dcr
Massachusetts

October 17, 2011

Leon Gaumond, Town Administrator
Town of West Boylston
127 Hartwell Street
West Boylston, MA 01583

Dear Mr. Gaumond:

A while back you indicated that the West Boylston Board of Selectmen had a discussion about the Town's municipal sanitary sewer and the question arose about whether the addition of sewers in West Boylston had improved water quality. DCR has staff that routinely tests water quality in the streams in the watershed including a number of streams in West Boylston. Water samples are tested for e-coli bacteria and for nutrients in the water, specifically nitrogen and phosphorus. Based upon our testing, DCR does believe that water quality in streams in West Boylston has shown improvement.

The positive effects of sewers on water quality cannot always be seen when reviewing bacteria data, especially when annual statistics are used to look for trends. Bacteria concentrations fluctuate dramatically during storm events and can also be impacted by low stream flow or the presence of domestic animals, wildlife and agricultural operations.

Annual nutrient data and estimated nutrient loading better reflect long-term water quality changes and do appear to show a positive impact on water quality in West Boylston streams. In three streams with a high percentage of homes now connected to the municipal sewer (Cook, Gates, West Boylston), both nitrate and total phosphorus annual mean concentrations have declined (Figures 1 and 2). There was little to no change in annual mean concentrations in two streams (Malden, Muddy) with a much smaller percentage of sewered homes. Estimates of annual nutrient loading illustrate the same pattern, with no change in two large rivers flowing through Sterling and Holden (Figure 3), limited change in Muddy and Malden Brooks (Figure 4) and significant improvement in Gates and West Boylston Brooks (Figure 5).

I hope this information is helpful in addressing the Select Board's question. If there are any questions, please feel free to contact me.

Sincerely,

John M. Scannell
Regional Director
Wachusett/Sudbury Section

Attachments

COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

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Richard K. Sullivan Jr., Secretary
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Department of Conservation & Recreation

ANNUAL NUTRIENT LOADING

ALL LOADS ARE SAMPLE MEAN METHOD ESTIMATES AND MAY NOT ADEQUATELY ADDRESS IMPACTS OF PRECIPITATION EVENTS

	NO3 GATES	NO3 MALD	NO3 MUDDY	NO3 WB	NO3 QUIN	NO3 STILL
2000	6070	1860	108		14100	8180
2001	3320	2200	177		13700	7670
2002	4180	503	34		8190	6180
2003	10000	2390	120		24590	10600
2004	4800	1640	48	3760	15100	6670
2005	5530	8300	1105	3300	22300	10700
2006	3420	4430	465	3800	21800	11200
2007	4115	759	116	2661	15134	8516
2008	3933	2883	305	2664	24139	14357
2009	2736	1546	48	1531	13896	7180
2010	1736	1125	83	1590	18632	9548

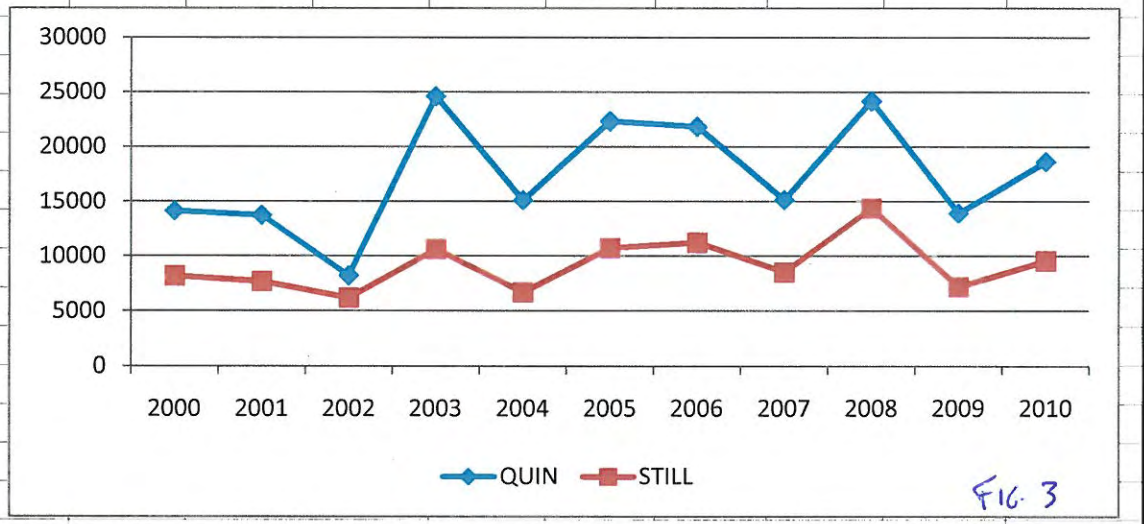

FIG. 3

estimated nutrient loading in two major rivers has remained relatively constant

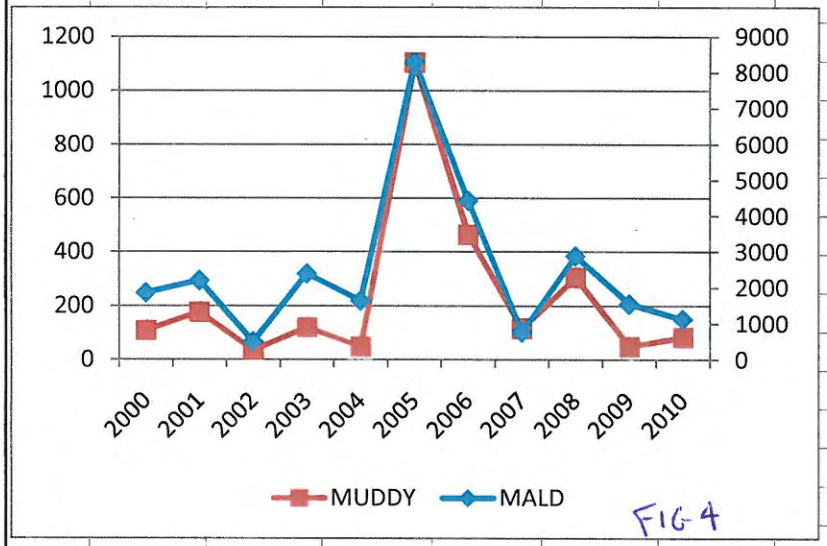

FIG 4

loads have not been significantly impacted (fewer homes on sewer)

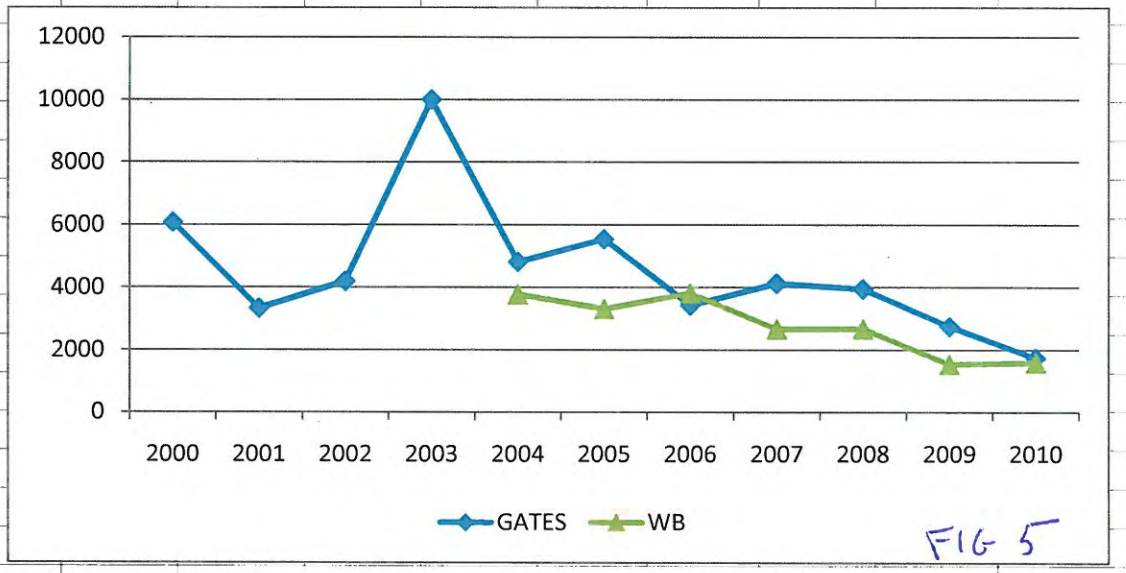

FIG 5

Gates/West Boylston loads much less due to high % now on sewer

NITRATE mean

DATE	COOK	GATES	MALDEN	MUDDY	WEST B
1999	3.82	1.87	0.516	0.123	2.41
2000	4.25	1.83	0.637	0.136	3.18
2001	3.55	1.68	0.653	0.193	2.88
2002	4.51	1.55	0.235	0.076	1.95
2003	3.34	2.97	0.450	0.086	3.40
2004	3.09	1.65	0.468	0.075	2.93
2005	2.82	1.50	0.386	0.097	1.95
2006	2.69	1.39	0.356	0.100	2.21
2007	2.50	1.10	0.452	0.113	2.05
2008	2.83	1.04	0.424	0.132	1.69
2009	2.60	1.03	0.403	0.072	1.25
2010	2.53	1.01	0.472	0.105	1.58
2011					
2012					
mean	3.21	1.55	0.454	0.109	2.29

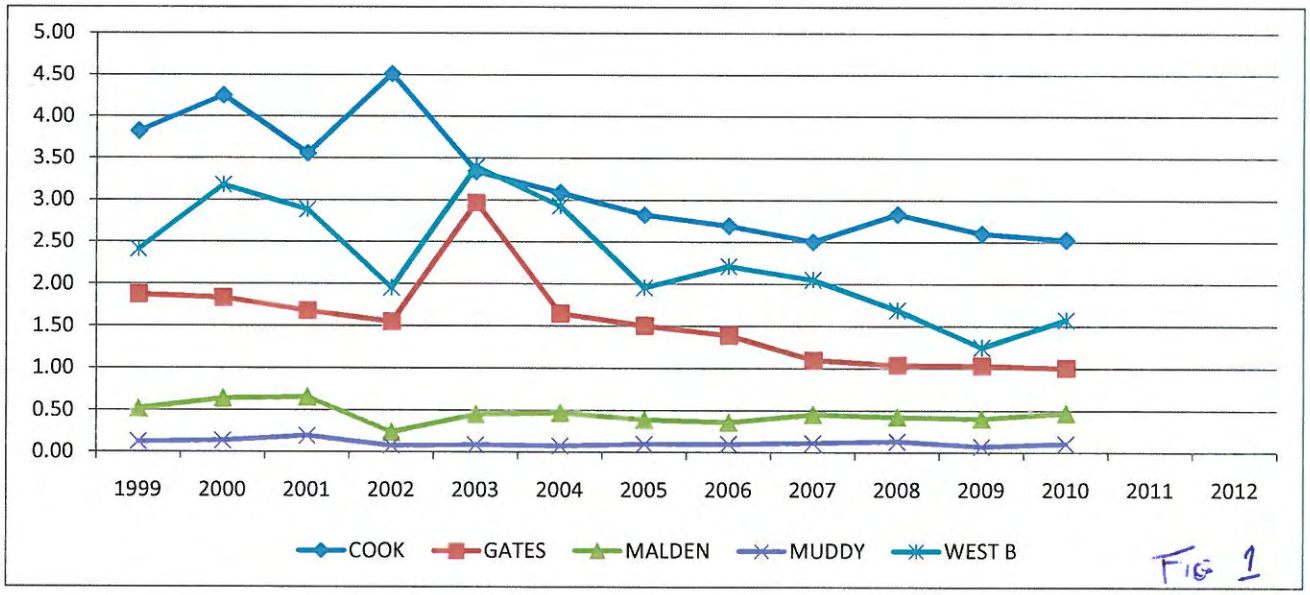

FIG 1

TOTAL P mean

DATE	COOK	GATES	MALDEN	MUDDY	WEST B
1999	0.089	0.024	0.069	0.020	0.030
2000	0.027	0.034	0.053	0.016	0.019
2001	0.029	0.059	0.058	0.074	0.032
2002	0.026	0.032	0.019	0.032	0.018
2003	0.021	0.021	0.023	0.011	0.031
2004	0.056	0.022	0.032	0.024	0.018
2005	0.041	0.034	0.057	0.042	0.051
2006	0.013	0.019	0.023	0.014	0.018
2007	0.016	0.018	0.027	0.015	0.025
2008	0.012	0.020	0.020	0.013	0.035
2009	0.013	0.016	0.030	0.017	0.022
2010	0.012	0.013	0.019	0.015	0.016
2011					
2012					
mean	0.030	0.026	0.036	0.024	0.026

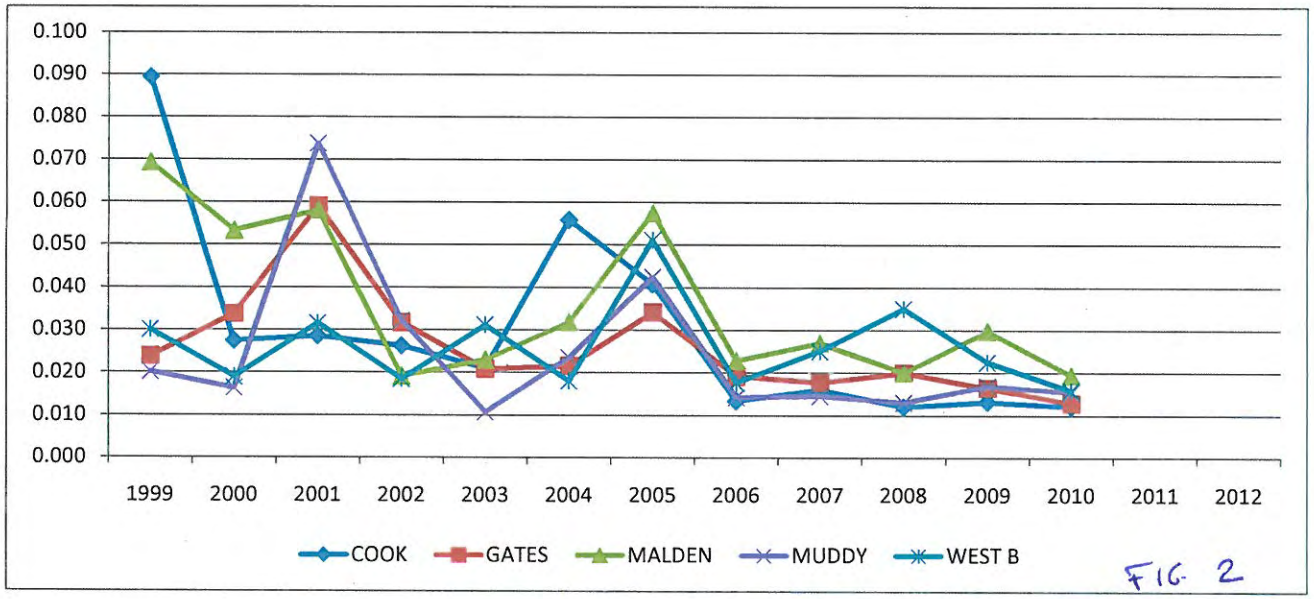

FIG 2