Exhibit 1: Neponset River Watershed High Yield Aquifer Map

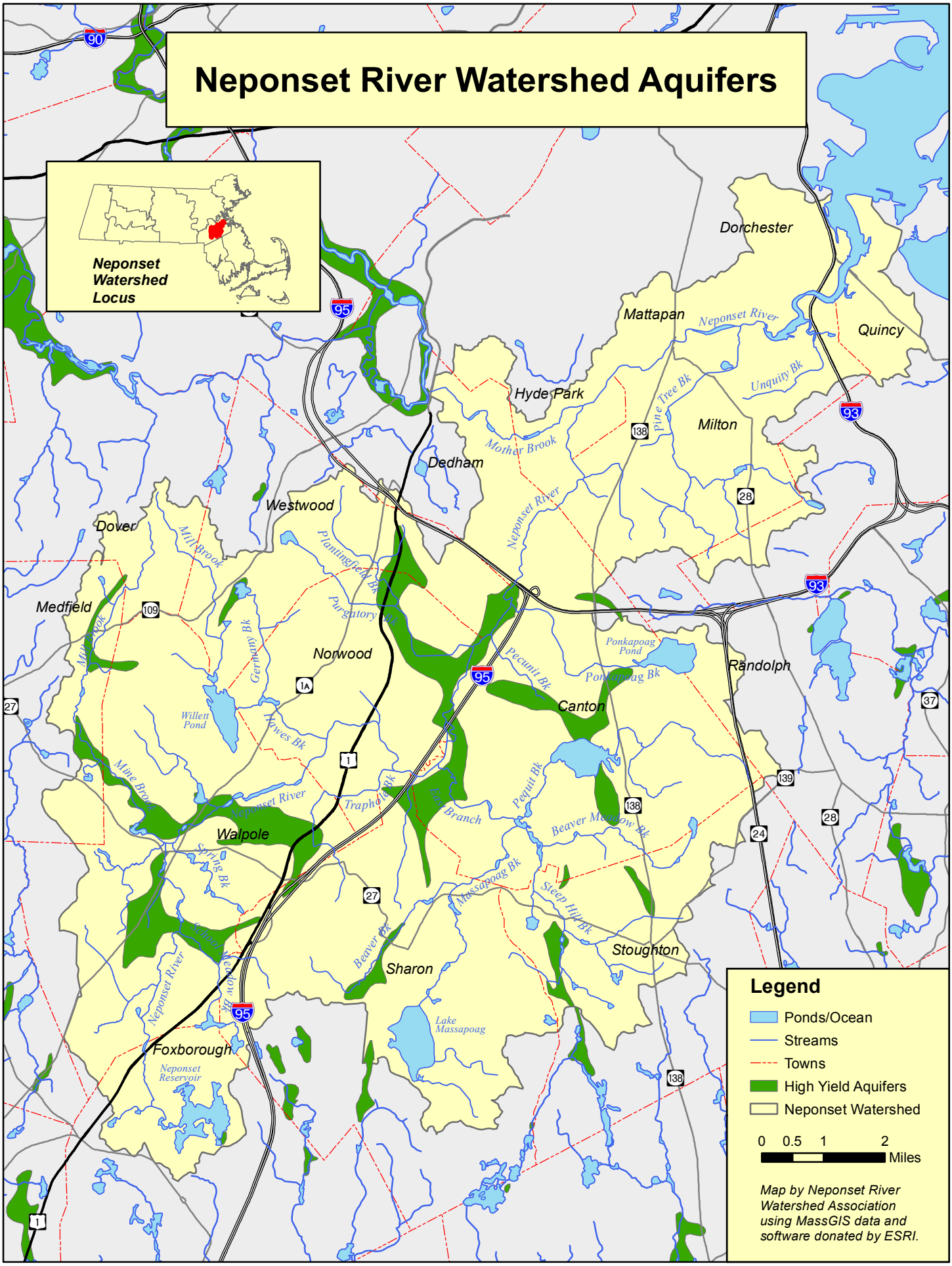

Exhibit 2: Original DEP "Baseline Comparison" Spreadsheet from "Baseline 2-17-12 All Basins.xls

Baseline Values- 2/17/2012

Basin	# of PWS Evaluated	Registration (MGD)	Current Authorized Vol. (MGD)	2029 Total Authorized Vol. (MGD)	Reported Use - 2000	Reported Use - 2001	Reported Use - 2002	Reported Use - 2003	Reported Use - 2004	Reported Use - 2005	Reported Use - 2009	Reported Use - 2010	2003-2005 Average (mgd)	Proposed Baseline	Old DEP Baseline (MGD)
Charles	14	13.6	24.95	22.03	17.66	17.16	16.17	17.01	17.16	17.22	15.87	16.46	17.13	19.03	19.29
Ipswich	7	15.44	18.67	17.63	15.26	16.29	15.82	15.37	15.49	15.42	15.14	15.16	15.43	16.5	15.76
Boston Harbor	10	12.89	19.13	18.04	14.76	15.05	13.83	14.04	14.54	15.11	11.77	12.32	14.57	15.46	15.57
Parker	3	1.43	2.28	2.28	2.01	2.13	1.95	1.85	2.07	2.03	1.82	1.97	1.99	2.15	2.05
Totals	34	43.36	65.03	59.98	49.69	50.634	47.774	48.27	49.26	49.78	44.6	45.91	49.12	53.14	52.67

# each year exceeding proposed baseline								
	9	12	7	10	6	8	6	10

Baseline is:

Reg. vol.	5
2005 +5%	10
03-05 avg.=5%	10
Compliance Limit	6
DCR Forecast	6

	Use	Baseline
Use vs. Reg. vol.	8.99	10.89

00-04 avg.	03-05 avg.	Proposed BL
49.13	49.10	53.14

Exhibit 3: Disaggregated Baseline Comparison Data

Neponset River Watershed Association

Baseline vs. 2000-2004 Use Perchentage Change and Volume Change for Individual Communities

Disaggregated from MassDEP 2-17-12 Spreadsheet

Basin	Municipality	Proposed Baseline MGD	Avg 00-04 MGD	Percentage increase from 00-04 to baseline		Basin	Municipality	Proposed Baseline MGD	Avg 00-04 MGD	MGD increase from 00-04 to baseline
Boston Harbor	CANTON	0.38	0.46	-17.03%		Boston Harbor	WALPOLE	2.25	2.52	-0.27
Boston Harbor	WALPOLE	2.25	2.52	-10.57%		Boston Harbor	CANTON	0.38	0.46	-0.08
Charles	NORFOLK	0.51	0.56	-8.60%		Charles	NORFOLK	0.51	0.56	-0.05
Ipswich	IPSWICH WATER DEPT.	0.22	0.23	-4.35%		Charles	LINCOLN	0.53	0.55	-0.02
Ipswich	TOPSFIELD	0.46	0.47	-2.95%		Ipswich	TOPSFIELD	0.46	0.47	-0.01
Charles	LINCOLN	0.53	0.55	-2.93%		Boston Harbor	SHARON	0.97	0.98	-0.01
Boston Harbor	SHARON	0.97	0.98	-1.42%		Ipswich	IPSWICH WATER DEPT.	0.22	0.23	-0.01
Ipswich	WENHAM	0.35	0.35	0.57%		Ipswich	WENHAM	0.35	0.35	0.00
Parker	GEORGETOWN WATER DEPARTM	0.69	0.68	1.47%		Charles	DOVER	0.02	0.02	0.00
Ipswich	DANVERS/MIDDLETON	3.35	3.28	2.07%		Parker	GEORGETOWN WATER DEPARTM	0.69	0.68	0.01
Charles	FRANKLIN	3.05	2.98	2.49%		Boston Harbor	DOVER	0.14	0.12	0.02
Charles	MEDWAY	1.01	0.98	3.27%		Charles	MEDWAY	1.01	0.98	0.03
Charles	HOLLISTON	1.18	1.14	3.69%		Charles	HOLLISTON	1.18	1.14	0.04
Ipswich	SALEM-BEVERLY	10.82	10.39	4.18%		Parker	ROWLEY WATER DEPARTMENT	0.49	0.45	0.04
Boston Harbor	WEYMOUTH	4.51	4.31	4.59%		Ipswich	LCWD	0.38	0.32	0.06
Boston Harbor	DEDHAM-WESTWOOD	3.11	2.96	4.93%		Ipswich	DANVERS/MIDDLETON	3.35	3.28	0.07
Charles	MILFORD	3.43	3.20	7.12%		Charles	FRANKLIN	3.05	2.98	0.07
Parker	ROWLEY WATER DEPARTMENT	0.49	0.45	9.87%		Parker	IPSWICH WATER DEPARTMENT	0.97	0.88	0.09
Parker	IPSWICH WATER DEPARTMENT	0.97	0.88	10.73%		Charles	MILLIS	0.84	0.74	0.10
Charles	NATICK	1.20	1.07	11.73%		Boston Harbor	NORWELL	0.60	0.50	0.10
Charles	MILLIS	0.84	0.74	12.90%		Charles	WRENTHAM	0.78	0.68	0.10
Charles	NEEDHAM	2.63	2.32	13.56%		Charles	NATICK	1.20	1.07	0.13
Charles	DOVER	0.02	0.02	13.64%		Boston Harbor	DEDHAM-WESTWOOD	3.11	2.96	0.15
Charles	WRENTHAM	0.78	0.68	14.71%		Charles	MEDFIELD	1.03	0.85	0.18
Boston Harbor	DOVER	0.14	0.12	14.75%		Boston Harbor	STOUGHTON	1.21	1.02	0.19
Boston Harbor	STOUGHTON	1.21	1.02	18.16%		Boston Harbor	WEYMOUTH	4.51	4.31	0.20
Boston Harbor	NORWELL	0.60	0.50	19.05%		Charles	BELLINGHAM	0.91	0.69	0.22
Ipswich	LCWD	0.38	0.32	20.25%		Charles	MILFORD	3.43	3.20	0.23
Charles	MEDFIELD	1.03	0.85	21.18%		Ipswich	HAMILTON	0.92	0.61	0.31
Charles	BELLINGHAM	0.91	0.69	31.50%		Charles	NEEDHAM	2.63	2.32	0.31
Boston Harbor	FOXBORO	1.37	1.02	34.05%		Boston Harbor	FOXBORO	1.37	1.02	0.35
Ipswich	HAMILTON	0.92	0.61	50.82%		Boston Harbor	MEDFIELD	0.92	0.54	0.38
Charles	DEDHAM WESTWOOD	1.91	1.26	51.35%		Ipswich	SALEM-BEVERLY	10.82	10.39	0.43
Boston Harbor	MEDFIELD	0.92	0.54	71.00%		Charles	DEDHAM WESTWOOD	1.91	1.26	0.6

Exhibit 4: Memo Regarding an Alternative Approach to Baseline

November 29, 2011

TO: Interested Parties
From: Ian Cooke, Neponset River Watershed
RE: SWMI Baseline Issues

Alternative Suggestions on Baseline
Several weeks ago, I was asked to participate in a SWMI meeting regarding the "baseline issue." Since then I have had the opportunity to participate in a number of further discussions as well as delve into some of the various spreadsheets and databases that underlie this discussion.

Based on this review, I would encourage EEA to consider an "impact-based" approach to permit tier classification tied to changes in August median streamflow depletion following the methods used by the USGS SYE and Indicators Project.

Specifically, I propose that Tier 1 review be applied to withdrawal requests that would cause an additional increase in August median flow depletion of 1% or less relative to the Indicators Project, Tier 2 would be for requests causing 1-5% additional depletion, and Tier 3 would be for requests producing 5% or more additional depletion. Tier 4 would be reserved for any withdrawal that would cause a subbasin to slip a flow category.

By focusing on impacts rather than just changes in withdrawal levels, this approach would be more logical, would have a solid basis in the science, and will be fairer for permittees.

I have had the opportunity to discuss this approach with Mark Smith, Margaret VanDeusen and Julia Blatt, and they agree that it would provide a more solid and logical basis for managing the tier classification process.

The reasoning behind this recommendation is explained further below.

Baseline Background
One of the most basic goals of the SWMI process is "No Backsliding," meaning that healthier streams in flow categories 1, 2, and 3, should maintain their biological and flow categories. At the same time, streams in flow categories 4 and 5 should be improved by minimizing existing impacts to the greatest extent feasible, and should not be allowed to deteriorate further even within their flow category by mitigating additional withdrawals .

To achieve the No Backsliding goal, it is important that permit applications be flagged for more intensive scrutiny and mitigation when they are likely to result in backsliding. In its effort to maintain no backsliding, the proposed WMA Permit Tier Review system uses "baseline" to distinguish between permits requests that are not likely to cause backsliding (Tier 1) from those that may or will cause backsliding (Tier 2-4).

Limitations of Currently Proposed Baseline as a Tool to Predict Impacts
The key problem with the currently proposed tier classification system is that baseline is not an accurate predictor of which permit applications are likely to result in backsliding.

Backsliding, by definition, is measured in terms of change relative to the streamflow category system. A stream's position in the streamflow category framework is defined by the level of streamflow depletion resulting from average withdrawals and discharges during the period 2000-2004 as reported in the Mass Indicators project. However, baseline, as presently being considered, has no direct relationship to this framework.

There are several different versions of baseline currently under consideration. All of these begin by looking at water use during 2003-2005, and then apply various mechanisms to increase the baseline above this measure of "current use."

However, none of the proposed baselines serve as a good screening tool to distinguish permit applications that are likely to create impacts from those not likely to create impacts. In some places application of baseline would result in large (by EEA's own definition) environmental impacts such as slipping a flow category, while in other places applying the baseline would result in minimal impacts.

There are several reasons for this disconnect. First, the current baseline proposals use a different water use period (2003-2005) than the streamflow categories (2000-2004). I looked at a list of 67 systems and basins provided by DEP and compared the 03-05 water use provided by DEP to the 00-04 water use taken from the MA Water Use Database. About half these systems saw use increase during 03-05 as compared to 00-04, while the other half saw a decrease. Most of the changes were small but in some cases they were substantial. In short, water use across the state during 03-05 was <u>different</u> from water use during 00-04, in ways that are not particularly predictable and which in some cases introduce a substantial discrepancy between current definitions of baseline and the flow categories.

The other reason for this disconnect is that increasing withdrawals in a given basin by a set percentage will result in different levels of impact in different places. That is because impacts in a specific basin are a function of other withdrawals in the basin, the level of base flow in the subbasin, the magnitude of the increase in the withdrawal, and how much if any of that water eventually comes back to the subbasin. Because baseline looks at only one of these factors—historic withdrawal levels—it can't accurately predict impacts.

Proposed Alternative to Current Baseline Approach

The baseline concept was originally developed before the SWMI process, at a time when there were no readily available tools to evaluate the impacts associated with a given withdrawal proposal. However, such tools now exist and the tier classification system would be more logical, better tied to the available science, and arguably fairer, if it were to focus on reviewing the impacts of a requested withdrawal, rather than focusing on changes in historic withdrawal levels.

With this in mind I recommend crafting a new approach to tier classification that builds on the impact-based review threshold that is already incorporated in Tier 2. Specifically, I would suggest defining the tiers as follows:

Tier 1: Withdrawal request is "limited" (<1% increase in cumulative august median flow depletion vs 2000-2004) and will not result in slipping a flow or biological category.

Tier 2: Withdrawal request is "small" (<5% increase in cumulative august median flow depletion vs 2000-2004) and will not result in slipping a flow or biological category

Tier 3: Withdrawal request is “large” (>5% increase in cumulative august median flow depletion vs 2000-2004) and will not result in slipping a flow or biological category

Tier 4: Withdrawal request, regardless of size, will result in slipping a flow or biological category.

Aside from the way each tier is defined, I am not proposing any changes to the substantive requirements that would be applied at each tier. For example in Tier 1, existing withdrawals in flow categories 1-3 would still need to implement conditions 1-8, and withdrawals in flow categories 4-5 would still need to minimize impacts to the greatest extent feasible. Similarly, in Tier 4, the highest degree of compensatory mitigation would be required with the goal of keeping the subbasin within both flow and biological categories.

The thresholds between limited, small and large withdrawals could be set at different levels depending on the science and policy objectives, but the key point is that the entire regulatory system would be tied to impacts, and clearly connected to both the flow categories and the no backsliding goal, rather than being tied to arbitrary pumping data or historical permit allocations, which have no direct relationship to impacts.

The current baseline approach would authorize similarly situated permit applicants to make withdrawals that produce widely varying levels of environmental impact. An impact-based approach would avoid this awkward situation.

For administrative purposes, the withdrawal volumes implied by the tier thresholds for any given subbasin can be very easily calculated from the Indicators Project data tables, by simply multiplying the unaffected August streamflow by the relevant threshold percentage.

An additional benefit of this approach is that it encourages applicants to focus on the amount of water being returned as well as that being withdrawn. This provides a positive incentive for permittees to look at both sides of the water balance equation. However, it is important to note that there are water-quality considerations in situations where clean base flow will be eliminated in exchange for less-clean surface water discharges, especially in surcharged subbasins.

Lastly, I would point out that this impact-based approach needs to incorporate the cumulative impacts of all withdrawal sources within a subbasin in order for the permitting process to be meaningful.

Conclusion

Thank you for taking the time to consider this suggestion, and if I can be of further assistance on this issue, please don’t hesitate to contact me.