

New Hampshire Department of Environmental Services

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

February 19, 2010

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 2010 Section 303(d) List of impaired waters 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/swqa/index.htm>). This document provides a list of all surface waters that were removed from the 2008 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 (3,636)

Assessment Units (AU) are the basic unit of record for conducting and reporting water quality assessments. For the 2010 assessment the assessment units have been moved from the 1:100,000 to 1:24,000 mapping scale hydrography that is linked to the National Hydrography Dataset (NHD); the national coverage used by EPA. As such we have gained some ~7,000 miles of rivers, ~450 (1,500 acres) impoundments, and ~375 (4,600 acres) lakes into the system. All told, there are 3,636 new freshwater assessment units for 2010. These improvements have greatly 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 all new freshwater assessment units in Category 4A 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.

GROUP 2. Erroneous Metals Listings (2)

The following Assessment Units were mistakenly listed for lead in 2006 and carried forward into 2008. In each case all samples were below the analytical detection limit (DL) and

reported in the Environmental Monitoring Database as <0.001mg/L. New Hampshire's Assessment Database automatically converted these values to 0.5 ug/L (i.e. 1/2 DL). 0.5 ug/L is still over the chronic water quality criteria for lead, which for these samples ranged from 0.12 to 0.27 ug/L depending upon hardness. New Hampshire's Consolidated Assessment and Listing Methodology (CALM) states that the department will not impair an assessment unit based upon samples that are below detection. Further, since all of the data is below the detection limit, the following assessment units have been removed from the 303(d) List for impairment of Aquatic Life due to Lead and placed in Category 3 (Insufficient Information).

AUID	AU Name	Number of Lead Samples	Number of lead samples below the analytical detection limit
NHRIV600020104-03	Wildcat Brook	2	2
NHRIV600020304-01-01	Saco River	2	2
NHRIV600020901-10	Ossipee River	14	14

GROUP 3. Maxwell Pond Dissolved Oxygen (1)

The Maxwell Pond Dam impounded a section of Black Brook in Manchester. The dam was located to the Southwest of the intersection of Front Street and Dunbarton Road in the Northwest portion of the city (see Figure 1). Constructed circa 1900, for the purposes of ice harvesting, the Maxwell Pond Dam altered the natural channel and hydrology within Black Brook eventually creating a stagnant, shallow waterbody with little circulation and relatively high water temperature. Sampling data from grab samples showed 10 exceedences of dissolved oxygen saturation standards within 19 samples, and 6 exceedences of dissolved oxygen concentration standards (with one exceedence of the Magnitude of Exceedence Criteria) within 19 samples.

Documentation of low dissolved oxygen levels present in the impoundment led to the following 303(d) impairments:

Maxwell Pond, Manchester (NHLAK700060801-02) Aquatic Life (5-P dissolved oxygen and 5-M dissolved oxygen saturation)

As a result of the listed impairments, additional environmental concerns, flooding, and public safety issues, the City of Manchester was compelled to address the issues at Maxwell Pond Dam. In cooperation with numerous project partners, including DES and EPA, the city implemented a restoration project in the watershed designed to restore Black Brook and remove the dissolved oxygen impairment. This restoration effort addressed the hydromodification that led to the dissolved oxygen impairments by removing the Maxwell Pond Dam and allowing the brook to return to a free flowing condition.

Beginning in 2002, DES and the city began planning for dam removal. As part of the pre-removal process, project partners obtained permits and approvals as needed, and completed surveys of numerous physical, chemical, and biological conditions at the project site. Additional work completed by the owner of an upstream industrial property mitigated erosion and runoff issues, and removed perched, under-sized culverts in an effort to reduce sediment inputs to the stream. In February 2009, the DES Dam Maintenance Section began removing the spillway of

the Maxwell Pond Dam. By the middle of March, the entire spillway had been removed and Black Brook was flowing freely (see Figure 2). Through the spring of 2009, additional work in streambank reconstruction, slope stabilization, and re-vegetation were completed.



Figure 1: Maxwell Pond Dam. (September 2008 photo)



Figure 2: Black Brook with dam removed. (August 2009 photo)

The project reestablished Black Brook as a free-flowing tributary to the Merrimack River with natural sediment transport capacity and a more self-maintaining channel that will minimize erosion. Removal of the dam eliminated the dissolved oxygen impairment within the pond by eliminating a stagnant waterbody with little circulation and high temperatures.

Dissolved Oxygen measurements have been completed before and after project implementation in Maxwell Pond and Black Brook. These samples were collected by volunteers participating in both the Volunteer Lake Assessment Program (VLAP) and the Volunteer River Assessment Program (VRAP). Both programs are administered by NHDES and have established, EPA approved Quality Assurance Project Plans (QAPP). Once the dam was removed, samples were collected according to the criteria established in the NHDES Comprehensive Assessment Listing Methodology (CALM) in order to demonstrate that Black Brook is now meeting designated uses and the dissolved oxygen impairment has been eliminated (see Table 1). The 2009 sampling was planned to occur under the most limiting conditions for dissolved oxygen.

Sample date	Upstream (01B-BKB)				Former Impoundment Site (01A-BKB)				Downstream (01-BKB)			
	Time	mg/L	%	°C	Time	mg/L	%	°C	Time	mg/L	%	°C
September 26, 2009	n/a				08:50	9.01	84	12.2	n/a			
September 18, 2009	n/a				08:45	10.55	101.9	13.8	n/a			
August 23, 2009	08:13	7.02	82.7	23.6	08:31	7.62	90.2	23.8	08:23	7.74	91.2	23.6
July 23, 2009	07:39	8.91	95.8	19	07:11	8.18	87.9	18.8	07:28	8.83	95	18.8

June 28, 2009	08:55	7.76	85.7	20	08:30	7.6	84.5	20.4	08:10	8.12	90.4	20.4
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Table 1: Post dam removal temperature (degrees Celsius), dissolved oxygen concentration (mg/L) and saturation (percent) values.

Had the 2009 sampling indicated a continued issue, the impairment would have been transferred to the riverine assessment unit NHRIV700060801-05-02 that now runs through the former Maxwell Pond. Aquatic Life Use in Maxwell Pond (NHLAK700060801-02) and Maxwell Pond's descendent NHRIV700060801-05-02 is no longer impaired by dissolved oxygen, and dissolved oxygen saturation. NHLAK700060801-02 should be removed from the 303(d) list and NHRIV700060801-05-02 should now be assessed as fully supporting dissolved oxygen (mg/L) and dissolved oxygen saturation DES category 2-G.

GROUP 4. Chloride – Moved to a different AUID (1)

The 2008, 303(d) List for impairment of Aquatic Life due to chloride on Wildcat Brook (NHRIV600020104-03) came from a datalogger at station 01-THT which is Thorn Hill Brook not Wildcat Brook. The remapping from 1:100,000 to 1:24,000 allowed the department to have an AUID on Thorn Hill Brook (NHRIV600020104-04).

The 01-THT datalogger had 4.7 days of chronic criteria exceedances and 0 days meeting the chronic criteria for chloride based on specific conductance. Acute chloride criteria was exceeded for 152.3 hours based on specific conductance.

The remaining 17 correctly assigned chloride datapoints for Wildcat Brook (NHRIV600020104-03) have a maximum chloride concentration of 6.8 mg/L (based on 64 uS), during the summer baseflow period, well below the chronic criteria threshold of 230 mg/L. Due to no sampling during the snowmelt period the Wildcat Brook (NHRIV600020104-03) assessment nit can not be conclusively assessed but all indication are that Wildcat Brook is well below the chronic criteria for chloride.

The Wildcat Brook (NHRIV600020104-03) 2008, 303(d) List for impairment of Aquatic Life due to chloride has been moved to Thorn Hill Brook (NHRIV600020104-04) for the 2010, 303(d). The Wildcat Brook (NHRIV600020104-03) assessment unit has been removed from the 303(d) List for impairment of Aquatic Life due to chloride and placed in Category 3 (Insufficient Information) for the 2010 cycle.

GROUP 5. Benthic-Macroinvertebrate Bioassessments (Streams) (1)

The 2008, 303(d) List for impairment of Aquatic Life due to degraded Benthic-Macroinvertebrate Community Bioassessments in Streams included Nash Stream (NHRIV801010706-05-04) based on a rock basket sample from July 31, 2002 at station SP02C-01 (Benthic ID 250). Nash Stream went onto the 303(d) list in 2006. As of 2006, there was a numeric translator for the narrative water quality standard Env-Wq 1703.19

Env-Wq 1703.19 Biological and Aquatic Community Integrity.

- (a) The surface waters shall support and maintain a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
- (b) Differences from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function.

The numeric translator set a threshold for each site based upon its location with in New Hampshire, northern to southern. Nash Stream fell into the northern membership and therefore

was given a benthic index of biological integrity (B-IBI) threshold of 65. The July 31, 2002 at station SP02C-01 (Benthic ID 250) scored a 48.2 thereby failing the B-IBI translator from the narrative criteria.

Nash Stream (NHRIV801010706-05-04) was resampled using a rock basket on September 27, 2004 (Benthic ID 337) at station SP02C-01. The B-IBI score for that sample was 70.9. The rough B-IBI thresholds of past cycles has been refined into three major groupings; mountains, hills, plains and calculates a B-IBI threshold for “Hybrid” sites that share the characteristics of multiple classes.

1. Classification defines distinct macroinvertebrate community types as determined from 74 “reference” sites. Site classification is determined by a site’s latitude, longitude, drainage area, elevation, EPA Level IV ecoregion, and to a lesser extent pH. “Hybrid” sites share the characteristics of multiple classes.
2. Weighted criteria are computed by multiplying a site’s likelihood of membership to each class by the respective class criteria and summing the products.
3. Justification for the classification of macroinvertebrate community types, and respective benthic IBI criteria can be found in the NH DES draft report entitled *Site classification using a non-linear predictive model in New Hampshire* prepared by Benjamin Jessup and David Neils (2009). A final report with an official departmental publication number will be issued February 28, 2010. Prior to this date copies of the draft report can be requested by contacting David Neils, biological monitoring program coordinator, at (603) 271-8865.

Site SP02C-01 on Nash Stream is a hybrid site. Based on its membership within the different classes the applicable B-IBI threshold at the site was 60.12 well below the sites September 27, 2004 score of 70.9.

Nash Stream (NHRIV801010706-05-04) has been removed from the 303(d) List for impairment of Aquatic Life Use due to poor benthic macroinvertebrate community and placed in Category 2 (Full Support).

GROUP 6. Erroneous Chlorophyll a listing on Primary Contact Recreation (1)

Adder Pond (NHLAK700030403-01) as mistakenly listed for Chlorophyll a in 2008. The erroneously listing used the highest Chlorophyll a values present in the dataset for a given date. When swimmers look at a waterbody and evaluate that water on an aesthetic basis for swimming they are responding to overall color within the swimmable depths. As such it is more appropriate to compare composite samples or averages of samples at multiple depths to the numeric interpretation of the narrative criteria.

Date	Maximum Chlorophyll a (Depth of sample)	Average of Chlorophyll a samples within the top 4 meters
2-Jul-2007	24.7 ug/L (3.88 m)	5.9 ug/L
30-Aug-2007	35.7 ug/L (4.27 m)	12.7 ug/L

When bundled with the one other sample from 29-Jul-2004 (11.85 ug/L, 2m composite) the waterbody should have been assessed as Insufficient Information-Potentially Attaining Standards (3-PAS) in 2008.

Two additional; samples have been collected since the 2008 assessment.

- 5-Aug-2008, 7.8 ug/L, a surface grab sample
- 23-Jul-2009, 12.8 ug/L, a 4 meter composite

The numeric interpretation of the narrative criteria used by the department for primary contact recreation in freshwaters is 15 ug/L of chlorophyll a. At no point in time since 2004 has a concentration seen by a swimmer exceeded 15 ug/L of chlorophyll a so not supporting is an inappropriate assessment. The department requires 10 samples of chlorophyll a to make a Full Support determination of primary contact recreation. Since all of the data is below the 15 ug/L threshold and fewer than 10 samples have been collected in the last 10 years, Adder Pond (NHLAK700030403-01) has been removed from the 303(d) List for impairment of Primary Contact Recreation due to Chlorophyll a and placed in Category 3 (Insufficient Information).

GROUP 7. Dissolved Oxygen in Great Bay (7)

Dissolved oxygen in the Great Bay assessment units is measured using an in-situ datasonde that is deployed at station GRBGB annually from April to December. The datasonde observations from station GRBGB are applied to the seven assessment units in Great Bay because dissolved oxygen concentration in the bay are homogeneous. The datasonde measures dissolved oxygen concentrations every 15 minutes. After quality assuring the raw data, DES calculates the daily minimum dissolved oxygen concentration for comparison to the water quality standards. Compliance or noncompliance with the water quality standards for dissolved oxygen (5 mg/L) is determined using the methods listed in the CALM. Specifically, for an assessment unit with 10 or more observations, if the daily minimum dissolved oxygen is less than 5 mg/L for more than 10% of the days with valid data, or if the daily minimum dissolved oxygen is less than 4.5 mg/L on two or more days, the assessment unit is considered impaired.

The datasonde at station GRBGB has been deployed each year between April and December. Data from the sonde from 2004, 2005, 2006, 2007, and 2008 were available for the 2010 assessments. Valid dissolved oxygen measurements were made by the datasonde for a total of 960 days during this period. The daily minimum dissolved oxygen concentration was below the standard of 5 mg/L on 6 of the 960 days (0.6%). Based on this percentage, the assessment units would not be considered impaired. However, there were three days when the daily minimum dissolved oxygen concentration fell below 4.5 mg/L. According to the CALM, having two or more days with concentrations below 4.5 mg/L is justification for an impairment. The dissolved oxygen concentrations less than 4.5 mg/L occurred on 5/25/2004, 5/26/2004, and 5/28/2004.

For the 2008 cycle, DES classified the assessment units of Great Bay to be impaired for dissolved oxygen because of these three days with dissolved oxygen less than 4.5 mg/L. Data were only available through 2006 for the 2008 assessments. Two more years of data were added for the 2010 assessments. These newer data show that dissolved oxygen concentrations never fell below 5 mg/L in 2006, 2007, and 2008. The datasonde was deployed in the same location and recorded continuously for the April to December period. Precipitation and water temperatures in 2007 were similar to those observed in 2004. The annual precipitation was 43.7 and 44.2 inches in 2004 and 2007, respectively. Comparison of the monthly average water temperatures in 2004 and 2007 shows that the water temperatures were similar between the two years (+/-2.2 deg C). Water temperatures were slightly warmer in 2007 than in 2004. Nitrogen loads to the Great Bay

Estuary were 42% higher in 2006-2008 than in 2002-2004 (PREP State of the Estuaries Report, 2009). Therefore, the absence of low dissolved oxygen concentrations in 2006, 2007, and 2008 indicates that the violations observed in May 2004 are not representative of current conditions in the Great Bay. The 2010 assessments were made based on the most recent data. Therefore, the impairments for dissolved oxygen added for the 2008 cycle were delisted in the 2010 cycle based on newer data.

Further, since all of the recent data is greater than the numeric water quality criteria the following assessment units have been removed from the 303(d) List for impairment of Aquatic Life due to Low dissolved oxygen and placed in Category 2 (Full Support).

Assessment Unit ID	Assessment Unit Name
NHEST600030904-02	GREAT BAY PROHIB SZ1
NHEST600030904-03	GREAT BAY PROHIB SZ2
NHEST600030904-04-02	CROMMET CREEK
NHEST600030904-04-03	PICKERING BROOK
NHEST600030904-04-04	FABYAN POINT
NHEST600030904-04-05	GREAT BAY - COND APPR
NHEST600030904-04-06	ADAMS POINT SOUTH - COND APP

GROUP 8. Dissolved Oxygen in South Mill Pond (1)

Dissolved oxygen in South Mill Pond is monitored by Great Bay Coast Watch at two stations. These stations are visited at high and low tide on a monthly frequency between April and October. Compliance or noncompliance with the water quality standards for dissolved oxygen (5 mg/L) is determined using the methods listed in the CALM. Specifically, for an assessment unit with 10 or more observations, if the daily minimum dissolved oxygen is less than 5 mg/L for more than 10% of the days with valid data, or if the daily minimum dissolved oxygen is less than 4.5 mg/L on two or more days, the assessment unit is considered impaired.

The South Mill Pond (NHEST600031001-09) assessment unit was originally listed on the 2006, 303(d) List for impairment of Aquatic Life due to low dissolved oxygen. This original listing in 2006 was based on multiple observations of dissolved oxygen below 4.5 mg/L. In 2008, the data available for the assessment did not specifically indicate an impairment. There were two observations of dissolved oxygen less than 5 mg/L in 2003. These two observations were made on the same day (8/12/2003) at stations GBCW-20 and GBCW-21. Only one of these observations was less than 4.5 mg/L so, per the CALM, the assessment unit should have been listed as Fully Supporting. However, given the history of multiple violations in this assessment unit, DES decided that it was prudent to retain the impairment until more data was collected to verify that the violations were no longer occurring under the same conditions as the older observations.

For the 2010 assessment cycle, water quality data from Great Bay Coast Watch were available for 2004, 2005, 2006, 2007, and 2008. Valid dissolved oxygen measurements were made for a total of 136 days during this period. Sixty-six of these observations were made during the critical period when increased temperatures, increased respiration, and decreases freshwater

inputs conspire to cause the lowest DO concentrations. The daily minimum dissolved oxygen concentration was below the standard of 5 mg/L on 1 of the 136 days (0.7%). This observation occurred during the non-critical period. Based on this percentage, the assessment unit would not be considered impaired. Samples were collected in August in 2004, 2005, 2006, and 2007 without detecting violations. The only violation was on 4/22/08 at 2:25 PM at station GBCW-21 (0.7 mg/L). This violation appears to be a typographic error because it is unusually low and dissolved oxygen at the same station was measured at 10.5 and 8.7 mg/L on the same date at 9:51 AM. The data available for the 2010 assessments was collected using the same methods and at the same stations as the older data. The newer data indicate that violations of the dissolved oxygen standard have ceased. A possible explanation for this change is the increased water flushing rates through a tide gate that have been implemented for this assessment unit in the years following 2004.

The South Mill Pond (NHEST600031001-09) assessment unit has been removed from the 303(d) List for impairment of Aquatic Life due to low dissolved oxygen and placed in Category 2 (Full Support) for the 2010 cycle.