

TO: Jennifer Perry, Mike Jeffers DATE: 7 May 2014
 FROM: Ed Leonard PROJECT NO.: 12883A
 SUBJECT: Exeter Wastewater Facilities Planning
 Preliminary Sub-Watershed Accounting (AOC Article IV.D.2)

In accordance with AOC Article IV.D.2, Exeter is required to “...begin coordination with the NHDES, other Great Bay communities, and watershed organizations in NHDES’s efforts to develop and utilize a comprehensive subwatershed-based tracking/accounting system for quantifying the total nitrogen loading changes associated with all activities within the Town that affect the total nitrogen load to the Great Bay Estuary”.

Exeter’s municipal boundaries fall within four Great Bay sub-watersheds: the Exeter/Squamscott River; the Lamprey River; the Winnicut River; and Hampton Harbor. The table below summarizes Exeter’s demographics and *attenuated* nitrogen loading to each of the sub-watersheds by source category (as a percent of the total). For example, Exeter has 30% of the total population that lives within the Exeter/Squamscott River sub-estuary watershed but has 10% of the total land areas that falls within that watershed. The information presented below is based on data sourced from NHDES work products produced from 2010 to 2013. A more detailed summary is attached to this memorandum, including citations to the NHDES work products which were sourced.

Category	% of Category in Each Sub-Watershed Resulting From Exeter			
	Exeter/ Squamscott River	Lamprey River	Winnicut River	Hampton Harbor
Population	30%	1%	0.4%	1.7%
Land Area	10%	1%	0.2%	7%
No. of Septic Systems	8%	1%	0.2%	2%
Point Source Nitrogen*	96%	0%	0%	0%
Non-Point Source Nitrogen*	13%	1%	0.3%	1%
Total Nitrogen*	34%	1%	0.3%	1%

- Attenuated load

The information contained herein will be updated when NHDES finalizes the Great Bay Nitrogen Non-Point Source Study (anticipated in 2014). Moving forward, the Town’s tracking/accounting activities required by AOC Article IV.D.1 will continue to improve this information. Our interpretation of the AOC is that the Town will develop its own tracking/accounting system for its municipal boundaries and will share and coordinate its information with NHDES, Great Bay communities and watershed organizations. We expect that a *GIS-based tracking/accounting system* will allow for information to be shared and coordinated more readily among the EPA, NHDES, municipalities and the general public.

TOWN OF EXETER - WASTEWATER FACILITIES PLAN
SUMMARY OF NITROGEN LOADINGS BY GREAT BAY SUB-WATERSHED

		Great Bay Sub-Watershed				
		Exeter River (Squamscott River)	Lamprey River	Winnicut River	Hampton Harbor	Total
Demographics						
	Number of Towns	15	14	5	7	-
	Total Population	44,878	39,966	6,233	34,315	-
	Exeter Portion	13,294	411	22	584	-
	Exeter Portion (%)	29.6%	1.0%	0.4%	1.7%	-
Total Attenuated Nitrogen Load (Tons/yr)						
	Point Source	44.27	34.73	0.00	0.00	-
	NPS: Atmospheric Dep.	31.47	47.42	4.98	22.61	-
	NPS: Chemical Fertilizer	37.77	33.13	7.83	22.61	-
	NPS: Animal Waste	18.08	26.85	2.50	7.53	-
	NPS: Septic Systems	45.40	47.21	8.35	18.54	-
	TOTAL	177.00	189.34	23.66	71.29	
Exeter Portion, Total Attenuated Load (Tons/yr)						
	Point Source	42.69	0.00	0.00	0.00	42.69
	NPS: Atmospheric Dep.	5.35	0.43	0.02	0.18	5.98
	NPS: Chemical Fertilizer	5.94	0.21	0.04	0.26	6.46
	NPS: Animal Waste	2.09	0.27	0.00	0.05	2.42
	NPS: Septic Systems	3.53	0.56	0.02	0.34	4.45
	TOTAL	59.61	1.46	0.08	0.83	61.99
Exeter Portion (%)						
	Point Source	96%	0%	n/a	n/a	-
	NPS: Atmospheric Dep.	17%	1%	0.5%	0.8%	-
	NPS: Chemical Fertilizer	16%	1%	0.5%	1.2%	-
	NPS: Animal Waste	12%	1%	0.2%	0.7%	-
	NPS: Septic Systems	8%	1%	0.2%	1.8%	-
	TOTAL	34%	1%	0.3%	1%	-
	NPS Aggregate	13%	1%	0.3%	1%	
Threshold Load (Tons/yr)						
	River DO	140	226	24		-
	River Eelgrass	88	140	15		-
	Bay DO	n/a	n/a	n/a		-
	Bay Eelgrass	162	182	24		-

Sources

- 1 Memorandum of Agreement between The Great Bay Municipal Coalition and NHDES relative to Reducing Uncertainty in Nutrient criteria for the Great Bay/Piscataqua River Estuary. (2010, December)
- 2 Trowbridge, P., Wood, M., Underhill, J., & Healy, D. (2013). *Great Bay Nitrogen Non-Point Source Study*. Concord: NH DES.
- 3 Trowbridge, P., Wood, M., Underhill, J., & Healy, D. (2013, May). Exeter GBNNPSS data.xlsx. Concord, New Hampshire.
- 4 Trowbridge, P. (2010). Analysis of Nitrogen Loading Reductions for Wastewater Treatment Facilities and Non-point Sources in the Great Bay Estuary Watershed. Concord: NH DES.
- 5 NH DES. (2012). Surface Water Quality Assessments. Retrieved December 6, 2013, from NH DES: http://www2.des.state.nh.us/WaterShed_SWQA/WaterShed_SWQA.aspx
- 6 NH DES. (2013). *FINAL SUBMITTED TO EPA - 2012 LIST OF THREATENED OR IMPAIRED WATERS THAT REQUIRE A TMDL*. Concord: NH DES.

TOWN OF EXETER - WASTEWATER FACILITIES PLAN
SUMMARY OF LAND USE BY GREAT BAY SUB-WATERSHED

Entire Watershed	Great Bay Sub-Watershed			
	Exeter River (Squamscott River)	Lamprey River	Winnicut River	Hampton Harbor
Land Area (acres)	115,545	135,619	9,011	4,050
Est. Area - Impervious (acres)	8,662	8,946	1,725	6,084
Est. Area - Agricultural (acres)	7,085	6,694	961	1,540
Est. Area - Managed Turf (acres)	306	77	444	69
Est. Area - Surface Waters (acres)	1,622	3,622	138	1,849
Est. No. of Septic Systems (total)	32,864	32,612	5,961	10,215
Est. No. of Septic Systems (<200m)	86	1,544	128	288
Est. No. of Centralized WWTFs	2	2	0	1
Est. No. of Decentralized WWTFs	0	0	0	3

Exeter Portion				
Land Area (acres)	10,977	1,546	20	270
Est. Area - Impervious (acres)	1,176	84	12	87
Est. Area - Agricultural (acres)	381	35	0	1
Est. Area - Managed Turf (acres)	107	12	0	0
Est. Area - Surface Waters (acres)	584	7	0	7
Est. No. of Septic Systems (total)	2,534	411	13	250
Est. No. of Septic Systems (<200m)	45	0	0	0
Est. No. of Centralized WWTFs	1	0	0	0
Est. No. of Decentralized WWTFs	0	0	0	0

Exeter Portion (%)				
Land Area (acres)	10%	1%	0.2%	7%
Est. Area - Impervious (acres)	14%	1%	1%	1%
Est. Area - Agricultural (acres)	5%	1%	0%	0%
Est. Area - Managed Turf (acres)	35%	16%	0%	0%
Est. Area - Surface Waters (acres)	36%	0%	0%	0%
Est. No. of Septic Systems (total)	8%	1%	0.2%	2%
Est. No. of Septic Systems (<200m)	52%	0%	0%	0%
Est. No. of Centralized WWTFs	50%	0%	n/a	0%
Est. No. of Decentralized WWTFs	0%	0%	0%	0%

Sources

- 1 Memorandum of Agreement between The Great Bay Municipal Coalition and NHDES relative to Reducing Uncertainty in Nutrient criteria for the Great Bay/Piscataqua River Estuary. (2010, December)
- 2 Trowbridge, P., Wood, M., Underhill, J., & Healy, D. (2013). *Great Bay Nitrogen Non-Point Source Study*. Concord: NH DES.
- 3 Trowbridge, P., Wood, M., Underhill, J., & Healy, D. (2013, May). Exeter GBNNPSS data.xlsx. Concord, New Hampshire.
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- 5 NH DES. (2012). Surface Water Quality Assessments. Retrieved December 6, 2013, from NH DES: http://www2.des.state.nh.us/WaterShed_SWQA/WaterShed_SWQA.aspx
- 6 NH DES. (2013). *FINAL SUBMITTED TO EPA - 2012 LIST OF THREATENED OR IMPAIRED WATERS THAT REQUIRE A TMDL*. Concord: NH DES.