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Kathleen Baskin, P.E.
Director of Water Policy
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, 9th floor
Boston, MA 02114

RE: Comments on Draft SWMI Framework released by EEA on February 3, 2012
Via Electronic Mail

Dear Ms. Baskin:

The Massachusetts Water Works Association, Inc. (MWWA) is a membership organization dedicated to the advancement of the drinking water profession. Through education and advocacy, MWWA is committed to public health and to providing a safe and sufficient supply of drinking water to Massachusetts consumers. MWWA represents more than 1,100 members of the public water supply profession throughout the Commonwealth; our membership consists of water operators, water system managers, department of public works officials, consulting engineers, vendors and equipment manufacturers. MWWA would like to offer the following written comments on the Executive Office of Energy and Environmental Affairs (EEA) draft sustainable water management framework (Framework) released on February 3, 2012.

At the outset of Sustainable Water Management Initiative (SWMI), MWWA got involved because it appeared to present a real opportunity to look holistically at water resource management in Massachusetts. It was our hope that the process would expand the dialogue and recognize all stakeholders who have an interest in water resources. We were also led to believe that emerging science was being developed to inform and guide this discussion in a meaningful way. At the end of this process, we regret to say that our expectations were not met. While we agree wholeheartedly with the goal of sustainable water management, we are left as we conclude this phase of the initiative with a Framework that will unfortunately apply solely to Water Management Act (WMA) permitting and may not address the real environmental challenges or opportunities facing the state.

The scientific studies that have been done over the past 5-10 years (*Indicators of streamflow alteration, habitat fragmentation, impervious cover and water quality for Massachusetts stream basins: USGS report*

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2009-5272;Precipitation-Runoff Model for Analysis of the Effects of Water Withdrawals on Streamflow, Ipswich River Basin, Massachusetts, USGS WRI 00-4029; Effects of Selected Low-Impact Development (LID) Techniques on Water Quality and Quantity in the Ipswich River Basin, Massachusetts: Field and Modeling Studies, USGS report 2010-5007) have failed to convince us that further regulation of water supply will improve either streamflow or aquatic habitat. In fact these studies confirm that the primary measures being considered in the Framework will do little to achieve that goal. Therefore, we are concerned that the Framework does nothing to address the long term sustainability of our public water supplies and may contribute to continued degradation of our existing water supply infrastructure as scarce resources are redirected away from projects important to public health and safety.

Our comments on the specific components of the Framework are outlined below:

Safe Yield:
Safe Yield is the amount of water available in a basin to be withdrawn. MWWA supported the methodology originally put forth by MassDEP in October of 2009. When the watershed groups protested, MassDEP issued its clarification statement on Safe Yield, stating that Safe Yield would henceforth be defined to include environmental protection factors; this fundamentally changed the concept of Safe Yield. MWWA contends that this interpretation does not comply with the statutory language in Massachusetts General Law, Chapter 21G, quoted in its entirety: *"Safe yield", "the maximum dependable withdrawals that can be made continuously from a water source including ground or surface water during a period of years in which the probable driest period or period of greatest water deficiency is likely to occur; provided, however, that such dependability is relative and is a function of storage and drought probability."* In order to avoid future legal challenge, MassDEP should consider rescinding its contrary interpretation.

The Framework states that in basins where current allocations are greater than Safe Yield, MassDEP will employ a permitting strategy that will ensure through conditions, that use does not exceed Safe Yield through the life of the permit. In the case of the Ipswich basin it appears that the current Registered volumes (grandfathered water rights) exceed the proposed Safe Yield. The courts have determined that Registered volumes cannot be reduced; therefore, MWWA recommends that at a minimum, Safe Yield be no less than the Registered volumes in a basin.

The current methodology proposed in the Framework allows for allocation of 55% of the Q90, with 45%of the Q90 being reserved for the environment. In most cases the Q90 reflects conditions that are worse than the drought of record. Because the statute requires MassDEP to consider the probable driest period, MWWA suggests that MassDEP change its methodology to reflect the appropriate "Q", (i.e. Q85, Q80 or Q75), that corresponds to the drought year of record in that basin. Furthermore, a reasonable interpretation of MGL 21G and an understanding of the history of the legislation makes it clear that Safe Yield was never meant to be a single, all encompassing factor to determine how water is allocated. Rather, specific concerns

related to increased water withdrawals were to be addressed through regulatory criteria and standards for obtaining permits, as clearly stated in Section 7 of the Act. It seems that the more appropriate place to consider environmental protection factors is in the development of streamflow criteria; we see no need to reserve 45% of the Q90 for the environment within the Safe Yield Methodology.

Biological Categorization of Streams:
The Framework is based on assumptions about the interactions between streamflow and aquatic biology including:

1. Fluvial fish abundance is a measure of the environmental health of rivers and streams.
2. Flow alterations have a direct, linear, negative relationship to fluvial fish abundance.
3. Reducing or mitigating flow alterations by further regulating water withdrawals will increase fluvial fish abundance and river health.

With these assumptions driving the process, the USGS working with Mass Fish & Wildlife (DFW) analyzed fish sampling data and relationships between fluvial fish abundance and a host of variables. This work, presented first in a June 2010 report titled, *Preliminary Assessment of Factors Influencing Riverine Fish Communities in Massachusetts,* and then in November 2011 in a report titled, *Factors Influencing Riverine Fish Assemblages in Massachusetts* (Factors), produced a Fluvial Fish Relative Abundance (RFFA) Model. This mathematical equation suggests that fluvial fish relative abundance can be described as a function of four variables, two of which (stream gradient, % wetlands in buffer zone) are often natural factors and two of which (groundwater withdrawals as a percent of August Median flow, percent impervious cover) are anthropogenic.

RFFA is the underpinning of the Framework. Through its application across the state, RFFA formed the basis for determining biological categories for 1,400 subbasins. The biological categories, in turn, determine acceptable flow alterations, which then are used to dictate actions to be taken by permit holders under the WMA. RFFA and biological categories are thus critical components in ultimately determining the level of costs and regulatory impacts on communities and public water suppliers.

According to the USGS/DFW Preliminary Report, “statistical models of species abundance often fail to produce consistently reliable predictions”, (pg. 57). Models in the Preliminary Report were also described as having low to moderate predictive capability. The Factors Report (pg. 49) states that the predictive ability of the model is not high. The Factors Report (p.48) recommends that RFFA not be “used to predict responses at individual sites or extrapolated to define reference conditions.” It suggests that the model be best used “to compare fish assemblage response among a set of sites or to look at the change in mean response associated with a change in a particular covariate.”

Despite these stated limitations, the Framework relies exclusively on RFFA to predict conditions at specific sites (i.e., specific subbasins) and, to define reference conditions at each subbasin. The Framework applies the model not to compare responses at a set of sites but to assess conditions in all subbasins across the state. For each subbasin the RFFA is used to make two predictions of fluvial fish abundance. First, by setting the anthropogenic variables to "near natural" conditions (groundwater withdrawals = 0; impervious cover = 1%) the reference or "natural" condition of the stream is established. This becomes the benchmark for the stream against which alterations are measured. The alteration in biological conditions are then predicted using RFFA with anthropogenic variables set to existing conditions for the subbasin. The model product is a fluvial fish abundance measure that is used to represent the hypothetical loss in the range of fluvial fish abundance for the sub-basin when compared to the reference condition. This loss in abundance forms the basis for determining the biological category for the subbasin.

Throughout the SWMI process, questions were raised about the adequacy of the model (both in the preliminary and final reports, even though the model itself changed) for reasonably informing biological conditions. Some questions remain unanswered and other questions were "answered" but not resolved, leaving the very underpinnings of the Framework in doubt. To further understand this matter, MWWA retained the services of TRC, a consulting firm with expertise in fisheries and aquatic biology, to review the USGS/DFW reports, the SWMI framework and the actual fish sampling data used in the RFFA development. TRC produced a report, *Assessment of Fisheries Data and Related Stream Flows in MA*, which has previously been submitted as part of the SWMI record.

The TRC report looked at actual fish sampling data and focused on five case studies in streams where multiple years of sampling data with variable flow conditions was available. From this analysis TRC concluded:

1. Fluvial fish abundance did not exhibit a linear negative relationship to streamflow.
2. RFFA based biological categories were inconsistent with actual fish sampling data. Many instances were found where the model predicted high quality conditions (Biological Category 3 or better) but the actual fish sampling showed zero or very low counts of fluvial fish. Conversely, high actual counts were obtained in Biological Category 4 and 5 subbasins.

After repeated requests by MWWA for the agencies to produce a statewide map of actual fish sampling results to compare to modeled results, MassDEP on March 27, 2012 posted to the SWMI website an interactive map that provides actual fish sampling data (fluvial fish in counts per hour for each fish sampling site used in SWMI) along with RFFA modeled results for the fish sampling location and for the sub-basin. In the short time that this information has been available, MWWA has been able to analyze the data in the Blackstone, Taunton, French and Housatonic basins. A summary of that analysis is as follows:

Blackstone Basin

46 fish sampling sites

Average actual fluvial fish abundance in counts per hour: **204**
Range of actual fluvial fish counts: **0-1434**
Percent of sites with actual counts >20% more than model: **37%**
Percent of sites with actual counts >20% less than model: **46%**
Percent of sites with actual counts more than 20% difference from model: **83%**
Range of variation of actual counts from model: **-100% to +802%**
Average variation from model for sites with actual counts greater than model**: +137%**
Average variation from model for sites with actual counts less than model: **-58%**

The four highest actual count sites (all of which were greater than the highest mathematically possible model count) were all in biological category 4 or 5. The local percent impervious cover for the four subbasins with the highest counts ranged from 10% to 27% while the flow levels included two subbasins at flow level 1, one at flow level 2 and one at flow level 4.

The four lowest actual counts sites, which include two sites with zero fluvial fish, were also biological category 4 or 5. The local impervious cover for the four subbasins with the lowest counts ranged from 5.15% to 19.4% while the flow levels include one site at flow level 2, two sites at flow level 3 and one site at flow level 4. The two flow level 3 sites had zero fluvial fish in actual counts.

Taunton Basin
18 fish sampling sites
Average actual fluvial fish abundance in counts per hour: **24**
Range of actual fluvial fish counts: **0-112**
Percent of sites with actual counts >20% more than model: **0%**
Percent of sites with actual counts >20% less than model: **83%**
Percent of sites with actual counts more than 20% difference from model: **83%**
Range of variation of actual counts from model: **-100% to -8%**
Average variation from model for sites with actual counts greater than model**: NA**
Average variation from model for sites with actual counts less than model: **-77%**

RFFA overestimates counts in all fish sampling sites in the Taunton Basin.

There were four Biological Category 3 subbasins with fish sampling sites and the remaining 14 sites were Biological Category 4 or 5. Actual fish counts in the four Biological Categories 3 sites were, 2, 0, 0, 0 fluvial fish per hour. The Flow level category for these four sites was all Flow Level 1. The Flow level category at an additional three sites with zero actual counts included two flow level 3 and one flow level 4.

French Basin
8 fish sampling sites
Average actual fluvial fish abundance in counts per hour: **369**
Range of actual fluvial fish counts: **0-2,028**

Percent of sites with actual counts >20% more than model: **38%**
Percent of sites with actual counts >20% less than model: **62%**
Percent of sites with actual counts more than 20% difference from model: **100%**
Range of variation of actual counts from model: **-100% to +956%**
Average variation from model for sites with actual counts greater than model**: +358%**
Average variation from model for sites with actual counts less than model: **-64%**

One fish sampling site with over 2,000 fluvial fish per hour in an actual count is considered a Biological Category 4 by the RFFA. There were actually two fish sampling sites in this same sub-basin and the average of the two actual counts was 512% higher than the average modeled count for the two sites and 419% higher than the modeled reference (natural condition) count for the subbasin.

The majority of the Basin is in Flow Level Category 2 and 3. Two fish sampling sites in Flow level 4 subbasins include the lowest actual count of zero and the 3rd highest actual count which was 29% higher than the model prediction for the site.

Housatonic Basin
44 fish sampling sites
Average actual fluvial fish abundance in counts per hour: **337**
Range of actual fluvial fish counts: **20-2,023**
Percent of sites with actual counts >20% more than model: **39%**
Percent of sites with actual counts >20% less than model: **55%**
Percent of sites with actual counts more than 20% difference from model: **94%**
Range of variation of actual counts from model: **-90% to +511%**
Average variation from model for sites with actual counts greater than model**: +109%**
Average variation from model for sites with actual counts less than model: **-56%**

In the Housatonic Basin there were eight sub-basins with multiple (2 or 3) fish sampling sites. When the average of the actual fish counts are compared to the average of the site model counts only one sub-basin shows a difference of average actual counts that is 20% or less from the modeled average counts. The difference between the average actual counts and average modeled counts for the eight sites ranges from -83% to +80% of the average modeled counts. This would suggest that the model does little better at predicting average fish counts in a sub-basin than it does predicting counts at a given site.

There are four biological category 1 sub basins in the Housatonic. These sites include both the highest actual fish count (2,023) and the lowest actual fish count (20). Both the highest and lowest actual counts were also within Flow Level 1 subbasins

It is understood that the RFFA attempts to describe conditions that result from a mean response to variables across a subbasin. There is expectation on our part that a mathematical model of any kind would be exact and produce results that precisely match real world data. On the other hand, a model that is used to determine biological conditions across the state which, in turn, will lead to costly minimization and mitigation

efforts by communities should be reasonably accurate, follow logical patterns and, at the very least, be consistent with real world data. Based on TRC's work and our analysis of interactive map data, it is clear that the RFFA fails in this regard.

The RFFA model is consistent only in its inability to approximate actual fluvial fish abundance even roughly. The model results show extreme underestimates or extreme overestimates but very few sites close to (within 20%) actual fish counts. High actual counts are found in locations where there should be few fluvials while very low actual counts occur where conditions seem perfect for fluvial fish. If that were a consistent result, there could be an opportunity to make some sense of the model results; but there is no consistency. The biological categories derived from the model appear to be arbitrary and any association between flow levels, impervious cover and fluvial fish abundance is illusive.

If it were a matter of a small percentage of subbasins being wrongly classified, the matter might be resolvable through site-specific studies. However, it appears that the majority of subbasins with fish sampling data in the watersheds reviewed have actual fish counts that differ markedly and inconsistently from modeled results. Moreover, subbasins lacking fish sampling sites are totally dependent on modeled estimates of fluvial fish. There is no reason to conclude that these subbasins have more accurate predictions than those we have reviewed so far. Given the inability of the RFFA model to provide logical and consistent results over a broad scale, it would be unfair and punitive for water suppliers and communities to have to pay for site-specific studies to correct modeled assumptions that are so obviously in error.

In addition to the inadequacy of the RFFA model at determining Biological Categories, the poor performance of the model also raises questions about some of the basic assumptions at play in the Framework. The basic premise that flow alterations impact fluvial fish abundance is even at issue. With high fish counts occurring in severely depleted streams (Flow Level 4/5) and low fish counts present in virtually unaltered streams (Flow Level 1/2) the fish-and-flow relationship that has been purported to exist based on data associations (not actual cause/effect) seems to fall apart. The same is true for impervious cover and may even be true for the natural variables included in the model. Perhaps theses discrepancies simply highlight the inability of the Framework to represent accurately the actual mix of cause/effect conditions in reverie systems, fluvial fish, flow and the host of variables that play out on a site-specific basis but not on a general basis.

Since the outset of SWMI, questions have been raised about the science "guiding" policy development. Most of these questions still stand, having not been resolved by the answers offered by the agencies or having not been answered at all. Resolution of the outstanding issues is essential to explain the apparent inadequacy of the model and the failure to identify real biological conditions in the 1,400 subbasins in Massachusetts.

The major issues raised include:

1. Fish sampling

At one of the first SWMI Advisory Committee meetings a question was asked about the fish sampling database and the reliability of the sampling methodology. Agency staff assured the Committee that electrofishing in wadeable depths was a very reliable and proven means by which to determine fluvial fish abundance as needed to inform SWMI and model development. No other discussion of fish sampling took place at Advisory Committee meetings in the years that followed.

Through our own research, MWWA has come across numerous, published studies in fishery science journals that strongly suggest electrofishing effectiveness greatly overstated. These studies have determined that numerous biases are at play in fish sampling by electrofishing, and that these biases, if not adjusted for, can produce erroneous estimates of fish abundance. Among the factors impacting the ability to capture fish by electrofishing are the congregation of fluvial fish in water too deep to wade, water quality (conductivity, turbidity), fish species, fish size, width/depth/gradient of the stream and stream habitat characteristics like undercut banks, submerged vegetation, woody debris and cobbles. These studies suggest that measures of fish abundance can be grossly underestimated or overestimated because of such factors.

We understand that none of the fish sampling data used in the USGS/DFW analysis was corrected for inherent biases. This alone could account for the lack of fish in certain streams (fish may be present but not captured during sampling). More importantly, these biases and undercounting can lead to assumptions or even statistical relationships between fish abundance and environmental variables that give false indications.

A particularly important bias related to fish sampling was the inclusion of data obtained only by sampling in wadeable streams. As was pointed out on many occasions, some rivers and streams are too deep to wade but could be sampled by boat. During the low-flow season, when all samples used in the USGS/DFW study were obtained, many species of fish congregate in the deep holes. By excluding boat sampling from the database, samples taken waters too deep to wade, where most of the fish may congregate during July through September, would be missed, thus leading to undercounting of fluvial fish abundance and inferences about impacts that may not exist. This issue and the biases related to exclusion of fish below certain sizes and trout above a certain size (which, even if “stocked” are relevant to the protection of water-based recreational use mandated by the WMA) are considered in detail in the TRC report.

2. Geography and species distribution

In the Preliminary USGS/DFW study, the geographic setting of a sub-basin in Massachusetts played a prominent role in development of

relationships between fluvial fish abundance and richness and other variables. "Outlet X" was shown to be an important variable by USGS and a dominant factor (by TRC) to which all other variables were subservient. The reason that east-west geography is so important in Massachusetts appears to be related to the post glacial distribution of fluvial fish across the Massachusetts landscape, a landscape physically isolated populations (and species) along an elevation pattern from high elevations in the west to low elevations in the east.

This geographic pattern is, unfortunately, mirrored by the pattern of human development in the Commonwealth, with sparsely developed western Massachusetts trending to the densely developed eastern part of the state. It thus becomes easy, when considering fluvial fish abundance across the state, to assume that high numbers of species and individuals in the west decline to low numbers in the east as a result of stream alteration due to flow depletion or impervious cover. This assumption is superseded when one considers that natural restriction and corresponding range limits of fluvial species, like slimy sculpin, creek chub, and blacknose dace is a critical factor. (see Preliminary Report pg.29) (see TRC Report for more on the Geography factor)

This is well illustrated using the interactive map analysis for the Blackstone and Taunton Basins, as previously described. Both are relatively large river basins with numerous streams. The Blackstone includes a mix of Flow-level categories among its subbasins with no one level being dominant. The Taunton, however, is dominated by Flow Level 1 and 2 subbasins with only a small percentage of Flow Level 4 and 5. Based on the map, it appears to have the best flow conditions of any river basin east of Worcester.

Despite overall better flow conditions, the Taunton's actual fish sampling counts, on average, are an order of magnitude less than that in the Blackstone. Fully 33% of the fish sampling sites in the Taunton had zero fluvial fish, while only 4% of the Blackstone sampling sites were without fluvials. The TRC report highlights additional examples of eastern basins with near natural flows and little impervious cover that are completely or nearly devoid of fluvial fish.

While "Outlet X" was a key variable in the preliminary report, the final USGS/DFW report barely mentioned the term, apparently considering it to be a "confounding variable". This is both unfortunate and inexplicable given the importance of this factor. Certainly, leaving this variable out of the discussion and the model misinforms our attempts to understand our water resources and fisheries and sets the stage for expectations (restoration of rivers based on fluvial fish abundance) that can never be met.

3. Water quality, stream habitat and other unknowns

That the RFFA model is shown to be less than adequate at predicting biological categories should not be a surprise. The model suggests that it can be used to describe fluvial fish abundance based on only four variables. Those variables do not include water quality, stream habitat or dams. It seems incongruous that any effort to estimate fluvial fish abundance could be attempted without consideration of these critical factors.

It has been suggested that impervious cover is a surrogate measure of water quality, but that is unsubstantiated. Water quality impacts can and do occur in agricultural areas and in the logging of forests far from any pavement or urban areas. Water quality measures, such as dissolved oxygen, play critical roles in aquatic ecosystems health; any meaningful endeavor to assess river health cannot ignore the direct importance of water quality simply because it is difficult or inconvenient to quantify. To do so would be another disservice to the environment and communities by misdirecting resources needlessly and without benefit.

In a similar fashion, stream habitat has not been considered in development of the Framework. The physical structure of a stream plays a large role in determining where fish can reproduce or take refuge during low-flow periods. The Framework has no means of accounting for stream habitat because there is no available database. Stream habitat, such as undercut banks, woody debris, deep pools, meanders and riffles can make all of the difference in determining whether a given waterway can support fluvial fish through stressful, low-flow periods since it is the habitat and connections between habitats that can provide refuge. Even in rivers known to go partially dry during droughts, fluvial fish do not go extinct. They manage to survive stress if there is suitable habitat to hold them over until conditions improve. If that were not the case, then most of our streams would be devoid of fish altogether.

We understand that EEA is currently considering a proposal by the USGS to further study this topic. MWWA encourages the Secretary to recognize the importance of this effort and fund this study.

Streamflow Criteria: The streamflow criteria matrix is confusing and complicated, and fails to reflect the importance of the prevalent differences between modeled and actual RFFA. MWWA is still unclear how, with those limitations, it can apply in practice. MWWA still has questions about whether the streamflow criteria will be applied on a cumulative basis.

The small alterations allowed (<3% in August for Flow Level 1) imply that such a minute flow change is significant. This seems unrealistic given that healthy streams

that are little impacted by human activities can experience natural flow variations that can be 50% to 80% below August median flow. It is troubling that some interpret August median flow to be some sort of a threshold or goal in itself when it is nothing more than a statistic which tells us that flows will be less than that amount 50% of the time. The very low flow alteration level also implies that such a change in flow is measureable, especially on un-gauged streams where flow information is modeled using a tool (SYE) whose accuracy remains unknown.

Streamflow criteria is built on biological categories and supposed biological losses associated with anthropogenic factors. As our discussion on Biological Categories indicates, it appears that reasonable assessments of biological conditions on a subbasin scale are not possible with the tools currently available. This raises great doubt about our ability to measure a 5% or even a 65% biological loss and thus raises questions about the establishment of any flow triggers driven by biological loss.

Site-specific Study/Rebuttable Presumption: EEA recognizes that the model is stated to be a "statewide screening tool" and will allow water suppliers the opportunity to rebut the model's presumptions through site-specific study. However, as we stated above in our discussion on Biological Categorization, it important for EEA to validate the model on a statewide basis so that systems can make decisions on whether to default to the model results or conduct site-specific study (also see further comments under Pilot Application of SWMI below). We are concerned that, without clear guidelines on what site-specific analysis entails, it could be daunting and costly for individual communities to develop a scope on their own. The TRC report that MWWA submitted for inclusion in the SWMI process provides examples of low-cost site-specific analyses and thoughts on how site-specific study can be approached and what should be evaluated in a study and we urge EEA to convene a stakeholder group of technical experts to develop a model study scope.

Water Management Act Permitting: The Framework cannot be taken as a standalone document; it must consider within the context of MGL 21G, Section 7 not simply streamflow and aquatic habitat as determined by a factor not called out in the statute, fluvial fish presence. As quoted in its entirety:

> *"Section 7. The department shall, by regulation, specify, for each water source from which withdrawals are to be permitted, a date upon which its regulations establishing criteria, standards and procedures for issuing permits shall become effective. No person may, after the effective date thus specified, make a new withdrawal of more than the threshold volume of water from any water source, or construct any building or structure which may require that person to make such a new withdrawal of water unless such person obtains a permit in accordance with regulations adopted by the department.*
>
> *In adopting regulations establishing criteria and standards for obtaining permits, the department shall assure, at a minimum, that the following factors are considered:—*
> *(1) The impact of the proposed withdrawal on other water sources which are*

hydrologically interconnected with the water source from which the withdrawal is to be made;
(2) The anticipated times of year when withdrawals will be made;
(3) The water available within the safe yield of the water source from which the withdrawal is to be made;
(4) Reasonable protection of water uses, land values, investments and enterprises that are dependent on previously allowable withdrawals;
(5) The use to be made of the water proposed to be withdrawn and other existing, presently permitted or projected uses of the water source from which the withdrawal is to be made;
(6) Any water resources management plan for any city or town in which the affected water source is located;
(7) Any state water resources management plan adopted by the commission;
(8) Reasonable conservation practices and measures, consistent with efficient utilization of the water;
(9) Reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, waste assimilation capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture, and flood plains; and
(10) Reasonable economic development and the creation of jobs in the commonwealth."

The word reasonable is used repeatedly in the Act and that principle must carry over into the Framework. Specifically, the Framework must also provide guidance on how competing withdrawals and water uses are to be truly balanced. There should also be language within all permits which provide flexibility in implementation of conditions and associated off-ramps if science or other unanticipated factors brings new information to bear or if results from implementation are determined to be ineffective with respect to intended improvements.

MWWA and EEA spent a lot of time developing a "public water supply metric." It was our expectation that the public water supply metric would be used in a classification system whereby a process would be developed to judge a subbasin's importance from the perspective of water for public health and safety or ecological protection. This metric was apparently rolled into "Acknowledge Existing Water Supply." However, water suppliers are still expected to minimize existing impact when perhaps the subbasins are so valuable for water supply that they should not be expected to do anything but provide for existing human use.

Baseline: While MWWA appreciates that the Framework creates a buffer for water systems with respect to baseline, MWWA has fundamental disagreement with using the baseline as MassDEP has recently defined it (average of 2003-05, 2005 or registered withdrawal, whichever is greater). In all flow levels, water suppliers are already being asked to comply with Conditions 1-8, which among other things requires them to meet the standards of 65/10 and implement water use restrictions. Meeting these conditions in and of themselves is a significant "ask." In Flow-depleted 4 and 5

subbasins water suppliers will also be asked to minimize the impact of their existing withdrawals; therefore, we feel it is unnecessary to benchmark their water use against an arbitrary baseline.

Such benchmarking tends to penalize water systems who have worked diligently and responsibly to conserve water. It does not take into account measurable savings already realized by individual communities whom have long-standing and in some cases, resource intensive conservation programs, or capital investments that systems have made based on their permitted allocation. Nor does it take into account community master planning decisions or economic development considerations that have been made based on permitted volumes. The current proposal also makes no allowance for systems that may have been operating in a different manner during prior time periods, during which they were not aware that their operational choices would be utilized to establish a baseline that affects their ability to make withdrawals in the future. There is also no allowance made for systems that may have had sources offline during the relevant time period. Moreover, for water suppliers with withdrawals in multiple basins, it is unfair to look at the individual basins separately.

MWWA believes baseline benchmarking will have the effect of denying public water systems their permitted volume unless they undertake costly studies and potential mitigation efforts. Furthermore, MGL 21G Section 7, "*(4) Reasonable protection of water uses, land values, investments and enterprises that are dependent on previously allowable withdrawals"* recognizes the protection of water uses that are dependent on previously allowable withdrawals. In keeping with this commitment, we therefore request that increased withdrawals be defined to include only increases above previously permitted volumes.

Transition Rule for Surface Waters: There was limited discussion within the SWMI stakeholder process about surface water. MWWA believes that it is premature to add a transition rule to surface water suppliers until the science is more developed. We recommend a stakeholder group of technical experts be formed to look more closely at this issue before recommending particular action. It should also be noted that MWWA has particular concern about any recommendation regarding releases from surface water reservoirs as the major purpose of a drinking water reservoir is to store water captured in times of plenty so that it is available in times of need. In fact, suppliers are increasingly being challenged with a need to increase their reliability and ability to respond to extreme climate variability including for times of drought and flood. All releases impact the available yield of a surface water system. While some systems may have firm yields above their current needs it would be folly to require that this "excess" volume be released to satisfy environmental desires when it could also be used to support economic growth, jobs, long term planning and water system reliability. Requiring releases without enough information could compromise the system's ability to provide for public health and safety and even reduce biological productivity by compromising the reproductive success of some species vulnerable to "wash-out."

Offset/Mitigation Actions:

MWWA believes that any requirements for offsets/mitigation must include a cost assessment so that implementation ranges are recognized and well understood by regulators and the impacted systems. We are also concerned that the Framework will require implementation of offsets/mitigation prior to the system's exceeding its baseline withdrawal volume. Demand projections forecast by the Department of Conservation and Recreation may never be realized. To require that measures be implemented before baseline volumes are exceeded could impose an unnecessary financial burden on a water system. MWWA suggests that MassDEP require only that a system must develop an offset/mitigation plan the first year in which baseline withdrawal volumes are exceeded, with implementation to occur in subsequent years.

The Framework notes that credits will be considered for measures implemented within the previous 5-year period; MWWA suggests that the timeframe be expanded to credit measures within the past 10 years. For instream flow, if downstream releases from surface waters occur, the release should be the action and the volume or flow rate of release should be the credit. The releases need not be from a water supply reservoir but from any impounded surface water. Groundwater systems should be able to get credit if they can arrange for appropriate surface water. Consideration should also be made for groundwater supplementation (diversion) provided from surcharged watersheds or bedrock aquifers.

On the issue of wastewater returns, credit should be on a gallon-for-gallon basis, with minor adjustments to compensate for the distance from the discharge to the withdrawal point. EPA currently has an aggressive program to deal with water quality related to NPDES discharges, and all indications are that limits are becoming increasingly more stringent. Also, given the linkage with biological impairment, MWWA continues to believe that offset/mitigation measures associated with stormwater/impervious cover improvements, where appropriately captured, could be the most important "credits" that a community can collect. We believe that additional resources and expertise should be explored to capture this potential accurately and sufficiently.

Habitat improvement projects cover a full range of costs and may often be the most beneficial to the rivers. There should be greater credits granted for planned or existing projects. There should also be a category added for "Minimizing Adverse Effects of Local Water Withdrawals," as was outlined the New England Water Works Association/MWWA Toolbox of Best Management Practices. Measures under this category could include: Shifting use of near stream wells during low-flow periods; Using wells upgradient of ponds and lakes; Conjunctive use of multiple supplies within a community; Cooperative resource management; and Alternative supplies.

Outdoor Water Use Restrictions: All permits that have been recently renewed have conditions triggering non-essential water use restrictions on a calendar or streamflow basis. MassDEP assigns stream gages for systems to monitor and abide by; there needs to be a process established whereby a system can petition MassDEP for an alternate gage if it does not believe that the gage assigned reflects conditions at its sources.

Attempts to change residents' behavior are not always accepted. As evidenced by municipal efforts to require private well owners to follow the same water use restrictions that public water supply customers must abide by. For example, the Town of Middleton's private well bylaw was met with strong objection and its Town Meeting subsequently repealed it. MWWA also notes with interest that the testimony given at the Advisory Committee meeting on March 29th by a representative of the Irrigation Association suggested that one-day-per-week watering may have an unintended consequence of encouraging residents to use more water in one-day because they feel they have to get water on their lawns all at once.

Consideration should be made for customized lawn watering programs which may include more sophisticated and automated metering, pricing or individual control system which may prove to be more effective and efficient than day of week restrictions.

Redundant Wells: MWWA strongly supports updating Chapter 4 of the Guidelines and Policies for Public Water Systems to facilitate siting of replacement wells to increase the radius from 250 to 500 feet. We also appreciate that EEA has made provisions for the installation of redundant wells in the Framework. The original proposal that MWWA offered on redundant wells was more comprehensive than the proposal in the Framework, however, and we would like to offer suggestions to improve the Framework and make it more attractive for systems to consider. The idea behind MWWA's proposal was to allow systems greater flexibility in optimizing sources to mitigate potential environmental harm or to address particular public health and safety concerns.

While we understand that Registered only suppliers would receive the greatest benefit from a proposal that would allow for their installation of new sources without being subject to Conditions 1-8 of water management permitting, redundant well permits should be available to all public water systems. Redundant wells should also be allowed in any subbasin in the supplier's service territory and not be limited to those within the same subwatershed (HUC 12). MWWA suggests that EEA remove the sentence "The volume of the withdrawals from the redundant well in combination with existing wells should not exceed the three year rolling annual average of withdrawals from the registered source(s) within the HUC 12. The three year rolling annual average shall be determined based on the three calendar years preceding the date of application for a redundant well."

If EEA would like water suppliers to optimize water withdrawals during the summer, it should be encouraging the development of more sources in to order to spread out the withdrawals. To the extent that the withdrawals are spread out, the local impacts are lessened, (assuming that there is no overall increase in WMA-authorized withdrawal volume). We think that the changes we have suggested above will make this a more attractive alternative for water systems to consider.

Pilot Application of SWMI: MWWA suggested piloting the Framework to assess its implementation in real-world scenarios; we commend EEA for including it as a component within the Framework. We note that the Factors model cannot credibly be used to predict conditions in subbasins without any "ground-truthing" of whether its predictions of what impacts and what will benefit the stream have any factual basis. This analysis should demonstrate sufficient accuracy in the model to justify its use in evaluating impacts and benefits in permitting decisions. Similarly, the piloting is the only timely opportunity to "field test" potential approaches to site-specific studies in order to allow water suppliers to make informed decisions about whether to rely on the model's predictions during permitting or to undertake such site-specific studies instead. For these reasons, a robust piloting program that includes field verification of the impacts and benefits predicted by the model is essential.

Water suppliers (and ultimately their ratepayers), need to be sure that the prediction of a biological category and flow level in a subbasin is reasonably accurate before they are required to undertake measures to minimize or mitigate their alleged impact. In order to improve the scope of the pilot project, MWWA submitted comments to MassDEP on March 12, 2012; we hope that the pilots will include those considerations.

MWWA is concerned with the timeframe and funding for the pilot effort as we understand that capital funds expire at the end of this fiscal year. We do not think that it is appropriate to expect the first phase of the piloting to be done by June 30, 2012. We strongly urge EEA to extend the timeframe and to identify capital funds for the next fiscal year so that regulations are not developed prematurely or in haste. We view the piloting phase as the last opportunity to gain comfort with the science before regulations are issued and applied to water suppliers in ways that are damaging to economic development, our communities' social obligations and water supply, while often forseeably producing little or no environmental benefit.

Incentives: While MWWA appreciates that the Framework speaks to incentives, it makes no guarantee that funds will be available beyond Fiscal Year 2012. The Framework as drafted will have financial impact by requiring water systems to meet conditions 1-8, as well as its minimization and mitigation obligations. If it is a priority of the Patrick Administration to address streamflow and aquatic health concerns, then the administration should invest the same resources to provide assistance to communities to accomplish the goals set forth as it did with the very successful Green Communities Program.

MWWA supports the "Go with the Flow" Program because it provides an opportunity to incentivize good practice in the same way that Green Communities has done on the energy side. In the final Framework, MWWA recommends that EEA make a firm commitment of funds of at least $10 million to fund the "Go with the Flow" Program.

Review by Water Resources Commission:
MWWA also understands that as the Framework moves toward the regulatory phase, regulations that deal with the Water Management Act must go before the Water

Resource Commission for approval. MWWA believes that the duties, responsibilities, structure, powers and purpose of this commission need to be re-evaluated. In creating the Water Resources Commission, the Legislature, through MGL 21A, clearly sought to establish a balanced group to create and guide water policy in Massachusetts. The WRC includes the Secretary of Environmental Affairs (or designee), the Commissioners of the four major state environmental agencies, the Department of Housing and Community Development and five public members representing major water users. The intent was to have different perspectives that could collectively reach consensus on critically important policy and guidance related to water resources.

The WRC, as it exists today, has clearly and significantly deviated from the Legislature's intent. With five agency seats all reporting to the Secretary of EEA and the sixth also part of the Executive Branch of government, any critical votes on important state policy are a lock. The traditional makeup of the "public members" has appeared to ensure a maximum of like-minded individuals. While current public members may be qualified to serve on the WRC, MWWA believes strongly that the makeup of the Commission is lacking some important viewpoints related to water resources, including drinking water, stormwater, wastewater and economic development. It is troubling that a Commission with such authority has had years gone by with vacancies in two of the public member seats, while "designees" for the agency seats are routinely assigned prior to any given meeting thereby assuring the controlling votes in all circumstances.

The WRC should have the role of scrutinizing state water policy and serving as a check against over-reaching (or under-reaching) agendas. It concerns us greatly that the new WMA regulations will go before a Commission that is decidedly unbalanced and in which the public is underrepresented at the present time. MWWA strongly suggests that the WRC be reconfigured as a true stakeholders group to provide some level of oversight of state water policy or that it be eliminated altogether.

Conclusion: It should be recognized that costs for implementation of the future regulations will be borne almost exclusively by ratepayers and taxpayers. In these difficult economic times, communities have very limited resources and water suppliers are facing increasing challenges and obligations to meet essential needs for public health, safety and aging infrastructure. The Water Infrastructure Commission recently concluded that the gap between existing funding for infrastructure improvement and the need over the next 20 years is $10.2 billion dollars; this does not take into account new regulatory mandates such as SWMI. In order to close this gap it is likely that rates will need to double.

As the Framework rolls out, suppliers will be assessing whether the measures they are required to implement will achieve the intended outcome. Feasibility and cost are central components of the Framework which must be well defined. Yet the framework lacks a process for measuring improvement over time. There must be a way to monitor real world progress, not just modeled progress, in order to determine whether the Framework and SWMI itself has been effective. MWWA encourages EEA to

include more concrete definitions about measurable biological (and other) endpoints, cost and feasibility so that expectations will be clear to permitees.

Given major issues with the ability of the USGS/DFW RFFA model to present a reasonably accurate assessment of existing biological conditions on a sub-basin level and the use of this model and biological conditions to inform flow levels and WMA permit conditions, MWWA must insist that the Framework is not ready to roll out. While we would support a full reconsideration of the Framework and the basic assumptions that have lead to its creation and a "back to the drawing board" approach there may be alternatives. For instance:

- Can the Framework be restructured so that the use of RFFA model and biological categories are stricken altogether? Can the Framework be remade into a holistic approach to address flow depletion issues in those limited areas where true flow depletion issues occur and where feasible solutions can be had without sacrificing public health, safety and quality of life of Massachusetts' residents?
- Can the RFFA model approach be refined and explored on a major river basin, rather than statewide, scale? Perhaps some versions of the model might work in some river basins but not in others. Perhaps regional studies would be more informative than statewide assessments but less intensive than local, site-specific studies.

MWWA believes that the problems with the RFFA model approach stem from fish sampling biases that were never fully disclosed to or vetted by the Technical or Advisory Committees coupled with development of a model that generalizes conditions to the point that it is not applicable to any particular location. The model was described as a general screening tool but is not being used in that manner. It describes a Massachusetts landscape that is uniform, where each stream reacts in an identical manner and where all fish respond accordingly. That is not the world we inhabit and that will not help us make informed, cost effective decisions about what we should be doing on a local basis to insure adequate water supplies to meet the needs of people while protecting our water resources. We appreciate the opportunity to comment and would be happy to meet with you to discuss any of our comments in further detail.

Sincerely,

Jennifer A. Pederson
Executive Director