Unified Watershed Assessment & Restoration Priorities in Rhode Island

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Rhode Island
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Office of Water Resources

UNIFIED WATERSHED ASSESSMENTS AND RESTORATIONPRIORITIES IN RHODE ISLAND

I. INTRODUCTION

The Clean Water Action Plan, released in February 1998 by President Clinton, presented a blueprint of over 100 specific actions that are designed to support continued progress toward clean water across the Nation. The Action Plan presents a broad vision of watershed protection which integrates the protection and restoration of America's coastal and estuarine waters, surface freshwater, wetlands, groundwater, and natural resources with the traditional clean water and human health objectives. A key theme of the Action Plan is a new, cooperative process for restoring and protecting water quality on a watershed basis. State, federal, tribal, and local governments are asked to work with stakeholders and interested citizens to : (1) identify watersheds with the most critical water quality problems, and (2) work together to focus resources and implement effective strategies to solve these problems. This framework is intended to help focus thoughts and actions for unified watershed assessments, restoration priorities, and restoration action strategies.

The Action Plan calls for state environmental agency leaders and state conservationists to jointly convene the process and work cooperatively with federal and local agencies, watershed based organizations and the public to conduct a unified watershed assessment and define watershed priorities. The Rhode Island Department of Environmental Management (RIDEM), Office of Water Resources and USDA Natural Resources Conservation Service (NRCS) have followed this framework to develop the *Unified Watershed Assessment and Restoration Priorities in Rhode Island.*

The watershed assessment process was a collaborative effort that drew from a full range of available information including the State's 305(b) data, 303(d) List of Impaired Waters, Total Maximum Daily Load (TMDL) schedule, as well as priority areas for agricultural conservation programs, and other watershed projects/initiatives. The integration of this available assessment information was utilized to characterize the conditions of the watersheds within Rhode Island, as defined by the five US Geological Survey 8-digit hydrologic units, into four assessment categories outlined by the Action Plan. The watershed data utilized in this process divides the state into 10 major watersheds/basins (see Table 1) which do not exactly coincide with the USGS 8-digit hydrologic units (see Figure 1) but which can be nested within the USGS 8-digit hydrologic units. This unified watershed assessment process then provided the foundation for setting watershed restoration priorities.

Public participation to direct efforts in the areas of water resources and environmental concerns has been an integral part of the state and federal conservation agencies in Rhode Island for a number of years. That participation has been substantial in the development of the state's 305(b) data, 303(d) List , TMDL schedule and Environmental Quality Incentives Program (EQIP) Priority Areas, all of which were used as the foundation in the development of the unified watershed assessment and restoration process for Rhode Island.

II. PUBLIC PARTICIPATION

The RIDEM Office of Water Resources (OWR) and USDA Natural Resources Conservation Service have over the past several years convened numerous meetings and workshops with various agencies, organizations, and the public to discuss and prioritize water resource related issues. This public input on past water resource initiatives and the current unified watershed assessment and restoration priorities process is outlined below.

A. Performance Partnership Agreement

In FY97, The RIDEM OWR participated for the first time in the development of a Performance Partnership Agreement (PPA) between DEM and EPA. In developing the workplan for the PPA, OWR made a commitment to increasing public input during workplan development. The PPA process encourages states to assess their programs and prioritize environmental concerns. Using the most recently compiled information on the condition of the state's waters, OWR prepared and distributed to various stakeholders and the public, an assessment of water resource concerns. This report provided the background for an initial public workshop. At this meeting, OWR briefly outlined its view of the ten most critical water resource concerns. Using a facilitator, this initial list was expanded via public input to 29 issues. Then the large audience, of approximately 150 persons representing 33 communities, was divided into smaller facilitated groups and charged with compiling priorities for both statewide issues and specific geographic locations of concern. This was done by allowing each participant to vote for two statewide issues and indicate three priority waterbodies on a map. In this way, the OWR received feedback on both state and local concerns.

The results of this first meeting indicated that the public's ranking of statewide concerns was very similar to that initially outlined by OWR. The issues ranked high by the public were incorporated into the priority issues list. The rankings of geographic areas of concern confirmed the public's support for protecting and restoring Narragansett Bay – which was the top priority. Also ranked as priorities by the public were the Providence-Seekonk River and Blackstone River watersheds as well as the Wood-Pawcatuck watershed. Taking the results of the first meeting, the public was invited to a second meeting which focused on potential initiatives OWR could undertake as part of the FY98 workplan. Attendees reviewed two lists of potential initiatives and voted as to which tasks were most important to pursue. This public input has helped to define and direct OWR's efforts over the last two years towards prioritization of environmental concerns on both an issue-based and geographical level.

B. 303(d) List and TMDL Schedule

In FY 98, the OWR developed the State's 1998 303(d) List of Impaired Waters and TMDL schedule. The list and schedule were developed utilizing the assessment information summarized in the state's 305(b) Report and from priority initiatives resulting from the above noted public workshops and as outlined in the OWR PPA. A workshop was convened where OWR invited various stakeholders, local and federal agencies and the public to discuss their perspectives and comments on the waterbodies and priorities included in the List and schedule. OWR noted that the list and schedule would direct water quality planning and protection activities in Rhode Island for a number of years. Input from this workshop and the subsequent Public Notice helped OWR to refine the list of waterbodies and priority rankings.

C. Environmental Quality Incentives Program (EQIP)

The EQIP Geographic Priority Areas were established using a process developed by the NRCS National Office. The three Rhode Island Conservation Districts convened a statewide local work group to determine the need for, and recommend the location of, priority areas for Rhode Island. The local work group was comprised of representatives of federal, state, and local groups having an interest in agriculture and its potential impact on the environment. The local group agreed to focus on five (5) geographic areas where agriculture may be having adverse impacts:

- Drinking water supply reservoirs
- Ground water aquifers and recharge areas, including community wellhead protection areas
- Critical fish and wildlife habitat areas impacted by agriculture
- Coastal salt pond watersheds
- Shellfish beds watersheds

These five areas were identified in the Rhode Island Geographic Information System and a map of the Priority areas was developed. USDA has funded restoration projects throughout these areas in 1997 and 1998. The 1999 EQIP proposal is based on this same geographic area.

D. Unified Watershed Assessment and Restoration Priorities

The RIDEM OWR and USDA NRCS presented the draft *Unified Watershed Assessment and Restoration Priorities in Rhode Island* at three public meetings during the month of August 1998. The purpose of these three meetings was to explain the content of the document and to receive public comment. A press release announcing the availability of the draft Unified Watershed Assessment and Restoration Priorities and inviting the public to the three meetings to discuss the document, was issued on August 6, 1998. The draft document was also available on the DEM website.

The document was first presented on August 14th at the Rhode Island State Technical Committee meeting. The Rhode Island State Technical Committee was established by the Food Security Act of 1985. The role of the Rhode Island State Technical Committee is to provide recommendations for establishing criteria, priorities, and other State-level initiatives for USDA programs such as the Environmental Quality Incentives Program. Membership of the Committee includes federal agencies (EPA, FSA, ACOE, USFS, USFWS), State Agencies (RIDEM, CRMC, DOH), Conservation Districts, FSA County Committee Members, local environmental groups, and other interested parties.

On August 17th, OWR and NRCS presented and discussed the document at a Partners in Resource Protection meeting. The Partners in Resource Protection was established for the purposes of providing a forum for collaboration on natural resource issues; sharing information about natural resources and related activities; and coordinating programs, projects, and plans in natural resource areas. The group consists of representatives from state, federal and local agencies, volunteer organizations, and the public. The group pursues goals that include the following: (1) jointly identify critical resource issues; (2) coordinate activities and business plans; (3) improve communication among partners; (4) exchange information; (5) jointly plan projects; (6) undertake public outreach; and (7) actively seek feedback on their activities from partners and stakeholders.

A public meeting to discuss the draft Unified Watershed Assessments and Restoration Priorities was held on August 27th. Approximately 200 meeting notices were mailed out to representatives of state, local, and federal agencies, municipalities, volunteer organizations, environmental groups and the public.

The public input received at these meetings was valuable toward completing the final Unified Watershed Assessment and Restoration Priorities documentation for Rhode Island.

III. UNIFIED WATERSHED ASSESSMENT SUMMARY

The integration of available assessment information was utilized to characterize the conditions of the watersheds within Rhode Island, as defined by the five US Geological Survey 8-digit hydrologic units, into the four assessment categories outlined below. The available watershed assessment data utilized in this process divides the state into 10 major watersheds/basins (see Table 1) which do not exactly coincide with the USGS 8-digit hydrologic units (see Figure 1) but which can be nested within the USGS 8-digit hydrologic units.

Category I – Watersheds in need of restoration.

Broadly defined, watersheds in this category do not currently meet clean water and other natural resource goals. The following criterion taken from US EPA guidance[1] was utilized to identify Category I watersheds: Any 8 digit hydrologic accounting unit (HUC)[2] watershed in which reasonably current information shows non-attainment of clean water or other natural resource goals in more than about 15 – 25% of the assessed waters or natural resource components of the watershed.

8 digit HUC	RI Major Basin[3]
Blackstone (01090003)	Blackstone River
Narragansett (01090004)	Narragansett Bay Moshassuck River Ten Mile River Woonasquatucket River Pawtuxet River Coastal Waters
Pawcatuck-Wood (01090005)	Pawcatuck River Coastal Waters

Category II – Watersheds needing preventive action to sustain water quality.

These watersheds meet clean water and other natural resource goals and standards and support healthy aquatic systems. All such watersheds need the continuing implementation of core clean water and natural resource programs to maintain water quality and conserve natural resources.

8 digit HUC	RI Major Basin[3]
Quinebaug (01100001)	Quinebaug River
Cape Cod (01090002)	Westport River Narragansett Bay Coastal Waters

Category III – Watersheds with pristine/sensitive aquatic system conditions administered by federal state or tribal government.

No watersheds in Rhode Island are listed under this category. Lands administered by federal, state, or tribal government are relatively limited when compared with the geographic scale of Rhode Island's major basins.

Category IV – Watersheds with insufficient data to make an assessment.

These watersheds lack significant information, critical data elements, or the data density needed to make a reasonable assessment at this time. Watersheds in which greater than 25% of the waters, by waterbody type (i.e. lakes/reservoirs, rivers, estuaries), are not assessed.

No watersheds are listed under this category. Watersheds that might be considered not assessed meet the minimum criteria for Category I and since watershed information must be aggregated to the 8-digit HUC unit and may appear in only one category, these watersheds are listed there.

[1] "Final Framework for Unified Watershed Assessments, Restoration Priorities, and Restoration Action Strategies" – June 9, 1998

[2] The above referenced US EPA guidance requires States to utilize the "8-digit hydrologic accounting unit" or HUC for reporting the unified watershed assessments. The 8-digit hydrologic units are defined by the US Geological Survey and represent a uniform scale commonly utilized by federal agencies. USGS has divided the nation into 2,149 of these basic "hydrologic units", the smallest of which is 700 square miles. Rhode Island contains all or part of five 8-digit HUC units (see the attached map).

[3] Rhode Island currently defines 10 Major Basins (see the attached map). Portions of the "Coastal Waters" Major Basin lie in Pawcatuck-Wood, Narragansett, and Cape Cod 8-digit HUC watersheds. Portions

Figure 1. Rhode Island Major Basins and USGS 8-Digit Hydrologic Units

Rhode Island Major Basins

1. Blackstone River Basin
2. Woonasquatucket River Basin
3. Moshassuck River Basin
4. Ten Mile River Basin
5. Quinebaug River Basin
6. Pawtuxet River Basin
7. Narragansett Bay Basin
8. Pawcatuck River Basin
9. Westport River Basin
10. Coastal Waters

USGS 8-Digit Hydrologic Units Within Rhode Island

Blackstone (01090003)

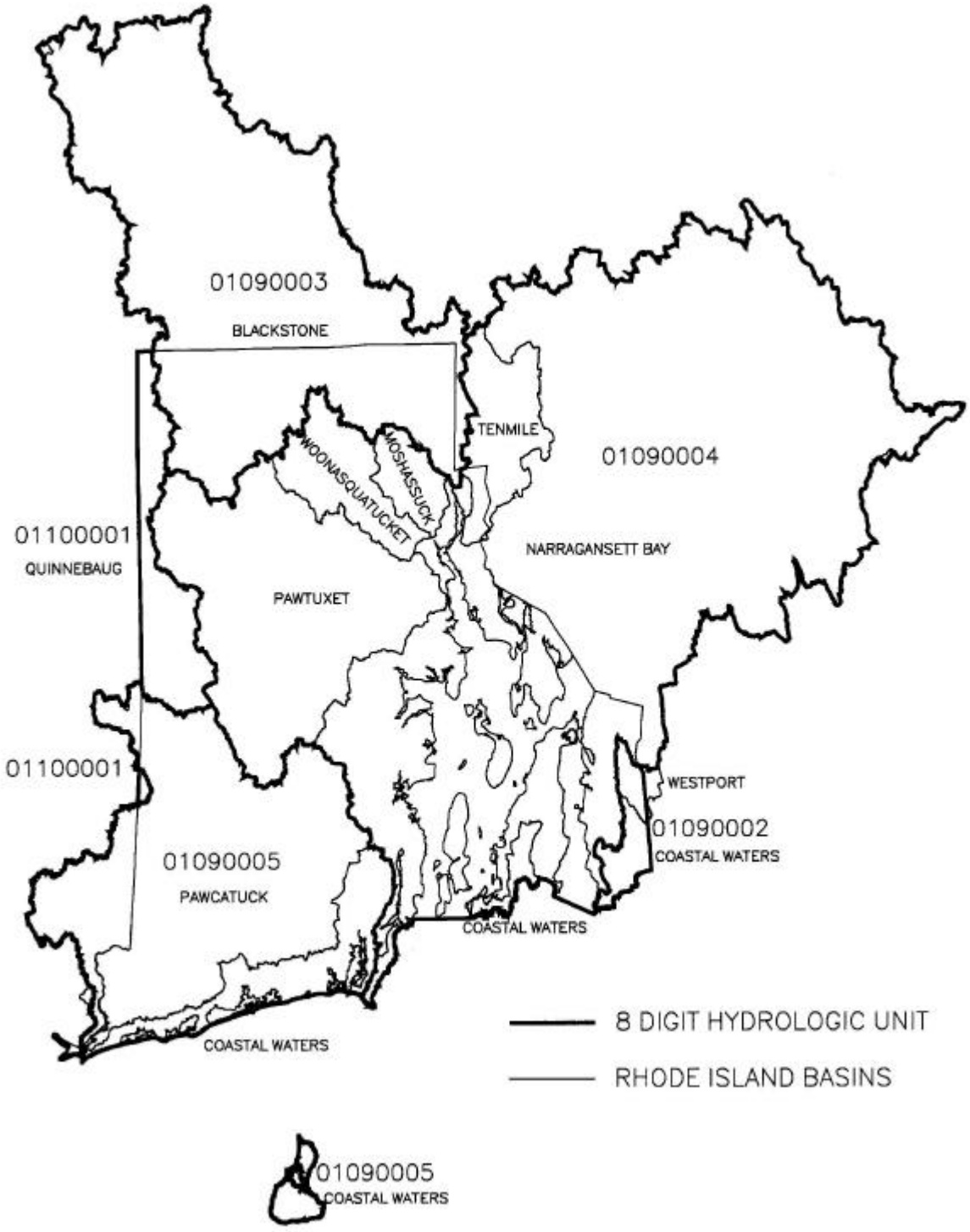
Narragansett (01090004)

Pawcatuck-Wood (01090005)

Quinebaug (01100001)

Cape Cod (01090002)

Figure 1. Rhode Island Major Basins and USGS 8-Digit Hydrologic Units Map



IV. UNIFIED WATERSHED ASSESSMENT RATIONALE AND PROCESS

The watershed assessment process was a collaborative effort that drew from a full range of available information including the State's 305(b) data, 303(d) List of Impaired Waters, TMDL schedule, as well as priority areas for agricultural conservation programs, and other watershed projects/initiatives. The integration of this available assessment information was utilized to characterize the conditions of the watersheds within Rhode Island, as defined by the five US Geological Survey 8-digit hydrologic units, into four assessment categories outlined by the Action Plan. The rationale and process utilized to develop each of the four categories is discussed below.

A. Category I -- Watersheds in Need of Restoration. This category was developed by querying Rhode Island's 305(b) database for the basins in which 15% or *greater* of the waters are impaired. The term impaired followed the 305(b) guidance definition which means waters that are partially and/or not supporting any uses for which they are assessed. If a waterbody is impaired for any uses, the entire river mile, lake acre, or estuarine square mile for that waterbody is used in determining the total impaired waters percentages. Evaluation of the dataset determined that 3 of the 5, eight-digit hydrologic units (HUCs) within Rhode Island fall into this Category. They are the: Blackstone (01090003); Narragansett (01090004); and Pawcatuck-Wood (01090005) (Table 2).

Blackstone (01090003)

The Blackstone hydrologic unit encompasses an area of approximately 454 square miles, the majority of which is in Massachusetts. The portion of this hydrologic unit within Rhode Island encompasses one major basin, the Blackstone River Basin. The Rhode Island portion of the Blackstone River Basin is approximately 75 percent rural land and very low density residential land with the balance about evenly split between suburban residential land and urban land. The urban areas are concentrated along the Blackstone River and in villages along its major tributaries. At a scale of 1:24,000 (the scale commonly used on USGS topographic maps), there are approximately 112 river miles and 2,440 lake acres in the Rhode Island portion of the Blackstone hydrologic unit. Most of the data for this watershed are on the Blackstone River which was the focus of a major monitoring effort conducted by Region I EPA, the MA DEP, URI, and the RIDEM. This study collected metals, DO, nutrient, sediment, toxicity, and effluent data during both wet and dry weather. The USGS also has several gaging stations along the Blackstone River from which flow, metals and nutrient data are available. Biological assessment data are collected from several rivers in this watershed as is baseline chemical data. A local Citizens Monitoring organization (Watershed Watch) collects water quality data for numerous lakes within the watershed. Approximately 36% of the river miles and 12% of the lake acres in this hydrologic unit are considered impaired. The major causes of impairment for rivers in this watershed are from: metals (Cu, Cr, Pb); ammonia, nutrients (phosphorus), low DO, pathogens and biodiversity impacts. The major causes of impairment for lakes in this watershed are from metals (Cu, Pb); ammonia; nutrients low DO; pathogens; and biodiversity impacts.

Data from the groundwater quality assessment in the state's 305(b) report, shows that there are 69 sites in Rhode Island within the Blackstone hydrologic unit where the groundwater is designated as not meeting the groundwater classification standards (referred to as non-attainment areas). The leading cause of this groundwater contamination is leaking underground storage tanks (27 sites). Public well data from the RI Department of Health for community wells and non-transient non-community wells revealed that 8 out of 54 wells sampled had detections of volatile organic compounds (305(b) report for the year ending June 1995, the last year tabulated).

Narragansett (01090004)

The Narragansett hydrologic unit encompasses portions of 6 of the 10 major basins described in the state's 305(b) Report. Those 6 major basins are the Coastal Waters; Narragansett Basin; Moshassuck River Basin; Woonasquatucket River Basin; Pawtuxet River Basin; and Ten

Mile River Basin. In general, these basins are highly urbanized, especially in their lower reaches, and also have several significant areas of old industrial sites. The Narragansett hydrologic unit covers approximately 1,657 square miles of which 61% are located in Massachusetts and 39% within Rhode Island. At a scale of 1:24,000 (the scale commonly used on USGS topographic maps), there are approximately 430 river miles; 10,543 lake acres; and 140 estuarine square miles in the Rhode Island portion of the Narragansett hydrologic unit. The Bay itself covers 147 square miles, including the Providence River. Data for this watershed are from special studies on several rivers and estuarine areas. There are also fixed stations where chemical, physical and/or biological data are collected. The lake water quality data are collected by the Watershed Watch Volunteer Monitoring program. Approximately 63% of the estuarine areas, 13% of the lake acres and 34% of the river miles in this hydrologic unit are considered impaired. The major causes of impairment for the estuarine waters is from low DO; thermal modifications; pathogens; and total toxics. The major causes of impairment for the rivers is from metals (Cu, Pb); pathogens; and biodiversity impacts. The major causes of impairment for lakes is from low DO; metals; nutrients; chlorides; pathogens; and excess algal growth.

Data from the groundwater quality assessment in the state's 305(b) report, shows that there are 303 sites in Rhode Island within the Narragansett hydrologic unit where the groundwater is designated as groundwater classification non-attainment. The leading cause of this groundwater contamination is leaking underground storage tanks (118 sites). Public well data from the RI Department of Health for community wells and non-transient non-community wells indicated that 18 out of 82 wells sampled had detections of volatile organic compounds (305(b) report for the year ending June 1995, the last year tabulated).

Pawcatuck-Wood (01090005)

The Pawcatuck-Wood hydrologic unit has an area of 603 sq. miles and encompasses towns in Connecticut and Rhode Island. Two major watersheds, the Pawcatuck River Basin and Coastal Waters (southern RI coastal waters and salt ponds and Block Island) are incorporated in this hydrologic unit. Approximately 88% of the Rhode Island portion of the basin is rural and very low density residential. Significant portions of the rural land is in agricultural use. About 8% of the Rhode Island portion of the basin is suburban residential and 4% is urban land. At a scale of 1:24,000 (the scale commonly used on USGS topographic maps), there are approximately 287 river miles, 3898 lake acres and 12 estuarine square miles in the Rhode Island portion of the Pawcatuck-Wood hydrological unit. Data for this hydrologic unit comes from a number of sources including fixed chemical and biological stations on several of the small tributaries; special water quality studies; and site remediation projects. Many of the lakes in the unit are monitored by the Watershed Watch Program. Approximately 68% of the estuarine waters, 9% of the lake acres and 30% of the river miles in this hydrologic unit are considered impaired. The major cause of impairment for the estuarine waters (salt ponds and tidal Pawcatuck river) is from pathogens. The major causes of impairment for rivers is from metals (Cu, Pb) and biodiversity impacts. The major causes of impairment for lakes is from nutrients, metals (Pb) and low DO. The relatively large percentage of river miles impaired in this generally considered pristine watershed, is a reflection of the fact that when a waterbody has any impairment for any use, the entire length of river segment, not just the length of the impaired area, is used in calculating the impaired waters totals. In the Pawcatuck River Basin, several rivers, including the Pawcatuck River, had biodiversity impacts and, as is the case in many rivers across the state, had violations of the very low Cu and Pb criteria. Totaling the entire river lengths from all these rivers resulted in an impairment of over 15% of the river miles in this hydrologic unit.

Data from the groundwater quality assessment in the state's 305(b) report, shows that there are 71 sites in Rhode Island within the Pawcatuck-Wood hydrologic unit where the groundwater is designated as groundwater classification non-attainment. As is the case with the

other hydrologic units, the leading cause of this groundwater contamination is leaking underground storage tanks (33 sites). Public well data from the RI Department of Health for community wells and non-transient non-community wells revealed that 11 out of 86 wells sampled had detections of volatile organic compounds (305(b) report for the year ending June 1995, the last year tabulated).

Table 2. Category I -- Watersheds in Need of Restoration

BLACKSTONE (01090003)

Basin Name	Waterbody Type		
Blackstone River Basin			
	Rivers	Total River Miles	112.13
		Total River Miles Impaired	40.58
		Percent River Miles Impaired	**36.20%**
	Lakes	Total Lake Acres in Basin	2442.55
		Total Lake Acres Impaired	284.7
		Percent lake acres impaired	**11.66%**

NARRAGANSETT (01090004)

Basin Name	Waterbody Type		
Coastal Waters			
	Estuarine	Total Estuarine Sq. Miles	32.36
		Total Estuarine Sq. Miles Impaired	27.61
		Percent Estuarine Waters Impaired	**85.32%**
	(Note:71% of the Coastal Waters Estuarine sq. miles are within the Narragansett HUC)		
	Lakes	Total Lake Acres in Basin	461
		Total Lake Acres Impaired	55
		Percent Lake Acres Impaired	**11.93%**
	(Note: 26% of the Coastal Waters Lake Acres are within the Narragansett HUC)		
	Rivers	Total River Miles	42.58
		Total River Miles Impaired	8.87
		Percent River Miles Impaired	**20.82%**
	(Note: 17% of the Coastal Waters River Miles are within the Narragansett HUC)		
Moshassuck River Basin			
	Rivers	Total River Miles	28.05
		Total River Miles Impaired	23.2
		Percent River Miles Impaired	**82.70%**
	Lakes	Total Lake Acres in Basin	161.1
		Total Lake Acres Impaired	0
		Percent Lake Acres Impaired	**0%**
Narragansett Bay Basin			
	Estuarine	Total Estuarine Sq. Miles	116.91
		Total Estuarine Sq. Miles Impaired	74.08
		Percent Estuarine Waters Impaired	**63.36%**
	Lakes	Total Lake Acres	2421.4
		Total Lake Acres Impaired	1205.2
		Percent Lake Acres Impaired	**49.77%**
	Rivers	Total River Miles	85.88
		Total River Miles Impaired	32.87
		Percent River Miles Impaired	**38.27%**

Table 2 continued

NARRAGANSETT (01090004) continued

Basin Name	Waterbody Type		
Pawtuxet River Basin			
	Lakes	Total Lake Acres in Basin	6718
		Total Lake Acres Impaired	332
		Percent Lake Acres Impaired	**4.94%**
	Rivers	Total River Miles	257.08
		Total River Miles Impaired	60.03
		Percent River Miles Impaired	**23.35%**
Ten Mile River Basin			
	Lakes	Total Lake Acres	234.3
		Total Lake Acres Impaired	234.3
		Percent Lake Acres Impaired	**100%**
	Rivers	Total River Miles	8.92
		Total River Miles Impaired	8.92
		Percent River Miles Impaired	**100%**
Woonasquatucket River Basin			
	Rivers	Total River Miles	42.68
		Total River Miles Impaired	21.46
		Percent River Miles Impaired	**50.28%**
	Lakes	Total Lake Acres in Basin	889
		Total Lake Acres Impaired	0
		Percent Lake Acres Impaired	**0%**

PAWCATUCK-WOOD (01090005)

Basin Name	Waterbody Type		
Pawcatuck River Basin			
	Estuarine	Total Estuarine Sq. Miles	2.44
		Total Estuarine Sq. Miles Impaired	2.44
		Percent Estuarine Waters Impaired	**100%**
	Rivers	Total River Miles	264.1
		Total River Miles Impaired	76.61
		Percent River Miles Impaired	**29.01%**
	Lakes	Total Lake Acres in Basin	3574.6
		Total Lake Acres Impaired	308.9
		Percent Lake Acres Impaired	**8.64%**

Table 2 continued

PAWCATUCK-WOOD (01090005) continued

Basin Name	Waterbody Type		
Coastal Waters			
	Estuarine	Total Estuarine Sq. Miles	32.36
		Total Estuarine Sq. Miles Impaired	27.61
		Percent Estuarine Waters Impaired	**85.32%**
	(Note:29% of the Coastal Waters Estuarine sq. miles are within the Pawcatuck-Wood HUC)		
	Lakes	Total Lake Acres in Basin	461
		Total Lake Acres Impaired	55
		Percent Lake Acres Impaired	**11.93%**
	(Note: 74% of the Coastal Waters Lake Acres are within the Pawcatuck-Wood HUC)		
	Rivers	Total River Miles	42.58
		Total River Miles Impaired	8.87
		Percent River Miles Impaired	**20.82%**
	(Note: 53% of the Coastal Waters River Miles are within the Pawcatuck-Wood HUC)		

B. Category II -- Watersheds Needing Preventative Action to Sustain Water Quality. The list of basins in this category was developed by querying Rhode Island's 305(b) database for the basins in which 15% or *less* of the waters are impaired. Evaluation of the dataset determined that the remaining 2 of the 5, eight-digit hydrologic units (HUCs) within Rhode Island fall into this category. They are the: Quinebaug (01100001), and the Cape Cod (01090002) (Table 3).

Quinebaug (01100001)

This hydrologic unit encompasses an area of approximately 737 sq. miles, most of which is in Connecticut with a small portion of its headwaters in Rhode Island. The portion of this hydrologic unit within Rhode Island encompasses one major basin, the Quinebaug River Basin. The Rhode Island portion is about 95% rural and very low density residential. The remainder of the area is suburban residential and very little urban land. At a scale of 1:24,000 (the scale commonly used on USGS topographic maps), there are approximately 62 river miles and 617 lake acres in the Rhode Island portion of this hydrologic unit. The Rhode Island portion is largely undeveloped area and consists of headwater streams and lakes. Data for this hydrologic unit comes from several fixed biological and chemical baseline stations. The lakes data comes from monitoring conducted by the Watershed Watch Program. Only 6% of the lake acres and 6% of the river miles are considered impaired. The threats of impairment in this hydrologic unit are low DO for lakes and metals (Pb) and biodiversity impacts for rivers.

Data from the groundwater quality assessment in the state's 305(b) report, shows that there are only 9 sites in Rhode Island within the Quinebaug hydrologic unit where the groundwater is designated as groundwater classification non-attainment. The leading cause of this groundwater contamination is leaking underground storage tanks (5 sites). Public well data from the RI Department of Health for community wells and non-transient non-community wells indicated that there were only 2 wells sampled and both were below detection limits for volatile organic compounds (305(b) report for the year ending June 1995, the last year tabulated).

Cape Cod (01090002)

This hydrologic unit encompasses an area of approximately 2,885 sq. miles, most of which is in Massachusetts. The Rhode Island portion is largely undeveloped area and includes portions of three major watersheds: Coastal Waters; Narragansett Basin; and Westport River Basin. The Rhode Island portion of the watershed is approximately 82% rural land and very low density residential. Approximately 15% is suburban residential and 3% urban land. At a scale of 1:24,000 (the scale commonly used on USGS topographic maps), there are approximately 19 lake acres and 27 river miles in the Rhode Island portion of this hydrologic unit. Data for this hydrologic unit comes from several fixed biological stations and several special-study, bioassessment sites; a chemical baseline monitoring site and several Watershed Watch pond sites. None of the river miles nor any of the lake acres in this hydrologic unit are considered impaired. The only threats of impairment identified are from pathogens on the rivers.

Data from the groundwater quality assessment in the state's 305(b) report, shows that there are only 5 sites in Rhode Island within the Cape Cod hydrologic unit where the groundwater is designated as groundwater classification non-attainment. The leading cause of this groundwater contamination is leaking underground storage tanks (2 sites) and landfills/dumps (2 sites). Public well data from the RI Department of Health for community wells and non-transient non-community wells revealed that there were only 3 wells sampled and one had a detection of a volatile organic compound (305(b) report for the year ending June 1995, the last year tabulated).

Table 3. Category II -- Watersheds Needing Preventive Action to Sustain Water Quality

QUINEBAUG (01100001)

Basin Name	Waterbody Type		
Quinebaug River Basin			
	Lakes	Total Lake Acres in Basin	617.1
		Total Lake Acres Impaired	39
		Percent Lake Acres Impaired	**6.32%**
	Rivers	Total River Miles	62.2
		Total River Miles Impaired	3.48
		Percent River Miles Impaired	**5.60%**

CAPE COD (01090002)

Basin Name	Waterbody Type		
Westport River Basin			
	Rivers	Total River Miles	14.2
		Total River Miles Impaired	0
		Percent River Miles Impaired	**0%**
Coastal Waters	*Rivers*	Total River Miles	42.58
		Total River Miles Impaired	8.87
		Percent River Miles Impaired	**20.82%**
	(Note: 30% of Coastal River Miles are in the Cape Cod HUC)		
Narragansett Bay Basin	*Lakes*	Total Lake Acres	2421.4
		Total Lake Acres Impaired	1205.2
		Percent Lake Acres Impaired	**49.77%**
	(Note: 0.8% of the Narragansett Bay Basin lake acres are in the Cape Cod HUC)		

C. Category III - Watersheds with Pristine/Sensitive Aquatic System Conditions on Lands Administered by Federal, State, or Tribal Governments.

It is the State's understanding that basins listed under Category III represent those lands administered by federal, state, or tribal governments. Since such holdings are extremely limited in any of the basins which may be considered pristine, no basins will be listed for this category.

D. Category IV - Watersheds With Insufficient Data to Make an Assessment.

Available data indicate that the basins that might have been placed in this category in fact meet the threshold criteria of greater than 15% waters impaired, and therefore, they will be placed in Category I and not Category IV.

BLACKSTONE (01090003)

Basin Name	Waterbody Type		
Blackstone River Basin			
	Rivers	total river miles	112.132
		river miles not assessed	35.242
		percent unassessed	**31%**
	Lakes	total lake acres	2442.55
		lake acres not assessed	683
		percent unassessed	**28%**

NARRAGANSET (01090004)

Basin Name	Waterbody Type		
Woonasquatucket River Basin			
	Rivers	total river miles	42.676
		river miles not assessed	21.216
		percent unassessed	**49.7%**

V. WATERSHED RESTORATION PRIORITIES

A. Process and Rationale

Following the previously referenced US EPA guidance, the State of Rhode Island has put together a listing of watershed restoration priorities. The core elements of these priorities are to identify specific Category I watersheds most in need of restoration, beginning 1999 – 2000 and to coordinate with existing restoration priorities including but not limited to those established by the Section 303(d) Total Maximum Daily Load process. Additionally, US EPA guidance requires a preliminary long term schedule for attention to all remaining Category I watersheds.

The unified watershed assessment process provided the foundation for setting the watershed restoration priorities within Rhode Island. Many existing priority-setting mechanisms including the state's 303(d) List, TMDL schedule, Performance Partnership Agreement, and locally led conservation efforts by the state conservation technical committee were valuable in establishing these watershed restoration priorities. The following tables and final section of this report are not intended to exclude other potential projects within these priority watersheds but to identify known problems as of the development of this document. The priorities presented include those scheduled for TMDL development, those which require additional monitoring prior to TMDL development and those that are priorities for agricultural best management practices (BMPs).

Table 4 identifies the Category I watersheds and waterbodies most in need of restoration, beginning in 1999 – 2000. This table, which lists the watershed restoration priorities, reflects the scheduling set forth in the State's 303(d) Total Maximum Daily Load (TMDL) List, finalized in August 1998. As noted previously, in developing the TMDL schedule, the Department of Environmental Management's Office of Water Resources incorporated the ideas and comments of other state and federal agencies, environmental organizations, concerned businesses and citizens received through a number of public workshops and forums held over the past year. These groups have consistently supported the prioritization of efforts to protect and restore the State's drinking water supply sources, shellfish harvesting waters, and Narragansett Bay and waters tributary thereto. A long-term schedule, beyond the year 2000, to address all remaining Category I watersheds and waterbodies, is also incorporated into Table 4.

Tables 5 and 6 reflect the watersheds and waterbodies which appear in Group 3 and Group 4, respectively, of the 303(d) List. These lists include the watershed restoration priorities for waterbodies which require additional monitoring prior to TMDL development. Group 3 includes the list of waterbodies where monitoring data for metals show violations of criteria however, all data are expressed as total metals. Based on the 1997 amendments to the Water Quality Regulations, metals criteria are now expressed as dissolved metal. Therefore, it is not known whether these waters have metal violations based on dissolved criteria. Additional sampling is required to make this assessment and confirm their status on the 303(d) List. Group 4 includes waterbodies whose assessments were made based on insufficient data and/or data that is old. Therefore, these waters need further monitoring to determine if there are Water Quality Standards violations.

For the purpose of complete reporting, Table 7, which reflects the watersheds and waterbodies which appear in Group 5 of the 303(d) List has been included. A TMDL or a control action functionally equivalent to a TMDL has been developed for these waters. Implementation is underway which will result in attainment of the standards.

The EQIP Geographic Priority Areas were established using a process developed by the NRCS National Office. The three Rhode Island Conservation Districts convened a statewide local work group to determine the need for, and recommend the location of, priority areas for Rhode Island. The local work group was comprised of representatives of federal, state, and local groups having an interest in agriculture and its potential impact on the environment. The local group agreed to focus on five (5) geographic areas where agriculture may be having adverse impacts:

- Drinking water supply reservoirs
- Ground water aquifers and recharge areas, including community wellhead protection areas
- Critical fish and wildlife habitat areas impacted by agriculture
- Coastal salt pond watersheds
- Shellfish beds watersheds

These five areas were identified in the Rhode Island Geographic Information System and a map of the Priority areas was developed. USDA has funded restoration projects throughout these areas in 1997 and 1998. The 1999 EQIP proposal is based on this same geographic area. Further discussion of the Watershed Restoration Priorities for Agricultural Impacts can be found in the next section, section VI, of this document.

The State has utilized a "nesting approach" to identify waterbodies and sub-watershed areas that fall within the larger 8-digit HUC unit and even the RI Major Basin. It is at this scale that the actual restoration work will be accomplished.

Table 4. Watershed Restoration Priorities

BLACKSTONE (01090003)

Blackstone River Basin

Waterbody ID	Name	Priority	Size	Class	Status	Reason for non attainment	Target for TMDL
RI0001003R-01	Blackstone River	T	15.748 mi	B1/B1{a}	NS	biodiversity impacts, hypoxia, nutrients, pathogens, metals (Cr, Cu, Pb)	1998 - 2001 requires EPA/MA action
RI0001006L-04	Robin Hollow Pond	T	15 ac	A (U)	PS	TSS, turbidity, pathogens	1998 - 2000
RI0001003L-01	Scott Pond	H	34 ac	B (E)	PS	hypoxia, nutrients, excess algal growth	2000 - 2005
RI0001003L-02	Valley Falls Pond	H	42 ac	B1 (U)	NS	biodiversity impacts, pathogens, hypoxia, nutrients, Cu, Pb	2000 - 2005
RI0001003R-03	Mill River	H	0.082 mi	B	NS	metals (Pb)	2000 - 2005
RI0001003R-04	Peters River	H	0.469 mi	B	NS	pathogens, metals (Cu, Pb)	2000 - 2005
RI0001006R-01	Abbott Run Brook	H	4.392 mi	A	PS	biodiversity impacts, TSS, turbidity	2000 - 2005
RI0001002R-01	Branch River	M	10.744 mi	B	PS	biodiversity impacts, pathogens, metals (Cu, Pb)	2005 - 2010
RI0001002R-05	Clear River	M	2.199 mi	B/B1	PS	biodiversity impacts, nutrients, metals (Pb)	2005 - 2010

NARRAGANSETT (01090004)

Narragansett Basin

Waterbody ID	Name	Priority	Size	Class	Status	Reason for non attainment	Target for TMDL
RI0007032E-01	Mount Hope Bay	T	8.940 mi^2	SB1/SB/SA	PS	biodiversity impacts	1998 - 2000 pending EPA/MA action
RI0007037L-01	Stafford Pond	T	485 ac	A (E)	PS	hypoxia, nutrients, excess algal growth	1998 - 2000
RI0007021E-01	Barrington River	T	0.956 mi^2	SA/SB1	PS/NS	pathogens	1998 - 2000
RI0007022E-01	Palmer River	T	0.733 mi^2	SA	PS/NS	pathogens, nutrients	1998 - 2000 requires EPA/MA action
RI0007021R-01	Runnins River	T	2.807 mi	B	NS	pathogens	1998 - 2000
RI0007025R-01	Hardig Brook	T	5.768mi	B	NS	pathogens, nutrients	1998 - 2000
RI0007025R-01	Hardig Brook	M	5.768 mi	B	NS	biodiversity impacts, chlorides	2005 - 2010
RI0007025E-01	Apponaug Cove	T	0.297 mi^2	SB	NS	nutrients, hypoxia	1998 - 2000

Table 4 continued

NARRAGANSETT (01090004) Cont'd							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Status**	**Reason for non attainment**	**Target for TMDL**
RI0007025E-02	Brushneck Cove	T	0.122 mi^2	SA	PS/NS	pathogens, nutrients, hypoxia	1998 - 2000
RI0007025E-03	Buttonwoods Cove	T	0.072 mi^2	SA	PS	pathogens, nutrients, hypoxia	1998 - 2000
RI0007025E-04	Greenwich Bay	T	3.870 mi^2	SA/SB	PS	pathogens, nutrients, hypoxia	1998 - 2000
RI0007025E-05	Greenwich Cove	T	0.418 mi^2	SB1	NS	nutrients, hypoxia	1998 - 2000
RI0007025E-06	Warwick Cove	T	0.214 mi^2	SB	PS	nutrients, hypoxia	1998 - 2000
RI0007019E-01	Seekonk River	T	1.022 mi^2	SB1{a}	NS	hypoxia	2000 -2002
RI0007020E-01	Providence River	T	8.292 mi^2	SB1{a}/SB1	NS	hypoxia, nutrients	2000 - 2002
RI0007028R-03	Hunt River	T	8.820 mi	B	TH	pathogens, nutrients	2000 - 2002
RI0007028R-02	Fry Brook	T	6.155 mi	B	PS	pathogens	2000 -2002
RI0007028R-06	Scrabbletown Brook	T	3.155 mi	A	NS	pathogens	2000 - 2002
RI0007021R-01	Runnins River	H	2.807 mi	B	NS	biodiversity impacts, hypoxia	2000 – 2005
RI0007027E-02	Bissel Cove	H	0.107 mi^2	SA	NS	pathogens	2000 - 2005
RI0007035R-01	Bailey Brook	H	3.667 mi	A	PS	biodiversity impacts, nutrients, chlorides	2000 - 2005
RI0007035R-02	Maidford River	H	4.258 mi	A	PS	biodiversity impacts, nutrients, chlorides	2000 - 2005
RI0007025L-01	Gorton Pond	M	59 ac	B (E)	PS	hypoxia, nutrients, excess algal growth, chlorides	2005 – 2010
RI0007020L-03	Warwick Pond	L	86 ac	B (E)	PS	hypoxia, nutrients, excess algal growth	2010+
RI0007020L-06	Prince's Pond (Tiffany Pond)	L	19 ac	A (H)	PS	nutrients, excess algal growth	2010+
RI0007024R-01	Buckeye Brook	L	2.711 mi	B	PS	biodiversity impacts	2010+
RI0007032E-01	Mount Hope Bay	M	8.940 mi^2	SB1/SB/SA	PS	pathogens, hypoxia, nutrients	2005 - 2010 requires EPA/MA action
RI0007033E-01	Kickamuit River	M	0.878 mi^2	SA	PS	pathogens	2005 - 2010
RI0007034R-01	Upper Kickamuit River	H	0.925 mi	A	PS	biodiversity impacts	2005 - 2010
RI0007036R-01	Jamestown Brook	M	1.312 mi	A	NS	biodiversity impacts, pathogens	2005 - 2010
RI0007026R-01	Silver Creek	L	1.728 mi	B	PS	biodiversity impacts	2010+
RI0007029E-01	East Passage Narr. Bay (area around McAllister Landfill)	L	0.043 mi^2	SA	NS	unspecified toxicity	2010+

NARRAGANSETT (01090004) Cont'd Table 4 continued							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Status**	**Reason for non attainment**	**Target for TMDL**
RI0007029E-03	Potter Cove	L	0.154 mi^2	SA{b}	PS	hypoxia	2010+
RI0007030E-01	Newport Harbor/Coddington Cove	L	0.916 mi^2	SB	NS	biodiversity impacts	2010+
Woonasquatucket River Basin							
RI0002007R-05	Latham Brook	H	3.285 mi	B	NS	biodiversity impacts	2000 - 2005
RI0002007R-10	Woonasquatucket River	H	8.396 mi	B1/B1{a}	NS	biodiversity impacts, PCBs, dioxin, metals (Hg)	2000 - 2005
RI0002007R-11	Nine Foot Brook	H	2.836 mi	B	PS	biodiversity impacts	2000 - 2005
Ten Mile River Basin							
RI0004009R-01	Ten Mile River	L	8.923 mi	B/B1	NS	biodiversity impacts	2010+
RI0004009L-02	Slater Park Pond	L	1.3 ac	B1 (H)	NS	pathogens, hypoxia, excess algal growth	2010+
Pawtuxet River Basin							
RI0006018L-03	Simmons Reservoir	M	109 ac	B (E)	PS	nutrients, excess algal growth, siltation, turbidity	2005 - 2010
RI0006017L-05	Roger Williams Parks Ponds	L	98 ac	B (H)	PS	pathogens, hypoxia, nutrients, excess algal growth, chlorides	2010+
Coastal Waters							
RI0010031E-01	Sakonnet River (Portsmouth Park)	T	0.262 mi^2	SA	NS	pathogens	1998 - 2000
RI0010031E-03	The Cove - Island Park	T	0.157 mi^2	SA	NS	pathogens	1998 - 2000
RI0010044E-01	Pettaquamscutt River (Narrow River)	T	0.914 mi^2	A	NS	pathogens	1998 - 2000
RI0010031E-02	Nannaquaket Pond	H	0.018 mi^2	SA	PS	pathogens	2000 - 2005
PAWCATUCK-WOOD (01090005)							
Coastal Waters							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Status**	**Reason for non attainment**	**Target for TMDL**
RI0010045R-03	Mitchell Brook	T	0.820 mi	B	NS	biodiversity impacts	2000 - 2002
RI0010045L-01	Saugatucket Pond	T	41 ac	B (M)	PS	biodiversity impacts, nutrients	2000 - 2002
RI0010045R-05	Saugatucket River	T	1.573 mi	B	PS/NS	biodiversity impacts, pathogens	2000 - 2002
RI0008038E-01	Pawcatuck River - Tidal	H	0.718 mi	SB1/SB	PS/NS	hypoxia, pathogens	2000 - 2005 requires CT action
RI0008038E-02	Little Narr. Bay	H	1.724 mi^2	SA/SA{b}	NS	pathogens	2000 - 2005 requires CT action
RI0010043E-02	Greenhill Pond	H	0.660 mi^2	SA	NS	pathogens	2000 - 2005

Table 4 continued

PAWCATUCK-WOOD (01090005) Cont'd							
Coastal Waters Cont'd							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Status**	**Reason for non attainment**	**Target for TMDL**
RI0010043E-04	Ninigret Pond	H	0.158 mi^2	SA	NS	pathogens	2000 - 2005
RI0010043E-06	Point Judith Pond	H	0.335 mi^2	SA	NS	pathogens	2000 - 2005
RI0010046L-01	Sands Pond	H	14 ac	A (U)	PS	excess algal growth, taste and odor, turbidity	2000 - 2005
Pawcatuck River Basin							
RI0008039R-02	Ashaway River	M	9.231 mi	A/B	PS	biodiversity impacts	2005 - 2010
RI0008039R-06	Chipuxet River	M	15.367 mi	A/B	PS	biodiversity impacts, nutrients, turbidity	2005 - 2010
RI0008039L-13	Hundred Acre Pond	M	85 ac	B (M/E)	PS	hypoxia, excess algal growth	2005 - 2010
RI0008039L-14	Barber Pond	M	28.5 ac	B (M)	PS	hypoxia	2005 - 2010
RI0008039R-18	Pawcatuck River	M	9.300 mi	B/B1	PS/NS	biodiversity impacts	2005 - 2010
RI0008040R-04	Canochet Brook	M	9.002 mi	B	PS	biodiversity impacts, pathogens	2005 - 2010
RI0008040L-12	Deep Pond (Exeter)	M	2.4 ac	A (M/E)	PS	hypoxia	2005 - 2010

Table 5. TMDL Group 3 Watersheds and Waterbodies

Group 3 **Monitoring data for metals for these waters show violations of criteria however, all data is expressed as total metals. Based on 1997 amendments to the Water Quality Regulations, metals criteria are expressed as dissolved. Therefore it is not known whether these waters have metal violations based on dissolved criteria. Additional sampling is required to make this assessment.**							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Reason for non attainment**	**Target for Data Collection ***	**Target for TMDL (if necessary)**
Blackstone River Basin							
RI0001002L-09	Slatersville Reservoir	M	208 ac	B (E)	metals	1998 - 2002	2005 - 2010
RI0001006R-01	Abbott Run Brook	H	4.392 mi	A	Pb	1998 - 2002	2000 - 2005
Woonasquatucket River Basin							
RI0002007R-10	Woonasquatucket River	H	8.396 mi	B1/B1{a}	Cu, Pb	1998 - 2002	2000 - 2005
Moshassuck River Basin							
RI0003008R-01	Moshassuck River	L	5.276 mi	B/B{a}	Cu, Pb	1998 - 2002	2010+
Ten Mile River Basin							
RI0004009L-01	Turner Reservoir (North and South)	L	233 ac	B (E)	metals	1998 - 2002	2010+
RI0004009R-01	Ten Mile River	L	8.923 mi	B/B1	Pb	1998 - 2002	2010+
Quinebaug River Basin							
RI0005047R-02	Keach Brook	L	3.484 mi	B	Cd, Pb	1998 - 2002	2010+
Pawtuxet River Basin							
RI0006014R-04	Pawtuxet River - South Branch	M	10.033 mi	B/B1	Cd, Cu, Pb	1998 - 2002	2005 - 2010
RI0006016R-06	Pawtucket River - North Branch	M	6.938 mi	A/B	Cd, Cu, Pb	1998 - 2002	2005 - 2010
RI0006017L-02	Three Ponds	M	22 ac	B (U)	Cu	1998 - 2002	2005 - 2010
RI0006017L-06	Mashapaug Pond	M	77 ac	B (E)	metals	1998 - 2002	2005 - 2010
RI0006017R-02	Meshanticut Brook	M	6.527 mi	B	Cu, Pb	1998 - 2002	2005 - 2010
RI0006017R-04	Three Ponds Brook	M	1.103 mi	B	Cu, Pb	1998 - 2002	2005 - 2010
RI0006018R-03	Pocasset River	M	21.549 mi	B	Cu, Pb	1998 - 2002	2005 - 2010
RI0006018L-05	Print Works Pond	M	26 ac	B (U)	Cu	1998 - 2002	2005 - 2010

Table 5.

Waterbody ID	Name	Priority	Size	Class	Reason for non attainment	Target for Data Collection *	Target for TMDL (if necessary)
Narragansett Basin							
RI0007020E-01	Providence River	L	8.292 mi^2	SB1{a}/SB1	metals	1998 - 2002	2010+
RI0007021R-01	Runnins River	H	2.807 mi	B	metals	1998 - 2002	2000 - 2005
RI0007025R-01	Hardig Brook	M	5.768 mi	B	Pb	1998 - 2002	2005 - 2010
RI0007035R-01	Bailey Brook	H	3.667 mi	A	Cd, Pb	1998 - 2002	2000 - 2005
RI0007035R-02	Maidford River	H	4.258 mi	A	Cd, Pb	1998 - 2002	2000 - 2005
RI0007035L-03	North Easton Pond (Green End Pond)	L	113 ac	A (U)	Cu, Pb	1998 - 2002	2010+
RI0007036R-01	Jamestown Brook	M	1.312 mi	A	Cd, Pb	1998 - 2002	2005 - 2010
RI0007036L-02	South Watson Pond (South Pond)	M	5 ac	A (U)	Cu, Pb	1998 - 2002	2005 - 2010
Pawcatuck River Basin							
RI0008039L-01	Chapman Pond	M	173 ac	B (U)	Pb	1998 - 2002	2005 - 2010
RI0008039R-02	Ashaway River	M	9.231 mi	A/B	Cu, Pb	1998 - 2002	2005 - 2010
RI0008039R-06	Chipuxet River	M	15.367 mi	A/B	Pb	1998 - 2002	2005 - 2010
RI0008040R-04	Canochet Brook	M	9.002 mi	B	Pb	1998 - 2002	2005 - 2010

***** The target dates for additional data collection for those waters in Group 3 will occur in accordance with the Department's monitoring strategy, when developed.

Table 6. TMDL Group 4 Watersheds and Waterbodies

Group 4 Assessments were made based on insufficient data and/or data that is old. Therefore, these waters need further monitoring to determine if there are Water Quality Standards violations.							
Waterbody ID	**Name**	**Priority**	**Size**	**Class**	**Reason for non attainment**	**Target for Data Collection ***	**Target for TMDL (if necessary)**
Blackstone River Basin							
RI0001002L-09	Slatersville Reservoir	M	208 ac	B (E)	pathogens, nutrients	1998 - 2002	2005 - 2010
Ten Mile River Basin							
RI0004009L-01	Turner Reservoir (North and South)	L	233 ac	B (E)	pathogens, hypoxia, nutrients, chlorides	1998 - 2002	2010+
Pawtuxet River Basin							
RI0006017L-02	Three Ponds	M	22 ac	B (U)	pathogens, hypoxia, nutrients		2005 - 2010
RI0006017L-06	Mashapaug Pond	M	77 ac	B (E)	hypoxia, nutrients, organics	1998 - 2002	2005 - 2010
RI0006018R-03	Pocasset River	M	21.549 mi	B	pathogens	1998 - 2002	2005 - 2010
RI0006018R-04	Simmons Brook	M	2.878 mi	B	pathogens	1998 - 2002	2005 - 2010
RI0006018L-05	Print Works Pond	M	26 ac	B (U)	pathogens, SS, chlorides	1998 - 2002	2005 - 2010
Narragansett Basin							
RI0007020L-04	Posnegansett Pond	L	13 ac	A (M)	hypoxia, nutrients	1998 - 2002	2010+
RI0007034L-01	Kickamuit Reservoir (Warren Reservoir)	H	42.2 ac	A (U)	pathogens, nutrients, excess algal growth, taste and odor, turbidity	1998 - 2002	2005 - 2010
RI0007035L-01	Gardiner Pond	H	92 ac	A (U)	biodiversity impacts, nutrients, turbidity	1998 - 2002	2000 - 2005
RI0007035L-02	Nelson Paradise Pond	H	29 ac	A (U)	biodiversity impacts	1998 - 2002	2000 - 2005
RI0007035L-03	North Easton Pond (Green End Pond)	H	113 ac	A (U)	biodiversity impacts, nutrients, excess algal growth, SS, turbidity	1998 - 2002	2000 - 2005
RI0007035R-04	Lawton Brook	H	0.379 mi	A	biodiversity impacts	1998 - 2002	2000 - 2005
RI0007035L-05	Saint Mary's Pond	H	112 ac	A (U)	biodiversity impacts	1998 - 2002	2000 - 2005
RI0007035L-06	Lawton Valley Reservoir	H	81 ac	A (U)	biodiversity impacts	1998 - 2002	2000 - 2005
RI0007035L-10	Sisson Pond	M	69 ac	A (U)	biodiversity impacts	1998 - 2002	2005 - 2010
RI0007036L-02	South Watson Pond (South Pond)	M	5 ac	A (U)	biodiversity impacts, turbidity	1998 - 2002	2005 - 2010

Group 4

Assessments were made based on insufficient data and/or data that is old. Therefore, these waters need further monitoring to determine if there are Water Quality Standards violations.

Waterbody ID	Name	Priority	Size	Class	Reason for non attainment	Target for Data Collection *	Target for TMDL (if necessary)
Pawcatuck River Basin							
RI0008039L-01	Chapman Pond	M	173 ac	B (U)	nutrients, noxious aquatic plants	1998 - 2002	2005 - 2010
RI0008040R-16	Wood River	M	0.635 mi	B	biodiversity impacts	1998 - 2002	2005 - 2010
RI0008040L-20	Long Pond (Hopkinton)	M	20 ac	B (D)	hypoxia	1998 - 2002	2005 - 2010

* The target dates for additional data collection for those waters in Group 4 will occur in accordance with the Department's monitoring strategy, when developed.

Table 7. TMDL Group 5 Watersheds and Waterbodies

Group 5 **A TMDL or a control action functionally equivalent to a TMDL has been developed for these waters. Implementation is underway which will result in attainment of the standards. However, the standards will not be met within the next two years.**				
Waterbody ID	**Name**	**Size**	**Cause**	**Control Action**
Blackstone River Basin				
RI0001002R-13	Tarkiln Brook	0.250 mi	hazardous waste site	signed Record of Decision
Woonasquatucket River Basin				
RI0002007R-10	Woonasquatucket River	3.732 mi	pathogens	due to CSOs; approved Facilities Plan
Moshassuck River Basin				
RI0003008R-01	Moshassuck River	5.276 mi	pathogens, TSS	due to CSOs; approved Facilities Plan
RI0003008R-03	West River	5.557 mi	pathogens	due to CSOs; approved Facilities Plan
Pawtuxet River Basin				
RI0006017R-03	Pawtuxet River - Main Stem	11.004 mi	biodiversity impacts, nutrients, hypoxia, Cu, Pb	permits issued to RIPDES dischargers
Narragansett Basin				
RI0007020E-01	Providence River	8.292 mi^2	pathogens	due to CSOs; approved Facilities Plan
RI0007024E-01	Upper Narragansett Bay	14.910 mi^2	pathogens	due to CSOs; approved Facilities Plan
RI0007027E-01	Allen Harbor	0.091 mi^2	toxics	signed Record of Decision

KEY for Tables 4, 5, 6, & 7.

TMDL PRIORITY:
T = Targeted
H = High Priority for TMDL
M = Medium Priority for TMDL
L = Low Priority for TMDL

Class:
The column labeled "Class" includes the water quality classification for all waterbodies. In addition, this column contains the tropic class for freshwater lakes, ponds or reservoirs. The tropic class is found in parenthesis.

Water Quality Classification:
A drinking water supply, primary and secondary contact recreation, fish and wildlife habitat
B primary and secondary contact recreation, fish and wildlife habitat
B1 primary and secondary contact recreation, fish and wildlife habitat, recognizes potential for impacts to primary contact due to approved wastewater discharges
SA shellfish harvesting for direct human consumption, primary and secondary contact recreation, fish and wildlife habitat
SB shellfish harvesting for controlled relay and depuration, primary and secondary contact recreation, fish and wildlife habitat
SB1 primary and secondary contact recreation, fish and wildlife habitat, recognizes potential for impacts to primary contact due to approved wastewater discharges
{a} denotes partial use of classification due to impacts from combined sewer overflows
{b} denotes partial use of classification due to potential impacts from concentration of vessels as may be found at marinas or mooring fields

Trophic Class:
O = Oligotrophic (low algae/nutrient)
M = Mesotrophic (intermediate algae/nutrients)
E = Eutrophic (excess algae/nutrients)
H = Hypereutrophic ("pea soup" conditions, extreme eutrophic conditions)
D = Dystrophic (high tannin/"brown water lake"/humic substances)
U = Unknown
$^{@}$ = abundant bottom vegetation

Assessment Status
PS = Partially Supporting
NS = Not Supporting
TH = Threatened

Reason for non attainment
Are those pollutants or other stressors that contribute to the actual or threatened impairment of designated uses in a waterbody.
Biodiversity Impacts = Evaluation of the biological community indicates an impairment relative to a reference/control site.

VI. WATERSHED RESTORATION PRIORITIES FOR AGRICULTURAL IMPACTS

The US Department of Agriculture Environmental Quality Incentives Program (EQIP) promotes selection of priority areas for conservation work based on critical natural resources being impacted and environmental effects. The criteria selected in Rhode Island for EQIP Priority Areas were based on agricultural impacts to natural resources. These areas conform to the Unified Watershed Restoration Priorities for other land use within Rhode Island.

A local group of interested people attended a meeting on September 17, 1996 to select a geographic priority area and statewide natural resource priority concern for Rhode Island. The group consisted of local farmers from all five counties in the state and members of the local Farm Service Agency (FSA) county committees and conservation districts. Proposals for the geographic priority area and the priority concern approved by the local group were presented to the State Technical Committee on September 19th. The Technical Committee reviewed the proposals and made recommendations to the State Conservationist that they be approved.

The criteria that the local group identified were those resources that the group felt were critical in the state. The following criteria were used for selection of a geographic priority area in the state. All these areas are impacted by agriculture.

- Drinking water supply reservoir watersheds
- Ground water aquifers and recharge areas, including community wellhead protection areas
- Critical fish and wildlife habitat areas impacted by agriculture
- Coastal salt pond watersheds
- Shellfish beds watersheds

Based on the above criteria, appropriate GIS data sets were selected to delineate the EQIP priority area for Rhode Island (refer to EQIP map).

Descriptions of land use, farm operations and environmental effects to be reduced or avoided will be described for each of these areas. In addition, the factors causing or threatening resource degradation within these areas will be addressed. Likewise, and the kind and extent of conservation measures needed to address resource concerns within these areas will be also be addressed.

Watersheds Of Drinking Water Reservoirs:

Land Use And Farming Operations

Rhode Island's drinking water reservoirs are present in the northern and eastern corners of the state, and essentially absent in the southern section. This is due to the land forms and soils present. In these areas, glacial till in a rolling terrain dominant the landscape. In the northern portion of the state, the sandy, gravely soils are not conducive to large scale farm operations. Hence, most of the farms in Providence County are relatively small dairy farms and orchards. However, in the eastern section, the dense till, silt loam soils are abundant and quite conducive to large vegetable and nursery operations. Dairy and other livestock operations also exist in eastern Rhode Island.

Environmental Effects Reduced Or Avoided

The primary concerns relative to agriculture and its impact on drinking water quality are phosphorus, bacteria and sediment loadings to reservoirs. Implementation of best management practices will be focused on reducing inputs of these parameters.

Conservation Measures Needed

Following the development of an holistic conservation plan for those farms either identified as being a source of contaminants or who independently come forward to implement a plan, the following Best Management Practices (BMP's) may be installed:

- Integrated crop management systems, including nutrient and pesticide management.
- Erosion control structures, such as diversions and waterways.
- Riparian and field buffer strips.
- Pasture management, including improved grazing systems.
- Barnyard and manure management systems, including waste storage structures, heavy use areas, filter strips, treatment wetlands, roof runoff management, compost facilities, and waste utilization.

Watersheds Of Prime Shellfish Beds Potentially Impacted By Agriculture

Land Use And Farming Operations

The majority of the watersheds draining directly to prime shellfish beds are highly developed, given that they are adjacent to the coastline. However, rural/agricultural areas are concentrated in the upper reaches of these watersheds. Hence, most of the farms are not generally considered to be causing any significant loadings. However, as noted in the introduction, one small dairy farm was recently identified as being the major source of fecal coliform bacteria negatively impacting a very important shellfishing area. This scenario is likely to be repeated again and again as the state regulatory agencies continue their monitoring efforts in other sensitive watersheds. RIDEM has already guessed that two other dairy farms might be causing similar problems in other areas. Livestock farms are the only farming operations of concern in the shellfish bed watersheds due to the contribution of fecal bacteria.

Environmental Effects Reduced Or Avoided

As stated above, fecal coliform bacteria loadings to prime shellfish beds are the primary environmental effects to be reduced or avoided with implementation of conservation plans in the these areas.

Conservation Measures Needed

Once again, following the development of holistic conservation plans and agricultural waste management plans, the following BMP's may be implemented:

- Integrated crop management systems, including nutrient and pesticide management.
- Riparian and field buffer strips.
- Pasture management, including improved grazing systems.
- Barnyard and manure management systems, including waste storage structures, heavy use areas (in some cases a roof may be necessary to prevent stormwater runoff), filter strips, treatment wetlands, roof runoff management, compost facilities, and waste utilization.

Watersheds Of Coastal Salt Ponds

Land Use And Farming Operations

Land use in the watersheds of coastal salt ponds tends to be a mixture of either extremely dense development of small cottage type "summer residences," or newly developed subdivisions on very large lots. Interspersed among these two principle uses are old, historic farms. These farming operations are very diversified without one primary type in dominance. Some ponds have dairy farms in close proximity, others only have vegetable, hay, and cut flower operations. Many of the fields extend to very near the edge of the water. These coastal ponds are extremely sensitive ecosystems and economically important to the shellfishing and open water fishing areas within Block Island Sound. The ponds provide

winter shelter for migratory waterfowl, and are the primary food source of open water fish species. They are also economically important to the multibillion dollar recreation industry in Rhode Island.

Environmental Effects Reduced Or Avoided

The primary environmental effects from agricultural operations would be nitrogen and bacterial loadings to the saltwater ponds.

Conservation Measures Needed

Again, following the development of holistic conservation plans and agricultural waste management plans, the following BMP's may be implemented:

- Integrated crop management systems, including nutrient and pesticide management.
- Detailed nutrient management plans with field-specific nitrogen budgets.
- Riparian and field buffer strips.
- Pasture management, including improved grazing systems.
- Barnyard and manure management systems, including waste storage structures, heavy use areas (in some cases a roof may be necessary to prevent stormwater runoff), filter strips, treatment wetlands, roof runoff management, compost facilities, and waste utilization.

Groundwater Aquifers And Recharge Areas, Including Community Wellhead Protection Areas

Land Use And Farming Operations

The two largest sole source groundwater aquifers in Rhode Island are located in the southwestern corner of the state. These areas are also home to the large majority of commercial turf and vegetable farms in Rhode Island. Land use in these areas is very rural with a predominance of cropland and forests. Crop farms are predominantly located on broad glacial outwash in river valleys, which affords flat, extremely productive silt and sandy loam soils. Livestock operations tend to be located in the drumloidal hills separating the outwash valleys. Soils are sandy and stony and not particularly productive.

Environmental Effects Reduced Or Avoided

In discussion with the local work group and state team, the primary concern in groundwater areas is proper storage of farm fertilizers and chemicals, including fuels. Pesticide or fuel spills during mixing and loading can cause "point" problems. Also, old, decaying underground fuel tanks are present on many farms, despite state laws requiring their removal. In addition, improper storage of animal waste products has historically caused concern in sole source aquifers. Large field stacks of dairy and poultry manure have caused significant nitrogen loading to groundwater.

Conservation Measures Needed

- Pesticide and fuel storage containment structures.
- Pesticide management plans, including vulnerability assessments of farmstead wellhead areas.
- Waste storage structures, to eliminate the need to field stack manure.

Critical Fish And Wildlife Habitat Areas Impacted By Agriculture

Land Use And Farming Operations

As noted above, most of RI's large crop farms are located in broad outwash plains in riverine valleys in the Pawcatuck watershed. The scenic Wood and Pawcatuck rivers are located here, home to several endangered and threatened species. In addition, state and federal wildlife agencies are working to restore the native salmon population in area streams and rivers. Many of the large farm operations rely on

irrigation water to produce their high value crops (turf and truck crops). This water is pumped directly from these same pristine and ecologically significant streams. Unresolved conflicts over the use of the water continue. Working within the Pawcatuck Hydrologic Unit Area, NRCS and other agencies have provided significant assistance to these farmers to improve irrigation water management strategies on their farm. While on-farm use has improved, the overall issue of in-stream withdrawals remains. These withdrawals may be impacting critical wildlife habitat.

Environmental Effects Reduced Or Avoided

Reducing the need for insert withdrawals that impact critical fish and wildlife habitat areas is the goal of this component of the EQIP proposal. This effort will help to maintain aquatic base flow levels in the stream which will improve conditions for sensitive species.

Conservation Measures Needed

- Irrigation wells, to reduce the number of in-stream withdrawals.
- Irrigation water management plans.
- Improved irrigation conveyance systems (pipelines).
- Crop rotations, thereby reducing the need for irrigation.
- Green manure crops, building organic matter and thereby increasing water holding capacity of the soils.

Figure 2. Geographic Priority Areas