

New Hampshire Department of Environmental Services

IMPAIRMENTS REMOVED (I.E. DELISTED) FROM THE 303(D) LIST OF THREATENED OR IMPAIRED WATERS

April 20, 2012

In accordance with Section 303(d) of the federal Clean Water Act, States must prepare a list of impaired waters that require a Total Maximum Daily Load study every 2 years (i.e., the 303(d) List). The last approved 303(d) List was prepared by the New Hampshire Department of Environmental Services (DES) in 2010. A draft of the 2012 Section 303(d) List of impaired waters has been issued for public comment. Downloadable copies of the draft list are available on the DES website for review (<http://des.nh.gov/organization/divisions/water/wmb/swga/index.htm>). This document provides a list of all surface waters that were removed from the 2010 303(d) List (i.e., “delisted”) and the reasons why they were removed.

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GROUP 1. New AUIDs Covered by New England Regional Mercury TMDL (79)

Assessment Units (AU) are the basic unit of record for conducting and reporting water quality assessments. For the 2010 assessment the assessment units were transferred from the events on the 1:100,000 National Hydrography Dataset (NHD) to events on the more accurate and detailed 1:24,000 NHD; the national coverage used by EPA. As such, the total miles of rivers increased by approximately 7,000 miles, the number of impoundments increased by approximately 450 (1,500 acres), and the number of lakes increased by approximately 375 (4,600 acres). For the 2012 assessment DES continued to refine the assessment units by adding 79 new freshwater assessment units. These improvements have further enhanced the ability of DES to manage and report on the status of the State’s water resources.

In 2007, EPA approved the Northeast Regional Mercury TMDL prepared by the Northeast States and the New England Interstate Water Pollution Control Commission (see http://des.nh.gov/wmb/tmdl/documents/NortheastRegional/FINAL_Northeast_Regional_Mercury_TMDL.pdf). This TMDL addresses all fresh surface waters in NH that are impaired for the fish consumption use primarily due to atmospheric deposition of mercury. Consequently all surface waters on the 2006 303(d) list that are listed as impaired for fish consumption due to mercury where atmospheric deposition is the primary source of mercury were delisted and moved to Category 4A for in 2008.

With regards to new assessment units, section 5.1 of the Northeast Regional Mercury TMDL states that, “In addition to the impaired waters listed in Appendix A, the TMDL may, in appropriate circumstances, also apply to waterbodies that are listed for mercury impairment in subsequent Clean Water Act Section 303(d) Lists of Impaired Waters. For such waterbodies, this TMDL may apply if, after listing the waters for mercury impairment and taking into account all relevant comments submitted on the Impaired Waters List, a state determines with EPA approval of the list that this TMDL should apply to future mercury impaired waterbodies.”

In accordance with the TMDL, DES is requesting public comment on its intent to include the 79 new freshwater assessment units (Table 1) in Category 4A (i.e. impaired waters that have an EPA approved TMDL) due to impairment of the fish consumption use caused primarily by atmospheric deposition of mercury. This is because NH considers all surface waters in the state to be impaired for the fish consumption use due to mercury and intent of the TMDL was to address all such impairments in freshwaters. Consequently, all fresh surface waters in NH, regardless of whether or not they have yet been assigned an assessment unit number, are impaired for this use and are covered by the Northeast Regional Mercury TMDL. Therefore since a TMDL has been approved by EPA, DES proposes to place all new freshwater assessment units where atmospheric deposition is the primary source of mercury in impairment Category 4A instead of on the 303(d) list (Category 5) for fish consumption due to mercury.

Table 1. New Assessment Unit IDs covered by the Northeast Regional Mercury TMDL

NHIMP600030603-07	NHRIV801060303-16	NHRIV700060906-43	NHRIV700030501-14
NHIMP600030806-08	NHRIV801040204-05	NHRIV700060102-25	NHRIV700030304-40
NHIMP600030904-06	NHRIV801040204-06	NHRIV700030402-11	NHRIV700020101-34

NHRIV700020107-09
NHRIV700020108-15
NHRIV700020108-16
NHRIV700020108-17
NHRIV700020110-07
NHRIV700020201-32
NHRIV700020203-24
NHRIV700010603-16
NHRIV700010603-17
NHRIV700010603-18
NHRIV700010603-19
NHRIV700010804-18
NHRIV700010304-23
NHRIV700010501-30
NHRIV700010601-07
NHRIV600030904-26
NHRIV600031001-22

NHRIV600031004-34
NHRIV600030709-25
NHRIV600030806-27
NHRIV400020103-25
NHLAK802020203-01-03
NHLAK802010202-22
NHLAK801030504-02
NHLAK801060303-03
NHLAK801060303-03-01
NHLAK700061102-13-02
NHLAK700061203-05-03
NHLAK700060102-04
NHLAK700060201-02-01
NHLAK700060201-03-01
NHLAK700060201-03-02
NHLAK700060201-03-03
NHLAK700060302-19

NHLAK700060401-12-01
NHLAK700060502-06-01
NHLAK700030105-04
NHLAK700030304-12
NHLAK700020108-06
NHLAK700020110-02-40
NHLAK700020110-06
NHLAK700020201-08
NHLAK600031001-02
NHLAK600030709-01
NHLAK600030802-05-01
NHIMP801060303-05
NHIMP802020103-09
NHIMP700061203-13
NHIMP801030304-01
NHIMP801040204-03
NHIMP700060402-02-01

NHIMP700060402-02-02
NHIMP700060402-02-03
NHIMP700060402-02-04
NHIMP700060402-02-05
NHIMP700060402-02-06
NHIMP700060402-02-07
NHIMP700060503-16
NHIMP700030501-02
NHIMP700010302-03
NHIMP700020203-12
NHIMP700030101-04
NHIMP700030102-06
NHRIV700030104-30
NHRIV700060601-04-01
NHRIV801030502-19
NHRIV801070503-15

GROUP 2. AUIDs Covered by Regional Bacteria TMDL (394)

On September 21st, 2010 EPA approved the New Hampshire Statewide Bacteria TMDL. The purpose of the TMDL is to provide a framework to address bacterial pollution in the surface waters of New Hampshire, including rivers and streams, impoundments, lakes and ponds, estuaries, and the Atlantic Ocean. The TMDL report covered 394 distinct bacterial impairments from the 2008 303(d) list due to *E. coli* (freshwaters primary contact {i.e. swimming}) and enterococcus (marine primary contact {i.e. swimming}) and fecal coliform (marine shellfishing).

A copy of the EPA approval letter may be found at <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/epa-approval-letter.pdf> and additional detail documents may be found in <http://des.nh.gov/organization/divisions/water/wmb/tmdl/categories/publications.htm>

Since the TMDL has been approved by EPA, DES has placed all assessment units included in the TMDL in impairment Category 4A instead of on the 303(d) list (Category 5) for primary contact recreation (i.e. swimming) due to *E. coli* (fresh waters) and enterococcus (marine waters) and shellfishing due to fecal coliform (marine waters).

GROUP 3. AUIDs Covered by Beach Bacteria TMDL (59 Impairments on 58 AUs)

On August 29th, 2011 EPA approved the ‘TMDL Report for 58 Bacteria Impaired Waters in New Hampshire’. The purpose of the TMDL is to address impairment of primary contact recreation (i.e. swimming and shellfishing in marine water due to bacteria from improperly treated human waste and stormwater runoff. The TMDL report cover 59 distinct bacterial impairments on 58 assessment units from the 2010 303(d) list due to *E. coli* (freshwaters primary contact {i.e. swimming}) and enterococcus (marine primary contact {i.e. swimming}) and fecal coliform (marine shellfishing).

A copy of the EPA TMDL approval letter may be found at <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/epaapproval.pdf> and additional detail

documents may be found in

<http://des.nh.gov/organization/divisions/water/wmb/tmdl/categories/publications.htm>

Since the TMDL has been approved by EPA, DES has placed all assessment units included in the TMDL in impairment Category 4A instead of on the 303(d) list (Category 5) for primary contact recreation (i.e. swimming) due to *E. coli* (fresh waters) and enterococcus (marine waters).

GROUP 4. AUIDs Covered by Acid Pond TMDL Beach Bacteria TMDL (8)

On January 26th, 2011 EPA approved the addition of eight beach assessment units listed as impaired for aquatic life use support due to low to the TMDLs of their parent lakes. The parent lake TMDLs were approved by EPA in FY07 (Table 2).

A copy of the EPA approval letter may be found at

<http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/approval8acidbeaches.pdf> and additional detail documents may be found in

<http://des.nh.gov/organization/divisions/water/wmb/tmdl/categories/publications.htm>

Therefore since a TMDL has been approved by EPA, DES has placed all assessment units included in the TMDL in impairment Category 4A instead of on the 303(d) list (Category 5) for aquatic life use due to pH.

Table 2. Assessment Units (AUs) Impaired Due to Low pH (i.e. Acid Impaired Beaches)

Assessment Unit ID	Assessment Unit Name	Town	Parent Waterbody	TMDL ID Number
NHIMP700061403-04-02	Tricklin' Falls Beach	Kingston	Pow-wow Pond	33878
NHLAK600020605-02-02	State Park Beach	Tamworth	White Lake	11460
NHLAK700030302-04-02	Massasecum Casino Beach	Bradford	Lake Massasecum	33878
NHLAK700030302-04-03	French's Park Town Beach	Bradford	Lake Massasecum	33878
NHLAK700030302-04-04	Camp Piesault Beach	Bradford	Lake Massasecum	33878
NHLAK700061101-01-02	Chase's Grove	Hampstead	Island Pond	33878
NHLAK700061101-01-03	Sanborn Shore Acres	Hampstead	Island Pond	33878
NHLAK802010101-06-02	Town Beach	Washington	Millen Pond	11500

GROUP 5. AUIDs Covered by the Lake Phosphorus TMDL (84 Parameter/Designated use combinations on 26 AUs)

On May 12th, 2011 EPA approved the '24 Lake Phosphorus TMDLs'. On October 18th, 2011 EPA approved the 'Lake Phosphorus TMDL for Turtle Pond'. On January 9th, 2012 EPA approved the 'Lake Phosphorus TMDL for Webster Lake'. In all cases the waterbodies are not meeting the criteria for phosphorus and are not supporting the primary contact and/or aquatic life designated uses on the 2010 303(d). The waterbodies are impaired by varying combinations of chlorophyll a, cyanobacteria, dissolved oxygen (mg/L), and dissolved oxygen (percent saturation) as shown in Table 3. The target total phosphorus for the TMDLs was 12 ug/L with the exception of Sandy Pond (12.6 ug/L) and Long Pond (12.4 ug/L).

Copies of the EPA approval letters may be found at

- <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/epas-approval-24tmdls.pdf>
- <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/turtlepond-epas-approval.pdf>
- <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/epa-review-webster.pdf>

Since the TMDLs have been approved by EPA, DES has placed all assessment units included in the TMDL in impairment Category 4A instead of on the 303(d) list (Category 5) for the relevant parameters as shown in Table 3.

Additionally, during the 2012 assessments additional data was gathered demonstrating an additional seven impaired Parameter/Designated use combinations on waterbodies covered by the approved phosphorus TMDLs. The total phosphorus end-point in the TMDLs for lakes associated with the new impairments is 12 ug/L TP. The 24 waterbodies covered in the May 12, 2011 approval were not meeting criteria for phosphorus as related to aquatic life and/or primary contact and for assorted combinations of chlorophyll-a, cyanobacteria, low dissolved oxygen concentration, and dissolved oxygen saturation. The 12 ug/L target was set to ensure compliance with all of the above parameters. The new impairments are shown in Table 3 as ‘2012’ (the previous impairments on these lakes are denoted with an ‘X’). As shown, there are seven new impairments on six assessment units. In accordance with the TMDLs, DES is requesting public comment on its intent to include the seven new impairments in Category 4A instead of on the 303(d) list (Category 5) since the impairments are covered by the approved TMDLs.

Table 3. Summary of Assessment Units (AUs) Covered by the Total Phosphorus TMDLs

TMDL ID	Assessment Unit ID	TMDL Name	Primary Contact Recreation		Aquatic Life Use Support				TMDL Target
			Chl-a	Cyano	DO ppm	DO Sat	Chl-a	TP	
40277	NHLAK700060905-01-01	BABOOSIC LAKE	X	X			X	X	12 ug/L TP
40278	NHLAK801010203-01-01	BACK LAKE		X					12 ug/L TP
40279	NHLAK700061403-03-01	COUNTRY POND		X					12 ug/L TP
40280	NHLAK700060802-01	DORRS POND	X		X	X	X	X	12 ug/L TP
40281	NHLAK700040402-01	FLINTS POND	X		X	X			12 ug/L TP
40282	NHLAK80X401-01-01	FOREST LAKE	X	2012			X	X	12 ug/L TP
40283	NHLAK700030504-02-01	FRENCH POND	X	X			X	X	12 ug/L TP
40284	NHLAK600030703-01	GOVERNORS LAKE	X				X	X	12 ug/L TP
40285	NHLAK700061403-07	GREENWOOD POND		X					12 ug/L TP
40286	NHLAK700061403-08	HALFMOON POND	X	2012					12 ug/L TP
40287	NHLAK700060502-05	HARVEY LAKE	X	X		X	2012	2012	12 ug/L TP
40289	NHLAK700061002-03	HORSESHOE POND	X	X					12 ug/L TP
40290	NHLAK700020201-02	HUNKINS POND	X	X			X	X	12 ug/L TP
40291	NHLAK600030606-01	LONG POND	X				X	X	12.4 ug/L TP
40292	NHLAK700060803-01	NUTT POND	X		X	X	X	X	12 ug/L TP
40293	NHLAK600030704-02-01	PAWTUCKAWAY LAKE		X		X	X	X	12 ug/L TP
40294	NHLAK700060703-04	PINE ISLAND POND	X	X	X	X			12 ug/L TP
40295	NHLAK700061203-06-01	ROBINSON POND	X	X		X	X	X	12 ug/L TP
40296	NHLAK700060804-03-01	SANDY POND	X				X	X	12.6 ug/L TP
40297	NHLAK700060804-02	SEBBINS POND	X	2012			X	X	12 ug/L TP
40298	NHLAK600030802-04	SHOWELL POND	X	X			X	X	12 ug/L TP
40299	NHLAK700060101-02-01	SONDOGARDY POND		X		2012	X	X	12 ug/L TP
40300	NHLAK700060803-02	STEVENS POND	X		X	X			12 ug/L TP
40301	NHLAK700030304-05	TOM POND	X				X	X	12 ug/L TP

TMDL ID	Assessment Unit ID	TMDL Name	Primary Contact Recreation		Aquatic Life Use Support				TMDL Target
			Chl-a	Cyano	DO ppm	DO Sat	Chl-a	TP	
41414	NHLAK700060302-08	TURTLE POND		X					12 ug/L TP
41472	NHLAK700010804-02-01	WEBSTER LAKE		X		2012			12 ug/L TP

GROUP 6. Additional Cyanobacteria Impairments Covered by the Lake Phosphorus TMDL (3)

Cyanobacteria hepatotoxic microcystins was added as an impairment to primary contact recreation in 2012 to three Assessment Units that are beaches on the Assessment Units covered by the 'Lake Phosphorus TMDL' (approved May 12, 2011) due to recent blooms (Table 4).

The total phosphorus end-point in the TMDL for lakes associated with the three new Cyanobacteria hepatotoxic microcystins impairments is 12 ug/L TP. The 24 waterbodies covered in the May 12, 2011 approval were not meeting criteria for phosphorus as related to aquatic life and/or primary contact and for assorted combinations of chlorophyll-a, cyanobacteria, low dissolved oxygen concentration, and/or dissolved oxygen saturation. The 12 ug/L target was set to ensure compliance with all of the above parameters. As such, the 12 ug/L TP end-point will be protective against cyanobacteria blooms in the three new cyanobacteria impaired assessment units (Table 4).

In accordance with the TMDL, DES is requesting public comment on its intent to include the three new Cyanobacteria hepatotoxic microcystins impaired assessment units in Category 4A due to impairment of the Primary Contact Recreation use caused by Cyanobacteria hepatotoxic microcystins instead of on the 303(d) list (Category 5) for primary contact due to cyanobacteria.

Table 4. Cyanobacteria impaired beaches on Assessment Units (AUs) Covered by the Total Phosphorus TMDLs

Assessment Unit ID	Assessment Unit Name	Primary Town	Bloom Years Documented	TMDL ID
NHLAK700060804-02-02	Sebbins Pond-Camp Kettleford	Bedford	Beach Advisories: 2010 & 2011.	40297
NHLAK600030704-02-02	Pawtuckaway SP	Nottingham	Beach advisory: 2011.	40293
NHLAK802010401-01-02	Forest Lake TB	Winchester	Beach advisories: 2007, 2008, 2 in 2011.	40282

GROUP 7. Additional Dissolved Oxygen Saturation Impairments Covered by the Lake Phosphorus TMDL (2)

Dissolved Oxygen Saturation was added as an impairment to Pawtuckaway Lake (NHLAK600030704-02-01) to Aquatic Life Use Support during the 2006 assessment cycle at a time when beaches on a lake inherited the aquatic life use assessment of their parent waterbodies. As such, Pawtuckaway SP Beach (NHLAK600030704-02-02) and Pawtuckaway Town Beach (NHLAK600030704-02-03) inherited the all of the data used for the assessment from the non-beach area of Pawtuckaway Lake (Table 5).

On May 12th, 2011 EPA approved the '24 Lake Phosphorus TMDLs'. In all cases the waterbodies are not meeting the criteria for phosphorus and not supporting the primary contact and/or aquatic life designated uses on the 2010 303(d). The waterbodies are impaired by varying

combinations of chlorophyll a, cyanobacteria, dissolved oxygen (mg/L), and/or dissolved oxygen (percent saturation) as shown in Table 3. Pawtuckaway Lake was part of the ‘24 Lake Phosphorus TMDLs’ with a target total phosphorus for the TMDLs was 12 ug/L.

In accordance with the TMDL, DES is requesting public comment on its intent to include the two additional impaired assessment units in Category 4A due to impairment of the Aquatic Life Use caused by low dissolved oxygen saturation instead of on the 303(d) list (Category 5) for low dissolved oxygen saturation.

Copies of the EPA approval letters may be found at <http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/epas-approval-24tmdls.pdf>

Table 5. Dissolved Oxygen Saturation impaired beaches on an Assessment Unit (AU) Covered by the Total Phosphorus TMDLs.

Assessment Unit ID	Name	Primary Town	TMDL ID
NHLAK600030704-02-02	Pawtuckaway SP Beach	Nottingham	40293
NHLAK600030704-02-03	Pawtuckaway Town Beach	Nottingham	40293

GROUP 8. Cains Pond (NHIMP600031004-05) Sedimentation/Siltation (1)

Cains Pond was listed as non support for Secondary Contact Recreation due to Sedimentation/Siltation in the 2008 assessment. The impairment was based upon the loss of navigability per the narrative water quality criteria;

Env-Ws 1703.01

- (c) All surface waters shall provide, whenever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters.

Env-Ws 1703.03 general Water Quality Criteria

- (c) The following physical, chemical and biological criteria shall apply to all surface waters:
 - (1) All surface waters shall be free from substances in kind or quantity which:
 - e. Interfere with recreational activities;

Problem Statement

Cains Pond is a 3-acre impoundment located on Cains Brook in Seabrook, NH. Cains Brook has been modified by the construction of several dams that have created a series of millponds, including Cains Pond. Historically, the ponds have accommodated various uses including mill operation, ice harvesting, fire suppression, recreation, and others. Land use in the watershed is primarily urban and residential.

Residents in the area traditionally used Cains Pond for fishing and other recreational pursuits; however, these uses became increasingly restricted. As construction activities in the watershed increased, the pond filled in with sediment to a depth that no longer supported navigation. From 2001 through 2009, a series of events including flood-related impacts, construction of several large stores, reconstruction of a major state road, and smaller, localized

projects resulted in significant, unprecedented sediment loading to Cains Pond. (Table 6.) (All impacts are shown on Figure 1.)

Subsequent to these events, Cains Pond was listed on the 2008 303(d) list as impaired for Secondary Contact Recreation due to Obstructions to Navigation (sedimentation). In 2009, the Seabrook Conservation Commission conducted a project to restore recreational uses to the pond.
 Table 6. Summary of Cumulative Impacts in the Cains Pond Watershed 2001 – 2009

Year	Location	Impact	Problem Description
2001	Home Depot	Construction	During construction, sediment was tracked from the site on to Route 1 where it washed into the pond during rain events.
2006	Shorefront retaining wall and parking area	Construction	Constructed on the south side of the pond without proper erosion control practices. Sediment loading from the construction site occurred during rain events.
2006	Cains Pond Dam	Dam breach	During the Mother's Day flood, the Cains Brook dam, located in the headwaters of the system, breached. A large volume of sediment was mobilized and moved downstream through the system.
2007	Lowes	Construction	During construction, the entrance to the site was not stabilized correctly; sediment from the site entrance was washed down Route 1 into the pond during rain events.
2008	Route 1	Construction & road maintenance practices	Reconstruction activities resulted in sediment being washed into the pond. Reconstruction activities were conducted on the entire segment of Route 1 located in the watershed. Additionally, winter maintenance activities for Route 1 included road sanding (until 2008).
2008	Kohl's	Construction	The construction site was not stabilized properly; additionally, the site entrance was not properly stabilized. Sediment was transported down Route 1 and into the pond during rain events. (Violations were issued.)

Shallow pond depths, sediment shoaling, and dense aquatic plant growth hindered navigation for small, hand-powered craft such as kayaks, canoes, and light fishing craft. A bathymetric survey conducted in 2007 before restoration, showed rapid shoaling of the pond near Route 1 and Lakeshore Drive, with as much as 2.0 feet of sediment accumulation reducing water depths to non-navigable depths of 1 to 2.2 feet

Sediment cores taken from three locations in the pond indicate that the accumulated sediment included fine to medium yellow and brown sand with a trace of silt and substantial organics (decomposed plant matter and peat type organics).

Restoration of Recreational Uses

To address shallow pond depths and improve recreational uses, the Town of Seabrook dredged the pond and installed BMPs to reduce sediment loading. A target dredge depth of six to seven feet was set and determined to be sufficient to attain depths for small boat navigation. 7,500 cubic yards of accumulated sediment, leaf litter, and decaying vegetation were removed from the pond to achieve target dredge depths and correct the navigation impairment. The main basin of the pond was dredged to an average depth of 7 feet (an increase of approximately 5' over pre-dredge depths). A deeper "hole" (10' feet) was dredged in the northeastern section of the pond to provide a cool deep spot for fish habitat. The narrower, western "inlet" end of the pond was also dredged to an average depth of four feet (an increase of 3' over pre-dredge depths). These depths allow for navigation on the pond and provide fish habitat. The dredge depth is also deep enough to prevent the pond freezing all the way to the bottom in winter. It is also anticipated that the deeper pond depth will limit the growth and spread of invasive aquatic plants, thereby reducing the accumulation of decaying vegetation.

Additionally, the primary stormwater outfall to the pond was modified to incorporate a sediment load reduction BMP (oil and grit separation chamber) to reduce sediment loading from Route 1. The stormwater BMP removes an estimated 32 cubic feet of sediment per year (26.3 CF measured in the first 10 months). This occurred during a period when NH DOT says it no longer applies winter road sand to this section of Route 1.

The dredging, in combination with the BMP installation, should provide many decades (likely more than 60 years) of pond restoration, until pond depths are again reduced to about one foot of depth, at the present sediment accumulation rate. (D. Mellor, memo to NH DES, January 3, 2011.)

Project Outcome

Construction activities around in the watershed have largely been completed and sources of sediment shown in Table 6 have been controlled through stabilization actions. The watershed is at, or close to, build-out; additionally, post-construction BMPs were installed at several of the construction locations further reducing sediment loads to the pond.

Lowe's and Kohl's construction is finished and the lot is stabilized; post-construction runoff is managed through stormwater BMPs (detention basins).

Shorefront retaining wall is stabilized and no erosion is occurring at present.

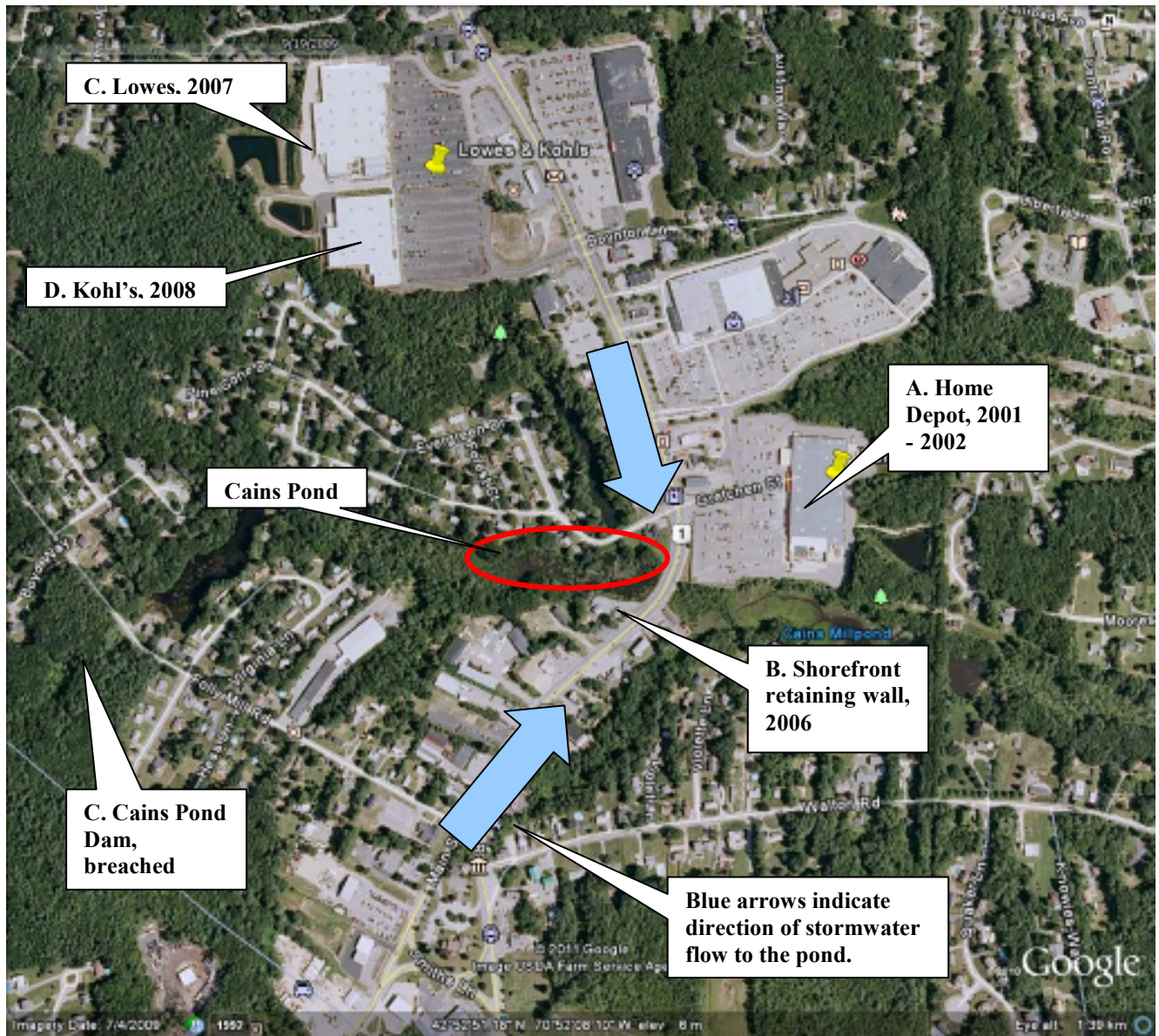
Sand is no longer used on Route 1 during winter maintenance.

Cains Pond BMP installed during the project period further reduces sediment loads.

The dredging and restoration activities resulted in a resumption of recreational use and small boats are once again able to navigate the waterway. A post-restoration survey conducted by the Seabrook Conservation Commission indicates that residents will use the pond for boating, wildlife watching, fishing, and skating. Target dredge depths have been met, residents are recreating on the pond, and measures are in place to control sediment loading to the waterbody.

Based on the above, Cains Pond (NHIMP600031004-05) has been removed from the 303(d) List for impairment of Secondary Contact Recreation due to Sedimentation/Siltation and placed in Category 2 (Fully Supporting) for this parameter.

Figure 1. Locus Map Cumulative Impacts: Cains Pond Sedimentation 2001 – 2008



GROUP 9. Contoocook River, Jaffrey to Peterborough WWTFs (42 AUID/Designated Use/Impairment combinations)

In 2006, nine assessment units of the Contoocook River between the Jaffrey and Peterborough wastewater treatment facilities (WWTFs) were added to the 303(d) List based on a 2005 QUAL2E model calibrated to Jaffrey's permit conditions at that time. Since the impairments were based on model results (assuming design flow and limiting conditions of Jaffrey's permit at that time) rather than any measured criteria exceedence the impairments were listed as 'Threatened'. The 'Threatened' impairments covered 42 AUID/Designated Use/Impairment combinations (Table 7).

On September 28th, 2009 (and modified with an effective date of August 16th, 2010) Jaffrey was issued a new permit with more stringent limits for total phosphorus and ammonia (<http://www.epa.gov/region1/npdes/permits/2010/finalmodnh0100595permit.pdf>) to control chlorophyll a, dissolved oxygen concentration, and dissolved oxygen saturation. In 2010 Jaffrey began operating under the new permit and is in compliance with the permit conditions. As such, the 2005 QUAL2E model is no longer a valid means of assessment.

Since the WWTF is now successfully operating under a new permit with very stringent limits the original reason for listing (i.e. the 2005 model) no longer valid. As such, the 42 AUID/Designated Use/Impairment combinations have been removed from the 303(d) List and placed in the categories shown in Table 7 based upon sampling data since the Jaffrey WWTF began operating under the new permit in 2010. As shown, all have been placed in Category 3 (insufficient information). Most parameters now have no data (Category 3-ND) while a few have a limited amount of data that meets water quality standards but not enough to say fully supporting per the 2012 CALM (Category 3-PAS).

Table 7. Contoocook River assessment changes between Jaffrey and Peterborough WWTFs due to compliance with new NPDES permit.

Assessment Unit ID	Assessment Unit Name	Designated Use	Impairment Name	2010 Category	2010 Threatened	2012 Category	2012 Threatened
NHRIV700030101-16	Contoocook River - Unnamed Brook	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-PAS	N
			Oxygen, Dissolved	5-T	Y	3-PAS	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHRIV700030101-17	Contoocook River - 3000 ft DS of WWTF to Town Farm Br. - Including Town Farm Br.	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHRIV700030104-03	Contoocook River - Town Farm Br. to Noone Mill Dam - Including Gridley R	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-P	Y		N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHIMP700030104-04	Contoocook River – Noone Mill Pond	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-PAS	N
			Oxygen, Dissolved	5-T	Y	3-PAS	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact	Chlorophyll-a	5-T	Y	3-ND	N

Assessment Unit ID	Assessment Unit Name	Designated Use	Impairment Name	2010 Category	2010 Threatened	2012 Category	2012 Threatened
		Recreation	Phosphorus (Total)	5-T	Y	3-ND	N
NHRIV700030104-12	Contoocook River – Noone Mill Dam to US of Transcript Dam	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHIMP700030104-08	Contoocook River - Transcript Printing CO Dam	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHRIV700030104-16	Contoocook River - TRANSCRIPT Dam to North Village Dam	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHIMP700030104-12	Contoocook River - North Village Dam	Aquatic Life	Dissolved oxygen saturation	5-T	Y	3-ND	N
			Oxygen, Dissolved	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
		Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N
NHRIV700030104-17	Contoocook River – North Village Dam to US of Peterborough WWTF	Primary Contact Recreation	Chlorophyll-a	5-T	Y	3-ND	N
			Phosphorus (Total)	5-T	Y	3-ND	N

GROUP 10. Berry River (NHRIV600031002-01) Chlorophyll a for Primary Contact Recreation (1)

Berry River (NHRIV600031002-01) was listed for Primary Contact Recreation due to Chlorophyll a in 2006. The 2006 listing was based on chlorophyll a measurements which exceeded 15 ug/L, which is DES' numeric translator of the narrative criteria for primary contact

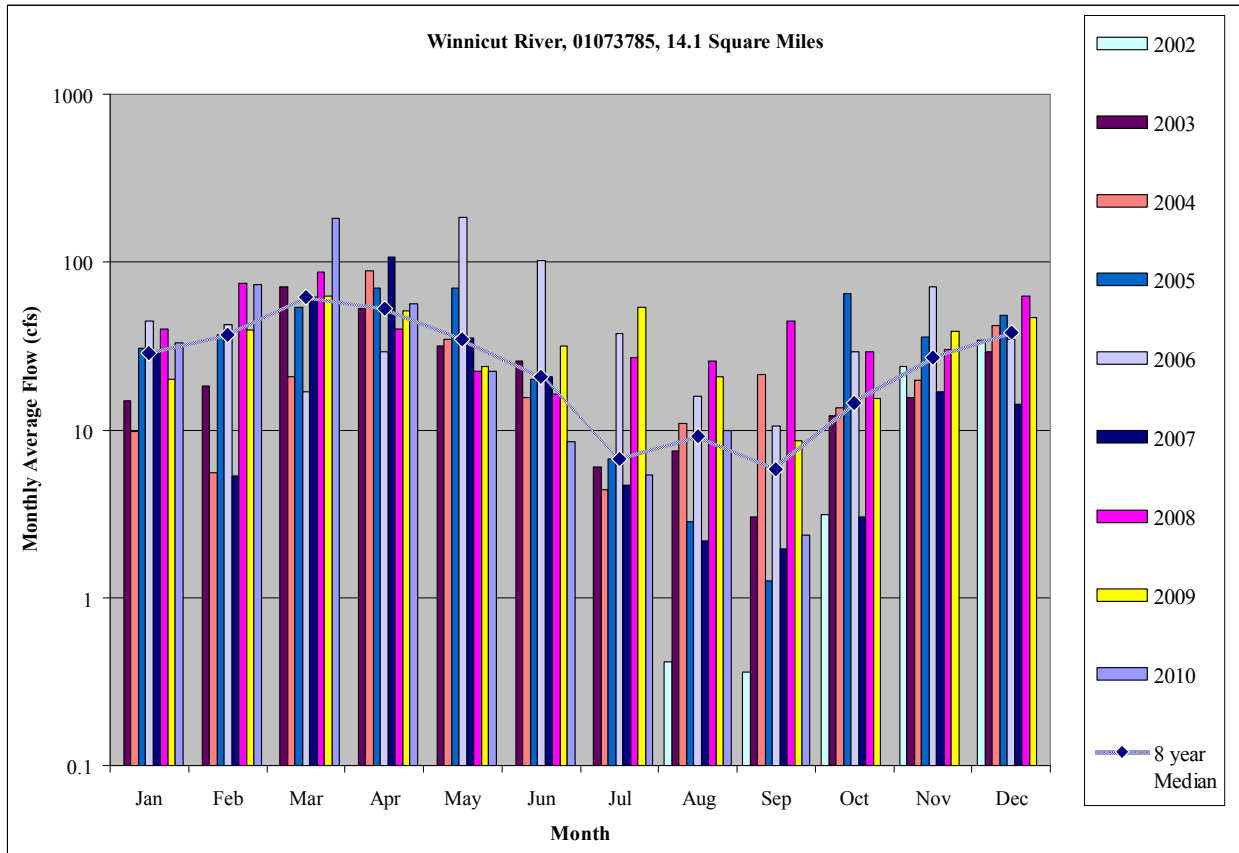
recreation in freshwaters. The 15 ug/L threshold was exceeded once in 2001 and twice in 2002. All samples from the most recent five years of collected data (2003-2007) remain well below the 15 ug/L threshold. While the summers of 2001 and 2002 were dryer than normal, the summers of 2005 (August and September) and 2007 (September) also experienced dryer than normal conditions without chlorophyll-a exceedences based on the 82 square mile Winnicut River Stream gage (01073785) which lies four miles from Berry River (Figure 2). The 2003-2007 data covers 15 samples collected within the critical summer swimming period (May 24th – Sept 15th) and 27 samples in the non-critical, off-summer, swimming season (Sept 16th - May 25th) (Table 8).

Berry River (NHRIV600031002-01) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for impairment of Primary Contact Recreation due to Chlorophyll-a.

Table 8. Statistics and counts of chlorophyll-a samples meeting and not meeting the water quality criteria for Berry River (NHRIV600031002-01)

	Year	N	Samples Meeting 15 ug/L	Samples Exceeding 15 ug/L	Average ug/L	Maximum ug/L
CHLA-Grab samples in the Critical Summer swimming season (May 24 th -Sept 15 th)	2007	3	3		4.8	10.2
	2006	3	3		3.3	3.8
	2005	3	3		3.4	4.3
	2004	2	2		4.2	6.1
	2003	3	3		2.8	5.3
	2002	3	2	1	41.0	114.7
	2001	2	1	1	14.1	26.4
CHLA-Grab samples in the Non-Critical off-Summer swimming season (Sept 16 th -May 23 th)	2007	6	6		1.3	2.3
	2006	6	6		1.1	1.9
	2005	5	5		1.1	2.1
	2004	3	3		1.9	2.1
	2003	7	7		2.1	9.7
	2002	7	6	1	7.6	35.5
	2001	6	6		2.5	7.9

Figure 2. Monthly average stream flow at the Winnicut River stream gage (01073785).



GROUP 11. Clough Pond (NHLAK700060202-03-01) Chlorophyll-a for Primary Contact Recreation (1)

Clough Pond was listed as non support for Primary Contact Recreation due to Chl-a in the 2010 assessment. The 2010 listing was based on 21 samples (Table 8) of which two exceeded the chlorophyll a threshold of 15 ug/L; one on June 27, 2007 (23.5 ug/l) and the other on August 29, 2007 (17.6 ug/l). August of 2007 was somewhat drier then the normal condition. Since 2007 there have been 11 additional samples in the critical summer period such that in the 2012 assessment a total of 25 samples are available for assessment. None of the recent 11 values exceeded the 15 ppb translator for the narrative criteria. Since 2007, three additional values were collected in June (6/2008, 6/2009 and 6/2010) and four additional values were collected in August (8/2008, 8/2009, 8/2010 and 8/2011), all remained below the 15 ppb threshold. The samples from the summer of 2010 were collected under drier conditions then the samples from 2007 based on the 82 square mile Soucook River Stream gage (01089100) which lies eight miles from Clough Pond (Figure 3). No samples since 2002 were collected outside the critical period (May 24th-Sept. 15th) (Table 9).

Clough Pond (NHLAK700060202-03-01) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for impairment of Primary Contact Recreation due to Chlorophyll a.

GROUP 12. Oyster River (NHEST600030902-01-03) Chlorophyll-a and Total Nitrogen for Primary Contact Recreation (2)

Chlorophyll-a is an indicator for the Primary Contact Recreation designated use. Chlorophyll-a concentrations greater than 20 ug/L are considered to not support this designated use because concentrations above this level affect water clarity for swimming and boating. A Magnitude of Exceedence criteria of 40 ug/L is used to identify excessively high concentrations.

In 2006, DES added a chlorophyll-a impairment to the NH 303(d) list for Primary Contact Recreation in the tidal portion of the Oyster River. The impairment decision was due to six exceedences of the Magnitude of Exceedence criteria (40 ug/L) in 2002-2003 (5 exceedences occurred in the summer ‘critical period’ for swimming of May 24th to September 15th). An impairment for total nitrogen, representing a violation of the narrative standard for nutrients Env-Ws 1703.14, was added to the 2008 303d list because of the strong causal connection between high chlorophyll-a and nitrogen in estuaries. The chlorophyll-a and total nitrogen impairments were retained for the 2010 cycle.

The high chlorophyll-a concentrations that occurred in 2002 and 2003 were collected by an autosampler and are likely due to contamination of the autosampler. An autosampler was deployed in this assessment unit during 2002-2004 to collect 12 samples during one tide cycle each month. No exceedences of the criteria for chlorophyll-a have been observed in the 56 samples (30 in the critical period) during 2005-2010 after the autosampler was removed. The autosampler was deployed by the University of New Hampshire. The UNH project manager reported that the autosampler can entrain small bits of moss, macroalgae, and other organic matter into the sample because the autosampler intake is near the bottom. The entrained material can cause chlorophyll-a concentrations in the autosampler to not be representative of phytoplankton populations in the water column for which the 20 ug/L threshold was established.

Table 10 and Table 11 summarize all of the independent measurements of chlorophyll-a in the Oyster River assessment unit with and without the autosampler results, respectively. Both tables show that there have not been any exceedences of the criteria since 2003. Without the autosampler results, there would be a total of 108 samples in 2000-2010 with two samples above the single sample criteria and one sample above the Magnitude of Exceedence criteria back in 2003. Per the assessment process in the CALM, these data would be considered “fully supporting” of the Primary Contact Recreation designated use (category 2-M) for chlorophyll-a. The data reviewed for the 2012 assessment cycle (2006-2010) would also be considered “fully supporting” (category 2-G) for chlorophyll-a.

Therefore, the original impairments for chlorophyll-a and total nitrogen for the Primary Contact Recreation designated use were likely caused by contamination of autosampler results. More recent sampling data under equally limiting conditions of tide, inflow, and weather shows these parameters support the designated use. Consequently, the assessment unit has been removed from the 303(d) List and placed in Category 2 (Full Support) for Primary Contact Recreation due to chlorophyll a and total nitrogen.

This de-listing decision only applies to the Primary Contact Recreation designated use. Chlorophyll-a and total nitrogen impairments for the Aquatic Life designated use are still supported by recent data and will be retained on the 2012 303d list.

Table 10. All Chlorophyll-a Data in the Oyster River (2000-2010)

Period	Year	Number of Independent Samples	Number Greater Than SSMC	Number Greater Than MAGEXC	Minimum Concentration (ug/L)	Average Concentration (ug/L)	Maximum Concentration (ug/L)
Critical Period	2010	5			3.3	10.2	17.3
	2009	5			1.3	4.9	16.1
	2008	5			1.9	4.8	7.2
	2007	5			5.1	9.6	19.5
	2006	5			0.8	7.5	17.8
	2005	5			3.5	7.1	14.2
	2004	16			0.1	4.9	12.9
	2003	12	6	4	0.7	28.1	79.4
	2002	17	1	1	0.7	10.3	81.6
	2001	2			4.3	4.5	4.7
2000	2			3.2	4.5	5.8	
CP Total		79	7	5	0.1	10.5	81.6
Non-Critical Period	2010	3			5.1	5.4	5.6
	2009	4			0.6	2.3	3.9
	2008	3			2.9	4.4	7.1
	2007	6			1.8	3.7	6.2
	2006	5			0.9	3.4	6.5
	2005	5			0.3	2.2	7.2
	2004	15			1.0	4.6	19.5
	2003	9	2	1	1.1	13.8	63.3
	2002	9			0.2	4.1	17.3
	2001	0			-	-	-
2000	0			-	-	-	
NCP Total		59	2	1	0.2	5.4	63.3
Grand Total		138	9	6	0.1	8.3	81.6

Table 11. Chlorophyll-a Data in the Oyster River (2000-2010) Excluding Autosampler Samples

Period	Year	Number of Independent Samples	Number Greater Than SSMC	Number Greater Than MAGEXC	Minimum Concentration (ug/L)	Average Concentration (ug/L)	Maximum Concentration (ug/L)
Critical Period	2010	5			3.3	10.2	17.3
	2009	5			1.3	4.9	16.1
	2008	5			1.9	4.8	7.2
	2007	5			5.1	9.6	19.5
	2006	5			0.8	7.5	17.8
	2005	5			3.5	7.1	14.2
	2004	11			0.1	4.5	12.9
	2003	6	1		0.7	7.8	20.3
	2002	10			0.7	4.5	15.5
	2001	2			4.3	4.5	4.7
2000	2			3.2	4.5	5.8	
CP Total		61	1	0	0.1	6.2	20.3
Non-Critical Period	2010	3			5.1	5.4	5.6
	2009	4			0.6	2.3	3.9
	2008	3			2.9	4.4	7.1
	2007	6			1.8	3.7	6.2
	2006	5			0.9	3.4	6.5
	2005	5			0.3	2.2	7.2
	2004	10			1.0	2.7	6.8
	2003	5	1	1	1.1	17.4	63.3
	2002	6			0.2	1.5	2.7
	2001	0	-	-	-	-	-
2000	0	-	-	-	-	-	
NCP Total		47	1	1	0.2	4.	63.3
Grand Total		108	2	1	0.1	5.5	63.3

GROUP 13. Ashuelot River (NHRIV802010403-19) pH (1)

Ashuelot River (NHRIV802010403-19) was listed for Aquatic Life Use Support due to low pH in 2004. The lower threshold for pH in the water quality standards is 6.5. The 2004 listing was due to low pH values collected during the summer months in 2002 (6.48, 6.04, and 6.24). In 2004 there was an additional low reading of 6.35 that was included in the 2006 assessment. All samples from the most recent seven years of collected data (2005-2011) remain above the 6.5 threshold. The 2005-2011 data cover 21 sampling dates (Table 12).

Ashuelot River (NHRIV802010403-19) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for impairment of Aquatic Life Use Support due to low pH.

Table 12. Ashuelot River (NHRIV802010403-19) pH data.

		N	Count Meeting (≥6.5 and ≤8)	Count Exceeding (<6.5 or >8)	Minimum	Maximum
pH-Grab samples	2011	3	3		6.60	6.84

		N	Count Meeting (≥6.5 and ≤8)	Count Exceeding (<6.5 or >8)	Minimum	Maximum
	2010	3	3		6.80	7.43
	2009	3	3		6.88	7.54
	2008	3	3		6.61	7.15
	2007	3	3		6.77	7.27
	2006	3	3		6.86	7.13
	2005	3	3		6.94	7.74
	2004	3	2	1	6.35	6.68
	2003	2	2		6.77	7.32
	2002	3	0	3	6.04	6.48

GROUP 14. Fresh Creek (NHRIV600030608-11) pH (1)

Fresh Creek (NHRIV600030608-11) was listed in 2008 for Aquatic Life Use Support due to low pH in 2006 and 2007. The lower threshold for pH in the water quality standards is 6.5. The 2008 listing was due to low pH values collected in 2006 and 2007 (6.45 and 6.49). All samples from the most recent three years of collected data (2008, 2009, and 2011) remain above the 6.5 threshold including a 14 day datalogger deployment (sample interval of 15 minutes). In general, the datalogger records are considered more reliable as the logger probe has a much greater equilibration time for each reading. The 2008, 2009, and 2011 data cover 24 sampling dates (Table 13).

Fresh Creek (NHRIV600030608-11) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for Aquatic Life Use Support due to low pH.

Table 13. Fresh Creek (NHRIV600030608-11) pH data.

		N	Count Meeting (≥6.5 and ≤8)	Count Exceeding (<6.5 or >8)	Minimum	Maximum
pH - 24 HR minimum / maximum from datalogger	2011	14	14		7.09	7.25
pH-Grab samples	2009	5	5		6.58	6.95
	2008	5	5		6.54	6.79
	2007	7	6	1	6.49	7.12
	2006	8	7	1	6.45	7.13

GROUP 15. South Mill Pond (NHEST600031001-09) pH (1)

South Mill Pond (NHEST600031001-09) was listed in 2006 for Aquatic Life Use Support due to high pH in 2004. The upper threshold for pH in the water quality standards is 8.5. The 2006 listing was due to pH values collected in 2004 and reported to the nearest whole number. Due to the lack of data integrity, the samples from that project collected in 2004 have been invalidated. Once the 2004 data were removed from the dataset, there was only one sample above 8.5, an 8.59 collected in 2000. The remaining 151 samples from the most recent nine years of collected data (2000-2009) remain within the 6.5 to 8.5 threshold (Table 14).

South Mill Pond (NHEST600031001-09) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for Aquatic Life Use Support due to high pH .

Table 14. South Mill Pond (NHEST600031001-09) pH data.

Full Comparison Description	Year	N	Count Meeting (>6.5 and <=8)	Count Exceeding (<6.5 or >8.5)	Minimum	Maximum
pH-GRAB	2009	4	4		7.6	7.9
	2008	8	8		7.4	8.4
	2007	15	15		6.6	8
	2006	17	17		7.2	8
	2005	16	16		7.1	8
	2004*	0			-	-
	2003	14	14		6.9	8.2
	2002	18	18		7.3	8
	2001	16	16		7.1	8
	2000	44	43	1	6.6	8.59

*2004 zeros out once the invalid data is removed.

GROUP 16. North Mill Pond (NHEST600031001-10) pH (1)

North Mill Pond (NHEST600031001-10) was listed in 2006 for Aquatic Life Use Support due to high pH in 2004. The upper threshold for pH in the water quality standards is 8.5. The 2006 listing was due to pH values collected in 2004 and reported to the nearest whole number. Due to the lack of data integrity, the samples from that project collected in 2004 have been invalidated. Once the 2004 data were removed from the dataset, there were only three samples that appear to exceed the criteria; an 8.6 sample collected in 2003 and two samples at 6.4 in 2005. The remaining 129 samples from the most recent nine years of collected data (2000-2009) remain within the 6.5 to 8.5 threshold including no criteria exceedences since the 2005 sample (Table 15).

North Mill Pond (NHEST600031001-10) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for impairment of Aquatic Life Use Support due to high pH.

Table 15. North Mill Pond (NHEST600031001-10) pH data.

Full Comparison Description	Year	N	Count Meeting (>6.5 and <=8)	Count Exceeding (<6.5 or >8.5)	Minimum	Maximum
pH-GRAB	2009	4	4		7.7	7.8
	2008	8	8		7.4	8
	2007	8	8		6.9	8
	2006	8	8		6.6	8
	2005	9	7	2	6.4	8.1
	2004*	0			-	-
	2003	8	7	1	7.6	8.6
	2002	11	11		7.2	8.2
	2001	8	8		7.1	8.2
	2000	67	67		6.5	8.0

*2004 zeros out once the invalid data is removed.

GROUP 17. Adams Point South – Cond. Appr. (NHEST600030904-04-06) pH (1)

Adams Point South – Cond. App. (NHEST600030904-04-06) was listed for Aquatic Life Use Support due to high pH in 2006 based upon data collected in 2004. The upper threshold for pH in the water quality standards for marine waters is 8.5. The 2006 listing was due to pH values collected in 2004 and reported to the nearest whole number. Due to the lack of data integrity, the eight samples from that project collected in 2004 have been invalidated. Once the 2004 data were removed from the dataset, there were no samples that exceed the criteria. All samples from the most recent five years of collected data (2005 through 2009) remain within the 6.5 to 8.5 threshold.

Adams Point South - Cond App, (NHEST600030904-04-06) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for Aquatic Life Use Support due to high pH.

Table 16. Adams Point South – Conditionally Approved (NHEST600030904-04-06) pH data.

Full Comparison Description	Year	N	Count Meeting (>6.5 and <=8)	Count Exceeding (<6.5 or >8.5)	Minimum	Maximum
pH-GRAB	2009	4	4		7.1	7.8
	2008	8	8		7.4	7.9
	2007	8	8		7.2	7.9
	2006	19	19		6.9	8.1
	2005	12	12		7.1	7.8
	2004*	6	6		7.8	8.3
	2003	11	11		7.2	7.9
	2002	11	11		7.3	8.1

*Eight values were determined to be invalid and removed from the 2004 dataset.

GROUP 18. Adams Point Mooring Field SZ (NHEST600030904-06-10) pH (1)

Adams Point Mooring Field SZ (NHEST600030904-06-10) was listed for Aquatic Life Use Support due to high pH in 2004. The higher threshold for pH in the water quality standards for marine waters is 8.5. The 2006 listing was due to pH values collected in 2004 and reported to the nearest whole number. Due to the lack of data integrity, the six samples from that project collected in 2004 have been invalidated. Once the 2004 data were removed from the dataset, there were no samples that exceed the criteria. All samples from the most recent five years of collected data (2005 through 2009) remain within the 6.5 to 8.5 threshold (n=43) (Table 17).

Adams Point Mooring Field SZ (NHEST600030904-06-10) has been removed from the 303(d) List and placed in Category 2 (Fully Supporting) for impairment of Aquatic Life Use Support due to high pH.

Table 17. Adams Point Mooring Field SZ (NHEST600030904-06-10) pH data.

Full Comparison Description	Year	N	Count Meeting (>6.5 and <=8)	Count Exceeding (<6.5 or >8.5)	Minimum	Maximum
pH-GRAB	2009	5	5		7.1	7.8

Full Comparison Description	Year	N	Count Meeting (>6.5 and <=8)	Count Exceeding (<6.5 or >8.5)	Minimum	Maximum
	2008	8	8		7.4	7.9
	2007	8	8		7.2	7.9
	2006	13	13		6.9	8.1
	2005	9	9		7.1	7.8
	2004*	2	2		8.2	8.3
	2003	11	11		7.2	7.9
	2002	9	9		7.3	8.0
	2001	1	1		7.8	7.8

*Six values were determined to be invalid and removed from the 2004 dataset.

GROUP 19. Black Brook (NHRIV700060801-05-02) Iron (1)

In 2006 Black Brook (NHRIV700060801-05-02) was listed as impaired for Aquatic Life due to Iron. All of the iron data used for the 2006 assessment was from the USGS NWIS system collected from station ID 01090477 and showed iron concentrations of 283 mg/L (6/13/01), 538 mg/L (7/4/01), 290 mg/L (7/25/01), 294 mg/L (8/15/01), and 108 mg/L (9/6/01). That data was pulled into New Hampshire's Environmental Monitoring database in 2005 and subsequently used in the 2006 assessments to make an impairment determination for Aquatic life due to Iron.

In 2011, the USGS NWIS system was once again queried to pull data into the Environmental Monitoring database for use in the 2012 assessments. Upon review, the 01090477 station data was found to have been corrected to read ug/L rather than the mg/L [i.e. 283 ug/L (6/13/01), 538 ug/L (7/4/01), 290 ug/L (7/25/01), 294 ug/L (8/15/01), and 108 ug/L (9/6/01)]. These values are all well below the chronic criteria for iron of 1,000 ug/L.

The 2006 listing was in error and since there has been no iron sampling since 2001, the assessment unit has been removed from the 303(d) List and placed in Category 3 (Insufficient Information) for Aquatic Life due to Iron.

GROUP 20. Horseshoe Pond (NHLAK700060302-02) Chlorophyll-a for Aquatic Life Use (1)

Horseshoe Pond (NHLAK700060302-02) is a tea-colored, weedy eutrophic ox-bow pond of the Merrimack River with a mean depth of 1.3 m. In 2010 Horseshoe Pond (NHLAK700060302-02) was listed as impaired for Aquatic Life due to Chlorophyll a. At the time of assessment, all of the data was in an EXCEL file rather than in the Department's Environmental Monitoring database (which is less prone to assessment error). In 2010 the assessor accidentally set Chlorophyll a as impaired when they should have set Chloride (one row down in the database) as impaired.

In 2010 there was only one sample available for comparison to the Trophic Class based criteria for Chlorophyll a to protect Aquatic Life Use. Subsequent data collections have determined the median chlorophyll-a of 7.6 ug/L (n=13) is well below the 11 ug/L criteria for chlorophyll a and the median total phosphorus of 22.8 ug/L (n=8) is well below the 28 ug/L criteria for total phosphorus for a eutrophic lake.

The 2010 listing was in error and since sampling indicates that the waterbody meets the chlorophyll a criteria to protect aquatic life for its trophic class, this assessment unit has been

removed from the 303(d) List and placed in Category 2 (Full Support) for impairment of Aquatic Life due to Chlorophyll-a. Chloride has been added to the 2012 303(d) as an impairment to Aquatic Life Use.

GROUP 21. Kezar Lake (NHLAK700030303-03-01) Chlorophyll-a & Total Phosphorus for Aquatic Life Use (2)

Kezar Lake, located in central New Hampshire, has had a long history of water quality problems. Following a major fish kill and persistent algae blooms beginning in the early 1960s, a Diagnostic/Feasibility Study (Phase I of the Clean Lakes Program) was initiated in 1980 under section 314 of the Clean Water Act. The study established that the lake's problems were from internal loading of phosphorus, and outlined a management strategy to restore the lake. Lake sediments, contaminated by years of effluent discharge from a nearby wastewater treatment facility, were the source of this internal loading from 1931 to 1981.

A Restoration/Protection Project (Phase II of the Clean Lakes Program) commenced in 1984 to implement the recommended management strategy for Kezar Lake. Two main approaches were employed to reduce phosphorus concentrations in the lake. First, aluminum salts were injected into the hypolimnion to inactivate sediment phosphorus. The injections were performed using a modified barge system that was an efficient and cost-effective means of aluminum salts application. Second, upstream riparian wetlands were manipulated by elevating water level and planting new species to encourage phosphorus removal by sedimentation and vegetative uptake.

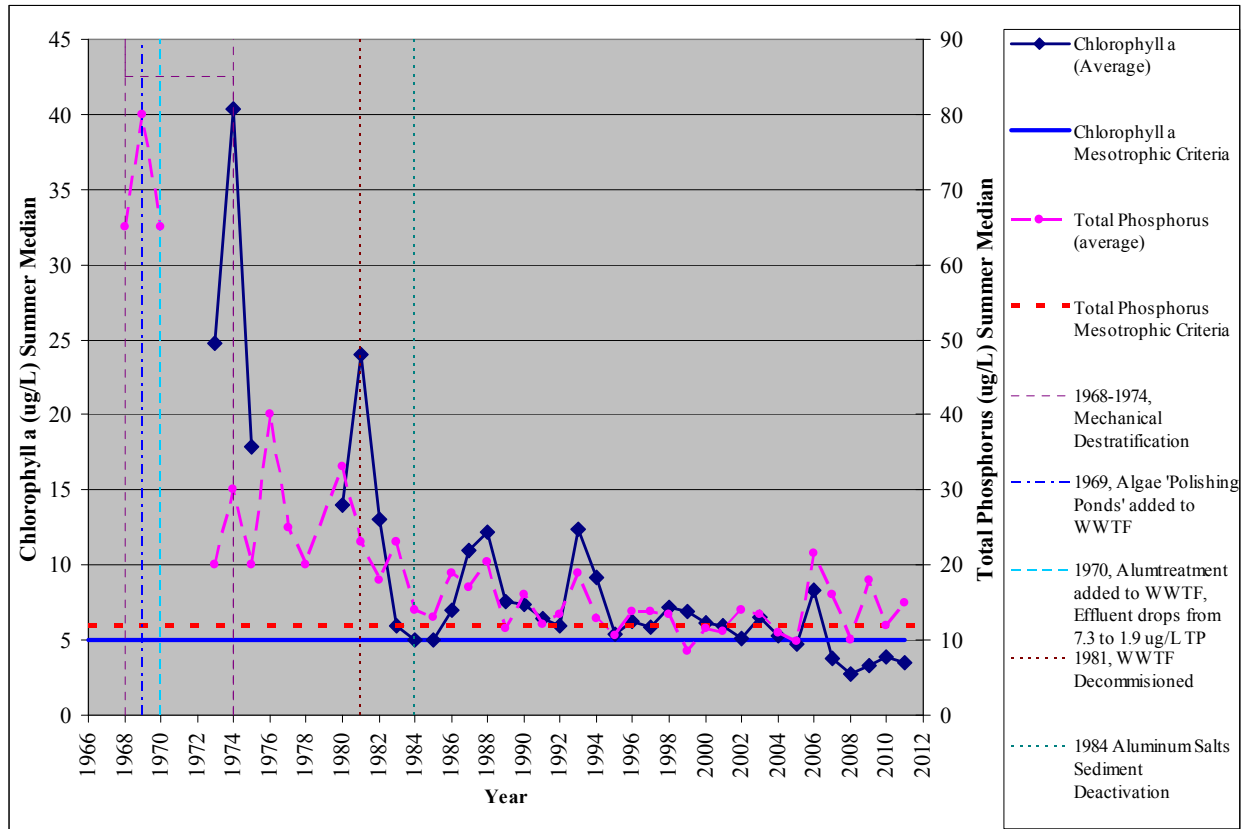
For more details on the Clean Lakes Program project on Kezar Lake please see <http://water.epa.gov/type/lakes/kezar.cfm>.

Figure 4 clearly shows the decrease in chlorophyll a concentration since the WWTF was decommissioned in 1981 and the sediment inactivation effort in 1984. It should be noted that court ordered weekly sampling occurred between 1993-2004. Since 2005 the lake has only been sampled on one to four occasions per year during the middle of the summer the peak.

The criteria established for a mesotrophic lake are 5 ug/L for chlorophyll a (the response variable) and 12 ug/L for total phosphorus (http://des.nh.gov/organization/divisions/water/wmb/wqs/documents/20090122_lake_phos_criteria.pdf). The medians calculated for the 2012 assessment are 4.5 ug/L (n=27) for chlorophyll a and 12 ug/L (n=66) for total phosphorus.

The assessment unit has been removed from the 303(d) List and placed in Category 2 (Full Support) for Aquatic Life due to Chlorophyll a and Total Phosphorus.

Figure 4. Mean annual Chlorophyll a and Total phosphorus concentrations over time.



GROUP 22. Lamprey River South (NHEST600030709-01-02) Dissolved Oxygen (Concentration & Percent Saturation)(2)

The Lamprey River South assessment unit was created for the 2012 cycle by splitting the parent Lamprey River assessment unit (NHEST600030709-01). The parent assessment unit was listed as impaired for dissolved oxygen and dissolved oxygen saturation on the 2010 303(d) list. The impairments in the parent assessment unit were based on datasonde measurements in the other child assessment unit (Lamprey River North, NHEST600030709-01-01). Once these datasonde measurements were assigned to the other child assessment unit, there were 29 and 21 independent measurements of dissolved oxygen and dissolved oxygen saturation, respectively, in the Lamprey River South assessment unit. The data were sufficient for a new assessment and no violations of the water quality standards were detected. Therefore, the categories for dissolved oxygen and dissolved oxygen saturation in the Lamprey River South assessment unit should be changed as shown in Table 18. These changes are not a formal delisting because they are due to a re-segmentation of the assessment units and the 2010 303(d) list impairments from the parent assessment unit were retained on the other child assessment unit (Lamprey River North, NHEST600030709-01-01).

Table 18. Dissolved Oxygen and Dissolved Oxygen Saturation in the Lamprey River South Assessment

Assessment Zone	Assessment Unit ID	Impairment Name	2010 Category	2012 Category
LAMPREY RIVER SOUTH	NHEST600030709-01-02	Dissolved oxygen saturation	5-M	2-G
		Oxygen, Dissolved	5-P	2-G

GROUP 23. Lamprey River North (NHEST600030709-01-01) and Squamscott River South (NHEST600030806-01-01) Estuarine Bioassessments (2) & Light Attenuation Coefficient (2)

In the tidal portions of the Squamscott and Lamprey Rivers, eelgrass has historically existed only in the downstream areas near the mouth where the river discharges to Great Bay. For the 2012 assessments, DES split these assessment zones into two pieces each to clarify that the restoration goal for eelgrass only applied in the areas where eelgrass has historically existed near the Bay (DES¹, 2011). The restoration goal for the new upstream areas (Squamscott River South and Lamprey River North) is to prevent low dissolved oxygen. Since the eelgrass estuarine bioassessment and light attenuation coefficient indicators are no longer applicable to these assessment zones, the categories for these parameters were changed from 5-P to No Standard as shown in the Table 19. These changes are not a formal delisting because they are due to a re-segmentation of the assessment units and the 2010 303(d) list impairments from the parent assessment units were retained on one of the child assessment units.

Table 19. Eelgrass Estuarine Bioassessments and Light Attenuation Coefficient in the Squamscott River South and Lamprey River North Assessment Zones.

Assessment Zone	Assessment Unit ID	Impairment Name	2010 Category	2012 Category
SQUAMSCOTT RIVER SOUTH	NHEST600030806-01-01	Estuarine Bioassessments	5-P	No Stnd
		Light Attenuation Coefficient	5-P	No Stnd
LAMPREY RIVER NORTH	NHEST600030709-01-01	Estuarine Bioassessments	5-P	No Stnd
		Light Attenuation Coefficient	5-P	No Stnd

¹ DES. 2011. Letter to the Environmental Protection Agency Dated August 8, 2011 Regarding Squamscott River and Lamprey River Assessment Units for 2012 305(b)/303(d) Cycle. New Hampshire Department of Environmental Services, Water Division, Watershed Management Bureau, Concord, NH.

GROUP 24. Lamprey River South (NHEST600030709-01-02) and Squamscott River North (NHEST600030806-01-02) Changes due to Re-segmentation

A suite of toxins have not been included on the Lamprey River South (NHEST600030709-01-02) (Table 20) and Squamscott River North (NHEST600030806-01-02) (Table 21) on the 2012 303(d) List as a result of the resegmentation process mentioned in ‘GROUP 23’. These toxins impaired Aquatic Life Use in the parent assessment units in 2010 and have been retained as impairments on the related Lamprey River North (NHEST600030709-01-01) and Squamscott River South (NHEST600030806-01-01) segments for the 2012 cycle. The 2012 category is Not Assessed (NA) or Insufficient Information (II) in the Lamprey River South (NHEST600030709-01-02) (Table 20) and Squamscott River North (NHEST600030806-01-02) as there were no recent sediment data for the above portions of the tidal tributaries to Great Bay. Table 20 (Lamprey River) and Table 21 (Squamscott River) provide the 2010 to 2012 assessments, parameter by parameter for all designated uses.

Table 20. Re-segmentation and Assessment of the Lamprey River.

Designated Use	Water Quality Parameter	2010	2012	
		LAMPREY RIVER (NHEST600030709-01)	LAMPREY RIVER NORTH (NHEST600030709-01-01)	LAMPREY RIVER SOUTH (NHEST600030709-01-02)
Primary Contact Recreation	Chlorophyll-a	NS	NS	NS
	Enterococcus	NS	NS-TMDL Completed	NS-TMDL Completed
	Nitrogen (Total)	NS	NS	NS
Secondary Contact Recreation	Enterococcus	NS	FS-TMDL Completed	NS-TMDL Completed
Aquatic Life	.alpha.-Endosulfan (Endosulfan 1)	FS	NA	NA
	.beta.-Endosulfan (Endosulfan 2)	FS	NA	NA
	2-Methylnaphthalene	NS	NS	NA
	Acenaphthene	NS	NS	NA
	Acenaphthylene	NS	NS	NA
	Aluminum	NS	NS	NA
	Ammonia (Un-ionized)	FS	FS	II
	Anthracene	NS	NS	NA
	Antimony	FS	NA	NA
	Arsenic	NS	NS	NA
	Benzo(a)pyrene (PAHs)	NS	NS	NA
	Benzo[a]anthracene	NS	NS	NA
	Benzo[b]fluoranthene	FS	NA	NA
	Benzo[g,h,i]perylene	FS	NA	NA
	Benzo[k]fluoranthene	FS	NA	NA
	Biphenyl	FS	NA	NA
	Cadmium	NS	NS	NA
Chlorophyll-a	NS	NS	NS	

Designated Use	Water Quality Parameter	2010	2012	
		LAMPREY RIVER (NHEST600030709-01)	LAMPREY RIVER NORTH (NHEST600030709-01-01)	LAMPREY RIVER SOUTH (NHEST600030709-01-02)
	Chrysene (C1-C4)	NS	NS	NA
	Copper	NS	NS	NA
	DDD	NS	NS	NA
	DDE	NS	NS	NA
	DDT	NS	NS	NA
	Dibenz[a,h]anthracene	NS	NS	NA
	Dieldrin	FS	NA	NA
	Dissolved oxygen saturation	NS	NS	FS
	Endosulfan sulfate	FS	NA	NA
	Endrin	FS	NA	NA
	Estuarine Bioassessments	NS	No Std	NS
	Fluoranthene	NS	NS	NA
	Fluorene	NS	NS	NA
	Hexachlorobenzene	FS	NA	NA
	Indeno[1,2,3-cd]pyrene	FS	NA	NA
	Iron	FS	NA	NA
	Lead	NS	NS	NA
	Lindane	FS	NA	NA
	Mercury	NS	NS	NA
	Naphthalene	NS	NS	NA
	Nickel	NS	NS	NA
	Oxygen, Dissolved	NS	NS	FS
	Phenanthrene	NS	NS	NA
	Polychlorinated biphenyls	FS	NA	NA
	Pyrene	NS	NS	NA
	Silver	FS	NA	NA
	Toxaphene	FS	NA	NA
	Zinc	FS	NA	NA
	pH	NS	NS	FS
	Nitrogen (Total)	NS	NS	NS
	Light Attenuation Coefficient	NS	No Std	NS
	cis-Chlordane	FS	NA	NA
	trans-Nonachlor	NS	NS	NA
Fish Consumption	Mercury	NS	NS	NS
	Polychlorinated biphenyls	NS	NS	NS
Wildlife	Not assessed	-	-	-
Drinking Water After Adequate Treatment	Escherichia coli	II	II	II
	Fecal Coliform	II	II	II

Designated Use	Water Quality Parameter	2010	2012	
		LAMPREY RIVER (NHEST600030709-01)	LAMPREY RIVER NORTH (NHEST600030709-01-01)	LAMPREY RIVER SOUTH (NHEST600030709-01-02)
Shellfishing	Dioxin (including 2,3,7,8-TCDD)	NS	NS	NS
	Mercury	NS	NS	NS
	Polychlorinated biphenyls	NS	NS	NS
	Fecal Coliform	II	II	II

Table 21. Re-segmentation and Assessment of the Squamscott River.

Designated Use	Water Quality Parameter	2010	2012	
		SQUAMSCOTT RIVER (NHEST600030806-01)	SQUAMSCOTT RIVER SOUTH (NHEST600030806-01-01)	SQUAMSCOTT RIVER NORTH (NHEST600030806-01-02)
Primary Contact Recreation	Chlorophyll-a	NS	NS	NS
	Enterococcus	NS	NS-TMDL Completed	NS-TMDL Completed
	Nitrogen (Total)	NS	NS	NS
Secondary Contact Recreation	Enterococcus	NS	NS-TMDL Completed	NS-TMDL Completed
Aquatic Life	.alpha.-Endosulfan (Endosulfan 1)	FS	NA	II
	.beta.-Endosulfan (Endosulfan 2)	FS	NA	II
	2-Methylnaphthalene	FS	NA	II
	Acenaphthene	NS	NS	II
	Acenaphthylene	NS	NS	II
	Aluminum	NS	NS	II
	Ammonia (Un-ionized)	FS	II	FS
	Anthracene	NS	NS	II
	Antimony	FS	NA	II
	Arsenic	NS	NS	II
	Benzo(a)pyrene (PAHs)	NS	NS	II
	Benzo[a]anthracene	NS	NS	II
	Benzo[b]fluoranthene	FS	NA	II
	Benzo[g,h,i]perylene	FS	NA	II
	Benzo[k]fluoranthene	FS	NA	II
	Biphenyl	FS	NA	II
	Cadmium	NS	NS	II
	Chlorophyll-a	NS	NS	NS
	Chrysene (C1-C4)	NS	NS	II
	Copper	NS	NS	II
DDD	FS	NA	II	

Designated Use	Water Quality Parameter	2010	2012	
		SQUAMSCOTT RIVER (NHEST600030806-01)	SQUAMSCOTT RIVER SOUTH (NHEST600030806-01-01)	SQUAMSCOTT RIVER NORTH (NHEST600030806-01-02)
	DDE	FS	NA	II
	DDT	FS	NA	II
	Dibenz[a,h]anthracene	NS	NS	II
	Dieldrin	FS	NA	II
	Dissolved oxygen saturation	FS	NS	FS
	Endosulfan sulfate	FS	NA	II
	Endrin	FS	NA	II
	Estuarine Bioassessments	NS	No Stnd	NS
	Fluoranthene	NS	NS	II
	Fluorene	NS	NS	II
	Hexachlorobenzene	FS	NA	II
	Indeno[1,2,3-cd]pyrene	FS	NA	II
	Iron	FS	NA	II
	Lead	NS	NS	II
	Lindane	FS	NA	II
	Mercury	NS	NS	II
	Naphthalene	FS	NA	II
	Nickel	NS	NS	II
	Oxygen, Dissolved	NS	NS	NS
	Phenanthrene	NS	NS	II
	Polychlorinated biphenyls	FS	NA	NA
	Pyrene	NS	NS	II
	Silver	FS	NA	II
	Toxaphene	FS	NA	II
	Zinc	NS	NS	II
	pH	NS	FS	NS
	Nitrogen (Total)	NS	NS	NS
	Light Attenuation Coefficient	NS	No Stnd	NS
	cis-Chlordane	FS	NA	NA
	trans-Nonachlor	NS	NS	NA
Fish Consumption	Copper	II	NA	NA
	Mercury	NS	NS	NS
	Nickel	II	NA	NA
	Polychlorinated biphenyls	NS	NS	NS
	Zinc	II	NA	NA
Wildlife	Not Assessed	-	-	-
Drinking Water After Adequate Treatment	Copper	II	NA	NA
	Escherichia coli	II	II	II
	Nickel	II	NA	NA

Designated Use	Water Quality Parameter	2010	2012	
		SQUAMSCOTT RIVER (NHEST600030806-01)	SQUAMSCOTT RIVER SOUTH (NHEST600030806-01-01)	SQUAMSCOTT RIVER NORTH (NHEST600030806-01-02)
	Fecal Coliform	II	II	II
	Zinc	II	NA	NA
Shellfishing	Copper	II	NA	NA
	Dioxin (including 2,3,7,8-TCDD)	NS	NS	NS
	Mercury	NS	NS	NS
	Nickel	II	NA	NA
	Polychlorinated biphenyls	NS	NS	NS
	Fecal Coliform	II	II	II
	Zinc	II	NA	NA