KINGSTON CONSERVATION COMMISSION

26 Evergreen Street, Kingston, MA 02364

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April 27, 2006

U.S. Environmental Protection Agency
Water Technical Unit
P.O. Box 8127
Boston, MA 02114

MAY - 1

RE: NPDES Phase II Small MS4 General Permit
Town of Kingston, Massachusetts Annual Report
EPA NPDES Permit Number: MAR041041
MADEP Transmittal Number : W-036193

To Whom It May Concern:

The Town of Kingston, Massachusetts is pleased to provide you with the National Pollutant Discharge Elimination System (NPDES) Phase II Small MS4 General Permit Annual Report for the period from March 2005 to March 2006. The town has developed a Stormwater Management Plan and is working to implement the plan in accordance with regulatory requirements and as available funding allows.

Please feel free to contact me with any questions at 781-585-0537.

Sincerely,

Maureen D. Thomas

Maureen Thomas
Conservation Agent

TELEPHONE: 781-585-0537 FAX: 781-585-0543

Municipality/Organization: Town of Kingston, MA

EPA NPDES Permit Number: MAR041041

MaDEP Transmittal Number: W-036193

Annual Report Number & Reporting Period: No. 3: March 05-March 06

NPDES PII Small MS4 General Permit Annual Report

MAY - 1

Part I. General Information

Contact Person: Maureen Thomas Title: Conservation Agent

Telephone #: 781-585-0537 Email: mthomas@kingstonmass.org

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Maureen A. Thomas

Printed Name: Maureen Thomas

Title: Conservation Agent

Date: April 27, 2006

Part II. Self-Assessment

During the March 2005 to March 2006 permit year, the Town of Kingston has steadily worked toward achieving the target activities for the third year of Phase II. We have successfully partnered with the Jones River Watershed Association (JRWA), the Mass Bays Program (MBP) and the North and South Rivers Watershed Association (NSRWA), the Silver Lake Regional School District/Kingston Intermediate School, as well as local citizens to incorporate the public education, outreach and participation aspects of the NPDES Phase II permit. We have completed detection and manual mapping of our illicit discharges in sensitive areas in order to assess, treat and eventually eliminate their influence on the water quality of streams, lakes, ponds and the bay. In addition, the Town and its collaborators have been fortunate to receive and participate in grant programs related to the goals of our NPDES Phase II permit during the 2005 – 2006 permit year. Plans are currently being drafted to expand the program even further in the fourth permit year.

Permit Term 2005-2006

The MBP/NSRWA coordinated with the Town of Kingston and JRWA in applying for and receiving a 319 Low Impact Development (LID) grant through DEP to encourage the use of LID techniques through review of local regulations, implementation of a local LID projects, education on LID techniques through workshops held at the Kingston Town Hall as well as continued education for students and the general public at the Kingston Intermediate School implementation site. The techniques on display at the Kingston Intermediate School will be a great educational tool for teaching young and old alike about the proper handling of stormwater so as not to affect adjacent resource areas. The Town of Kingston will be donating in-kind services for the filing of a Notice of Intent with the Conservation Commission to conduct the work and the Department of Streets, Trees and Parks has committed to not only implementing the project, but maintaining the LID structures once they are built. The JRWA, with cooperation from the school and the town, will be leading the effort to create signage, brochures, etc. to educate the general public about stormwater and LID at the site. We are hopeful that the LID demonstration site will be incorporated into the school curriculum and look forward to capitalizing on the fact that Annual/Fall Town Meetings are held at the school to educate the general public. The LID grant has helped the Town of Kingston in meeting some of the public education/outreach and public involvement/participation goals for the 2005-2006 permit year and will continue to be a mechanism for the goals in the 2006-2007 permit term.

The JRWA, through a grant from the Southeastern Massachusetts Environmental Education Alliance, also sponsored another educational campaign last year called "Our Waterhed Learning Project" to teach Kingston school children about vernal pools, wetlands, pollution, etc. The Parent -Teachers Organization (PTO) participated by funding a bus trip ride to a local conservation land property for the children to see real world examples of the classroom topics. Certificates of Completion for the program were given to 500 school children in June 2005 – a great educational achievement that involved impressing upon the younger generations the importance of the natural environment and the reasons it needs protection.

Of even greater importance from an educational perspective was the recent creation of the Jones River Marine Ecology Center (JRMEC) by the JRWA with support from the Town of Kingston. The JRMEC is a community institution whose mission is to cultivate the long-term stewardship of the Jones River and Cape Cod Bay through educational and recreational opportunities at its location along the banks of the Jones River. The future programs sponsored by JRMEC will provide the community at large with a sense of appreciation and ownership of the river and the bay to the point where more individuals will get involved in the quality of our waterways.

The JRWA, with support from various parties including the Kingston Conservation Commission, was successful in obtaining a water quality monitoring grant from CZM to purchase a water quality monitoring instrument for the establishment of a long-term, continuous monitoring site on the Jones River. Continuous sampling with the newly acquired instrument began in late winter and monthly transect sampling at 19 different locations along the Jones River began in mid-March. So far the sampling team has included the JRWA and Battelle, but the JRWA is planning on getting more community members involved in the sampling efforts. The JRWA is also seeking funding for an additional water quality monitoring instrument to expand the continuous monitoring effort and allow more flexibility with transect sampling. The sampling and analysis of the collected data will assist the JRWA and the Town of Kingston in assessing overall water quality of the Jones River and will help to pinpoint hotspots that may be related to illicit discharges that adversely affect the river and Kingston Bay.

At the Annual Town Meeting (ATM) in 2005, a presentation was given by the Kingston Conservation Commission on the NPDES Phase II program in order to explain the request for funding of a stormdrain stenciling program and associated educational effort. ATM approved the appropriation of $ 2, 500 for the purpose of beginning the stormdrain stenciling project and printing stormdrain stenciling doorhangers to be distributed in neighborhoods where stormdrain stenciling is conducted. Stormdrain stencils were created and printed and the Town of Kingston is currently in discussions with local Boy Scout troops to coordinate and conduct

stormdrain stenciling throughout the town.

The JRWA has also worked with the local cable access television company, PAC-TV, to create educational snapshots of the Jones River and the river herring whose populations have declined steeply in the last 25 years. The Division of Marine Fisheries also continues to sample the Jones as a permanent sampling site for the purpose of collection information on the rainbow smelt populations whose populations have also declined dramatically in the Jones River and the entire coast of Massachusetts. The sampling of the rainbow smelt will eventually be conducted by the JRWA and the community. Though the causes of the decline in migratory fisheries is unknown, one possible cause is the increase in development and sedimentation of waterbodies. An ongoing herring count on the Jones River in the spring of 2006 has sensitized participating individuals to the species and the plight of migratory fish in general. The JRWA organized the fish count effort and the Kingston Conservation Commission is assisting with the count. This is a program the JRWA hopes to continue in the coming years to involve and educate more of the general public.

In early 2006 the Towns of Kingston, Duxbury and Plymouth submitted an application to the Commonwealth of Massachusetts seeking to designate the Kingston-Duxbury-Plymouth Bays system as a No Discharge Area (NDA). Though the designation of a NDA would deal strictly with the release of sewage to the embayment system, it will compliment the land-based stormwater improvements being made and result in an overall enhancement of water quality. We look forward to hearing from the State to find out if we will be fortunate enough to receive the designation as a NDA.

Permit Term 2006-2007

The Town of Kingston, the JRWA and other members of the community have also been working with the Watershed Action Alliance (WAA) who received a grant through EOEA to write the South Coastal 5-Year Action Plan. Two forums were held at the Jones River Marine Ecology Center (JRMEC) to get input from the community on local/regional watershed priorities and solutions to improve the overall water quality of south coastal rivers and bays as well as to promote stewardship of those water resources. The Town of Kingston looks forward to working with other local and regional groups to improve our waterways by reducing impairments in the 5-Year Plan including adverse impacts from stormwater.

The Department of Streets, Trees and Parks (DSTP) will be allocating funds in 2006 for dry weather sampling of known illicit discharges of stormwater. The sampling will be conducted with the assistance of a consultant. Once baseline data is established, the Town of Kingston will start wet weather sampling of the same discharges to determine which are the most problematic and which need to be cleaned up or eliminated. The Kingston DSTP in partnership with the Town of Duxbury will also continue to hold its annual Household Hazardous Waste Day collection. The DSTP is also currently working on the acquisition of a machine for high pressure drain line cleaning that includes a color television for inspection purposes along with a vactor trailer for improved stormdrain cleaning throughout the Town of Kingston.

The Town of Kingston is currently consulting with Environmental Partners Group, Inc. to assist us with applying for funding through the Massachusetts State Revolving Fund (SRF) Loan Program to establish digitized data and color orthophotos of the stormdrain system to better manage and tackle the illicit discharge detection and elimination portion of our NPDES program. The SRF would also provide a web based GIS to the Town of Kingston, will include local bylaw review as well as a comprehensive public education and involvement plan. These plans, however, are contingent upon the approval of the SRF application by the 2006 Fall Town Meeting. Environmental Partners Group, Inc. will be assisting the Town of Kingston with seeking an approval from the taxpayers and we are hopeful that our combined efforts will result in an application to the SRF.

The JRMEC, with support from the Town of Kingston and others, submitted a grant proposal to the Massachusetts Environmental Trust (MET) to launch a Conservation and Stewardship Program for the Jones River. If the funds are granted, the JRMEC will purchase instruments that will enable the organization to establish additional long term monitoring stations in the Jones River estuary next to the Ecology Center and, along with the help of volunteers, collect data that will document water quality trends which will be used to develop strategies to target and remediate water quality impairments of the Jones River. The Town of Kingston is hopeful that the JRMEC will receive the grant to supplement ongoing and joint monitoring efforts to address water quality issues.

Though the Town of Kingston has yet to formalize our informal stormwater working group of various department heads, we are hopeful that Environmental Partners Group, Inc. and the SRF loan will help to coordinate efforts into a formal committee with a public participation element. The Town of Kingston has worked hard in the third permit year to comply with the goals of the NPDES Phase II Stormwater Permit and anticipate much greater strides in our fourth permit year with continued funding through various grant programs and additional funding through the SRF Loan Program.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 1.1	Partnership with local watershed association	Conservation, Department of Streets, Trees & Parks (DSTP) Planning, Board of Selectmen/Town Administrator	Meetings regarding storm water management, grant proposals, SRF loan, 5-Year South Coastal Action Plan and getting info. out to general public through newspaper articles, etc.	Continued (without funding) water quality sampling beyond two-year 604B grant estuary monitoring program to add to existing data (JRWA & public) Coordinating more water quality sampling efforts, exchange of ideas on educational programs, funding sources, etc., with Jones River Watershed Association (JRWA & public)	Continued cooperative efforts on future sampling with new JRWA water quality instrument, developing educational materials/programs & obtaining further funds for sampling through coordinated grant & loan applications. Herring count on Jones River in spring 2006 organized by JRWA with cooperation from Water Dept., Conservation and community at large.
Revised					
# 1.2	Storm drain stenciling Televised ATM presentation on NPDES Program and permit to receive funding	DSTP, Conservation, Boy Scouts, JRWA	Start and finish town-wide stenciling with educational campaign	Stormdrain doorhangers created by Conservation and funded through appropriations at ATM 2005. Additional materials for conducting the stenciling supplied by the DSTP and volunteers provided by Boy Scouts	Conduct stenciling and stormwater education (at same time) in cooperative effort among Conservation, DSTP, Boy Scouts and neighborhoods (including businesses, schools, etc.)
Revised					
# 1.3	Distribution of educational materials and offer of free workshops for residents through Greenscapes Program	Kingston Water Department, MassBays Program/NSRWA, JRWA and other federal, state, regional, private sponsors	Display and use these materials at Kingston Town Hall to encourage greenscapes in Kingston	Greenscapes brochures distributed in water/tax bills in 2006 and Greenscapes Reference Guide sent to all residents in Kingston (MassBays/NSRWA, JRWA and other regional agencies)	Implement a Greenscapes demonstration landscape on a visible town-owned property for educational purposes. Consider using the Town Hall property to demonstrate greenscapes principals
Revised					
# 1.4	Pet waste station installation at local conservation lands	Conservation, DSTP, ATM 2006		New BMP	Received funding through a town trust at ATM 2006 to install pet waste stations at conservation land to reduce adverse effects to water quality. Purchase and install pet waste stations with educational messages regarding clean water on rubbish barrels possibly with help of Boy/Girl Scouts

Revised					
# 1.5	Educational seminars and mailings for residents, local engineers, developers, real estate agents on water quality, stormwater, conservation issues	Conservation	Plan contents of workshops and set dates Get bulk mail account to do annual mailings	New BMP	Hold workshops Mail brochures
Revised					
# 1.6	Annual clean-up days on town properties	Conservation, DSTP	Hold annual clean-up day on Earth Day	New BMP	Start to plan and organize clean-up

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 2.1	Partnership with local schools	Recreation and Conservation	Gray's Beach Restoration Project	Completed planting of bio-retention areas on Gray's Beach (Silver Lake High School Conservation and Horticulture Program & Recreation)	Continue maintenance of bio-retention areas Work on implementing environmentally sustainable landscape management practices Add pet waste stations
Revised					
# 2.2	Partnership with watershed association	Planning, Harbormaster, Conservation	604(b) Estuary monitoring with combined town, watershed and volunteer efforts	Third year of two-year estuary monitoring completed (JRWA did without funding to supplement data)	Finish and use analysis of 604(b) project data to educate public and target impairments
		Conservation	Use new monitoring equipment and programs to continue collection of water quality data	Increased sampling efforts with citizen volunteers (JRWA)	Continue to involve more of public in sampling with new water quality instrument and continue education of public
		Water Dept., Conservation	Hold annual Herring counts	Succeeded in getting many volunteers to participate (JRWA)	Herring count involving many community members
Revised					
# 2.3	Storm drain stenciling	Highway, Conservation, Boy/Girl Scouts	Organizing neighborhoods/volunteers to stencil storm drains	Storm drain stencils and other supplies purchased through the Conservation and Highway Dept. budgets as well as ATM	Organization of volunteers and implementation of storm drain stenciling program with educational program starting with

Revised					
# 2.4	Establishing formal Storm Water Management Task Force with citizen involvement	Selectmen and all other applicable boards	Establish Storm Water Management Task Force with regularly scheduled meetings and activities	Informal stormwater management meetings with appropriate town officials (JRWA & occasionally other agencies)	Formal Stormwater Management Task Force established with expanded involvement to include more town boards and citizens at large Use SRF application process to educate further and help to form formal group
Revised					
# 2.5	Household Hazardous Waste Collection and Recycling Day	DSTP and Town of Duxbury	Hold annual collection days	Successfully held collection day that was well attended (SSRC)	Hold collection days for longer period or bi-annually
# 2.6	Educational seminars and mailings for residents, local engineers, developers, real estate agents on water quality, stormwater, conservation issues	Conservation	Plan contents of workshops and set dates Get bulk mail account to do annual mailings	New BMP	Hold workshops Mail brochures
# 2.7	Annual clean-up days on town properties	Conservation, DSTP	Hold annual clean-up day on Earth Day	New BMP	Start to plan and organize clean-up

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 3.1 Revised	Catch basin/outfall and sewer mapping to receiving waters	Planning, DSTP, Conservation	Mapping hotspots that are suspected to carry high pollutant loads	Orthophotos manually marked with hotspots Contacted MassHighway about there NPDES permit to get information about discharges to Kingston waterways, but received no information	Work to get ATM approval of SRF application to work with Environmental Partners to establish database of digitized stormdrain mapping, dry weather sampling, etc. Organize & educate public/ volunteers to wet weather sampling of newly digitized outfalls Establish hotline to report discharges
# 3.2 Revised	Sewering of densely developed areas and environmentally sensitive areas of town to reduce septic influence on water quality	Sewer Commission	Start Phase II Sewer Project and progress to completion	Phase II sewer begun in fall 2005 and scheduled for completion in 2006 Obtained copy of preliminary digitized sewer and drain lines in areas of Phase I and Phase II sewering	Continue to explore expanding capacity of sewer plant which will reach maximum capacity at end of Phase II Expand upon preliminary digital maps with SRF funds to comprehensively digitize underground infrastructure and outfalls
# 3.3 Revised	Hazardous Waste Collection and Recycling Program	DSTP	Hazardous Waste Collection Days	Annual collection of hazardous waste (in cooperation with Duxbury) is increased for residents by allowing residents and businesses to attend other town's collections via reciprocal arrangement (South Shore Recycling Cooperative - SSRC) Recycling and hazardous waste brochures mailed (SSRC) More recycling containers available in town hall	Encourage more recycling in more municipal buildings Work on holding more hazardous waste collection days
# 3.4 Revised	Storm drain stenciling	DSTP, Conservation	Adopt a Storm Drain	Discussion of including this in storm drain stenciling efforts	Neighborhood representatives to monitor storm drains for illicit discharges
# 3.5	Water Quality Monitoring	Harbormaster, Planning, Conservation, Highway, Water	Start monitoring program to establish focus areas	CZM Grant allowed purchase of water quality monitoring instrument (JRWA with support of Conservation) 604B monitoring of the bay and estuary completed but JRWA voluntarily continued for additional year Received 604(b) Report and began preliminary analysis (JRWA)	Get more of community involved in sampling program Obtain additional funding for equipment to expand monitoring program (JRWA)

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 4.1	Regulatory Mechanisms	Selectmen, Town Administrator, Planning, Building, Conservation, DSTP	Establish and implement local stormwater management by-laws and/or stormwater authority to increase construction runoff controls in design criteria	Conservation working on regs. to fully adopt MA DEP Stormwater Management Policy and Standards Reviewing existing by-laws related to stormwater management for revision All applicable rules, regulations and bylaws were reviewed and revisions suggested to better encourage use of LID techniques to better control stormwater runoff (MassBays/NSRWA & CEI)	Conservation currently revising regulations Adopt Stormwater By-laws and/or Authority(Town counsel) Adopt recommendations of CEI to make by-laws, rules, regs. more suitable to encouraging use of LID techniques for less site disturbance and less potential for erosion SRF loan will enable town to hire consultant who will do comprehensive review of rules, regs., bylaws for stormwater management controls (Environmental Partners)
Revised					
# 4.2	Site Plan Review	Planning, Conservation, Building, Zoning, BOH	Establish Phase II specific stormwater guidelines for review of site plans	LID Workshop Planning for municipal officials and local developers held in 2005 Presentation made to Planning on revision suggestions to better incorporate LID in subdivision designs Discussion of in house erosion and sediment control training Involvement in Low Impact Development (LID) with MassBays/NSRWA & JRWA and other South Shore towns to educate developers and town officials on implementation of LID Regularly require developers to obtain NPDES CGP for disturbance of 1 acre or more of land (Conservation)	Planning considering more LID subdivisions and other local boards encouraging its use Develop guidelines to be read, understood and signed by all homeowners/developers doing construction on all size projects (could be based on feedback from in-house stormwater workshops) Do in-house stormwater/erosion control workshop LID grant involves a retrofit of town-owned stormwater system for educational purposes and enhanced treatment – implement in 2006 Working on educating other boards to follow suit (Conservation)
Revised					

# 4.3	Enforcement	Building, Planning, Zoning, BOH, DSTP, Conservation	Establish new site inspection forms, new procedures and fee/fine schedules for incorporating requirements of Phase II	Educating developers on as needed basis of new 1 acre or more disturbance regulation and construction general permit requirements Regularly condition Conservation permits requiring NPDES Phase II Construction General Permits (CGP) to be in place prior to start of work on disturbance of 1 acre or more	Develop/gather educational materials for developers/citizens involved in building projects & include CGP in in-house stormwater workshops Develop guide on priority areas of town where further pollutant loading may threaten water supply or further degrade 303d's
Revised				Regularly require erosion controls on all sites (Conservation) Involvement in Low Impact Development (LID) with MassBays/NSRWA & JRWA and other South Shore towns to educate developers and town officials on implementation of LID	Working with other boards/departments to require same (Conservation) MET grant application (JRWA with town support) to start Conservation and Stewardship Program of Jones River – if received will be able to extrapolate to other areas of town to better manage construction around water resources

5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 5.1	Regulatory Mechanisms	Selectmen, Town Administrator, Planning, Building, Conservation, DSTP	Establish and implement local stormwater management by-laws	Adoption of MA DEP Stormwater Management Policy and Standards by Planning and Conservation Reviewing existing by-laws relating to stormwater management Attended Stormwater By-law workshop in winter 2004 to learn about draft by-laws created for towns of Plymouth, Duxbury & Marshfield	Adopt Stormwater By-laws (Town counsel) Revise existing regulations to address stormwater more comprehensively if stormwater bylaws/authority are not received favorably
Revised					
# 5.2	Site Plan Review	Planning, Conservation, Building, Zoning, BOH	Establish Phase II - specific stormwater guidelines and low impact development guidelines for review of site plans	Held LID workshops at Kingston Town Hall as part of 319 LID grant obtained by MassBays/NSRWA to educate South Shore developers, engineers, municipal officials, etc.	Develop guidelines to be read, understood and signed by all homeowners/developers doing construction on all size projects LID implementation project at KIS will assist in educating developers to use LID techniques that require less long-term maintenance and cost less to maintain in the future Succeed in convincing developers to use LID to be used as future examples
Revised					
# 5.3	Enforcement	Building, Planning, Zoning, BOH, DSTP, Conservation	Establish new site inspection forms, new procedures and fee/fine schedules for incorporating requirements of Phase II	Educating developers on as needed basis of new 1 acre or more disturbance regulation and construction general permit requirements Began to attach Operations & Maintenance Plans to Conservation Orders of Conditions and refer directly to the O & M Plan with specific conditions so that they can then be made perpetual conditions	Develop/gather educational materials for developers/citizens involved in building projects Develop guide on priority areas of town where further pollutant loading may threaten water supply Establish bond surety with developers to create binding obligation to keep stormwater runoff onsite Begin requiring reports of stormwater structure maintenance to be sent in to Conservation

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 3 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 4
# 6.1	Employee Training	Selectmen, DSTP, Water, Building, Planning, Conservation	Establish pollution prevention plan and good housekeeping procedures & schedules	DSTP employees attended NPDES Phase II training in fall 2004	Educate municipal employees on car oil leaks and other things that contribute to polluted runoff Town of Kingston has improved municipal recycling program
Revised					
# 6.2	Improved Maintenance	DSTP, Water, Building	Increase frequency of maintenance and implement better storage practices	No vacuum truck purchased in third permit year Sediment stockpiles at Highway barn removed in 2005 Annual street sweeping Annual cleaning of all town-owned water quality inlets	Plans to purchase sewer cleaner with camera and vactor trailer in 2006 that will allow for regular cleaning of catchbasins throughout the entire town Increase frequency of street sweeping, maintenance of catchbasins and infiltration galleys

Revised					
# 6.3	Improved stormwater treatment	DSTP, Water, Conservation, Planning	Upgrade current systems in sensitive areas	Applied for CZM grant to improve stormwater treatment prior to discharge to Jones River from town road – did not receive grant Route 27 improvements planned and permitted	Continue to seek funding through grant opportunities for improving stormwater treatment in sensitive areas of town. Work on Route 27 to start in 2006
Revised					
#6.4	Inter-department education	Conservation, Building, Water, DSTP, Sewer, Zoning	Continue informal education	Succeeded in communicating the importance of stormdrain protection during road work for water, sewer, drainline work performed by the town and the use of other erosion controls	Continue to be vigilant with informal inter-departmental education of stormwater impacts to waterways

7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA) *<<if applicable>>*

BMP ID #	**BMP Description**	**Responsible Dept./Person Name**	**Measurable Goal(s)**	**Progress on Goal(s) – Permit Year 3** (Reliance on non-municipal partners indicated, if any)	**Planned Activities – Permit Year 4**
7.1	Target 303d waterbodies	Conservation, Planning, DSTP	Focus sampling on 303d impaired waterbodies to work toward removing them from 303d list	Commented on the South Coastal and Taunton Watershed TMDL's (JRWA)	Continue to work on collecting water quality monitoring data to and seeking funding for more equipment to provide data for TMDL allocations
Revised					

Part IV. Summary of Information Collected and Analyzed

The following assessments were conducted in the third year of the NPDES Phase II permit year:

1. Third year of monitoring of the bay at 604(b) estuaries & bay monitoring stations (JRWA);
2. Start of collecting water quality data in Jones River at long-term monitoring station in late winter 2006 as part of CZM grant – continuous monitoring for depth, temperature, salinity, DO (mg/L), DO sat (%), and pH in permanent location in Jones River as well as monthly monitoring along 19 transects of the river (see attached preliminary data)
3. Multi-year rainbow smelt fish study in Jones River (DMF & JRWA– started in 2004 and ongoing as permanent sampling site)(see attached report by Brad Chase of DMF).

Results of the two-year 604 (b) estuary/bay project was submitted to the Town of Kingston in 2005 and included a discussion of water quality trends, seasonal trends, flow and nutrient loads. Further analysis of the data is needed and JRWA is conducting some preliminary analysis of the data.

With a grant from CZM, the JRWA purchased a multi-parameter water quality monitoring instrument to do sampling of the Jones River at a permanent, long-term station as well as along 19 transects of the river. The JRWA is funding the actual sampling and analysis of the data (see attached preliminary data). The JRWA hopes to be the recipient of further grant awards to purchase additional water quality monitoring equipment to expand on the current program. In addition, the JRWA would like to involve more of the public in the water quality monitoring effort once a system is established to conduct the monitoring and calibrating of the instrument.

The sampling of rainbow smelt in the Jones River (and three other rivers in Massachusetts) by the Division of Marine Fisheries (DMF through grant from NOAA) started in permit year 2003 – 2004 and will continue as a permanent sampling location for DMF for the purpose of developing population indices for the long-term goal of restoring smelt populations state-wide. Sampling results during the first year of the project showed that the Jones River smelt has decreased dramatically compared to sampling results from 20 – 25 years ago. DMF attributes the decline to a variety of things including acid deposition, sedimentation, eutrophication and overall degradation of water quality. Catches of smelt in 2005 increased substantially due, in part, to modifications to the net. Data from 2005 is not yet available, but a report of the 2004 findings is attached.

The main mission of the JRWA is to restore fish passage along the length of the Jones River and to that end, the JRWA is working to restore fish ladders on various reaches of the river for the purpose of restoring flow and fish migration to the watershed. The Town Of Kingston hopes to continue to work closely with JRWA to assist them in their mission and to improve the general health of the river and Kingston Bay.

Further sampling efforts are planned for FY07 pending funding availability.

Part V. Program Outputs & Accomplishments (OPTIONAL)

Programmatic

Stormwater management position created/staffed	(y/n)	
Annual program budget/expenditures	($)	

Education, Involvement, and Training

Estimated number of residents reached by education program(s)	(# or %)	
Stormwater management committee established	(y/n)	
Stream teams established or supported	(# or y/n)	
Shoreline clean-up participation or quantity of shoreline miles cleaned	(y/n or mi.)	
Household Hazardous Waste Collection Days		
▪ days sponsored	(#)	
▪ community participation	(%)	
▪ material collected	(tons or gal)	
School curricula implemented	(y/n)	

Legal/Regulatory

	In Place Prior to Phase II	Under Review	Drafted
Regulatory Mechanism Status (indicate with "**X**")			
▪ Illicit Discharge Detection & Elimination			
▪ Erosion & Sediment Control			
▪ Post-Development Stormwater Management			
Accompanying Regulation Status (indicate with "**X**")			
▪ Illicit Discharge Detection & Elimination			
▪ Erosion & Sediment Control			
▪ Post-Development Stormwater Management			

Mapping and Illicit Discharges

Outfall mapping complete	(%)	
Estimated or actual number of outfalls	(#)	
System-Wide mapping complete	(%)	
Mapping method(s)		
▪ Paper/Mylar	(%)	
▪ CADD	(%)	

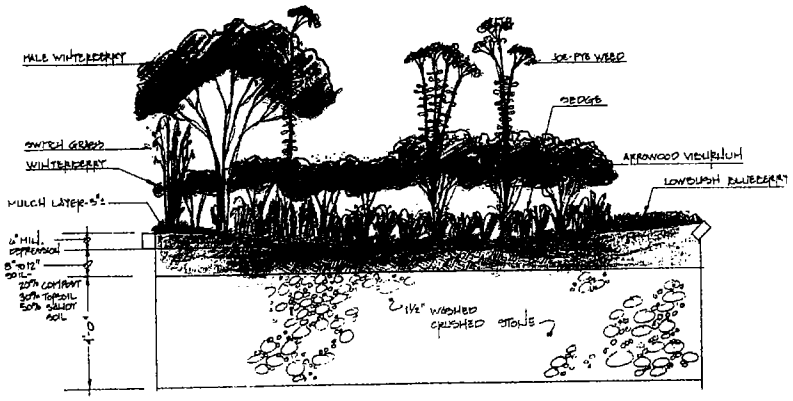
Reduction in application on public land of: ("N/A" = never used; "100%" = elimination)		
▪ Fertilizers	(lbs. or %)	
▪ Herbicides	(lbs. or %)	
▪ Pesticides	(lbs. or %)	

Anti-/De-Icing products and ratios	% NaCl % $CaCl_2$ % $MgCl_2$ % CMA % Kac % KCl % Sand	
Pre-wetting techniques utilized	(y/n)	
Manual control spreaders used	(y/n)	
Automatic or Zero-velocity spreaders used	(y/n)	
Estimated net reduction in typical year salt application	(lbs. or %)	
Salt pile(s) covered in storage shed(s)	(y/n)	
Storage shed(s) in design or under construction	(y/n)	

NSRWA

North and South Rivers Watershed Association
P.O. Box 43
Norwell, MA 02061

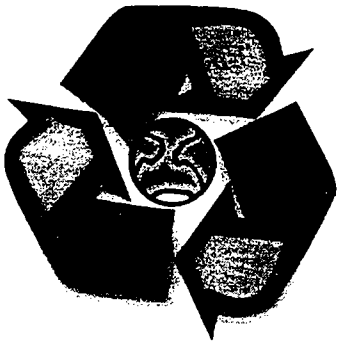
Rain Garden Planting Detail
Rain Garden 'Bio Island'
Scale 1/2"=1'-0"



Typical Rain Garden Cross-Section
Not to Scale

Good for Business, Good for My Town
A Workshop on LID
September 22nd – 23rd 2005
Registration Material Enclosed

ENHANCED OUTREACH (A fuel program that also helps people budget their household bills)	14
CITIZEN'S ENERGY OIL PROGRAM	6
LASER – (Leveraging Assets for Self-sufficiency Through Energy Resources)	1
WEATHERIZATION UTILITY LEVERAGING (Utility money used to extend The Federal Grant) 10/04 – 8/0	10
HEARTWAP (Burner Repair)	26
IDA (Individual Development Accounts – Supplies a local and Federal match to the individual's savings toward return to college, home ownership or starting up a small business)	1
LEND-A-HAND	2
FOOD BASKET	4



SOUTH SHORE RECYCLING COOPERATIVE

The Town of Kingston is a member of the South Shore Recycling Cooperative (SSRC), a voluntary association of fifteen South Shore towns established by Intermunicipal Agreement (IMA) and Special Legislation in 1998. Members of the SSRC are: Abington, Cohasset, Duxbury, Hanover, Hingham, Holbrook, Hull, Kingston, Marshfield, Norwell, Plymouth, Rockland, Scituate, Weymouth, and Whitman.

Each member town is represented by town associates appointed by the Selectmen. Kingston is represented by Paul Basler, Superintendent of Streets, Trees & Parks.

The mission of the SSRC as stated in the IMA is: "to provide a forum of cooperative management of solid waste by members, to assist each member Town to improve the cost-effectiveness of their recycling efforts by providing economy of scale while maintaining full control over solid waste management; to assist members to improve programs to divert waste materials from the waste stream and to reduce the amount and toxicity of wastes; and to provide such assistance on an individual basis to each member Town and cooperatively in joint programs with other Towns."

Each member town pays an annual membership fee of $4,000. In 2005 the SSRC

raised a total of **$60,000** through these fees, which the SSRC supplemented with $14,259.03 in grants from Mass. Dept. of Environmental Protection and Covanta at SEMASS. Those funds pay for the services of the Executive Director and support various solid waste and recycling activities during the year to benefit member towns. The SSRC estimates that in 2005 these activities **saved member towns an estimated $112,000,** and provided over 250 hours of direct services to the towns.

HOUSEHOLD HAZARDOUS PRODUCT COLLECTIONS: By using the regional contract negotiated by the SSRC with **Clean Harbors** for the collection and disposal of **household hazardous products,** Member Towns paid about 30% less than the State contract, and avoided the administrative time to bid and schedule them. The thirteen collections held in 20052,439 **residents** attended, and Member Towns saved approximately **$28,400** for this service. The contract also enabled **101 residents and businesses** to attend other Member towns' collections using the **reciprocal arrangement,** which is administered by the Executive Director. The SSRC publicized the events with several thousand **flyers** delivered to the town halls and libraries and ongoing press releases in all **local papers, on cable TV and the radio.** The Executive Director attended and helped run ten of the collections, handed out paint stirrers with cost saving instructions on latex paint disposal, provided signs and calculated the **proper billing** for the vendor to ensure that discounts and allowances were credited and visitors billed properly.

CONSTRUCTION AND BULKY WASTE. By using the arrangement negotiated by the SSRC with the **Bourne ISWMF,** Member Towns enjoyed a disposal rate of $70/ton for **construction and bulky waste.** The gate fee is $75/ton. With a generation of 7,965 tons, Member Towns saved **$39,825** in CY05 with this arrangement.

MATTRESSES. The SSRC conducted an RFQ for **mattress processing** when the surcharge at Bourne increased from $10 to $15 each plus the tip fee and transportation, coupled with the elimination of the 10 mattress/load allowance. Three companies responded, and the SSRC accepted an offer by Miller Recycling in Plainville to transport and process mattresses for $14/each, including container rental. This arrangement saved the three participating towns approximately **$7,400** on the 1,852 mattresses they collected in 2005.

WASTE OIL. The SSRC negotiated a 7-10¢/gal rebate from Cyn Environmental for waste oil. Towns had previously received nothing from either Clean Harbors or Cyn. This should have generated **$5,000** for Member Towns for the six months it was in effect in 2005. Exact figures were not available.

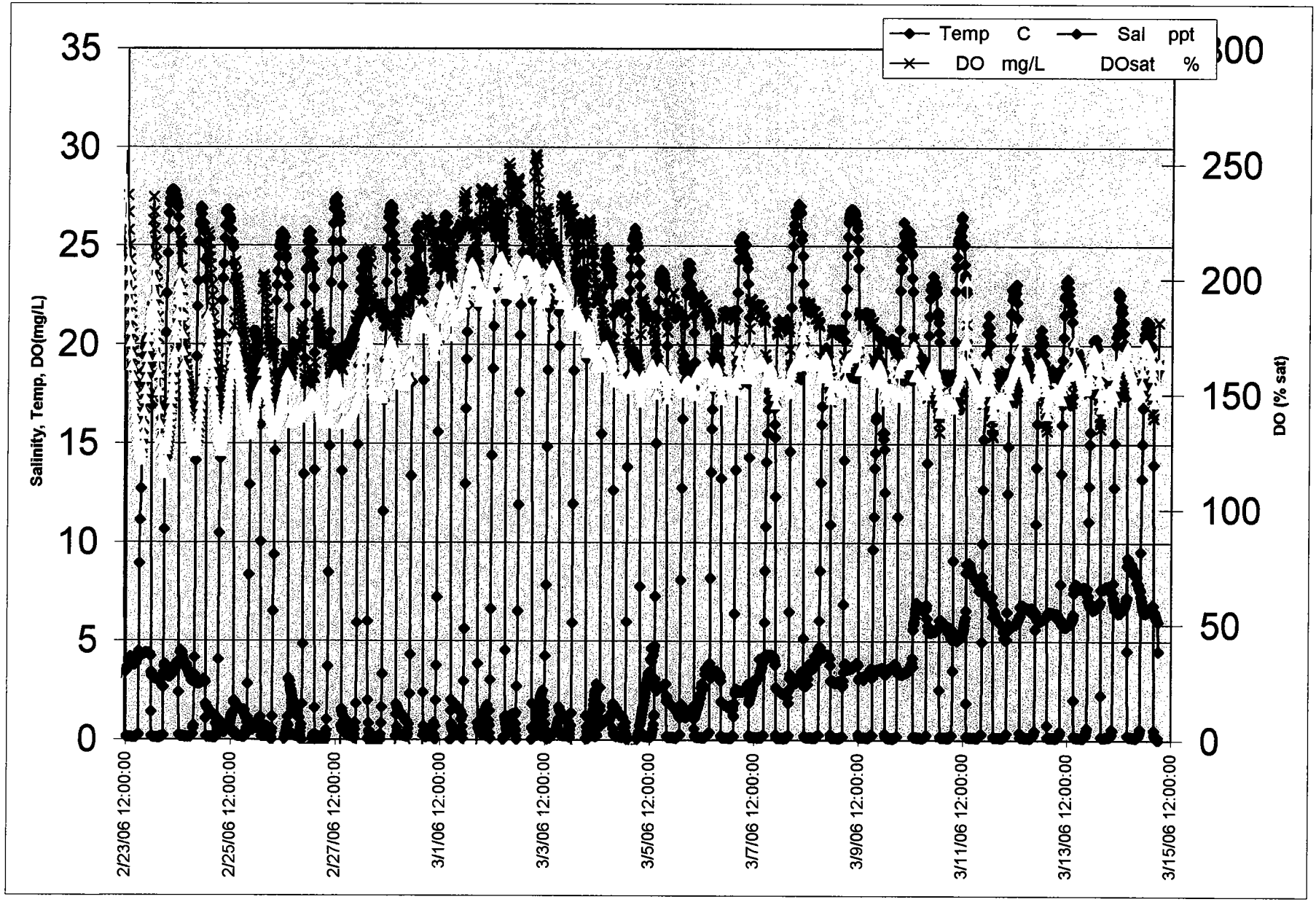
COMPOST AND BRUSH PROCESSING. The SSRC re-bid its contracts for **brush grinding and compost screening,** which were awarded to Letourneau Corp. and Lion's Head Organics. The contractors made presentations at a Board

Water Quality Monitoring in Jones River 2006

By

Jones River Watershed Association

(Equipment for monitoring funded by CZM grant)


Temp C
Sal ppt
DO mg/L
DOsat %
Salinity, Temp, DO(mg/L)
DO (% sat)
35
30
25
20
15
10
5
0
300
250
200
150
100
50
0
2/23/06 12:00:00
2/25/06 12:00:00
2/27/06 12:00:00
3/1/06 12:00:00
3/3/06 12:00:00
3/5/06 12:00:00
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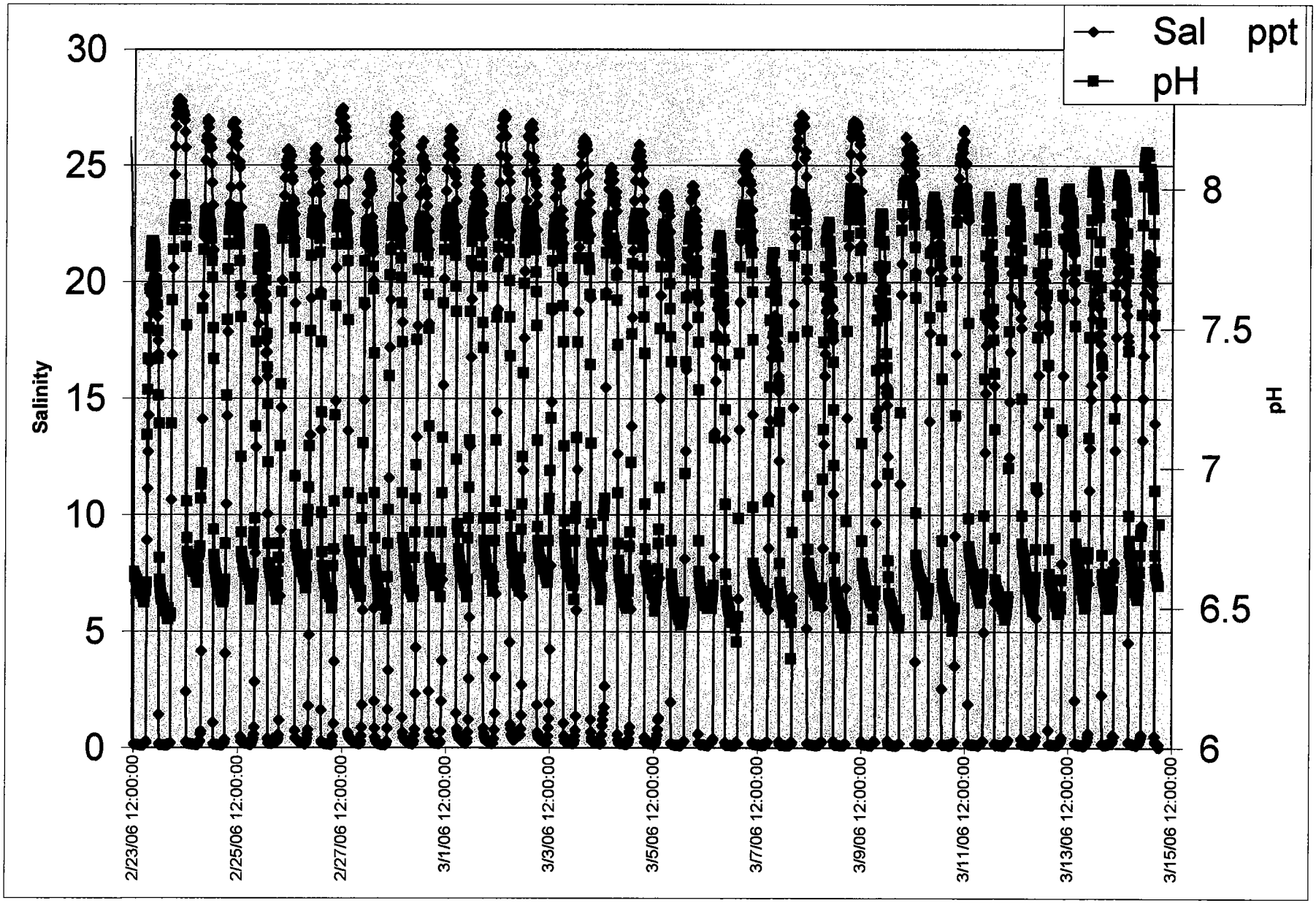
3/15/06 12:00:00


Sal ppt
pH
Salinity
pH
30
25
20
15
10
5
0
8
7.5
7
6.5
6
2/23/06 12:00:00
2/25/06 12:00:00
2/27/06 12:00:00
3/1/06 12:00:00
3/3/06 12:00:00
3/5/06 12:00:00
3/7/06 12:00:00
3/9/06 12:00:00
3/11/06 12:00:00
3/13/06 12:00:00
3/15/06 12:00:00

	DateTime M/D/Y	Temp C	SpCond uS/cm	Cond uS/cm	Salinity ppt	DO % %	DO Conc mg/L	DO Charge
0	3/18/2006 12:45	3.9	45830	27361	28.97	175.9	19.02	63
1	3/18/2006 12:45	3.9	45834	27362	28.98	175.9	19.02	64
2	3/18/2006 12:45	3.9	45878	27389	29.01	175.9	19.01	64
3	3/18/2006 12:45	3.9	45865	27381	29	175.9	19.02	64
4	3/18/2006 12:45	3.9	45855	27375	28.99	175.9	19.02	64
5	3/18/2006 12:45	3.9	45851	27373	28.99	175.9	19.02	64
6	3/18/2006 12:45	3.9	45848	27371	28.99	175.9	19.02	64
7	3/18/2006 12:45	3.9	45846	27370	28.99	175.9	19.02	64
8	3/18/2006 12:45	3.9	45846	27370	28.99	138	14.92	64
9	3/18/2006 12:45	3.9	45846	27371	28.99	138	14.92	60
10	3/18/2006 12:45	3.9	45841	27368	28.98	138	14.92	60
11	3/18/2006 12:45	3.9	45842	27368	28.98	138	14.92	60
12	3/18/2006 12:45	3.9	45845	27370	28.98	138	14.92	60
13	3/18/2006 12:45	3.9	45859	27379	28.99	138	14.92	60
14	3/18/2006 12:45	3.9	45887	27395	29.01	138	14.91	60
15	3/18/2006 12:45	3.9	45914	27411	29.03	138	14.91	60
16	3/18/2006 12:45	3.9	45940	27425	29.05	128.1	13.84	60
17	3/18/2006 12:45	3.9	45965	27438	29.07	128.1	13.84	59
18	3/18/2006 12:45	3.89	45988	27449	29.08	128.1	13.84	59
19	3/18/2006 12:45	3.89	46043	27478	29.12	128.1	13.84	59
20	3/18/2006 12:45	3.88	46098	27507	29.16	128.1	13.84	59
21	3/18/2006 12:45	3.88	46152	27534	29.19	128.1	13.84	59
22	3/18/2006 12:45	3.87	46202	27558	29.23	128.1	13.84	59
23	3/18/2006 12:45	3.87	46247	27579	29.26	128.1	13.84	59
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29	3/18/2006 12:46	3.82	46449	27659	29.39	123.7	13.36	59
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33	3/18/2006 12:46	3.79	46538	27688	29.45	121.5	13.13	59
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38	3/18/2006 12:46	3.77	46616	27713	29.5	121.6	13.14	59
39	3/18/2006 12:46	3.77	46633	27719	29.51	121.6	13.14	59
40	3/18/2006 12:46	3.76	46658	27731	29.53	120.3	13	59
41	3/18/2006 12:46	3.76	46685	27743	29.55	120.3	13	58
42	3/18/2006 12:46	3.75	46704	27750	29.56	120.3	13	58
43	3/18/2006 12:46	3.75	46727	27760	29.58	120.3	13.01	58
44	3/18/2006 12:46	3.74	46747	27768	29.59	120.4	13.01	58
45	3/18/2006 12:46	3.74	46767	27776	29.6	120.4	13.01	58
46	3/18/2006 12:46	3.74	46784	27783	29.61	120.4	13.01	58
47	3/18/2006 12:46	3.73	46800	27789	29.63	120.4	13.01	58
48	3/18/2006 12:46	3.73	46815	27795	29.64	119.3	12.89	58

49	3/18/2006 12:46	3.72	46829	27800	29.64	119.3	12.9	58
50	3/18/2006 12:46	3.72	46838	27801	29.65	119.3	12.9	58
51	3/18/2006 12:46	3.72	46849	27805	29.66	119.3	12.9	58
52	3/18/2006 12:46	3.71	46857	27807	29.66	119.3	12.9	58
53	3/18/2006 12:46	3.71	46866	27810	29.67	119.3	12.9	58
54	3/18/2006 12:46	3.71	46873	27812	29.67	119.3	12.9	58
55	3/18/2006 12:46	3.71	46881	27814	29.68	119.3	12.9	58
56	3/18/2006 12:46	3.7	46888	27816	29.68	118.4	12.8	58
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65	3/18/2006 12:46	3.7	46872	27800	29.67	117.5	12.71	59
66	3/18/2006 12:46	3.7	46874	27801	29.67	117.5	12.71	59
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87	3/18/2006 12:46	3.7	46851	27793	29.66	117.5	12.71	59
88	3/18/2006 12:46	3.7	46855	27795	29.66	116.8	12.63	59
89	3/18/2006 12:46	3.7	46860	27798	29.66	116.8	12.63	59
90	3/18/2006 12:46	3.7	46859	27798	29.66	116.8	12.63	59
91	3/18/2006 12:47	3.7	46861	27798	29.66	116.8	12.63	59
92	3/18/2006 12:47	3.7	46857	27796	29.66	116.8	12.63	59
93	3/18/2006 12:47	3.7	46855	27794	29.66	116.8	12.63	59
94	3/18/2006 12:47	3.7	46852	27792	29.66	116.8	12.63	59
95	3/18/2006 12:47	3.7	46848	27790	29.65	116.8	12.63	59
96	3/18/2006 12:47	3.7	46843	27787	29.65	117.3	12.69	59
97	3/18/2006 12:47	3.7	46840	27785	29.65	117.3	12.69	59
98	3/18/2006 12:47	3.7	46833	27782	29.64	117.3	12.69	59
99	3/18/2006 12:47	3.7	46834	27783	29.65	117.3	12.69	59

100	3/18/2006 12:47	3.7	46836	27785	29.65	117.3	12.69	59
101	3/18/2006 12:47	3.7	46838	27786	29.65	117.3	12.69	59
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103	3/18/2006 12:47	3.7	46838	27787	29.65	117.3	12.69	59
104	3/18/2006 12:47	3.71	46836	27786	29.65	116.7	12.62	59
105	3/18/2006 12:47	3.71	46832	27785	29.64	116.7	12.62	61
106	3/18/2006 12:47	3.71	46826	27781	29.64	116.7	12.62	61
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108	3/18/2006 12:47	3.71	46819	27778	29.64	116.7	12.62	61
109	3/18/2006 12:47	3.71	46816	27777	29.63	116.7	12.62	61
110	3/18/2006 12:47	3.71	46813	27776	29.63	116.7	12.62	61
111	3/18/2006 12:47	3.71	46810	27775	29.63	116.7	12.62	61
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119	3/18/2006 12:47	3.72	46792	27772	29.62	120.9	13.08	63
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137	3/18/2006 12:47	3.74	46463	27598	29.39	114.7	12.42	59
138	3/18/2006 12:47	3.75	46374	27548	29.33	114.7	12.42	59
139	3/18/2006 12:47	3.75	46362	27545	29.32	114.7	12.42	59
140	3/18/2006 12:47	3.75	46351	27542	29.32	114.7	12.42	59
141	3/18/2006 12:47	3.76	46338	27538	29.31	114.7	12.41	59
142	3/18/2006 12:47	3.76	46323	27534	29.3	114.7	12.41	59
143	3/18/2006 12:47	3.77	46307	27529	29.29	114.7	12.41	59
144	3/18/2006 12:47	3.77	46293	27525	29.28	113.9	12.33	59
145	3/18/2006 12:47	3.78	46280	27522	29.27	113.9	12.33	63
146	3/18/2006 12:47	3.78	46269	27519	29.26	113.9	12.33	63
147	3/18/2006 12:47	3.79	46254	27514	29.25	113.9	12.32	63
148	3/18/2006 12:47	3.79	46242	27512	29.25	113.9	12.32	63
149	3/18/2006 12:47	3.8	46230	27509	29.24	113.9	12.32	63
150	3/18/2006 12:47	3.8	46221	27508	29.23	113.9	12.32	63

151	3/18/2006 12:47	3.81	46214	27508	29.23	113.9	12.32	63
152	3/18/2006 12:47	3.81	46209	27508	29.23	122.6	13.26	63
153	3/18/2006 12:47	3.81	46205	27508	29.22	122.6	13.26	60
154	3/18/2006 12:47	3.82	46195	27506	29.22	122.6	13.26	60
155	3/18/2006 12:47	3.82	46192	27507	29.22	122.6	13.26	60
156	3/18/2006 12:47	3.82	46189	27507	29.21	122.6	13.26	60

Depth m	Latitude dd mm ss.s	Longitude ddd mm ss.ss
0.105	42 00 22.5	070 41 54.7
0.064		
0.116		
0.066		
0.111		
0.125		
0.184		
0.255		
0.239		
0.247		
0.316		
0.439		
0.64		
0.862		
0.964		
0.965		
1.018		
1.262		
1.624		
1.9		
2.067		
2.051		
2.048		
2.039		
2.037		
2.033		
2.028		
2.028		
2.031		
2.032		
2.038		
2.043		
2.048		
2.058		
2.071		
2.244		
2.296		
2.361		
2.425		
2.522		
2.58		
2.602		
2.605		
2.607		
2.608		
2.61		
2.613		
2.616		
2.619		

Commonwealth of Massachusetts
Division of Marine Fisheries
Annisquam River Marine Fisheries Station
30 Emerson Avenue
Gloucester, MA 01930
978-282-0308
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Paul Diodati
Director

March 1, 2006

Kingston Conservation Commission
Kingston Town House
Green Street
Kingston, MA 02364

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Dear Conservation Commission:

I wanted to update you on a rainbow smelt monitoring project by the Massachusetts Division of Marine Fisheries in the Jones River. After a successful pilot season in 2004 we set the fyke net again downstream of Route 3A in 2005. Our catches of smelt increased substantially from the first season, in part due to modifications to the net. I've enclosed the final report for the 2004 season. The data for the 2005 season is not fully processed, but I will be sure to pass this along when it is completed.

Our two-year grant for this project has ended, but I am glad to say we are committed to maintain the fyke net project as an annual monitoring series. It is clear the monitoring will provide valuable data on the migrations of smelt, other anadromous fish species, and water quality. Please inform any other Kingston Departments that may need to be aware of our sampling. The setting of these nets is permissible under our authority; however it is unlawful to tamper with the nets or for others to use this gear without a DMF permit. We want local authorities to know about this project because of your interest in these natural resources and in case you get public inquiries. We believe it is an interesting study that will produce useful population indices. Please call me anytime if you have questions (978-282-0308 x111).

Sincerely,

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cc: Jones River Watershed Association

FINAL REPORT for 2004 SEASON

(FEBRUARY 2006)

Population Indices of Rainbow Smelt (*Osmerus mordax*) Spawning Runs in Massachusetts.

Prepared for:

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Protected Resources Division
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NMFS Project Number: O-2003-NER4

Project Objective

A grant was received from NOAA Fisheries to conduct a two-year pilot study to develop monitoring protocols for biological and population parameters of rainbow smelt runs in Massachusetts. The monitoring focused on adult smelt during the spring spawning runs to produce estimates of size composition, age composition, sex ratio, survival, total mortality and a catch per unit index of abundance. This pilot effort began in 2004 and will be developed into an annual DMF monitoring project in 2006. This effort may also be useful for assisting the development of monitoring in other regions in New England, and for future sampling related to tagging experiments and restoration efforts using marked hatchery smelt. See "Field Sampling and Data Collection" in Appendix for specific details on sampling methods.

2004 Catch Summary

Fyke nets were set twice weekly in the following rivers during the period of March 7th - May 19th: Jones River (Kingston), Fore River (Braintree), North River (Salem), and Parker River (Newbury) (Figure 1). At least 18 successful hauls were made in each river during 2004. Three sampling periods during early April were incomplete due to a rain storm that brought 4-6 inches of rain to the region. Otherwise, the nets fished well as deployed. Smelt were caught in each river except the North River, and large numbers of smelt were only caught in the Fore River (Table 1). A total of 17 species of fish was caught (5 diadromous, 4 estuarine, and 8 freshwater); with mummichog, American eel, and fourspine stickleback following smelt in terms of highest relative abundance (Table 2). All catch and age data have been entered into an Access database and fully audited.

Figure 1. Smelt fyke net sampling stations for smelt fkye nets in the Parker River, Parker River, Fore River and Jones River during 2004.

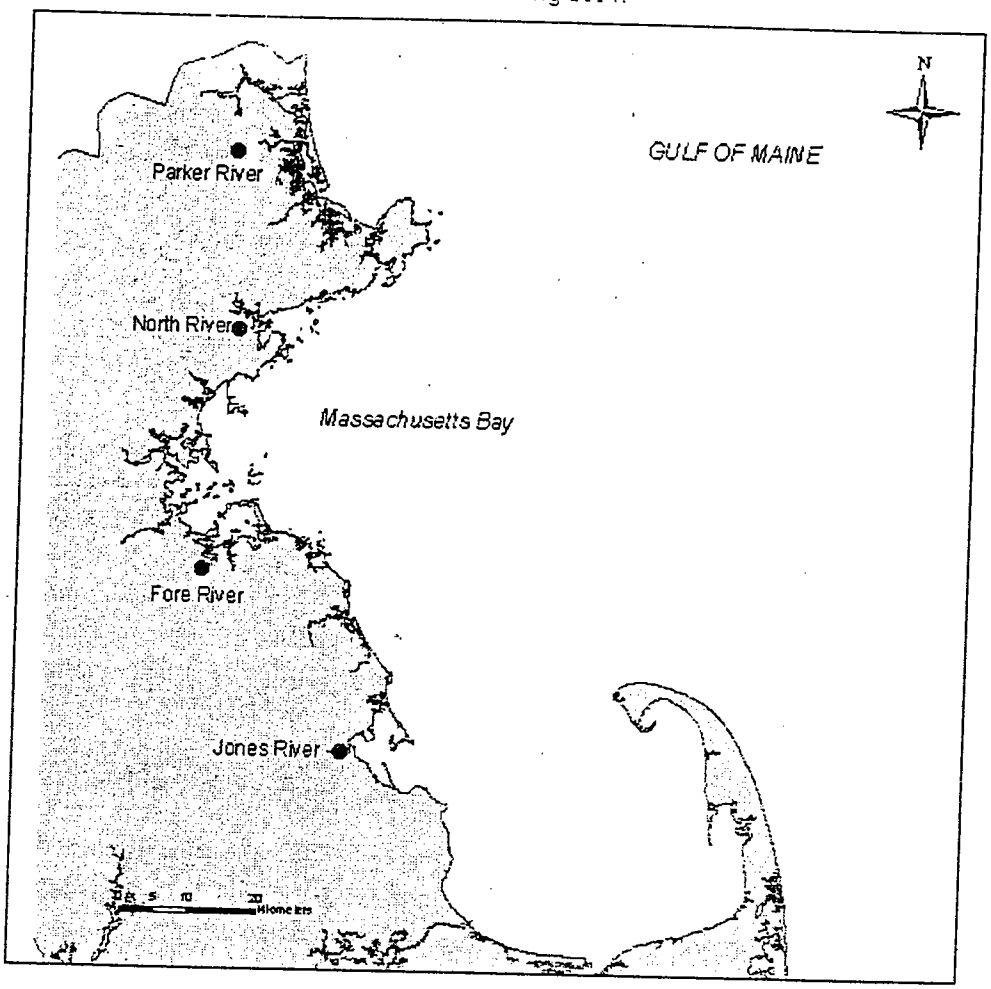

Table 1. Rainbow smelt fyke net catch summary, 2004. Ages for Parker River and Jones River smelt were allocated using age-length proportions from the Fore River sample.

River	Total Catch (No.)	Hauls (No.)	CPUE (smelt/haul)	Length Sample (No.)	Age Sample (No.)	Male (%)	Female (%)	Age-1 (%)	Age-2 (%)	Age-3 (%)
Fore	740	18	41.1	640	295	81.0	18.9	93.5	4.5	2.0
Jones	22	21	1.0	22	0	81.8	18.2	68.2	18.2	13.6
Parker	3	18	0.2	3	0	100.0	0	66.7	33.3	
North	0	18	0							

Table 2. Summary of fyke net catches at four sampling stations, 2004 (75 hauls).

Species Name	Scientific Name	Type	Total Catch (No.)	Occurrence (No. of Hauls)
rainbow smelt	*Osmerus mordax*	Diadromous	765	19
American eel	*Anguilla rostrata*	Diadromous	134	29
Atlantic tomcod	*Microgadus tomcod*	Diadromous	14	5
lamprey	*Petromyzon marinus*	Diadromous	4	4
white perch	*Morone americanus*	Diadromous	1	1
mummichog	*Fundulus heteroclitus*	Estuarine	201	18
fourspine stickleback	*Apeltes quadracus*	Estuarine	104	29
threespine stickleback	*Gasterosteus aculeatus*	Estuarine	51	18
winter flounder	*Pseudopleuronectes americanus*	Estuarine	2	2
yellow perch	*Perca flavens*	Freshwater	42	8
redfin pickerel	*Esox americanus americanus*	Freshwater	4	4
golden shiner	*Notemigonus crysoleucas*	Freshwater	4	4
pumpkinseed	*Lepomis gibbosus*	Freshwater	4	2
banded sunfish	*Enneacanthus obesus*	Freshwater	3	3
bluegill	*Lepomis macrochirus*	Freshwater	2	2
white sucker	*Catostomus commersoni*	Freshwater	2	1
yellow bullhead	*Ameiurus natalis*	Freshwater	2	1
Total Fish Catch			1339	

Fore River Smelt Catch. The Fore River was the only station that caught enough smelt to evaluate size and age composition. Smelt were caught in all but one fyke net deployment from March 7th through May 10th. A total of 740 smelt were caught in 13 hauls. Total length samples were recorded from 12 hauls (N = 640) and age samples were collected from only 4 hauls (N = 295). Peak catches occurred on April 12th when 569 smelt were captured. This large catch dominated the length and age composition of smelt catches in the Fore River. The large number of smelt overwhelmed the capacity of the fyke net, resulting in 358 dead smelt in the catch.

Smelt Population Data. A total of 295 smelt from the Fore River were aged using the methods of McKenzie (1958), and the age sub-sample proportions were applied to the 640 smelt with measured lengths (Appendix, Table 8). Age-1 smelt dominated the age composition (93.5%; Figure 2), and over 75% of the age-1 smelt were mature males. No age-4 smelt were found in this sample and only 2% were age-3. This age-length key is the first generated for a Massachusetts' smelt run in nearly 25 years. These results are different from previous studies that aged smelt in Massachusetts (Murawski and Cole 1978; and Lawton et al. 1990) and New Hampshire (Grout and Smith 1994) that found that age-2 smelt comprised a majority of the spawning run and had higher percentages of age-3 and age-4. The sex ratio for the 640 measured smelt was 4.3:1, male to female.

The dominance of age-1 smelt in the age composition may be biased by the reliance of the sample on smelt from the April 12th catch (476 of 640 measured smelt and 208 of 295 aged smelt). Secondly, the influence of males spawning multiple nights on catch rates and composition was not assessed. For these reasons, these data should be considered with caution. Length samples were distributed over 12 hauls and had age-1 smelt in most samples. Despite the potential bias, the high percentage of age-1 smelt appeared to be characteristic of this annual run

Table 8. Rainbow smelt age and length composition for Fore River fyke net catches, 2004. No adjustments were made for the size classes where age overlap was likely but not observed.

TL (cm)	TL (mm)	Length Sample (No.)	Age Subsample (No.)	AGE SUBSAMPLE						AGE COMPOSITION BY LENGTH		
				Age-1 (No.)	Age-2 (No.)	Age-3 (No.)	Age-1 (%)	Age-2 (%)	Age-3 (%)	Age-1 (No.)	Age-2 (No.)	Age-3 (No.)
10	100-109	1	1	1			1	0	0	1		
11	110-119	27	18	18			1	0	0	27		
12	120-129	165	73	72	1		0.9863	0.0137	0	163	2	
13	130-139	261	108	108	0		1	0	0	261		
14	140-149	118	60	58	2		0.9667	0.0333	0	114	4	
15	150-159	29	10	10	0		1	0	0	29		
16	160-169	3	1	1	0		1	0	0	3		
17	170-179	0	0									
18	180-189	2	2	0	2		0	1	0		2	
19	190-199	10	7	0	6	1	0	0.8571	0.1429		9	1
20	200-209	9	7	0	6	1	0	0.8571	0.1429		8	1
21	210-219	4	2	0	2	0	0	1	0		4	
22	220-229	6	3	0	0	3	0	0	1			6
23	230-239	4	3	0	0	3	0	0	1			4
24	240-249	1	0									1
Sum		640	295	268	19	8				598	29	13

APPENDIX --- Quality Assurance for smelt ageing in 2004

A total of 295 smelt was aged by reading annuli on scales in 2004. These samples were collected from the Fore River station on only four dates (Table 9). Scales were mounted on microscope slides and read using the "shiny-line" criteria described by McKenzie (1958). Blind reading of mounted scales was conducted by two technicians (KT and KB) for over 90% of the samples. All age-1 smelt <145 mm TL with readers agreement were accepted without further review. A third reader aged all samples that were age-2 or higher, age-1 over 145 mm TL, and those that did not have agreement between the primary readers. The third reader acted as the quality assurance officer (BC) and made the final decision over disputed ages and had access to fish length data. All scale samples were read by at least two readers. All smelt age data were entered to an Access database by KT and a complete audit was made during November 2005 by the QA officer.

Ageing precision was acceptable. The primary readers KT and KB had 90% agreement. Of the 126 scale samples checked by the QA reader, KT had 95% agreement ageing scales read by the QA reader (6 errors). Reader KB had 89% agreement ageing the 126 scales read by the QA reader (14 errors). All remaining samples were smelt <145 mm, which are likely to be age-1 and the primary readers had 100% agreement.. Assuming all remaining age-1 smelt were accurately aged, the overall precision was very good: KT had 98% agreement with final ages accepted by the QA reader (6 errors out of 262 samples), and KB had 95% agreement with the final ages accepted by the QA reader (14 errors out of 270 samples). Despite the high ageing precision, the QA reader found poor scale radii measurements by both primary readers. Reader KB was inconsistent with radii measurements. Reader KT consistently measured higher than actual radii (+6 mm for age-1). Therefore, BC radii measurements were used when available (all except FR-11-04 <145 mm). For the remaining radii, KT data were reduced by 6 mm and used.

The high precision was partially influenced by the presence of only three year classes, and may have been enhanced by the dominance of easily read age-1 smelt in the sample (91%). The total sample is heavily weighted to the April 13th sample when 569 smelt were caught with very high net mortality (>60%). The sampling protocol capped age samples at 50 per haul, however greater numbers of scale samples were collected on the 13th because of the high mortality among samples and the low numbers of samples collected to date. Ninety percent of the April 13th smelt were age-1; possibly biasing the age-key towards a higher percentage of age-1 smelt.

Table 9. Summary of smelt scale sampling and ageing for fyke net sampling project in 2004. Most scale samples were read by readers KT and KB (90% agreement). Reader BC read all scales except for sample FR-11-04 in which only disagreements, age-1 smelt >145 mm, and smelt older than age-1 were read. The agreement values shown compare the first two readers with the quality assurance reader.

			READERS			KT (1)	KT (1)	KB (2)	KB (2)
Date	Sample	Smelt (No.)	KT (1) (No.)	KB (2) (No.)	BC (QA) (No.)	Errors (No.)	Agreement (%)	Errors (No.)	Agreement (%)
March 23rd	FR-05-04	5		5	5	0	100	0	100
March 30th	FR-07-04	40	40	40	40	2	95	4	90
April 11th	FR-11-04	208	180	183	39	4	90	7	82
April 30th	FR-16-04	42	42	42	42	0	100	3	93
Total		295	262	270	126	6	95	14	89