepage.cfm

Primary Watershed Team Contact Groups

The Saugus River Watershed Council is a non-profit organization founded in 1991 to protect the natural resources of the watershed. Their priorities include restoring water quality, expanding public access, restoring habitat for anadromous fish and other wildlife, and protecting critical resources such as Rumney Marsh.

The council works with schools in Lynn, Revere, Wakefield and Saugus for watershed field studies. They also organize volunteers for river cleanups, conduct water quality testing programs, organize interpretive walks and educational exhibits, work with other organizations and various other activities to enhance and protect the Saugus River Watershed.

SRWC
PO Box 1092
Saugus, MA 01906

Email: srw@shore.net
Website: www.saugusriver.org
Executive Director: Joan LeBlanc

Salem Sound Coastwatch (formerly Salem Sound 2000) is a 501(c)(3) non-profit coastal watershed association that works in partnership with local governments, businesses and non-profit organizations from the communities of Peabody, Marblehead, Salem, Danvers and Beverly. Established in 1991, Salem Sound Coastwatch is dedicated to taking cooperative action to protect and enhance the environmental quality of Salem Sound. Their top priorities are to protect public health, restore coastal wildlife habitat, and increase recreational and sustainable commercial opportunities. They generate vast amounts of water quality data, work to educate and promote active participation of all stakeholders, and support local governments in a number of ways.

Salem Sound Coastwatch
201 Washington Street
Salem, MA
978-741-7900

info@salemsound.org
www.salemsound.org

Eight Towns and the Bay (8T&B) is a coalition of nine communities located along Ipswich Bay. The coalition includes educators, state and local officials, nonprofit organizations, and interested citizens who are concerned with protecting and restoring the area's coastal environment. 8T&B works with communities and the general public to foster stewardship of coastal resources by heightening public awareness of solutions to pollution problems, providing technical assistance, and supporting local research and education projects. 8T&B is sponsored by the Merrimack Valley Planning Commission and the Massachusetts Bays Program.

Merrimack Valley Planning Commission
160 Main Street
Haverhill, MA 01830

978-374-0519
info@mvp.org
www.thecompass.org/8TB/

The Nahant Bay/Broad Sound Subgroup, part of the Metro Boston Local Governance Committee, covers the communities of Lynn, Nahant, Revere, Saugus and Swampscott. The members of this group work to implement the Comprehensive Conservation and Management Plan - the guidance document of the Massachusetts Bays Program. The Nahant Bay/Broad Sound Subgroup meets bi-monthly, and works closely with local officials, citizens, nonprofit groups and state agencies. Some of the projects they are currently working on are a water quality assessment of Flax Pond in Lynn and a storm drain stenciling project in Lynn as well.

Metropolitan Area Planning Council
60 Temple Place, 6th Floor
Boston, MA 02111
617-451-2770 ext. 2061

Technical Assistant/Environmental Planner: Sam Cleaves
scleaves@mapc.org
www.state.ma.us/massbays/metroboston.html

The Essex County Conservation District sponsors the Essex County Buy Local Program and other farm-related programs.

Essex Conservation District
P.O. Box 346
Hawthorne, MA

Project manager: Christine Rasmussen
christine@ward5.com

Appendix C: Issues Background

This appendix lists the major issues in the North Coastal watersheds, with some breakdown by subwatershed systems. Included is background information on specific issues that arose during the public input phase of this project. Additional reference material and input from community members is available on the “Comments” section of the website, http://www.northcoastal.net/ncw/forum_main.asp. The website documents the source of the comments in most cases – readers should interpret any data which is undocumented in this report as from the website comments section, where source citations can be found.

NCW subwatershed list

SAUGUS	NAHANT BAY	SALEM SOUND	CAPE ANN	SALISBURY/ AMESBURY
Bennett’s Pond Brook	Lynn Harbor	Bass River	Alewife Brook	Blackwater River
Broad Sound	Nahant Bay	Beverly Harbor	Annisquam River	Smallpox Brook
Hawkes Brook	Phillips Beach	Beverly Rocks	Beaches	
Lower Saugus	Stony Brook	Chubb Creek	Cat Brook	
Pines River		Crane River	Chebacco Lake	
Revere Brook		Danvers River	Essex River	
Shute Brook		Forest River	Gloucester Harbor	
Town Line Brook		Frost Fish Brook	Good Harbor Beach	
Upper Saugus		Goldthwaite Brook	Halibut Point	
Lake Quannapowitt		Marblehead Harbor	Lanesville	
Flax Pond		North River	Rockport Harbor	
Strawberry Brook		Porter River	Sawmill Brook	
		Proctor Brook	Walker Creek	
		Salem Harbor	Wolf Trap	
		Sawmill Brook		
		Waters River		

C1. Saugus River subwatershed

The Saugus River subwatershed occupies 47 square miles (122 km²), originating at the outlet of Lake Quannapowitt in Wakefield. This Class B Treated Water Supply flows from the outlet at the lake in an easterly direction and forms the border between Wakefield, Lynnfield just west of Rt95/128. The river flows through the 540 acre Reedy Meadow where it is joined by Beaverdam Brook, which drains the central area of the town of Lynnfield. The river turns south, flows past the Colonial Golf and Country Club into an impoundment where the Lynn Water and Sewer Commission can divert the river as a water supply. The river receives flow from four tributaries in its freshwater reach including Beaverdam Brook, Mill River, Hawkes Brook, and Bennets Pond Brook. Below the Saugus Iron Works the river becomes a tidal estuary. Shute Brook discharges into the tidal Saugus River and is later joined by the Pines River. The tidal currents carry the river flow into Lynn Harbor, Broad Sound and Massachusetts Bay. The length of the river is 13 miles.

The 2003 Water Quality Report for the Saugus River Watershed found that 32% of the samples collected in failed to meet the federal water quality criteria for swimming, and 19% failed to meet the federal water quality criteria for boating. Approximately 10% of the samples collected were below the state recommended minimum of 5 mg/l of dissolved oxygen for a fresh water fishery. The watershed showed no significant problems associated with pH or conductance during 2003. The full document is available on www.NorthCoastal.net/ncw/Docs/

The Town Line Brook and its tributaries (Linden and Trifone Brook) drain into the Pines River before it meets up with the Saugus River. The Saugus River subwatershed includes Lake Quannapowitt and Town Line Brook which are detailed separately in sections C6 and C8 below. An NPS construction project is detailed in C10.

C2. Nahant Bay subwatershed

The Nahant Bay subwatershed is highly developed as urban and suburban land. Out of its total of 7,595 acres, 2,787 acres (or 36.7%) of the land is impervious surface and 62.2% of the land use is residential. Because of these and other factors, storm water runoff is a major issue here.

The Nahant Bay subwatershed includes seven communities, comprising major portions of Marblehead, Swampscott, Lynn and Nahant. It is divided up into four subwatersheds – Lynn Harbor, Nahant Bay, Phillips Beach, and Stony Brook. Although it is a highly developed area, the subwatershed contains about 1,010 acres of open space.

The subwatershed has three bodies of water on the Massachusetts section 303d list of impaired water bodies. Nahant Bay itself is on the list as well as Floating Bridge. (See Appendix F, category 5 waters).

C3. Salem Sound subwatershed

The Salem Sound subwatershed is a predominately urban area made up of six communities. The communities consist of Beverly, Danvers, Manchester, Marblehead, Peabody and Salem. The portion of Manchester that drains to Salem Sound is a mixed rocky and sandy beach coastline. The eastern portion of Beverly has large sections of sandy beach that are erosional zones, with few marshes.

With ten bodies of water on the Massachusetts section 303d list of impaired water bodies, water quality continues to be a main priority in this system. The major tributary to Salem Sound, the Danvers River, and two of its tributaries, Crane River and Waters River are on the list as well as two other tributaries to the Sound, North River and Forest River. It has 7,668 acres of impervious surface, or 27% of the entire system (total acreage 28,899 acres).

Salem Sound is divided up into thirteen sub-basins, several of which are small rivers that flow directly into the sea. They are as follows: Chubb Creek, Beverly Rocks, Beverly Harbor, Bass River, Frost Fish Brook, Crane River, Danvers River, Proctor Brook, Goldthwaite Brook, North River, Salem Harbor, Forest River and Marblehead Harbor. A large portion of Salem Sound is residential (42%) with 22% forest and 14% open land. It also has a significant amount of land dedicated to commercial, industrial, and transportation uses.

C4. Cape Ann subwatershed

The Cape Ann subwatershed is the largest system in the North Coastal Watershed at 38,558 acres. Gloucester, Rockport and communities southeast attract thousands of tourists each year. The coastline here is most noted for its rocky headlands and shallow soils covering ledge. Many people in this region depend on fishing (lobstering, finfishing, and shellfishing) and tourism. The upper North Shore, Ipswich and Essex, are most noted for their long barrier beaches, estuaries, salt and fresh water systems and poorly drained soils. Portions of Cape Ann include the Great Marsh Area of Critical Environmental Concern (ACEC). A total of eight communities make up the Cape Ann System. They include the above mentioned along with Manchester, Wenham, Hamilton and Beverly.

The land use is predominately forest at 51.9% with residential and wetlands at 22.1% and 10.5% respectively. While the total system has 2,634 acres (6.8%) of impervious surface, it is mostly concentrated in the coastal areas. The major routes include Route 128, 133, 127 and the commuter rail.

The Cape Ann System is divided in fourteen sub-basins. They are: Alewife Brook, Annisquam River, Beaches, Cat Brook, Chebacco Lake, Essex River, Gloucester Harbor, Good Harbor Beach, Halibut Point, Lanesville, Rockport Harbor, Sawmill Brook, Walker Creek and Wolf Trap. It has nine bodies of water on the Massachusetts section 303d list of impaired water bodies. These include Gloucester, Rockport and Manchester Harbors as well as Essex and Annisquam River. Some of the main issues in this area include development and growth rates along the coast as well as potential for growth inland. Major issues:

- ? Growth management
- ? Adequate Water Supply
- ? Shellfish Resources
- ? Harbor Redevelopment
- ? Combined Sewer Overflows

C5. Salisbury/Amesbury subwatershed

The Salisbury/Amesbury subwatershed is located in the northeastern corner of Massachusetts. Salisbury Beach, a popular and heavily visited recreation area, is a coarse sand barrier beach stretching from the Massachusetts/New Hampshire border to the mouth of the Merrimac River. Behind the beach is a salt marsh system that is part of the Great Marsh ecosystem.

The Salisbury/Amesbury subwatershed is the smallest in the North Coastal Watershed at 5,337 acres and is made up of largely forest and wetlands. Most of its residential areas are low to medium density with a higher density near the coastline. It has 468 acres (or 8.8%) of impervious surface and no bodies of water on the Massachusetts section 303d list of impaired water bodies. It is mostly located in Salisbury with a very small portion in Amesbury. It is divided into two sub-basins, Blackwater River and Smallpox Brook. A large industrial park is located adjacent to Smallpox Brook between I-95 and US 1. Constructed in 1973, wetlands were filled resulting in problems with drainage and sewage treatment. Another issue in this subwatershed is runoff from I-95 and US 1. Due to gaps in sufficient water quality data, this subwatershed could benefit from more studies in the future.

C6. Lake Quannapowitt (Saugus River subwatershed)

Background:

Reedy Meadow, a distinctive 540-acre freshwater marshland, along with Lake Quannapowitt form the headwaters of the Saugus River. Lake Quannapowitt in Wakefield is the largest lake (at 254 acres) of the 85 lakes and ponds in the watershed. Lake Quannapowitt was a water supply briefly in 1957 during a drought. Arsenic was introduced into the lake in the early 1960s to deal with aquatic weeds.

Water quality testing indicates that 65% of the phosphorous comes from storm drains, 22% from lake sediments, and the rest from direct runoff. Fertilizer and goose droppings are major sources of nutrients in direct runoff.

Beginning in 1999, the **Friends of Lake Quannapowitt** holds a watershed awareness program with an outdoor classroom for all children that graduate the public school system. The Friends of Lake Quannapowitt (FOLQ) website is at <http://www.wakefield.org/folq/folq.htm>

Action Items:

- ? The lake is overpopulated with Canada Geese. A program needs to be developed and implemented to reduce the geese population to a sustainable level.
- ? There is a problem with excessive weed and algae growth. The problem has been linked to excessive nutrient levels in the lake.
- ? Establishing a buffer zone along abutting streets (which currently offer no impediment to lawn fertilizer running directly into the lake during rain events).
- ? To improve the lake's quality to acceptable levels, the Town must address the stormwater problem. Treatment systems need to be developed and put in place.
- ? In the long term, arsenic contamination (from the 1960s weeding program) can only be removed by dredging. The flow rates in the lake are insufficient to remove heavy metals from the lake sediment, but sufficient so that leaching keeps measurable arsenic levels in some lake sections.

C7. Chebacco Lake (Cape Ann subwatershed)

Background:

Chebacco Lake is on DEP's integrated list of impaired waters under Category 4 ("Impaired by non-pollutants") and was formerly 303(d) listed (impaired). In 1999, DEM and Salem State College participated in a series of workshops and presentations on a study of Chebacco Lake. In 2003, the Chebacco Lake Association wrote a series of articles in the Hamilton-Wenham Chronicle to publicize the issues about the lake. Nearby residents claim that Chebacco Lake is contaminated. DEP has issued a fish contamination advisory. The lake has high mercury levels and problems with noxious plants including nonnative plants (fanwort). Residential development is claimed to be the main threat. The 303d listing indicates the lake is eutrophic and rated as:

- ? Fish consumption-non supportive
- ? Primary contact recreation 1/2 supportive, 1/2 unevaluated
- ? Secondary contact recreation- 1/2 supportive, 1/2 non-supportive
- ? Aesthetics- 1/2 supportive, 1/2 non-supportive

Action Items:

- ? Need to develop and implement a plan to control noxious plants and eliminate nonnative species.
- ? Need to develop and implement a plan to determine if excessive nutrients contribute to the plant problem. If excessive nutrients are present, develop a plan to identify the sources and control the nutrients.
- ? Develop a plan to identify and eliminate the sources of mercury.
- ? Locate sources of mercury within the lake and determine if they can be removed without increasing the environmental impact.

C8. Town Line Brook (Saugus River subwatershed)

Develop a plan to fund and implement the recommendations of the *Final Report: Town Line Brook Hydraulics And Hydrology Study*

The authors found through modeling and qualitative analysis that several solutions could be implemented singly or in combination to provide a noticeable improvement in not only flooding, but also water quality, and habitat. These alternatives were compiled into a preferred approach. The alternatives consists of the following:

- ? Install tide gates at the Linden Brook culvert to make available additional storage (as much as 10 to 13 ac-ft) at high tide when the SRTs are not set closed.
- ? Install tide gates on Trifone Brook culvert to protect upstream areas from excessive downstream water surface elevations.
- ? Set SRTs to close at elevation 2' NGVD (they are currently permitted to close at 4' during the winter months and 5' during the summer).
- ? Create approximately 76.8 ac-ft of offline storage on the main channel in combination with wetland restoration consistent with adjusted SRT closing elevation.
- ? Dredge the channel of approximately 4000 cubic yards of sediment that have accumulated in lined reaches.
- ? Increase flood dike height to 9' NGVD at all locations.

Implement the report's recommendations for improving water quality including:

- ? Training sessions for state and local public officials.
- ? Community Meetings.
- ? Storm Drain Stenciling.
- ? On-Site Cleanup Projects.
- ? Natural History Events / Youth education programs.
- ? Pet Waste Initiative.
- ? Stormwater Best Management Practices.

C9. Lynn Woods (Saugus River and Salem Sound subwatersheds)

Lynn Woods consists of 2,200 acres of city-owned property plus 400 acres of surrounding woods. There are 40 miles of legal trails (although bicyclists often go off-trail, which is a problem). Lynn Woods contains four reservoirs, which is Lynn's water supply. The City of Lynn now employs a park ranger (Dan Small) so that many schools send field trips to Lynn Woods and the previous litter problem is diminished, so the woods are now in pretty good shape. Lynn Woods has a small invasive weed problem – knotweed, some Norwegian Maple, and loosestrife. Arsenic, which was introduced in the Lynn Woods, had no clear means of having been dispersed or removed, so a study might locate arsenic contamination.

C10. Saugus Iron Works (Saugus River subwatershed)

The National Park Service runs the Saugus Iron Works National Historic Site. The site covers 9 acres along both banks of the Saugus River. A large-scale restoration project is proposed, which would restore the half of the park alongside and in the Saugus River. The goal would be to restore the marsh and restore flow, but not in the main

channel (which requires a different permit). The actions would remove 18 inches of peat layer from phragmites, which clogs the flow and causes sedimentation. The intended result is that visitors would see open water flowing into the river rather than fields of phragmites. The area is the head of a tidal estuary, but is fresh, not saltwater.

The proposal is a Line Item Construction project in the federal budget (direct funding to the National Park Service), which requires NPS and presidential signatures. NPS will restore only the part of the river within its boundaries, but the project could serve as a model for downriver, if successful. Anticipated schedule is to begin in September 2005 and complete by summer 2007. Funding level is approximately \$2.6 million. The project is referred to as the "Turning Basin" restoration because the site is where the boats historically turned around. Three possible levels of restoration are proposed:

- ? A: Restore pier and bulkhead with no sediment removal
- ? B: Remove sediment from north only.
- ? C: Remove all sediment and eradicate phragmites
- ? D: Remove sediment based on elevation from tidal surveys

C11. Water Supply Boards (Salem Sound and Cape Ann subwatersheds)

The Salem-Beverly Water Supply Board has conserved water by the effective use of reservoirs for storage, supplied by the withdrawal of water from the Ipswich River during the winter when water levels are high, and stored for the summer month's use. Currently that same supply of water is greatly threatened by increasing usage. Much of the increased usage is from the development in areas north of Salem-Beverly. For example, Salem-Beverly sometimes sells water to Danvers in times of shortage. Towns farther north grow and increase their well water use, decreasing the groundwater levels and the flow of the Ipswich River. Beverly and Salem are the largest users, yet because most of the land in the two cities is outside of the Ipswich River Watershed, the Salem-Beverly water supply after usage is returned to the sea depriving groundwater supply replenishment. The Ipswich River is one of the most endangered rivers in the US. The health of this river affects our entire region.

The same applies to Gloucester, Manchester, and Rockport. Most communities in the NCW have some local wells – often secondary wells. Surface water protection and watershed aquifer protection are the issues for drinking water protection, management, and planning.

C12. Contaminated stormwater issues (all subwatersheds)

Background:

Contaminated stormwater emanating from street drainage systems along highways and local roads. Contaminated stormwater is estimated to account for over 50% of the water quality problems in Massachusetts.

EPA has begun the process of addressing the problem of stormwater contamination. Under the authority of Section 402(p) of the Clean Water Act, small cities and towns located in urbanized areas will be required receive a permit to discharge stormwater and to develop and implement a stormwater management program. The permits will be administered as Phase II Stormwater Compliance of the NPDES program. These drainage systems are referenced as "municipal separate storm sewer systems" or MS4's. Communities were slated to submit their respective plans in March of 2003.

The problem of contaminated stormwater emanating from street drainage systems along highways and local roads requires the coordinated involvement of municipal, state and federal authorities to achieve meaningful reductions in pollution loading. A related issue is contaminated urban sediments, particularly in the Salem Sound and Saugus River subwatersheds.

Lynn is under Joint Federal/State Consent Judgment Consent Judgment #76-2184-G to eliminate all CSOs and to address contaminated stormwater (in conjunction with the wastewater issue, below).

Essex has entered into Consent Judgment #96-2209B with the Commonwealth to address the discharge of pollutants from the town's storm drainage facilities into Essex Coastal Waters. A source of the pollutants has been identified as failing septic systems that are directly or indirectly tied into the storm drainage system. The town has agreed to implement a Core Area Water Pollution Abatement Program and submit a Wastewater Management Plan in accordance with the terms of the Final Judgment.

Action Items:

- ? A plan need to be developed and implemented to provide technical assistance and funding assistance for the implementation of municipal stormwater plans and to insure the consent judgments are completed in a timely manner. Efforts should be prioritized within the four targeted subwatersheds of the Saugus River, Salem Sound, Gloucester Harbor, and Smallpox Brook.
- ? Develop and implement a plan to install containment structures on all river crossings on state highways. The need was demonstrated when there was a rollover of a gasoline truck in 1992 on 93N right at the Ipswich River within yards of Reading's wells. It was a high-cost cleanup by Cumberland Farms and jeopardized Reading's entire water supply as well as the Ipswich River communities down stream.
- ? Encourage communities and watershed groups to take advantage of the U.S. Department of Agriculture's Natural Resources Conservation Service interest in working with communities to identify sources of stormwater contamination, and evaluate remedial options. They can meet with communities to determine goals and problems, conduct watershed site visits, help them set priorities,¹⁰ carry out demonstration projects, and help prepare applications for funding through various grant programs.

C13. Impervious Surface runoff (all subwatersheds)

The major sources of runoff are individual actions with fertilizers and herbicides from lawns; and runoff of road salt, petroleum products, and heavy metals from impervious surfaces. Sediment runoff during rainstorm events affects fisheries heavily by filling in streambed interstices. It is estimated that each acre of impervious surface results in 20,000 gallons pf contaminated water.¹¹

Citizens are generally unaware of the connection of their lawn maintenance on water quality in nearby lakes. A prime example is Lake Quannapowitt, where the NCW video documents that well-fertilized lawns lay 10 feet from the lakeshore. There are easy-to-use solutions for fertilizers and herbicides, so the primary issue is publicity about them. Establishing buffer zones along lakes in that situation would also be effective.

Road salting is a major issue. It impacts both surface and groundwater and alters habitat by changing chlorides and TSS. Lessons can be learned from Canadian BMP for road salt use. The future of the watersheds and habitats are linked to water quality. Road salt and impervious surface runoff is generally a more expensive issue because it involves town road maintenance rather than individual action.

One drinking water related example is the Lincoln Street Well in Manchester. It is a public water source and is a concern regarding road salt and runoff contamination. Its headwaters are along Rt. 128, and the well itself is next to a school parking lot and a golf course – many possible runoff sources!

C14. Wastewater issues (all subwatersheds)

Wastewater issues are specific to each community's wastewater system. Hence in this section we describe each system separately, and then describe action items to address them collectively.

- ? Salisbury completed an extension of its sewer main up Rt. 1A to the New Hampshire State Line. Property owners are in the process of completing ties into the system at this time. Town has applied for permits to extend sewer line up to the Salisbury Industrial Park.
- ? Lynn is under Joint Federal/State Consent Judgment, #76-2184-G, to eliminate all CSOs and to address contaminated stormwater.
- ? Rockport is currently under an Administrative Order # 835, which restricts the number of new connections to the system except in the case of written authorization by the Board of Health due to ground water compliance problem with outfall at Long Beach.

¹⁰ Contacts include Marc MacQueen, Soil Conservationist, USDA NRCS, 15 Cranberry Highway, West Wareham, MA 02576. Tel: (508) 295-1481 x 113 and Laurence N. Boutiette, Jr., P.E., USDA NRCS, 52 Medical Arts Building, Suite 100, 52 Boyden Rd., Holden, MA 01520-2587. Tel: (508) 829-4477 x 116.

¹¹ NRDC Kings County study

- ? Gloucester is under a Joint Federal/State Consent Decree to manage all of its on-site systems. This resulted in the city installing sewers in West Gloucester and the development and adoption of the Daylor Plan to identify areas for further sewerage. The city is also focusing on eliminating CSOs in the Gloucester Harbor. The city has aggressively tackled the on-site problems, implemented a Wastewater Management Plan, and received funding through the Commonwealth's State Revolving Fund (SRF). The Gloucester Master Plan includes pricing of water so that business use is appropriate, and impact fees for new development.
- ? Essex has entered into a Consent Judgment, #96-2209B, with the Commonwealth to address the discharge of pollutants from the town's storm drainage facilities into Essex Coastal Waters. A source of the pollutants has been identified as failing septic systems that are directly or indirectly tied into the storm drainage system. The town has agreed to implement a Core Area Water Pollution Abatement Program and submit a Wastewater Management Plan in accordance with the terms of the Final Judgment.
- ? Manchester is under an Administrative Consent Order #844, which restricts the number of new connections into the system except by written authorization by the Board of Health and requires the town to conduct I&I removal operations and update the existing POTW. The Manchester POTW was upgraded from primary to a full secondary facility as of August 1998 per the requirements of the Administrative Consent Order AP-BO-92-101.
- ? South Essex Sewage District: the Beverly-Salem water treatment plant as of June 2004 removes its sedimentation filtration stream to SESD and maintains a lagoon for filter backwash, from which the solids are freeze dried and removed to landfill.

Action Items:

- ? Develop and implement a plan to provide technical and financial support to municipalities to improve compliance with all wastewater regulations, permits, consent orders, etc.
- ? Develop and implement a plan to provide technical support to help insure that all POTWs required to have a Local Limits program have one with a robust set of limits that address all water quality issues in their receiving waters and an enforcement program that insures compliance with all applicable limits.

C15. Blue Line Extension (Saugus River subwatershed)

The MBTA has proposed extending the Blue Line through Rumney Marsh to Lynn. No destruction is allowed of the ACEC. The entire marsh is a flood-prone area. Extending the Blue Line, say critics, has minimal transportation benefit because Lynn is already served by rail (commuter train to North Station – both the Rockport Line and the Newburyport Line). While recognizing the need for mass transit in general, critics also note that the MBTA parking garage in Lynn's Central Square is usually empty despite being free of charge.

C16. Agricultural Impacts (Cape Ann subwatershed)

Essex County farmland represents 8% of the landmass in the County (other counties in the watershed have lesser amounts of farmland, but the concepts are still applicable). There are 25,500 acres of land involved in agricultural production of which 12,500 acres are classified as prime land. Unfortunately farmland is under stress because average sales were \$23,055 a year and 51% report a loss. The average age of farmers is now over 55 and only 3% are less than 35. Without support, farms will disappear and with them, access to fresh food, wildlife habitats, and open space.

Action Items:

- ? Agricultural Preservation Restriction (APR) program (see www.mass.gov/agr/landuse/APR/)
- ? Fund educational program / study of how farms benefit land use
- ? Find new opportunities for sustainable farm products
- ? Educate public on CSAs (Community Supported Agriculture) and location of farm markets
- ? Encourage "Buy Local" programs (see www.BuyFresh.org)
- ? Dialogue with businesses and environmental groups
- ? Visioning conference for protection of agricultural land
- ? Support website for local food / Buy Local
- ? Education and booths at festivals and fairs

Appendix D: Previous Goals

The Watershed Team defined the following list of goals and priorities in 2002, prior to the initiation of this Action Plan's process. It represents a snapshot of the priorities at the time, as well as a major source of input for the list of issues in the Action Plan.

Goal 1: Restore and Protect Water Quality

Restore and Protect the Water Quality of the North Coastal Watersheds' Rivers, Streams, Lakes, Ponds and Coastal Marine Waters.

Objective 1.1 Minimize point sources of pollution throughout the watershed

Proposed actions for the next five years:

- ? Eliminate CSOs in Gloucester complete separation of sanitary sewers from storm drainage systems
- ? Eliminate CSOs in LWSC complete sewer complete separation of sanitary sewers from storm drainage systems
- ? Implement recommendations of DEP's 1997/1998 Water Quality Assessment of the North Coastal Watersheds
- ? Reissue major NPDES permits recommend inclusion of receiving monitoring requirements into permits.
- ? Update minor NPDES permits.
- ? Implement Phase II MS4 compliance in all municipalities in the watershed.

Objective 1.2 Identify and minimize nonpoint sources of pollution throughout the watershed.

Proposed actions for the next five years

- ? Implement best management practices within Town Line Brook subbasins to address nonpoint pollution sources.
- ? Implement Beaches Bill to provide timely monitoring and protect the public health.
- ? Monitor water quality from stormwater drainage from Stacy Creek stormwater drainage system as it discharges onto the DCR (MDC) Kings Beach.
- ? Continue and expand stormwater monitoring through regular bacterial sampling of streams and outfalls in the Salem Sound watershed.
- ? Work with Salem Sound municipal and community partners to uncover the sources of this nonpoint pollution and remediate the problems.
- ? Assist MDMF to conduct sanitary surveys of the Rumney Marsh shellfish growing areas.
- ? Ground truth "Sites of Concern" data base **Priority Project**
- ? Incorporate Sites of Concern database into 2002 North Coastal Watersheds Assessment Report.
- ? Incorporate EPA bacterial survey of Smallpox Brook into 2002 North Coastal Watersheds Assessment Report.
- ? Develop TMDLs for NCW targeted subwatersheds.
- ? Conduct assessment study on thermal discharge impacts in Saugus River estuary.