

Memorandum of Agreement between  
The Great Bay Municipal Coalition  
and  
New Hampshire Department of Environmental Services  
relative to  
Reducing Uncertainty in Nutrient Criteria  
for the Great Bay / Piscataqua River Estuary

WHEREAS, the Department of Environmental Services (DES) has published a Clean Water Act 305(b)/303(d) report for 2010 (the 2010 list) that lists aquatic life impairments due to nutrient-related parameters in assessment units of the Great Bay Estuary as shown in Table I (attached); DES has compiled the 303(d) list in accordance with the 2010 Consolidated Assessment and Listing Methodology (CALM); the CALM procedures for assessment of nitrogen effects on aquatic life are based on Numeric Nutrient Criteria for the Great Bay Estuary published by DES in June, 2009 (nutrient criteria); DES has published a draft Analysis of Nitrogen Loading Reductions for Wastewater Treatment Facilities and Non-Point Sources in the Great Bay Estuary Watershed dated December 2010 (loading analysis);

WHEREAS, the members of the Great Bay Municipal Coalition (Coalition) comprising the municipalities of Exeter, Dover, Durham, Newmarket, Portsmouth and Rochester, each operate a wastewater treatment facility discharging to an assessment zone listed on the 2010 list as impaired for aquatic life due to nitrogen, and each stand to incur significant costs for construction and operation of upgraded treatment facilities to reduce nitrogen loads from these facilities;

WHEREAS, DES and the Coalition agree that, relative to impairments on the 2010 303(d) list attributed to dissolved oxygen (DO) and nitrogen, there is uncertainty about the extent to which nitrogen is a causative factor relative to other factors in the listed assessment units and further agree that a dynamic, calibrated hydrodynamic and water quality model could reduce the uncertainty;

WHEREAS, DES and the Coalition agree that a weight of evidence approach such as presented in the nutrient criteria is appropriate as it relates to impairments related to eelgrass loss, there is uncertainty in the line of evidence for eutrophication as a causative factor, and additional analyses are required for macroalgae proliferation and epiphyte growth as causative factors;

WHEREAS, DES and the Coalition agree that the results of the loading analysis indicate that existing nitrogen loadings from treatment facilities operated by Coalition and other municipalities are as shown in Table II (attached); and

WHEREAS, DES and the Coalition agree that, given the uncertainties stated above and the potential financial burden of treatment plant upgrades to the Coalition municipalities, an adaptive management approach to water quality improvement is required to reduce impairments to aquatic life use in the Great Bay Estuary.

NOW, THEREFORE, IT IS MUTUALLY AGREED THAT :

I. The best way to resolve the scientific uncertainties with respect to assessment units impaired for DO and nitrogen is a collaborative effort to build a dynamic, calibrated hydrodynamic and water quality model, starting with the Squamscott River, that includes all of the major factors affecting the DO regime. This effort would include additional data collection as needed to calibrate and verify the model and will be substantially completed by January 2012.

II. EPA action to finalize and issue the draft Exeter permit, and any other draft permits that may be released, should be stayed so that municipal resources may be focused on resolving collaboratively with DES the uncertainties concerning the relationship between DO and nitrogen in the Squamscott and Lamprey Rivers.

III. Additional work on the multiple lines of evidence for the relationship between nitrogen and eelgrass loss should be conducted before the nutrient criteria are used to set permit limits for protection of eelgrass in assessment units on the 2010 list as impaired for nitrogen and eelgrass loss.

THE COALITION AGREES TO:

I. Construct, calibrate, and validate a dynamic hydrodynamic and water quality model for the Squamscott River, using a public domain model. Prior to commencing work, prepare a workscope and quality assurance project plan (QAPP) for the model in accordance with EPA guidance and generally accepted practice, to be submitted to DES for comment and approval;

II. Collect data required to calibrate and validate the model. Prior to commencing work, prepare a workscope and QAPP for data collection in accordance with EPA guidance and generally accepted practice, to be submitted to DES for comment and approval;

III. Provide DES with data collected in II, and all applicable metadata, in a format that can be easily entered into the DES Environmental Monitoring Database. Provide DES with source code and a compiled version of the model used in I. All modeling shall be substantially completed by January 2012;

IV. Use the model to propose site-specific nitrogen criteria for the Squamscott River, as well as wasteload allocations / NPDES permit limits for the Exeter wastewater treatment plant for nitrogen, phosphorus, and BOD;

V. Enter into a process jointly with DES, under the auspices of the Southeast Watershed Alliance (SWA) or Piscataqua Region Estuary Partnership (PREP), to address the uncertainties with the transparency, macroalgae, and epiphyte lines of evidence of the nutrient criteria for associated eelgrass loss;

VI. Commit to achieve 8 mg/l Total Nitrogen (seasonal average) effluent limit for wastewater treatment facilities discharging to the Great Bay impairment zone via the Squamscott and Lamprey Rivers and promptly begin the process to design such facilities; and

VII. Commit to optimize the existing facilities discharging to the Piscataqua River and its tributaries to promote cost-effective TN reduction and complete engineering evaluations to determine the degree of modifications needed to achieve an 8 mg/l TN (seasonal average) effluent limit, should such limits be found necessary to achieve DO standards.

DES AGREES TO:

I. Review the modeling and monitoring workscopes and QAPPs developed by the Coalition pursuant to this Memorandum of Agreement in a timely and constructive fashion to ensure that the collaborative approach to the model will serve all parties.

II. Publish site-specific nitrogen criteria for each assessment unit on the 2010 list with impairments attributed to dissolved oxygen (DO) and nitrogen as soon as practicable after results of a calibrated, verified dynamic hydrodynamic and water quality model are available for the assessment unit.

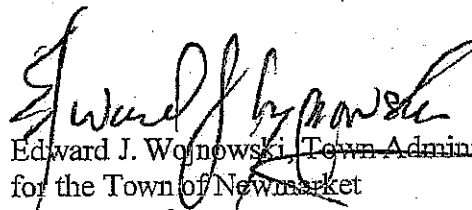
III. With full participation of Coalition municipalities, work with PREP or SWA to conduct a study with robust multiple lines of evidence for nitrogen as a cause of eelgrass loss for assessment units with impairments on the 2010 list attributed to eelgrass loss and documented criteria thresholds for nitrogen to restore Great Bay to attainment of the aquatic life designated use.

IV. Commit to supporting a delay in EPA's issuance of final NPDES permits for Coalition wastewater treatment facilities until applicable site-specific nitrogen criteria have been developed.

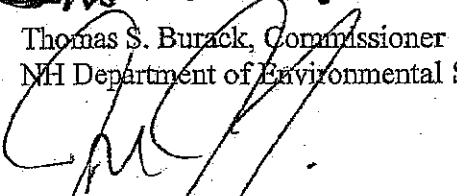
By signing this agreement, each signatory certifies that it is fully authorized to enter into this agreement:



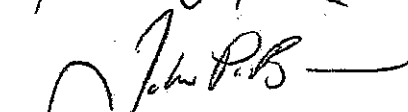
Thomas S. Burack, Commissioner  
NH Department of Environmental Services



Edward J. Wojnowski, Town Administrator  
for the Town of Newmarket



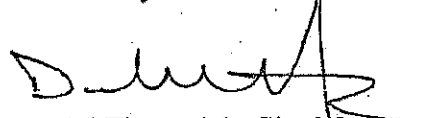
J. Michael Jozal, Jr., City Manager  
for the City of Dover



John P. Bohenko, City Manager  
for the City of Portsmouth



Russell J. Dean, Town Manager  
for the Town of Exeter



Daniel Fitzpatrick, City Manager  
for the City of Rochester

Table I: Aquatic Life Impairments for Nutrient-Related Parameters in the Great Bay Estuary from New Hampshire's 2010 303(d) List

Assessment Zone	Parameter	Impairment Category*
WINNICUT RIVER	Estuarine Bioassessments	5-P
SQUAMSCOTT RIVER	Chlorophyll-a	5-P
	Oxygen, Dissolved	5-P
	Light Attenuation Coefficient	5-P
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-P
LAMPREY RIVER	Chlorophyll-a	5-M
	Dissolved oxygen saturation	5-M
	Oxygen, Dissolved	5-P
	Light Attenuation Coefficient	5-P
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-P
OYSTER RIVER	Chlorophyll-a	5-P
	Dissolved oxygen saturation	5-M
	Oxygen, Dissolved	5-P
	Light Attenuation Coefficient	5-P
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-P
BELLAMY RIVER	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-M
COCHECO RIVER	Chlorophyll-a	5-M
	Nitrogen (Total)	5-P
SALMON FALLS RIVER	Chlorophyll-a	5-M
	Dissolved oxygen saturation	5-M
	Oxygen, Dissolved	5-P
	Nitrogen (Total)	5-M
UPPER PISCATAQUA RIVER	Light Attenuation Coefficient	5-P
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-P
GREAT BAY	Light Attenuation Coefficient	5-P
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-M
LITTLE BAY	Light Attenuation Coefficient	5-M
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-M
LOWER PISCATAQUA RIVER	Estuarine Bioassessments	5-P
PORTSMOUTH HARBOR	Light Attenuation Coefficient	5-M
	Estuarine Bioassessments	5-T
	Nitrogen (Total)	5-M
SAGAMORE CREEK	Estuarine Bioassessments	5-P
LITTLE HARBOR/BACK CHANNEL	Light Attenuation Coefficient	5-M
	Estuarine Bioassessments	5-P
	Nitrogen (Total)	5-M

\* 5-M = Marginal impairment, 5-P = Serious Impairment, 5-T = Threatened

Table II: Existing Nitrogen Loads to Assessment Zones from Point and Non-Point Sources\*

(Source: draft Analysis of Nitrogen Loading Reductions for Wastewater Treatment Facilities and Non-Point Sources in the Great Bay Estuary Watershed dated December 2010)

Point Sources	Winnicut River	Squamscott River	Lamprey River	Oyster River	Bellamy River	Cocheco River	Salmon Falls River	Upper Piscataqua River	Great Bay	Little Bay	Lower Piscataqua River	Portsmouth Harbor	Sagamore Creek	Little Harbor/Back Channel
Durham				11.76						11.76	TBD	TBD	TBD	TBD
Exeter		42.69							42.69	42.69	TBD	TBD	TBD	TBD
Newfields		1.58							1.58	1.58	TBD	TBD	TBD	TBD
Newmarket			30.42						30.42	30.42	TBD	TBD	TBD	TBD
Dover								103.69			TBD	TBD	TBD	TBD
South Berwick							5.53				TBD	TBD	TBD	TBD
Kittery								0.40	0.74	5.29	TBD	TBD	TBD	TBD
Newington								0.07	0.13	0.96	TBD	TBD	TBD	TBD
Portsmouth								0.95	1.76	12.56	TBD	TBD	TBD	TBD
Pease TTP								0.16	0.31	2.19	TBD	TBD	TBD	TBD
Farmington						2.66		2.66			TBD	TBD	TBD	TBD
Rochester						127.47		127.47			TBD	TBD	TBD	TBD
Epping			4.31						4.31	4.31	TBD	TBD	TBD	TBD
Berwick							9.52	9.52			TBD	TBD	TBD	TBD
Milton							1.59	1.59			TBD	TBD	TBD	TBD
Rollinsford							2.84	2.84			TBD	TBD	TBD	TBD
Somersworth							10.56	10.56			TBD	TBD	TBD	TBD
North Berwick							1.94	1.94			TBD	TBD	TBD	TBD
Subtotal	0.00	44.27	34.73	11.76	0.00	130.13	31.98	267.39	81.94	111.76				
Non-Point Sources	30.94	167.25	204.14	48.61	47.92	151.15	303.89	474.69	443.46	553.92	TBD	TBD	TBD	TBD
Total	30.94	211.52	238.87	60.37	47.92	281.29	335.88	742.07	525.40	665.68	TBD	TBD	TBD	TBD

\*Units: Delivered nitrogen load to the assessment zone (tons per year). Average values for 2003-2008.