APPENDIX B: CONNECTICUT INLAND SURFACE WATER CLASSIFICATIONS AND CRITERIA

CLASS AA DESIGNATED USES

These surface waters are designated for: existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture.

Classifications Shown on Maps

AA	Known or presumed to meet Criteria which support the designated uses.
B/AA or C/AA	May not be meeting Class AA Criteria or designated uses. The water quality goal is achievement of Class AA Criteria and attainment of Class AA designated uses.

CLASS A DESIGNATED USES

These surface waters are designated for: habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture.

Classifications Shown on Maps

A	Known or presumed to meet Criteria which support designated uses.
B/A or C/A	May not be meeting Criteria or one or more designated uses. The water quality goal is achievement of Class A Criteria and attainment of Class A designated uses.

CLASS B DESIGNATED USES

These surface waters are designated for: habitat for fish and other aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply.

Classifications Shown on Maps

B	Known or presumed to meet Criteria which support designated uses.
C/B or D/B	Due to point or non-point sources of pollution, certain Criteria or one or more designated uses assigned to Class B waters may not currently be met. The water quality goal is achievement of Class B Criteria and attainment of Class B designated uses.

CLASS C DESIGNATED USES

Class C water quality results from conditions that are usually correctable through implementation of established water quality management programs to control point and non-point sources. Present water quality conditions frequently preclude the attainment of one or more designated uses for Class B waters or one or more Criteria for Class B waters are not being consistently achieved. Class C waters may be suitable for certain fish and wildlife habitat, certain recreational activities, industrial use and navigation. Class C waters may have good aesthetic value. Examples of conditions that warrant a Class C designation include: combined sewer overflows,

urban runoff, inadequate municipal or industrial wastewater treatment, and community-wide septic system failures. The minimum acceptable goal is Class B unless a DEP and EPA approved Use Attainability Analysis demonstrates that one or more Class B designated uses are not attainable. In those situations, site-specific Quality Criteria will be employed to insure that all existing uses are maintained. Refer to Standard 6.

Classifications Shown on Maps

C/B, C/A or C/AA	Presently not meeting Criteria or not supporting one or more assigned designated uses due to pollution. The goal for such waters may be Class AA, A or Class B.

CLASS D DESIGNATED USES

Class D water quality results from conditions that are not readily correctable through implementation of established water quality management programs to control point and nonpoint sources. Present water quality conditions persistently preclude the attainment of one or more designated uses for Class B waters or one of more Criteria for Class B waters are not being achieved for prolonged periods. Class D waters may be suitable for bathing or other recreational purposes, certain fish and wildlife habitat, industrial uses and navigation. Class D waters may have good aesthetic value. Examples of conditions which warrant a Class D designation include chemical contamination of bottom sediments, contamination of fish or shellfish with toxic compounds, and pollution caused by out-of-state sources. The minimum acceptable goal is Class B unless a DEP and EPA approved Use Attainability Analysis demonstrates that one or more uses are not attainable. In those situations, site-specific Quality Criteria will be employed to insure that all existing uses are maintained. Refer to Standard 6.

Classifications Shown on Maps

D/B, D/A	Presently not meeting Criteria or not supporting one or more assigned designated uses due to severe pollution or presence of certain persistent contaminants in the sediments which may bioaccumulate in the food chain. The goal for such waters may be Class A or Class B.

CLASS AA CRITERIA

Parameter	**Criteria**
Aesthetics	Uniformly excellent.
Dissolved oxygen	Not less than 5 mg/L at any time.
Sludge deposits-solid refuse-floating solidsoils and grease-scum	None other than of natural origin.
Color	None other than of natural origin.
Suspended and settleable solids	None in concentrations or combinations which would impair designated uses; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of the bottom; none which would adversely impact aquatic organisms living in or on the bottom substrate.
Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity or dredging activity or discharge of dredged or fill materials provided all reasonable controls or Best Management Practices are used in such activities and all designated uses areprotected and maintained.
Turbidity	Shall not exceed 5 NTU over ambient levels and none exceeding levels necessary to protect and maintain all designated uses. All reasonable controls or Best Manage ment Practices are to be used to control turbidity.
Indicator bacteria	REFER TO APPENDIX B.
Taste and odor	None other than of natural origin.
pH As	naturally occurs.
Allowable temperature increase	There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and, in no case exceed 85 degrees F, or in any case raise the temperature of surface water more than 4 degrees F.
Chemical constituents	None in concentrations or combinations which would be harmful to designated uses. Refer to Standards numbers 10, 11, 12,13, 17 and 19.
Phosphorus	None other than of natural origin.
Sodium	Not to exceed 20 mg/L.
Benthic invertebrateswhich inhabit lotic waters	A wide variety of macroinvertebrate taxa should normally be present and all functional feeding groups should normally be well represented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irreversible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Co leoptera (beetles), and Trichoptera (caddisflies) should be well represented.

CLASS A CRITERIA

Parameter	**Criteria**
Aesthetics	Uniformly excellent.
Dissolved oxygen	Not less than 5 mg/L at any time.
Sludge deposits-solid refuse-floating solidsoils and grease-scum	None other than of natural origin.
Color	None other than of natural origin.
Suspended and settleable solids	None in concentrations or combinations which would impair designated uses; none aesthetically objectionable; none which would significantly alter the physical or chemical composition of the bottom; none which would adversely impact aquatic organisms living in or on the bottom substrate.
Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity, dredging activity or the discharge of dredged or fill materials provided all reasonable controls or Best Management Practices are used in such activities and all designated uses are protected and maintained.
Turbidity	Shall not exceed 5 NTU over ambient levels and none exceeding levels necessary to protect and maintain all designated uses. All reasonable controls or Best Manage ment Practices are to be used to control turbidity.
Indicator bacteria	REFER TO APPENDIX B.
Taste and odor	None other than of natural origin.
pH As	naturally occurs.
Allowable temperature increase	There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and, in no case exceed 85 degrees F, or in any case raise the temperature of surface water more than 4 degrees F.
Chemical constituents	None in concentrations or combinations which would be harmful to designated uses. Refer to Standards numbers 10, 11, 12,13, 17, and 19.
Phosphorus	None other than of natural origin.
Sodium	None other than of natural origin.
Benthic invertebrates which inhabit lotic waters	A wide variety of macroinvertebrate taxa should normally be present and all functional feeding groups should normally be well represented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irreversible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles), and Trichoptera (caddisflies) should be well represented.

CLASS B CRITERIA

Parameter	**Criteria**
Aesthetics	Good to excellent.
Dissolved oxygen	Not less than 5 mg/L at any time.
Sludge deposits-solid refuse floating solids-oils and grease-scum	None except for small amounts that may result from the discharge from a permitted waste treatment facility and none exceeding levels necessary to protect and maintain all designated uses.
Color	None which causes visible discoloration of the surface water outside of any designated zone of influence.
Suspended and settleable solids	None in concentrations or combinations which would impair the most sensitive designated use; none aesthetically objec tionable; none which would significantly alter the physical or chemical composition of the bottom; and none which would adversely impact aquatic organisms living in or on the bottom sediments; shall not exceed 10 mg/L over ambient concentrations.
Silt or sand deposits	None other than of natural origin except as may result from normal agricultural, road maintenance, construction activity, dredging activity or discharge of dredged or fill materials provided all reasonable controls or Best Management Prac tices are used in such activities and all designated uses are protected and maintained.
Turbidity	Shall not exceed 5 NTU over ambient levels and none exceeding levels necessary to protect and maintain all designated uses. All reasonable controls or Best Management Practices are to be used to control turbidity.
Indicator bacteria	REFER TO APPENDIX B.
Taste and odor	None that would impair any uses specifically assigned to this Class.
pH	6.5 – 8.0
Allowable temperature increase	There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and, in no case exceed 85 degrees F, or in any case raise the temperature of surface water more than 4 degrees F.
Chemical constituents	None in concentrations or combinations which would be harmful to designated uses. Refer to Standards numbers 10, 11, 12,13, 17, and 19.
Benthic invertebrates which inhabit lotic waters	Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. All functional feeding groups and a wide variety of macroinvertebrate taxa shall be present, however one or more may be disproportionate in abundance. Waters which currently support a high quality aquatic community shall be maintained at that high quality. Presence and produc tivity of taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies); and pollution intolerant Coleoptera (beetles) and Trichoptera (caddis- flies) may be limited due to

Class B Criteria (continued)
cultural activities. Macroinvertebrate communities in waters impaired by cultural activities shall be restored to the extent practical through implementation of the department's proce dures for control of pollutant discharges to surface waters and through Best Management Practices for non-point sources of pollution.

LAKE TROPHIC CATEGORIES

Criteria for Total Phosphorus, Total Nitrogen, Chlorophyll-a, and Secci Disk Transparency appearing in the table below represent acceptable ranges for these parameters within which recreational uses will be fully supported and maintained for lakes in each trophic category. For the purpose of determining consistency with the water quality standards for lakes classified AA, A or B, an assessment of the natural trophic category of the lake, absent significant cultural impacts, must be performed to determine which criteria apply.

OLIGOTROPHIC

May be Class AA, Class A, or Class B water. Low in plant nutrients. Low biological productivity characterized by the absence of macrophyte beds. High potential for water contact recreation.

Parameters	Criteria
1. Total Phosphorus	0-10 ug/l spring and summer
2. Total Nitrogen	0-200 ug/l spring and summer
3. Chlorophyll-a	0-2 ug/l mid-summer
4. Secchi Disk Transparency	6 + meters mid-summer

MESOTROPHIC

May be Class AA, Class A, or Class B water. Moderately enriched with plant nutrients. Moderate biological productivity characterized by intermittent blooms of algae and/or small areas of macrophyte beds. Good potential for water contact recreation.

Parameters	Criteria
1. Total Phosphorus	10-30 ug/l spring and summer
2. Total Nitrogen	200-600 ug/l spring and summer
3. Chlorophyll-a	2-15 ug/l mid-summer
4. Secchi Disk Transparency	2-6 meters mid-summer

EUTROPHIC

May be Class AA, Class A, or Class B water. Highly enriched with plant nutrients. High biological productivity characterized by frequent blooms of algae and/or extensive areas of dense macrophyte beds. Water contact recreation opportunities may be limited.

Parameters	Criteria
1. Total Phosphorus	30-50 ug/l spring and summer
2. Total Nitrogen	600-1000 ug/l spring and summer
3. Chlorophyll-a	15-30- ug/l mid-summer
4. Secchi Disk Transparency	1-2 meters mid-summer

HIGHLY EUTROPHIC

May be Class AA, Class A, or Class B water. Excessive enrichment with plant nutrients. High biological productivity, characterized by severe blooms of algae and/or extensive areas of dense macrophyte beds. Water contact recreation may be extremely limited.

Parameters	Criteria
1. Total Phosphorus	50 + ug/l spring and summer
2. Total Nitrogen	1000 + ug/l spring and summer
3. Chlorophyll-a	30 + ug/L mid-summer
4. Secchi Disk Transparency	0-1 meters mid-summer

APPENDIX B: BENTHIC INVERTEBRATE CRITERIA

Surface waters and sediments shall be free from chemical constituents in concentrations or combinations which will or can reasonably be expected to result in acute or chronic toxicity to aquatic organisms or impair the biological integrity of aquatic or marine ecosystems outside of any allocated zone of influence or which will or can reasonably be expected to bioconcentrate or bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels which will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic life. In determining consistency with this Standard, the Commissioner shall at a minimum consider the specific number criteria listed in Appendix D and any other information she or he deems relevant.

Benthic invertebrate criteria may be utilized where appropriate for assessment of biological integrity of surface waters. The criteria apply to the fauna of erosional or riffle habitats in flowing waters which are not subject to tidal influences.

III. SURFACE WATER CLASSIFICATIONS
INLAND SURFACE WATERS
CLASS AA
Designated Use - Existing or proposed drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other purposes, (recreational uses may be restricted).

CRITERIA

Parameter 13.Benthic Invertebrates which inhabit lotic waters	Standard	A wide variety of macroinvertebrate taxa should normally be present and all functional feeding groups should normally be well repre sented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irrevers ible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles) and Trichoptera (caddisflies) should be well represented.

INLAND SURFACE WATERS
CLASS A
Designated Uses - Potential drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other legitimate uses, including navigation.

CRITERIA

Parameter 13. Benthic Invertebrates	Standard	A wide variety of macroinvertebrate taxa should normally be present and all which inhabit lotic functional feeding groups should normally be well represented. Presence and productivity of aquatic species is not limited except by natural conditions, permitted flow regulation or irreversible cultural impacts. Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles) and Trichoptera (caddisflies) should be well represented.

INLAND SURFACE WATERS

CLASS B

Designated Use - Recreational use; fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation.

CRITERIA

Parameter 13. Benthic Invertebrates	Standard	Water quality shall be sufficient to sustain a diverse which inhabit lotic waters macroinvertebrate community of indigenous species. All functional feeding groups and a wide variety of macroinvertebrate taxa shall be present, however one or more may be disproportionate in abundance. Waters which currently support a high quality aquatic community shall be maintained at that high quality. Presence and productivity of taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies); and pollution intolerant Coleoptera (beetles) and Trichoptera (caddis-flies) may be limited due to cultural activities. Macroinvertebrate communities in waters impaired by cultural activities shall be restored to the extent practical through implementation of the department's procedures for control of pollutant discharges to surface waters and through Best Management Practices for non-point sources of pollution.

INLAND SURFACE WATERS

CLASS C

Present water quality conditions preclude the full attainment of one or more designated uses for Class B waters some or all of the time. One or more Water Quality Criteria for Class B waters are not being consistently achieved. Class C waters may be suitable for certain fish and wildlife habitat, certain recreational activities, industrial use and other legitimate uses, including navigation.

INLAND SURFACE WATERS

CLASS D

Present water quality conditions persistently preclude the attainment of one or more designated uses for Class B waters. One or more Water Quality Criteria for Class B waters are not being achieved most or all of the time. Class D waters may be suitable for bathing or other recreational purposes, certain fish and wildlife habitat.

APPENDIX B: WATER QUALITY CRITERIA FOR BACTERIAL INDICATORS OF SANITARY QUALITY

DESIGNATED USE	CLASS	INDICATOR	CRITERIA
Freshwater			
Drinking Water Supply (1)			
Existing / Proposed	AA	Total coliform	Monthly Moving Average less than 100/100ml Single Sample Maximum 500/100ml
Potential	A	----	------
Recreation (2)(3)			
Designated Swimming (4)	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 235/100ml
Non-designated Swimming (5)	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 410/100ml
All Other Recreational Uses	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100ml Single Sample Maximum 576/100ml
Saltwater			
Shellfishing			
Direct Consumption	SA	Fecal coliform	Geometric Mean less than 14/100ml 90% of Samples less than 43/100ml
Commercial Harvesting	SB	Fecal coliform	Geometric Mean less than 88/100ml 90% of Samples less than 260/100ml
Recreation			
Designated Swimming (4)	SA, SB	Enterococci	Geometric Mean less than 35/100ml Single Sample Maximum 104/100ml
All Other Recreational Uses	SA, SB	Enterococci	Geometric Mean less than 35/100ml Single Sample Maximum 500/100ml

Table Notes:

(1) Criteria applies only at the drinking water supply intake structure.

(2) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treat ment plant effluents is not required consistent with Standard 23.

(3) See Standard # 25.

(4) Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protection and the Department of Public Health, May 1989, revised June 1992.

(5) Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.

Guidelines for Use of Indicator Bacteria Criteria

Water Quality Classifications are reviewed approximately every three years at which time all available water quality monitoring data is considered along with other relevant information. Relevant information includes but is not limited to federal guidance concerning the scientific basis for deriving the criteria and the potential health risks associated with excursions above the criteria, recommended implementation procedures, and the results of sanitary surveys or other investigations into sources of indicator bacteria in the watershed. Public input is also solicited and considered in determining the existing water quality conditions and water quality goals. Nevertheless, the Water Quality Classification may not be an accurate representation of current water quality conditions at any particular site. For this reason, the Water Quality Classification should not be considered as a certification of quality by the State or an approval to engage in certain activities such as swimming or shellfish harvest.

APPENDIX C: MASSACHUSETTS INLAND CLASS STANDARDS

Inland Water Classes:

Class A - These waters are designated as a source of public water supply. To the extent compatible with this use they shall be an excellent habitat for fish, other aquatic life and wildlife, and suitable for primary and secondary contact recreation. These waters shall have excellent aesthetic value. These waters are designated for protection as Outstanding Resource Waters under 314 CMR 4.04(3).

1. Dissolved Oxygen -
a. Shall not be less than six mg/l unless background conditions are lower;
b. natural seasonal and daily variations above this level shall be maintained; levels shall not be lowered below 75% of saturation due to a discharge; and
c. site-specific criteria may apply where back-ground levels are lower than specified levels or to the hypolimnion of stratified lakes where the Department determines that designated uses are not impaired.

2. Temperature -
a. Shall not exceed 68°F (20°C) in cold water fisheries, nor 83°F (28.3°C) in warm water fisheries, and the rise in temperature due to a discharge shall not exceed 1.5°F (0.8°C); and
b. natural seasonal and daily variations shall be maintained. There shall be no changes from background conditions that would impair any use assigned to this Class, including site-specific limits necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms.

3. pH - Shall be in the range of 6.5 through 8.3 standard units but not more than 0.5 units outside of the background range. There shall be no change from background conditions that would impair designated uses.

4. Fecal Coliform Bacteria - Shall not exceed an arithmetic mean of 20 organisms per 100 ml in any representative set of samples, nor shall 10% of the samples exceed 100 organisms per 100 ml. More stringent regulations may apply [see 314 CMR 4.06(2)(d)1.]

5. Solids - These waters shall be free from floating, suspended and settleable solids in concentrations or combinations that would impair any use assigned to this class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.

6. Color and Turbidity - These waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to this class.

7. Oil and Grease - These waters shall be free from oil and grease, petrochemicals and other volatile or synthetic organic pollutants.

8. Taste and Odor - None other than of natural origin.(b)

Class B - These waters are designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Where designated they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.

1. Dissolved Oxygen
a. Shall not be less than 6.0 mg/l in cold water fisheries nor less than 5.0 mg/l in warm water fisheries unless background conditions are lower;
b. natural seasonal and daily variations above these levels shall be maintained; levels shall not be lowered below 75% of saturation in cold water fisheries nor 60% of saturation in warm water fisheries due to a discharge; and
c. site-specific criteria may apply where background levels are lower than specified levels, to the hypolimnion of stratified lakes or where the Department determines that designated uses are not impaired.

2. Temperature -
a. Shall not exceed 68°F (20°C) in cold water fisheries nor 83°F (28.3°C) in warm water fisheries, and the rise in temperature due to a discharge shall not exceed 3°F (1.7°C) in rivers and streams designated as cold water fisheries nor 5°F (2.8°C) in rivers and streams designated as warm water fisheries (based on the minimum expected flow for the month); in lakes and ponds the rise shall not exceed 3°F (1.7°C) in the epilimnion (based on the monthly average of maximum daily temperature); and
b. natural seasonal and daily variations shall be maintained. There shall be no changes from background conditions that would impair any use assigned to this Class, including site-specific limits necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms.

3. pH - Shall be in the range of 6.5 through 8.3 standard units and not more than 0.5 units outside of the background range. There shall be no change from background conditions that would impair any use assigned to this Class.

4. Fecal Coliform Bacteria - Shall not exceed a geometric mean of 200 organisms per 100 ml in any representative set of samples nor shall more than 10% of the samples exceed 400 organisms per 100 ml. This criterion may be applied on a seasonal basis at the discretion of the Department.

5. Solids - These waters shall be free from floating, suspended and settleable solids in concentrations and combinations that would impair any use assigned to this Class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.

6. Color and Turbidity - These waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to this Class.

7. Oil and Grease - These waters shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life.

8. Taste and Odor - None in such concentrations or combinations that are aesthetically objectionable, that would impair any use assigned to this Class, or that would cause tainting or undesirable flavors in the edible portions of aquatic life.(c)

Class C - These waters are designated as a habitat for fish, other aquatic life and wildlife, and for secondary contact recreation. These waters shall be suitable for the irrigation of crops used for consumption after cooking and for compatible industrial cooling and process uses. These waters shall have good aesthetic value.

1. Dissolved Oxygen -
a. Shall not be less than 5.0 mg/l at least 16 hours of any 24-hour period and not less than 3.0 mg/l at any time unless background conditions are lower;
b. natural seasonal and daily variations above these levels shall be maintained; levels shall not be lowered below 50% of saturation due to a discharge; and (c) site-specific criteria may apply where background levels are lower than specified levels, or to the hypolimnion of stratified lakes where the Department determines that designated uses are not impaired.

2. Temperature -
a. Shall not exceed 85°F (29.4°C) nor shall the rise due to a discharge exceed 5F (2.8°C); and
b. Natural seasonal and daily variations shall be maintained. There shall be no changes from background conditions that would impair any use assigned to this Class, including the site-specific limits necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms.

3. pH - Shall be in the range of 6.5 through 9.0 standard units and not more than 1.0 standard unit outside of the naturally occurring range. There shall be no change from background conditions that would impair any use assigned to this Class.

4. Fecal Coliform Bacteria - Shall not exceed a geometric mean of 1000 organisms per 100 ml, nor shall 10% of the samples exceed 2000 per 100 ml.

5. Solids - These waters shall be free from floating, suspended and settleable solids in concentrations and combinations that would impair any use assigned to this Class,that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.

6. Color and Turbidity - These waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to this Class.

7. Oil and Grease - These waters shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life.

8. Taste and Odor - None in such concentrations or combinations that are aesthetically objectionable, that would impair any use assigned to this Class, or that would cause tainting or undesirable flavors in the edible portions of aquatic life.

APPENDIX D: WATER UTILITIES OF THE WATERSHED AND POPULATIONS SERVED

Public Water Supply Company	Population Served
Aquarion Water Co.	14,134
Avon Water Co.	10,370
Bristol Water Co.	52,211
CT Water Co. - Collinsville System	3,224
CT Water Co. - Naugatuck Reg. - Terryville Sys.	5,146
CT Water Co. - Northern Region - Western Sys.	77,202
CT Water Co. - Unionville	13,400
The Metropolitan District (MDC)	400,000
New Hartford Water Dept.	1,200
New Britain Water Dept.	74,400
Salmon Brook District	1,001
Tariffville Fire Water Dist.	1,477
Valley Water System	17,500
Winsted Water Works	8,500
11 Water Supply Companies Serving	679,765

APPENDIX E: RESERVOIRS OF THE WATERSHED

Reservoir	Location	Drainage Area (sq. miles)	Usable Capacity (cu. ft)	Built	Use
Otis	Otis & Tolland, MA	15.9	780,000,000	1865	Originally for power, currently for recreation.
Colebrook	Sandisfield, Tolland, MA & Colebrook, CT	119	4,213,000,000	1969	Multi-purpose use.
West Branch	Colebrook & Hartland, CT	127	374,000,000	1960	Compensates for water diverted from Farmington River.
Mad River Detention	Winchester, CT	18.3	423,000,000	1962	Storage of water for recreation and flood control.
Sucker Brook	Tributary to Highland Lake	3.5	64,500,000	1970	Storage of water for flood control.
Highland Lake	Winchester, CT	7.05	144,400,000	1975*	Storage of water for power, recreation and flood control.
Barkhamsted	Hartland & Barkhamsted, CT	52.5	4,050,000,000	1939	Storage of drinking water for greater Hartford area.
Lake McDonough	Barkhamsted & New Hartford, CT	8.7	393,000,000	1919	Originally to compensate for water diverted from River, currently for recreation.
Nepaug	New Hartford, Canton & Burlington, CT	31.5	1,270,000,000	1918	Drinking water supply.
Whigville	Burlington, CT	4.1	1,270,000,000	1908	Storage of drinking water supply for New Britain.

* Represents date when elevation of Highland Lake was raised.

Source: USGS Water Resources Data, Connecticut Water Year 2000

APPENDIX F: "USE AND ECONOMIC IMPORTANCE OF THE WEST BRANCH OF THE FARMINGTON RIVER" CONCLUSIONS AND RECOMMENDATIONS FROM STUDY

Study by: Department of Parks, Recreation and Tourism Management and North Carolina State University

In the broadest terms, the wild and scenic river segment of the West Branch of the Farmington River is a day use river frequented most by anglers, tubers, and boaters. Over half of all users travel 30 miles or less one-way to get there and 90% are on day trips rather than staying overnight. Being primarily a day-use river does not mean that the West Branch of the Farmington River is lightly used. We estimate that there are over 77,400 visits to the segment annually. Sixty-two percent of the visitors are anglers, 30% are tubers, and another 8% are boaters.

Regardless of why people visit the West Branch of the Farmington River, it is clear that visitors to the West Branch of the Farmington River generate a large economic impact in the five river towns. The total economic impact of river recreation is approximately $3,630,000 annually with an estimated 63 jobs supported by river recreation in the area. This is especially large considering the impact area is relatively small and generally rural. This impact is also large considering that only 10% of the visitors to the West Branch stay overnight. Lodging expenses from overnight stays are typically one of the largest expenditure categories in economic impact estimations in outdoor recreation settings. The West Branch of the Farmington River's economic impact would have been higher had the impact area been expanded to include all of the two counties through which the wild and scenic river segment passes. This study limited the impact area to the five river towns corresponding to the jurisdictions of the organizations represented on the West Branch of the Farmington River Coordinating Committee.

The total economic benefits (consumer surplus values) to visitors of the West Branch were also quite large amounting to over $9.45 million for three river activities—angling, tubing, and boating—in 2001. Remember that total economic benefits are an estimate of the total social value of the recreational use of the river, and are not directly related to expenditures. Anglers received the majority of the total benefits followed by tubers then boaters. An important conclusion of the analyses of the contingent behaviors of the river users was that maintaining the high quality of river resources is the most important aspect of their recreational demand for visits to the West Branch. This is consistent with the Wild and Scenic Rivers Act's emphasis on free flowing conditions and "outstandingly remarkable" resource values.

In general, West Branch of the Farmington River users tended to be well-educated, middle-aged males with relatively high household incomes. Two characteristics of river users are worth noting. The small percentage of women using the river (16%) was a surprise. The uneven gender breakdown is probably related mostly to the fact that fly-fishing still tends to be a male-dominated activity. This situation is changing and the proportion of West Branch of the Farmington River users who are female will likely grow accordingly. The other somewhat unexpected finding was that the second most common occupation among users was "retired" (20%). This sizable segment of users will likely be growing as the population in the northeast continues to age.

A proportion of the West Branch of the Farmington River user base was still relatively new to the river. Over 40%, was either on their first visit there or had made their first visit 5 years ago or less. This represents both a challenge and an opportunity for managers. These new users will need to be informed of river policies, regulations and etiquette, particularly in terms of protecting river resources and minimizing conflicts among user groups. The fact that newcomers represent such a large group presents an opportunity for managers, as well. Many of these users are still developing expectations and habits related to using the river and should be more flexible when it comes to changing any behaviors that might cause problems. In addition, a sizable group has been associated with the river for a very long time. Over a quarter of those contacted made their first visit more than 25 years ago. This was, of course, nearly two decades before the segment was designated as a wild and scenic river. Some of these long-time users may be excellent candidates for involvement as river volunteers, monitors, or other roles that require knowledge and dedication to the river corridor.

Although many users are new to the West Branch of the Farmington River, they are not new to river recreation. Most are quite skilled and active in their respective river activities. Perhaps related to this, most do not use the services or equipment of either of the commercial outfitters that serve the segment. This is less true of the tubers, of course. Most of them do rent tubes and use the shuttle provided by Farmington River Tubing.

The river does appear to be providing the kinds of setting and experiences intended by the framers of the National Wild and Scenic Rivers Act of 1968. The nature-oriented motives of enjoying the river views, being close to nature, and experiencing the river itself were the three most important reasons people visited the West Branch. It is clear that conserving the natural river environment is important to Farmington users' experiences and that the protections and intent of the Act to conserve river settings like the Farmington are extremely important in this regard. This does not necessarily mean that users regard the West Branch as wilderness, however. In fact, most describe it as an "undeveloped recreation area." Over a third, however, do feel it is "semi-wilderness." This study did not examine how users viewed the river in terms of the "wild," "scenic," and "recreational" river categories set forth in the Wild and Scenic Rivers Act. Rather, the categories in this study reflect development levels, not the presence or absence of wild and scenic values.

The fact that the seven most important motives overall for people visiting the river were also the top seven experiences attained should be encouraging to West Branch of the Farmington River managers and supporters. This is one indication that current river visitors are getting what they are seeking there and that conservation efforts being effective. This result should be viewed with some caution though. If some earlier users have been unsatisfied enough to decide not to return, they would not have been contacted through the on-site sampling used in this research. The extent of such displacement (if any) is difficult to measure directly on site.

The unique importance of the West Branch as a destination is hinted at by a number of findings. For example, 90% of the respondents indicated their activities or the West Branch of the Farmington River were the most important reasons for their visits. It is clear that some users regard the West Branch as the best place for certain kinds of experiences. Perhaps more revealing is the fact that 10% of users say they would have simply stayed home if the river had not been available to them that day. There is apparently no substitute for that river segment in their eyes. The closest substitutes for other users appear to be parts of the Housatonic and Salmon Rivers. Over a third of respondents said they would have gone to one of these if the West Branch of the Farmington River had not been available to them that day. Remember that the West Branch is the only wild and scenic segment in the area and the most accessible one to the majority of the people in that part of the region.

Satisfaction was high or very high for most users. Consistent with this, levels of crowding and other problems were quite low on average. A small number found problems with the river. Crowding, too few rangers/management staff, conflicts, and litter were the biggest of these generally minor problems. "Too few rangers/management staff on the river" and "not enough restrooms along the river" had more widely dispersed responses (higher standard deviations) than other river management issues. There were strong feelings on both extremes for these two issues. Management should be careful when considering making changes that some users would consider improvements when others feel strongly those changes are inappropriate.

There is an indication that river conditions are improving in the eyes of users. While 60% of repeat visitors said the quality of visiting the wild and scenic segment had stayed the same since their first visit, 31% felt conditions had improved rather than gotten worse (9%). This should be encouraging. The actions taken by local communities, the CT DEP, and private landowners to improve the wild and scenic segment are being noticed by users.

It was surprising that only about half (47%) were aware that the West Branch of the Farmington River is a designated Wild and Scenic River. At the time of the study, this segment had been designated as a wild and scenic river for nearly 7 years, but over half of the visitors contacted did not know it was part of the Wild and Scenic River System. Although the question was not actually asked, it is likely that some of these users were not even aware that a Wild and Scenic River System exists at all. After reading a brief description of wild and scenic designation provided in the questionnaire, however, the vast majority of respondents felt the Farmington's River designation was important or very important. The obvious question is—Why don't more users know about the wild and scenic designation? In addition, how important is it that they know? The results of this study indicate that when users are aware of what designation is and what protections it affords, they feel strongly that it is important. It seems likely that giving users a greater awareness of wild and scenic river designation and its benefits could lead to greater support for the river and potentially greater support for similar protections for other segments in the region.

Similarly, most felt the partnership model was appropriate for the management of the West Branch and that wild and scenic river designation was effective in maintaining the river's free-flowing character and preserving its outstanding natural, cultural, and recreational features. Most also felt designation was effective in minimizing potentially harmful activities within the 100-foot corridor of land on either side of the river. Again, it seems that when users are aware of how

the wild and scenic river segment is protected, they are appreciative and supportive. West Branch users appear to be a well-educated and thoughtful group. Keeping users informed and involved as much as possible could be particularly helpful when public support is needed to help achieve the objectives of wild and scenic river designation and protection.

There are strong feelings among users that the river does provide important benefits to surrounding communities, particularly fish and wildlife habitat, preserving undeveloped open space, and aesthetic beauty. All of these are consistent with the purposes of the Wild and Scenic Rivers Act. It is interesting that "tourism and business development" was the next to the least important to users on average (although still just above the scale midpoint). Evaluating the economic impacts of river use was one of the four key objectives of this research, but apparently not an issue that is particularly important to the river users themselves. Which of the many river benefits managers choose to emphasize or promote depends in large part on the audience they wish to target. West Branch of the Farmington River users is most concerned about the aspects of the setting that they see when they visit. The economic impacts on local communities of visitors are likely more important to the people who live and work in the surrounding communities than they are to river users themselves.

Users were generally satisfied with the river and the corridor of land along it, but less so with the corridor of land than the river itself. This may reflect user's priorities in some regards. The river is the most important feature to them, in that their activities are not possible without a free-flowing, high quality river, but their experiences are made more pleasant with a natural corridor setting. The natural corridor may be a second priority to many users, but still very important to them. It is also likely that users are noticing some readily visible developments and changes along the river that detract from the natural character that the wild and scenic river designation attempts to maintain. More management attention may be warranted to assure the naturalness of the corridor of land adjacent to the river.

It is interesting that crowding led the list of issues users liked least and was the highest rated problem on average. On average, the level of crowding was actually relatively low (3.4 on a 9-point scale). The situation in terms of user conflicts was similar. Conflicts among the different types of visitors were the third greatest problem, noted by respondents, but its levels were also low. High user satisfaction and low levels of problems is a common finding in outdoor recreation research, but this does not mean that management can be complacent. Crowding and conflict are social concerns that should continue to be monitored along the West Branch of the Farmington River, even though a minority of users reports serious social problems.

One reason that problems with user conflicts and related social issues are minor along the West Branch is due to the segregation of the users encouraged by the CT Department of Environmental Conservation (DEC) policies and operations. Tubers are concentrated on the lower portions, a well-suited location for that activity where DEC has allowed the tubing concessionaire to operate. Similarly, the DEC Trout Management Area (TMA) is located several miles up river from the main concentration of tubers. This unofficial "zoning" of the West Branch is particularly effective because it is not imposed on users. Users may freely choose which sections of the river best suit their recreation endeavors even though conditions have been created that draw different users groups to different parts of the river.

There are differences among the major user groups on the West Branch of the Farmington River. Tubers are less sensitive to social problems like litter, evidence of human waste and lack of restrooms along the river than are anglers or boaters. In a number of cases, the anglers proved to be the group that was most sensitive overall. Part of this is probably because anglers are less mobile than the other two groups. Therefore, it is not surprising that people fishing are more concerned with these social problems than tubers who move through the area without focusing as much on the conditions over the corridor. It is important to remember, though, that all of these problems were minor on average.

Anglers felt the West Branch of the Farmington River was significantly more important in providing fish and wildlife habitat and preserving undeveloped open space than did tubers. This is not surprising since fishing is much more dependent on both of these aspects of the natural setting. This may be one of the reasons why anglers felt wild and scenic river designation for the West Branch of the Farmington River was significantly more important than did tubers. Although all three groups were satisfied, on average, anglers were significantly more satisfied with the West Branch of the Farmington River than were boaters. The difference may be due to the joint effects of wild and scenic river designation and the trout management area (TMA), which was created and managed by the Connecticut Department of Environmental Conservation (DEC).

The TMA helps make the segment an outstanding fishery with few, if any, substitutes within reasonable distances for most respondents. Boaters, on the other hand, have alternative substitute sites for their activities. It may be that the West Branch is simply not considered the best boating river in the area for some types of paddling and boaters' satisfaction ratings are reflecting this.

The same attributes that make the West Branch a successful example of a partnership to conserve a wild and scenic river also make it complex to determine the extent to which the actions of each partner contributes to the experiences and benefits that result from conserving the segment as a whole. Some river benefits result from the existence and high quality of the trout management area, some result from the state forest and state recreation area lands in the corridor, and some come directly from the designation and management of the segment as a National Wild and Scenic River. In reality, the distinctions across these different areas and jurisdictions are probably not very important to most users. Based on the experiences they seek and benefits they receive, it appears that conserving the river corridor and maintaining the high quality of its resources, regardless of who does it and how it is achieved, are the most important things to users. What wild and scenic designation brings with it is a management plan for the entire 14-mile segment and the existence of Farmington River Coordinating Committee. These help provide the connections that tie the many river areas and programs together to make the conserved river segment more than the sum of its parts in terms of both resources and benefits for users and neighbors.

APPENDIX G: FARMINGTON VALLEY BIODIVERSITY PROJECT

Biodiversity? What's That?

Biological diversity, often shortened to "biodiversity", refers to the total variety of living organisms and the areas they inhabit. The ruby-throated hummingbird that visits your garden, the salamander hiding under a rotten log, and the fireflies you see on summer evenings are all part of the Farmington Valley's biodiversity. In a broader sense, biodiversity is not just the different kinds of living organisms, but the relationship between each community of life and its habitat. The Farmington Valley towns enjoy a rich variety of habitats, including bogs, marshes, streams, ponds, mixed deciduous/ evergreen woods, trap rock ridges and sand plain grasslands. Some of these special areas are protected, for example, the trap rock ridge in Talcott Mountain State Park. However, as development of private land proceeds, the valley towns face a loss of biodiversity.

Biodiversity Loss? So What?

There are many reasons that biodiversity loss matters. From a practical standpoint, intact ecosystems provide important benefits. For example, marshy wetlands along streams and rivers hold and absorb storm water, helping to prevent flooding and to purify the water. Also, our food supply depends on insect pollinators that live in natural areas. The valley's apple orchards and vegetable farms could not produce their crops without insects to pollinate flowers when plants are in bloom. Biodiversity is also important for pest control. Bats, birds and frogs all help to keep mosquitoes under control. Public programs to preserve open space may be motivated by efforts to preserve these benefits, to preserve an area's rural character, or to avoid the fiscal burdens of development. The data from the biodiversity project will help towns make informed choices about which open space to protect and which areas are most suitable for growth.

Exactly What is the Farmington Valley Biodiversity Project?

The **Farmington Valley Biodiversity Project** is a regional initiative created to establish accurate and comprehensive biological information about the valley area. The data, collected by qualified field biologists, will give the valley towns a scientific basis for making decisions about land use management, open space acquisition and resource conservation. Coordinated by the Farmington River Watershed Association, the project is being done in cooperation with the towns of Avon, Canton, East Granby, Farmington, Granby, Simsbury and Suffield, and with the Metropolitan Conservation Alliance (a program of the Wildlife Conservation Society).

The objectives of the project are:

*** Field Research:** Establish a current and comprehensive biological data set through literature search and field research

*** Community Education:** Educate public officials, land conservation organizations and the public about biological resources of the Farmington Valley, and their value.

*** Sharing Information:** Distribute biodiversity research to decision makers

*** Fostering Conservation:** Foster the implementation of land use policies consistent with safeguarding local biological resources.

Funding for the Biodiversity Project has been provided through the generosity of the Hartford Foundation for Public Giving, the Metropolitan Conservation Alliance, the Sweet Water Trust, Northeast Utilities Foundation, Inc, Beatrice Fox Auerbach Foundation, Robinson and Cole, LLP of Hartford, and each of the seven Farmington Valley towns which are participating in the study.

APPENDIX H: CT DEP GOALS FOR THE FARMINGTON RIVER FISHERIES RESTORATION PROGRAM

Source**:** Memorandum from Steve Gephard, DEP Supervising Fisheries Biologist

1. Atlantic salmon- targeted for restoration from the mouth to the base of the Hogback Dam. Also in these tributaries: ranches of Salmon Brook to their respective gorges, Pequabuck to headwaters, Burlington Brook to gorge, lower Cherry Brook, lower Morgan Brook, Still River to Robertsville Gorge, Sandy Brook to State line. All waters heavily stocked to generate adult returns. Stocking occurs upstream of many of these gorges to mitigate for loss of native habitat (e.g. East Branch, Nepaug).

2. American shad- targeted for mouth to Lower Collinsville Dam. Fishways will be built at dams eventually for other species and some shad may pass upstream. Expect some colonization of lower Pequabuck River. Mostly rely on passing remnant run from below Rainbow but some transplantation of fish from Holyoke to above Rainbow occurs.

3. blueback herring- ditto above. Some will also enter lower reaches of Salmon and Burlington brooks. No stocking or transplantation. Rely only on passing fish up from Rainbow.

4. alewife- ditto above although may not penetrate quite as far as the dams or up the Pequabuck. Passage from fish up from Rainbow. Some transplantation of adults from a stream in East Lyme to Rainbow Reservoir.

5. sea lamprey- targeted for entire watershed. Most gorges will stop them. Rely entirely on passing fish up from Rainbow.

6. sea-run brown trout- targeted for mouth to mouth of Salmon Brook. Some will ascend Salmon Brook and branches for some distance. No stocking at this time but that may change in future.

APPENDIX I: Scientists' Ability to Study Water Issues in Connecticut May be Compromised by Lack of Funding

Source: USGS

The U.S. Geological Survey (USGS) has maintained networks of surface-water, ground-water, and water-quality stations throughout the state for many decades. The networks have been funded under a cooperative program between the USGS and the Department of Environmental Protection (DEP) and other State agencies and towns. This long-term data collection and analysis provides information vital to routine management of water resources, and the data are critical in management of water-related emergencies. Historically, the data have been used for planning the development of, and assessing the effects of industry, agriculture, and navigation. Other long-term uses include monitoring riverine habitat and climate change. Data available on a daily basis is used for flood forecasting and water-allocation and waste-assimilation decisions. All of these data are available to the public and much of it is posted on the web, updated at 4-hour intervals.

Individual stations are financially supported for many reasons including meeting permit requirements for minimum flow or water quality and monitoring the height of the water surface in flood-prone areas. In addition, and perhaps more importantly, information from a state-wide network allows scientists to estimate what happens in areas where there are no stations. For example, in the highly publicized court case on the Shepaug River, hydrologic analysis was based on information from two other streams, Salmon Creek and Pomperaug River. Had these stations not existed, the scientific testimony critical to the case would have lacked credibility.

The increasing costs of maintaining these networks of hydrologic-data stations have not been met by increases in funding. The number of stations in each network has been cut to stay within the funding available and new cooperators have been brought in to share the cost. If the networks are cut further, it will be difficult for scientists to provide the data and hydrologic analyses that form the basis for decisions by water managers. The number of gaging stations in the surface-water network has been reduced from a high of 99 in 1968 to only 43 in 2000. In the past decade, the number of water-quality samples that have been collected each year has dropped from 380 to only 204. Frequency of ground-water-level measurements has been reduced from twice a month to once a month. Despite these cutbacks, DEP's base funding for these programs is $128,000 short in fiscal year 2000 and projections are that the shortfall will be more than $160,000 in fiscal year 2001.

The USGS and DEP are developing a preliminary list of the10 to 20 stations that will be cut if additional sources of money are not found. Some of the uses of data from state-wide networks include:

Surface Water

- management of streamflow for flood control, habitat quality, water supply, power generation, and recreation
- estimates of safe yield for diversion permits (or water use) for both surface water and ground water
- design of safe and efficient bridges by engineers
- dissemination of flood warning information by state and local officials
- determination of flood hazard areas and actuarial flood insurance rate zones for communities by floodplain managers
- estimates of streamflows in areas where there are no data to provide a better understanding of floods and droughts

Water Quality

- management of nutrients loads (amount of nutrients) flowing into Long Island Sound that cause hypoxia (lowered dissolved oxygen)
- detection of emerging contaminants such as MTBE and radon
- determination of trends in water quality

Ground Water

- assessment of severity and timing of droughts
- estimates of probable ground-water levels (high ground water important for septic system installation and low ground water important for dewatering issues)
- design and planning of sustainable water supplies for both ground water and surface water
- mapping of aquifer protection areas (Level A mapping)
- investigation of hazardous waste sites for property transfer or clean up

APPENDIX J: SEWER TREATMENT PLANTS OF THE WATERSHED, CURRENT OPERATIONAL STATUS

Treatment Plant (Point of Discharge)	Present /Future WaterQuality Standard	Capacity/ Current Avg Discharge (gallons/day)
Winsted (Still River)	C/Bc	3.5/ 1.5 mgd
New Hartford (Farmington River)	Bc/Bc	90,000/ 90% of capacity
Canton (Farmington River)	B/B	800,000/550,000
Farmington (Farmington River)	B/C	5.56 /4mgd
Plymouth (Pequabuck River)	C/B	1.75/? mgd
Bristol (Pequabuck River)	C/B	10.75/ 9 mgd
Plainville (Pequabuck River)	C/B	3.8 mgd(design) 1.6 mgd(annual average) 2.2 mgd(average wet weather)
Simsbury (Farmington River)	C/B	2.85 / 2.2mgd
Windsor (Farmington River)	C/B	5/2 mgd

APPENDIX J: SEWER TREATMENT PLANTS OF THE WATERSHED (CONTINUED)

Permit Issue (Expiration)	Capacity Upgrade	Denitrification Upgrade	Comments
9/30/99 (9/30/04)	1990	Complete in 2004	Pretreated sanitary sewage. Advanced wastewater treatment using activated sludge, clarification, nitrification and seasonal chlorination/dechlorination.
6/27/01 (6/27/06)	Currently in planning phase, upgrade by 2006	Included in upgrade	Cost of upgrade about 2.75 million
12/30/02 (12/30/07)	Not Currently Required	Will evaluate at time of upgrade- currently buying nitrogen credits from DEP.	Municipal treatment only (no industry).
10/2002 (10/2007)	1995 (advanced treatment)	N/A	Advanced biological treatment, seasonal chlorination. Currently undergoing Total Nitrogen Reduction study resulting in success removing nitrates. 1995 upgrade reduced ammonia output. High success with post-aeration equipment; fish gravitating to point of discharge.
9/26/00 (9/26/05)	1991	Partial denitrification to be online in several months.	Secondary biological treatment, seasonal uv disinfection & nitrogen-ammonia treatment required. Currently undergoing pump station upgrade.
4/3/01 (4/3/06)	Upgrade not currently required. Last upgrade in 1987 (advanced treatment)	Planning process began in 2003.	Inflow/ Infiltration Study complete, has greatly improved collection system (Pump stations, 235 miles of sewer line) Has eliminated most all collection system bypasses. Pump stations operated telemetrically.
5/15/00 (5/15/05)	No plans to increase capacity	Facilities planning for nitrogen removal in progress.	Primary, secondary & tertiary treatment, with seasonal disinfections using UV.
9/27/98 (9/27/03)	Projected completion winter 2005 to 3.84 mgd capacity	Part of upgrade	
6/14/00 (6/14/05)	1989	Shares nitrogen credits with plants having excess	December 2002 toxicity report indicated low level toxicity from unknown source. CT DEP requiring monthly testing until resolution of problem.

APPENDIX K: To Drawdown of Not to Drawdown?

Source: Newsletter of the Farmington Watershed Team, April 2002

Otis Reservoir is the largest recreational water body in the Commonwealth of Massachusetts. It is arguably the largest economic engine in western Massachusetts due to its recreational value. This is the main reason for retaining water in the reservoir during the summer months. Discussions have arisen over how this water is released in the fall and winter months and what affect it has on the flora and fauna in the reservoir and downstream, adjacent wetlands, and groundwater levels.

According to the Otis Reservoir Diagnostic/Feasibility Study, done by ENSR International in 2000, there may be some positive impacts from the drawdown. The drawdown lowers the water level below permitted shoreline structures thereby minimizing ice damage. The drawdown may be the cause of a limited amount of shallow water rooted vegetation, which has resulted in a rocky and gravelly substrate. This type of habitat is in short supply in Massachusetts. Otis Reservoir does not have an infestation of invasive species or an overabundance of aquatic plants; this may be another positive impact from the drawdown. The drawdown may also establish the reservoir as a sink for large amounts of water from spring thaw thereby reducing spring flooding. The impact on fish is greatly unknown due to a lack of data.

While there are a number of benefits from the drawdown, there are also some negatives: low spring water level in Fall River, atypical species in adjacent wetlands, hibernating wildlife may be exposed to freezing temperatures if drawdown continues past October 15, fish breeding habitat (shallows) may be lost if spring refill is delayed, shallow private wells may dry, rapid drawdowns may prevent species from migrating safely, may impair ability of adjacent wetlands to remove pollutants. It may be possible to minimize these impacts by altering the drawdown process. The Diagnostic/Feasibility study has recommended the continuation of drawdown as a management practice, however it may not need to be as deep or as frequent in order to reverse the negative impacts caused.

APPENDIX L: ECOLOGICAL NEEDS: THE NEED FOR AN IN-STREAM FLOW STANDARD

Source: Draft Article by James G. MacBroom, P.E., Milone & MacBroom, Inc. and Richard A. Jacobson, C.F.S., Department of Environmental Protection

Rationale For Establishing Instream Flow Rates

Humans have altered stream flow rates for thousands of years through diversion for out-of-stream uses (i.e., crop irrigation, livestock, mechanical and electrical energy, transportation, and water consumption). Streamflow modifications are generally due to dams that impound water for later use or diversions that withdraw water from the rivers and release it at a different time or place.

The ability of upstream water uses to alter downstream flow rates have historically led to conflicts and competition for water. Although the eastern United Sates has a humid climate with generous precipitation, water conflicts were common even in colonial periods. Many early riparian water laws (i.e. riparian rights) developed in response to resolving flow conflict at water-powered mills located sequentially along rivers. Today, instream flow conflicts arise because of the need for diluting effluent, water supply diversions, recreational and commercial fishing, whitewater boating, tubing, and ecological impacts.

The early concept of having selected dam owners release a minimum flow into downstream channels had its origin in maintaining fisheries. Over time it has been recognized that fixed year-round minimum flow rates do not effectively meet downstream flow needs; seasonal variation is necessary to meet specific needs such as migration, spawning, and egg incubation. The concept of "variable flows" superseded the concept of "minimum flows" and a new term "instream flow" has been adopted to describe a flow used to meet time dependent needs.

Streamflow management involves many different water users and water related issues (see table below). Many water users that have an interest in streamflow rates have difficulty meeting all water demands.

Categories of Instream Flow Features

Physical	Biological
Water temperature	Migratory fish passage
Dissolved oxygen	Macroinvertebrate production
Effluent dilution	Juvenile fish development
Effluent assimilation	Endangered species Amphibian
Groundwater recharge	reproduction Vegetation
Sediment transport	encroachment Riparian wetlands
Salinity intrusion	Fish egg incubation
Aesthetics	
Channel morphology	
Bank stability	
Substrate composition	

Riparian law (Reis, 1967) distinguishes between consumptive and non-consumptive streamflow uses. The consumptive uses have a greater potential to impact downstream interests compared to non-consumptive users that return the full volume of water to the stream at or near the point of withdrawal although the return water may not be of the original quality. Riparian law established that riparian landowners might make reasonable diversions that can be beneficially used without causing undue injury to downstream areas (Reis, 1967). The right to divert for consumptive purpose exists under riparian law but is limited to reasonable use.

Streamflow Uses

Consumptive	**Non-Consumptive**	**Recreational and Cultural**	**Aquatic**
Irrigation	Hydroelectric power	Aesthetics	Invertebrates Reptiles
Livestock	Hydro mechanical power	White water sports	Amphibians
Water supply	River navigation	Power boats	Fish
Off-site cooling water	Once-through cooling	Swimming	Birds
Off-site washwater		Fishing	Rooted aquatic plants
Aquifer recharge		Tubing	Algae
Water supply diversions			Plankton

Expanding land development in Connecticut and the dependency of urban areas on water sources in competition with other uses and users, has led to increased regulatory control over water diversions. The Connecticut Water Diversion Regulations and Water Utility Planning process both impose administrative procedures that attempt to define how riparian law dictates water allocation between competing uses, much as laws in western states define how prior appropriation doctrine do so there.

The administrative control of water diversions, and streamflow also address the rights of non-riparian persons and environmental concerns. This is a fundamental change in water resource management that has evolved over the past 20 years (Cox, 1994). The specific concerns about selected streamflow issues and users are noted below:

Water temperature - Low flow rates in streams lead to reduced flow depths and velocities, increased solar penetration, longer exposure and higher water temperatures. As water temperatures rise, cold-water fishes, such as trout, are excluded and replaced by non-native cool and warm water species.

Dissolved oxygen - Low flows have less turbulence and lower aeration rates. Warm waters have a reduced oxygen saturation level, lowering productivity of coldwater communities, and in extreme cases increased incidence of fish kills. For example, widespread stream fishkills occurred in Connecticut during the dry warm summer of 1993. Low oxygen levels are also associated with increased odor from decomposition of organics.

Effluent dilution - Wastewater treatment plants depend on a minimum flow at their outlets to dilute the effluent in a limited mixing zone to meet water quality standards.

Effluent assimilation - Wastewater treatment plants depend upon streamflows to biologically assimilate and renovate the effluent downstream of the outfall-mixing zone. Excessively low flows can lead to water quality degradation.

Groundwater recharge - Some watercourses are located over pervious soils such as stratified drift and help to recharge aquifers via streambed infiltration. Excessively low flow can reduce recharge and reduce the yield of stream influenced water supply or irrigation wells.

Sediment transport and substrate composition - Watercourses with heavy sediment loads depend upon having sufficient flow to transport sediment. During periods of low flow, reduced velocities and water volumes limit sediment transport and encourage deposition in slack water areas. As a result, coarse substrates (e.g., cobble and gravel) are embedded with fine materials, rendering the substrates unsuitable for fish spawning, egg incubation and juvenile develop, and invertebrate production.

Channel morphometry - flows necessary to maintain channel shape and pool/riffle formation.

Salinity intrusion - Low flow rates and water levels in coastal rivers allow greater inland migration of high tides and salt waters. This becomes very serious if salt water reaches water supply inlets or wells. The water quality characteristics and coincident biota of estuaries changes with reductions in freshwater inputs.

Aesthetics - Streams and rivers are generally considered to have a positive visual appearance that is dependent upon having adequate water to cover the channel bed. Low flows expose the streambed and debris, and encourage growth of undesirable plants.

Migratory fish passage - Low flow rates and shallow water limits the seasonal migration of both freshwater and anadromous fish, potentially interfering with spawning, juvenile development and adult movements.

Stocked fish - Many rivers are stocked with hatchery-raised fish for recreational fishing. Artificially high fish populations in the critical summer months require adequate streamflow for shelter, water quality, and food sources.

Self-sustaining fish - Self-sustaining fish populations require adequate flow not only in the summer but also in the winter, to deter bottom ice over spawning areas and to maintain open water for aeration. In addition to migratory passage, self-sustaining populations require flow to deter ice formation, maintain channel morphometry and substrate characteristics, egg and juvenile development, and adult feeding and refuge.

Rare and endangered species - Water dependent rare and endangered species, such as fish, amphibians, and waterfowl may be impacted by low flow rates that restrict their habitat, food, or shelter.

Vegetation encroachment - Sustained periods of low flow, particularly when combined with the regulation or absence of flood flows, allow terrestrial and wetland vegetation to encroach on the channel and become established on mid-channel bars. This then encourages further sediment deposition.

White water recreation - The rivers used for white water sports need to have sufficient flow to generally provide water depths of about two feet and channel widths of 25 feet. For many users, flow velocities over five feet per second should be avoided.

In order to minimize conflicts, it is important that the methodology used to establish instream flow rates be technically valid and has a high level of public confidence.

APPENDIX M: MATTABASSET RIVER WATERSHED INTENSIVE WATER QUALITY SURVEYS CRITERIA FOR WATER QUALITY INDICATORS

Source: Connecticut River Watch Program, June 2002.

Indicator	Water Quality Criteria	
	Connecticut Water Quality Standards/ Guidelines	**Other Guidelines**
E-coli[1]	Not to exceed 235 (bathing) or 576 (non-bathing) for 10% of samples; not to exceed geometric mean of 126 colonies/100 mL for any group of samples	
Enterococcus[1]	Not to exceed 61 (bathing) or 151 (non-bathing) for 10% of samples; not to exceed geometric mean of 33 colonies/100 mL for any group of samples	
Turbidity	Not to exceed 5 NTU over background; for Mattabesset watershed, background is estimated to be 4 NTU, so results should not exceed 9 NTU	
Total Suspended Solids (TSS)	Not to exceed 10 mg/l over background; for Mattabesset watershed, background is estimated to be 5 mg/l, so results should not exceed 15 mg/l	
pH	Within 6.5 to 8.0 pH units	
Alkalinity		10–20 mg/l, sensitive to acidification; >20 mg/l not sensitive to acidification[1]
Color	None which causes visible discoloration of receiving stream	
Nitrate		Class A waters: <2.0 mg/l; Class B and C waters <5.0 mg/l[2]
Ammonia	Not to exceed 1.73 mg/l at 20° C and pH of 7.0	
Total Phosphate	NA	>0.05 mg/l, warning flag; >0.10 mg/l, impacts are certain[3]

[1] The State of Connecticut is now using E.coli for freshwaters and Enterococci for saline waters, though the Water Quality Standards have not been changed officially yet

[1] University of Massachusetts Acid Rain Monitoring Project Guidelines

[2] State of Vermont Water Quality Standards

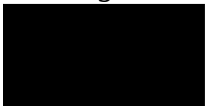
[3] State of Vermont Guidelines

APPENDIX N: CONSUMPTIVE VS. NON-CONSUMPTIVE DIVERSIONS OF THE WATERSHED, PERMITTED & REGISTERED

Name of Diversion	Purpose	Permitted Flowrate	Consumptive	Type
POLKVILLE BROOK POND	SITE DEV	n/a	Yes	Surface
STORMWATER DIVERSION	SITE DEV	n/a	Yes	Ground
PEQUABUCK RIVER DIVERSION	SITE DEV	n/a	Yes	Surface
PEQUABUCK RIVER DIVERSION	SITE DEV	n/a	Yes	Surface
STILL RIVER DIVERSION	SITE DEV	n/a	Yes	Surface
SALMON BROOK'S SUPPLEMENTAL WELL	PUBLIC WATER	n/a	Yes	Ground
FLOYDVILLE POND NORTH DIVERSION	AGRICULTURE	n/a	Yes	Surface
CARNELLI POND	SITE DEV	n/a	Yes	Surface
GRAVEL PACK WELLS	AGRICULTURE	n/a	Yes	Ground
GRAVEL PACK WELLS	AGRICULTURE	n/a	Yes	Ground
STILL RIVER DIVERSION	SITE DEV	n/a	Yes	Surface
UNNAMED TRIBUTARY NEPAUG RIVER DIVERSION	AGRICULTURE	n/a	Yes	Surface
ROARING BROOK DIVERSION	SITE DEV	n/a	Yes	Surface
ROARING BROOK DIVERSION	SITE DEV	n/a	Yes	Surface
ROARING BROOK DIVERSION	IRRIGATION	n/a	Yes	Surface
MILL BROOK DIVERSION	SITE DEV	n/a	Yes	Surface
BARKHAMSTED RESERVOIR	PUBLIC WATER	70	Yes	Surface
HOCKANUM RIVER DIVERSION	INDUSTRIAL	2.1	Yes	Surface
PEQUABUCK RIVER DIVERSION	PUBLIC WATER	1.5	Yes	Surface
VILLAGE WATER COMPANY WELLS #7 & 8	PUBLIC WATER	1.48	Yes	Ground
COLCHESTER WELLS	PUBLIC WATER	1.425	Yes	Ground
CHARLES W. HOUSE WELLS #4 & 5	PUBLIC WATER	1.35	Yes	Ground
CHARLES W. HOUSE WELL #5	PUBLIC WATER	0.918	Yes	Ground
TERRYVILLE WELL FIELD	PUBLIC WATER	0.9	Yes	Ground
VILLAGE WATER COMPANY WELLS #7 & 7A	PUBLIC WATER	0.8	Yes	Ground
MEADOW RIDGE WELL	PUBLIC WATER	0.576	Yes	Ground
AVON WELL #4	PUBLIC WATER	0.549	Yes	Ground
ROARING BROOK DIVERSION	IRRIGATION	0.5	Yes	Surface
PINE MEADOW WELL & BLACK BRIDGE WELL	PUBLIC WATER	0.45	Yes	Ground
PINE MEADOW WELL & BLACK BRIDGE WELL	PUBLIC WATER	0.45	Yes	Ground
CHARLES W. HOUSE WELL #4	PUBLIC WATER	0.432	Yes	Ground
PINE MEADOW & ELEMENTARY SCHOOL WELLS	PUBLIC WATER	0.418	Yes	Ground
PINE MEADOW & ELEMENTARY SCHOOL WELLS	PUBLIC WATER	0.418	Yes	Ground
WELL #3	PUBLIC WATER	0.252	Yes	Ground
GROUNDWATER DIVERSION	PUBLIC WATER	0.216	Yes	Ground
WELLS ACRES WELL	PUBLIC WATER	0.162	Yes	Ground
AVON INTERCONNECTION	PUBLIC WATER	0.144	Yes	Ground
UNNAMED SURFACE WATER DIVERSIONS	IRRIGATION	0.1287	Yes	Surface
UNNAMED SURFACE WATER DIVERSIONS	IRRIGATION	0.1287	Yes	Surface
PONDWOOD WELL #1	PUBLIC WATER	0.118	Yes	Ground
LAKEVIEW APARTMENT COMPLEX WELLS	PUBLIC WATER	0.053	Yes	Ground
HARCO'S IRRIGATION WATER WELL	IRRIGATION	0.0105	Yes	Ground
FARMINGTON RIVER DIVERSION	FLOOD MGT	n/a	No	Surface
FARMINGTON RIVER DIVERSION	RECREATION	n/a	No	Surface
IVY BROOK DIVERSION	FLOOD MGT	n/a	No	Surface
IVY BROOK DIVERSION	FLOOD MGT	n/a	No	Surface
GOODWIN & COLEBROOK RIVER DIVERSIONS	HYDROPOWER	388	No	Surface
GOODWIN & COLEBROOK RIVER DIVERSIONS	HYDROPOWER	388	No	Surface

Name of Diversion	Registered Flowrate	Purpose	Consumptive?	Type
CULBRO TOBACCO - FARM #20 POND EAST OF BABBS RD	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #02 FIRETOWN ROAD POND	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #02 HOSKINS ROAD POND	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #02 KETCHEN POND B	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #02 KETCHEN POND A	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #02 HALL HILL POND	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #03 SALMON BRK HOLDING POND	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #03 POND “B”	n/a	AGRICULTURE	Yes	Surface
CULBRO TOBACCO - FARM #03 POND “A”	n/a	AGRICULTURE	Yes	Surface
H.C. THRALL SHELANSKY POND	n/a	AGRICULTURE	Yes	Surface
H.C. THRALL WARNER POND	n/a	AGRICULTURE	Yes	Surface
CAVANAUGH - 10 WELLS	n/a	AGRICULTURE	Yes	Ground
CANTON PGC - POND ON 7TH HOLE FAIRWAY	n/a	IRRIGATION	Yes	Surface
ST. PIERRE DAM ON ROARING BROOK	n/a	IRRIGATION	Yes	Surface
CULBRO TOBACCO - FARM #28 POND WEST OF IRON ORE RD	n/a	AGRICULTURE	Yes	Surface
H.C. THRALL BAKER HOLLOW POND	n/a	AGRICULTURE	Yes	Surface
H.C. THRALL FITCH POND	n/a	AGRICULTURE	Yes	Surface
SIMSBURY - TOWN FOREST POND	n/a	IRRIGATION	Yes	Surface
FOLLY FARM FARMINGTON RIVER PUMP #4	n/a	AGRICULTURE	Yes	Ground
FOLLY FARM RIVER OXBOW PUMP #3	n/a	AGRICULTURE	Yes	Ground
FOLLY FARM RIVER OXBOW PUMP #2	n/a	AGRICULTURE	Yes	Ground
FOLLY FARM KING PHILLIP BROOK BYPASS POND PUMP#1	n/a	AGRICULTURE	Yes	Ground
FOLLY FARM CONCRETE HOLDING TANK PUMP #5	n/a	POTABLE SUPPLY	Yes	Ground
AVON GOLF CLUB IMPOUNDMENT #3	n/a	IRRIGATION	Yes	Ground
AVON GOLF CLUB IMPOUNDMENT #5	n/a	IRRIGATION	Yes	Ground
AVON GOLF CLUB IMPOUNDMENT #4	n/a	IRRIGATION	Yes	Ground
WESTWOODS CC POND #2	n/a	AGRICULTURE	Yes	Surface
WEST BRANCH RESERVOIR - ALL BLOWOFFS	1053	PUBLIC WATER	Yes	Surface
RUGG BROOK RESERVOIR	419	PUBLIC WATER	Yes	Surface
BARKHAMSTED RESERVOIR - 54" BLOW OFF	290	PUBLIC WATER	Yes	Surface
NEPAUG RESERVOIR - 24" BLOWOFF to NEPAUG R.	100	PUBLIC WATER	Yes	Surface
NEPAUG RESERVOIR - 48" SUPPLY MAIN to RES #6	99	PUBLIC WATER	Yes	Surface
NEPAUG RESERVOIR - 24" BLOWOFF to PHELPS Br.	97	PUBLIC WATER	Yes	Surface
BRISTOL RESERVOIR #5	97	PUBLIC WATER	Yes	Surface
NEPAUG RESERVOIR - 42" SUPPLY MAIN to W HTFD PLANT	90	PUBLIC WATER	Yes	Surface
BARKHAMSTED RESERVOIR - SUPPLY MAINS	70	PUBLIC WATER	Yes	Surface
BRISTOL RESERVOIR #4	39	PUBLIC WATER	Yes	Surface
NEPAUG - PHELPS BROOK INTERCONNECTION	15	PUBLIC WATER	Yes	Surface
WHITE BRIDGE PS POLKVILLE	15	PUBLIC WATER	Yes	Ground
BARKHAMSTED RESERVOIR - TURBINE	9.69	PUBLIC WATER	Yes	Surface
SKI SUNDOWN - DIVERSION POND AT RATLUM BROOK	9.22	OTHER	Yes	Surface
BRISTOL RESERVOIR #3	9	PUBLIC WATER	Yes	Surface
WHIGVILLE RESERVOIR	9	PUBLIC WATER	Yes	Surface
BRISTOL RESERVOIR #2	8.4	PUBLIC WATER	Yes	Surface
CRYSTAL LAKE RESERVOIR	7.7	PUBLIC WATER	Yes	Surface
BRISTOL RESERVOIR #1 (& Cranberry Bog)	7	PUBLIC WATER	Yes	Surface
WHITE BRIDGE WELLS	6.624	PUBLIC WATER	Yes	Ground
IMPERIAL R-VI SALMON BROOK @ FLOYDSVILLE ROAD	4.76	AGRICULTURE	Yes	Surface
VALLEY FARMS - FARMINGTON RIVER IRRIGATION PUMP	4.2	AGRICULTURE	Yes	Surface
IMPERIAL POND #11 FLOYDVILLE UPPER FARM POND	4	AGRICULTURE	Yes	Surface
BRISTOL RESERVOIR #6 (Poland Brook)	3.9	PUBLIC WATER	Yes	Surface
TERRYVILLE RES #3	3.4	PUBLIC WATER	Yes	Surface
NEW HARTFORD INTERCONNECTION	3	PUBLIC WATER	Yes	Surface
SKI SUNDOWN - LOWER POND PUMPED WITHDRAWAL	2.88	OTHER	Yes	Surface
IMPERIAL POND #13 FLOYDVILLE LOWER FARM POND	2.88	AGRICULTURE	Yes	Surface
WOODFORD - FARMINGTON RIVER WITHDRAWALS	2.88	AGRICULTURE	Yes	Surface
TOMASSO BROTHERS POND #1	2.8	IRRIGATION	Yes	Surface
UPPER WHITE BRIDGE WELLS	2.16	PUBLIC WATER	Yes	Ground
SKI SUNDOWN - UPPER POND - BROOK TO LOWER POND	2.05	OTHER	Yes	Surface
IMPERIAL POND #03 PIGEON HILL ROAD FARM POND	2	AGRICULTURE	Yes	Surface

Name of Diversion	Registered Flowrate	Purpose	Consumptive?	Type
SKI SUNDOWN - UPPER POND - PIPE TO LOWER POND	1.75	OTHER	Yes	Surface
AVON GOLF CLUB IMPOUNDMENT #1	1.58	IRRIGATION	Yes	Ground
MECHANIC ST WELL #2	1.564	PUBLIC WATER	Yes	Ground
TUCKAHOE POND #1	1.44	AGRICULTURE	Yes	Surface
TUCKAHOE WELL #1	1.44	AGRICULTURE	Yes	Surface
TUCKAHOE POND #3	1.44	AGRICULTURE	Yes	Surface
MALLARD DRIVE DAM ON ROARING BROOK	1.44	IRRIGATION	Yes	Surface
MILLBROOK GC - WITHDRAWAL FROM MILLBROOK	1.33	IRRIGATION	Yes	Surface
IMPERIAL R-III FARMINGTON RIVER @ WESTERBERG LOTS	1.3	AGRICULTURE	Yes	Surface
IMPERIAL POND #10 FLOYDVILLE FARM POND	1.3	AGRICULTURE	Yes	Ground
IMPERIAL R-IV CANAL BROOK @ GRIFFIN ROAD	1.3	AGRICULTURE	Yes	Surface
IMPERIAL R-V CANAL BROOK @ QUARRY ROAD	1.3	AGRICULTURE	Yes	Surface
IMPERIAL POND #02 HAZELWOOD FARM POND	1.3	AGRICULTURE	Yes	Surface
IMPERIAL R-II FARMINGTON RIVER @ CULBRO 7 FARM	1.3	AGRICULTURE	Yes	Surface
IMPERIAL R-I FARMINGTON RIVER @ MCKINNEY FARM	1.3	AGRICULTURE	Yes	Surface
IMPERIAL POND #07 DUBON FARM POND	1.3	AGRICULTURE	Yes	Surface
NEPAUG INTERCONNECTION TO COLLINSVILLE WTP	1.3	PUBLIC WATER	Yes	Surface
NEPAUG - COLLINSVILLE INTERCONNECTION	1.3	PUBLIC WATER	Yes	Surface
IMPERIAL POND #04 MARSHALL PHELPS ROAD FARM POND	1.3	AGRICULTURE	Yes	Surface
O.J. THRALL FARMINGTON RIVER PUMP #1	1.15	AGRICULTURE	Yes	Ground
IMPERIAL POND #05 DAY HILL ROAD FARM POND	1.1	AGRICULTURE	Yes	Surface
AVON WELL #5 Craigemore	1.008	PUBLIC WATER	Yes	Ground
BEL COMPO GOLF COURSE 1-POND	1	IRRIGATION	Yes	Surface
CANTON PGC - POND ON ROARING BROOK	0.976	IRRIGATION	Yes	Surface
O.J. THRALL FARMINGTON RIVER PUMP #2	0.96	AGRICULTURE	Yes	Surface
O.J. THRALL POND #1	0.95	AGRICULTURE	Yes	Surface
VILLAGE WATER COMPANY WELL #5	0.91	PUBLIC WATER	Yes	Ground
VILLAGE WATER COMPANY WELL #5	0.91	PUBLIC WATER	Yes	Ground
CAVANAUGH - WITHDRAWALS FROM FARMINGTON RIVER	0.864	AGRICULTURE	Yes	Surface
CAVANAUGH - IRIG POND #1	0.864	AGRICULTURE	Yes	Surface
CAVANAUGH - SPRINGDAM POND	0.864	AGRICULTURE	Yes	Surface
AVON WELL #6 Tollgate	0.864	PUBLIC WATER	Yes	Ground
MIX STREET WELL #4	0.864	PUBLIC WATER	Yes	Ground
VILLAGE WATER COMPANY WELL #3	0.84	PUBLIC WATER	Yes	Ground
VILLAGE WATER COMPANY WELL #4	0.821	PUBLIC WATER	Yes	Ground
IMPERIAL WELL #09 WINDSOR	0.792	AGRICULTURE	Yes	Ground
SALMON BROOK WELL #1	0.734	PUBLIC WATER	Yes	Ground
O.J. THRALL WELL #1	0.72	AGRICULTURE	Yes	Ground
AVON GOLF CLUB IMPOUNDMENT #2	0.72	IRRIGATION	Yes	Ground
MIX STREET WELL #3	0.72	PUBLIC WATER	Yes	Ground
MIX STREET WELL #5	0.72	PUBLIC WATER	Yes	Ground
C.W. HOUSE WELL FIELD C WELL #2	0.684	PUBLIC WATER	Yes	Ground
IMPERIAL POND #01 CULBRO 7 FARM POND	0.6	AGRICULTURE	Yes	Surface
IMPERIAL POND #06 HOLCOMB FARM POND	0.6	AGRICULTURE	Yes	Surface
VILLAGE WATER COMPANY WELL #2	0.583	PUBLIC WATER	Yes	Ground
SALMON HOLDING WELL #1	0.576	AGRICULTURE	Yes	Ground
SALMON HOLDING WELL #2	0.576	AGRICULTURE	Yes	Ground
SALMON HOLDING WELL #2	0.576	AGRICULTURE	Yes	Ground
POND #2	0.576	AGRICULTURE	Yes	Surface
TERRYVILLE WELL #2	0.533	PUBLIC WATER	Yes	Ground
IMPERIAL WELL #10 FLOYDVILLE OFFICE	0.513	POTABLE SUPPLY	Yes	Ground
IMPERIAL POND #09 SILVER BIRCH POND (LILY POND)	0.5	AGRICULTURE	Yes	Surface
UNIONVILLE HUCKELBERRY HILL INTERCONNECTION	0.5	PUBLIC WATER	Yes	Surface
AVON WATER COMPANY INTERCONNECTION	0.5	PUBLIC WATER	Yes	Ground
CLIFFSIDE CC - WITHDRAWAL FROM FARMINGTON RIVER	0.5	IRRIGATION	Yes	Surface
UNIONVILLE KNOLLWOOD RD INTERCONNECTION	0.5	PUBLIC WATER	Yes	Surface
FARMINGTON WATER CO INTERCONNECTION	0.5	PUBLIC WATER	Yes	Surface
TOMASSO BROTHERS POND #2	0.5	IRRIGATION	Yes	Surface
VILLAGE WATER COMPANY WELL #1	0.483	PUBLIC WATER	Yes	Ground
AVON - SPRING LAKE PUMP STATION	0.461	IRRIGATION	Yes	Surface




Name of Diversion	Registered Flowrate	Purpose	Consumptive?	Type
WINDY GLEN FARM - POND	0.432	AGRICULTURE	Yes	Surface
C.W. HOUSE WELL FIELD C WELL #3	0.432	PUBLIC WATER	Yes	Ground
AVON WELL #3 West Avon Road	0.432	PUBLIC WATER	Yes	Ground
TULLER RESERVOIR	0.4	PUBLIC WATER	Yes	Surface
TOMASSO BROTHERS POND #3	0.4	IRRIGATION	Yes	Surface
TOMASSO BROTHERS POPLAR SWAMP BROOK WITHDRAWAL	0.4	AGRICULTURE	Yes	Surface
TOMASSO BROTHERS FARMINGTON RIVER WITHDRAWAL	0.4	AGRICULTURE	Yes	Surface
TOMASSO BROTHERS POND #4	0.4	AGRICULTURE	Yes	Surface
BRADLEY AIRPORT WELL #3	0.396	PUBLIC WATER	Yes	Ground
TERRYVILLE WELL #1	0.37	PUBLIC WATER	Yes	Ground
WESTWOODS CC POND #1 ON SCOTT SWAMP BROOK	0.36	AGRICULTURE	Yes	Surface
Farmington Woods Well #1	0.35	PUBLIC WATER	Yes	Ground
BARLOWE ST WELL #1	0.304	PUBLIC WATER	Yes	Ground
IMPERIAL POND #12 FLOYDVILLE MIDDLE FARM POND	0.3	AGRICULTURE	Yes	Surface
FARMINGTON VALLEY NURSERY - PUMP @ FARMINGTON R.	0.288	AGRICULTURE	Yes	Surface
COLLINSVILLE RESERVOIR - 8" BLOWOFF	0.25	PUBLIC WATER	Yes	Surface
AVON WELL #2 Avon Park North	0.23	PUBLIC WATER	Yes	Ground
SIMSBURY - CURTISS PARK FARMINGTON RIVER INTAKE	0.22	IRRIGATION	Yes	Surface
SIMSBURY - CURTISS PARK FARMINGTON RIVER INTAKE	0.22	IRRIGATION	Yes	Surface
C.W. HOUSE WELL FIELD C WELL #1	0.216	PUBLIC WATER	Yes	Ground
Farmington Woods Well #2	0.20	PUBLIC WATER	Yes	Ground
SIMSBURY - PHAROS FARM WELL	0.144	AGRICULTURE	Yes	Ground
PONDWOOD WELL FIELD B #5	0.144	PUBLIC WATER	Yes	Ground
WINDY GLEN FARM - RATTLESNAKE BROOK PUMP #2	0.13	AGRICULTURE	Yes	Surface
WINDY GLEN FARM - RATTLESNAKE BROOK PUMP #3	0.13	AGRICULTURE	Yes	Surface
BRADLEY AIRPORT WELL #4	0.12	PUBLIC WATER	Yes	Ground
AVON WELL #4 Oxbow	0.16	PUBLIC WATER	Yes	Ground
AVON WELL #1 Route 44	0.108	PUBLIC WATER	Yes	Ground
TURKEY HILL APARTMENTS WELL #2	0.092	PUBLIC WATER	Yes	Ground
AVON WELL #7 Avonwood	0.072	PUBLIC WATER	Yes	Ground
TURKEY HILL APARTMENTS WELL #1	0.065	PUBLIC WATER	Yes	Ground
TOMASSO BROTHERS WELL	0.058	IRRIGATION	Yes	Ground
IMPERIAL WELL #08 WEST SUFFIELD	0.050	AGRICULTURE	Yes	Ground
IMPERIAL WELL #05 FLOYDVILLE POTTING SHED	0.050	AGRICULTURE	Yes	Surface
IMPERIAL WELL #03 FLOYDVILLE	0.050	AGRICULTURE	Yes	Ground
IMPERIAL WELL #02 FLOYDVILLE HEADQUARTERS	0.050	AGRICULTURE	Yes	Ground
IMPERIAL WELL #01 FLOYDVILLE HEADQUARTERS	0.050	AGRICULTURE	Yes	Ground
AVON GOLF CLUB WELL #2	0.05	IRRIGATION	Yes	Ground
CANTON PGC - POND ON UNNAMED BROOK	0.043	IRRIGATION	Yes	Surface
IMPERIAL WELL #06 FARREN ROAD HOUSE	0.014	POTABLE SUPPLY	Yes	Ground
HUCKLEBERRY HILL SPRINGS	0.005	PUBLIC WATER	Yes	Surface
CAMP STREET INTERCONNECTION	0.003	PUBLIC WATER	Yes	Surface
AMERICAN CHEMICAL WELL #1	n/a	INDUSTRIAL	Var	Ground
WELL NO. 3	1.08	INDUSTRIAL	Var	Ground
WARING PRODUCTS - WELL #MW-3	0.396	INDUSTRIAL	Var	Ground
CT SPRING & STAMPING WELL #1	0.36	INDUSTRIAL	Var	Ground
GREAT POND	0.096	INDUSTRIAL	Var	Surface
FOREMAN DAM	n/a	RECREATION	No	Surface
GRIGGS SWIMMING POOL DAM	n/a	RECREATION	No	Surface
PETER STICH ASSOCIATES POND	n/a	STORMWATER	No	Surface
ROBINSON POND	n/a	RECREATION	No	Surface
ENDERS POND #5	n/a	RECREATION	No	Surface
ENDERS POND #4	n/a	RECREATION	No	Surface
CHAPMAN ALSOP - ICE POND	n/a	RECREATION	No	Surface
ENDERS POND #3	n/a	RECREATION	No	Surface
ENDERS POND #2	n/a	RECREATION	No	Surface
ENDERS POND #1	n/a	RECREATION	No	Surface
MCLEAN GAME REFUGE WITHDRAWAL FROM BISSELL BROOK	n/a	RECREATION	No	Surface
TRUMPF AMERICA - STORMWAATER RETENTION BASIN	n/a	STORMWATER	No	Surface
RAINBOW RESERVOIR TWIN 5' x 7' SLUICE GATES	1977	HYDROPOWER	No	Surface

Name of Diversion	Registered Flowrate	Purpose	Consumptive?	Type
RAINBOW RESERVOIR HYDROELECTRIC TURBINES	1550	HYDROPOWER	No	Surface
ROBERTSVILLE POWER STATION ON STILL RIVER	29	HYDROPOWER	No	Surface
BURLINGTON TROUT HATCHERY BRADLEY BROOK UNIT	10.08	FISHERIES	No	Surface
BURLINGTON TROUT HATCHERY PUNCH BROOK UNIT	2.88	FISHERIES	No	Surface
SIMSBURY FARMS WELL	1.008	RECREATION	No	Ground
WINDSOR DATA CENTER - WELL NO. 1	0.18	COOLING/HEAT	No	Ground