

## EXHIBIT 2

### UBWPAD RESPONSE TO COMMENTS

On March 23, 2007, the United States Environmental Protection Agency began the public comment period for a draft permit for the Upper Blackstone Water Pollution Abatement District (UBWPAD). A public meeting and a public hearing were held in Worcester, MA on May 9, 2007. At the public hearing, EPA extended the public comment period until May 25, 2007. Comments were received from UBWPAD, its consultant Camp Dresser and McKee and its attorneys, as well as from numerous other organizations and individuals. After review of the comments, EPA has determined to issue a final National Pollutant Discharge Elimination System (NPDES) permit for the UBWPAD facility.

The final permit is issued only by EPA. The permittees should contact the Massachusetts Department of Environmental Protection regarding authorization to discharge pursuant to the requirements of the Massachusetts Clean Water Act, as amended, Mass. Gen. Laws ch. 21, §§ 26-53. In addition, EPA has determined that Massachusetts has waived certification pursuant to Section 401(a)(1) of the Clean Water Act (CWA), 33 U.S.C. § 1341(a)(1) and 40 C.F.R. Section 124.53.<sup>1</sup>

The following responses address both written and oral comments provided to EPA during the comment period. Where comments are similar, we have cross-referenced rather than repeated relevant responses. This document also describes changes and clarifications EPA has made to the final permit.

This response is generally organized as follows:

Part A responds to comments from the following individuals and organizations: Massachusetts Department of Fish and Game, Riverways Program; Mark A. Briggs Blackstone River Watershed Council; Trout Unlimited; Mass Audubon; Blackstone River Valley National Heritage Corridor Commission; Blackstone Headwaters Coalition; Stephanie D. Matheny; Blackstone River Watershed Association; Narragansett Bay Estuary Program; Blackstone River Coalition; Rhode Island Bays, Rivers, & Watersheds Coordination Team; Senator Richard T. Moore; Save The Bay; Donald Pryor; Conservation Law Foundation; The Smart Growth Task Force, Bristol, Rhode Island Preserve Bristol; and Jan Reitsma.

Part B addresses comments received from Grace Ross; Tatnuck Brook Watershed Association; and City Councilor Frederick Rushton.

Part C addresses comments from Dr. Mauri S. Pelto.

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<sup>1</sup> The final permit reflects that the permit is issued solely by EPA pursuant to its authority under the CWA. Please note we have modified footnote 4 of the permit which relates to limits for DO, pH range and seasonal fecal coliform to make clear that the limits are consistent with historical state certification requirements and are required by antibacksliding requirements.

Part D responds to comments from the Rhode Island Department of Environmental Management.

Part E responds to comments submitted by the Massachusetts Department of Environmental Protection.

Part F addresses comments received from the Upper Blackstone Pollution Abatement District, including from its technical consultants and legal counsel.

Part G responds to comments received from the following: New England Plating Co., Inc.; Town of Holden; City of Worcester (City Manager); Town of West Boylston; Worcester Regional Chamber of Commerce; City of Worcester (DPW); UBWPAD Board of Directors; Town of Leicester; and Pepe & Hazard

#### **PART A.**

**Comments were received from many organizations and individuals noting the significance of the UBWPAD permit relative to water quality in the Blackstone River and/or Narragansett Bay and expressing support for the nutrient limits in the draft permit. These organizations and individuals include:**

Massachusetts Department of Fish and Game, Riverways Program  
Mark A. Briggs  
Blackstone River Watershed Council  
Trout Unlimited  
Mass Audubon  
Blackstone River Valley National Heritage Corridor Commission  
Blackstone Headwaters Coalition  
Stephanie D. Matheny  
Blackstone River Watershed Association  
Narragansett Bay Estuary Program  
Blackstone River Coalition  
Rhode Island Bays, Rivers, & Watersheds Coordination Team  
Senator Richard T. Moore  
Save The Bay  
Donald Pryor  
Conservation Law Foundation  
The Smart Growth Task Force, Bristol, Rhode Island  
Preserve Bristol  
Jan Reitsma

**Other comments from the above individuals and organizations include the following:**

**Comment #A1:** The Narragansett Bay Estuary Program, and Rhode Island Bays, Rivers,

& Watersheds Coordination Team commented that the available science supports the conclusion that attenuation of nitrogen in the Blackstone River is low.

**Response #A1:** Attenuation is defined as the difference between the amount of nitrogen released to the river and the amount delivered to the mouth of the river. We agree that the available science indicates that the majority of nitrogen discharged from the UBWPAD is delivered to the Providence and Seekonk River system (Upper Narragansett Bay). *See also* Response #F17 below.

**Comment #A2:** Several commenters, including Blackstone River Watershed Council, Trout Unlimited, Blackstone River Valley National Heritage Corridor Commission, Blackstone River Coalition, Stephanie D. Matheny, Senator Moore, Mark A. Briggs, and Save The Bay indicated that compliance with the permit limits should be pursued with urgency. A few specifically commented that the Massachusetts Department of Environmental Protection (MassDEP) proposed schedule (*see* MassDEP Comment #E2) is too long.

**Response #A2:** EPA recognizes the severity of the water quality impacts in the Blackstone River and Upper Narragansett Bay and the contribution of the UBWPAD discharge to these impacts. Consequently, we intend to establish a compliance schedule that is reasonable but that also ensures compliance with the permit limits as soon as possible. We believe that the UBWPAD can achieve compliance with its total nitrogen limit in the same time frame as the Rhode Island facilities, which will expedite the process of assessing the water quality response in Upper Narragansett Bay. *See also* Response #E2.

**Comment #A3:** The Blackstone Headwaters Coalition, Mark A. Briggs, and the Blackstone River Coalition all commented that a phosphorus total maximum daily load (TMDL) for the Blackstone River should be completed but that the current permit limits are necessary and should not wait for the TMDL.

**Response #A3:** Pursuant to 40 CFR §130.7(c), States are required to prepare TMDLs for impaired waters. While we believe that a TMDL can be a useful tool for ensuring that all sources of phosphorus are adequately addressed, EPA has a clear obligation to establish water quality based limits that will ensure attainment of water quality standards even in the absence of a TMDL. In fact, the relevant regulations require that EPA include an effluent limit for any pollutants which EPA determines “are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” 40 CFR §122.44(d)(1)(i). Where a TMDL has been established, EPA is required to ensure that the effluent limits are “consistent with the assumptions and requirements of any available wasteload allocation” applicable to the discharger. 40 CFR §122.44 (d)(1)(vii)(B).

**Comment #A4:** The Riverways Program commented that the infiltration/inflow removal requirements are important to minimize partially treated discharges.

**Response #A4:** We concur that the infiltration/inflow (I/I) removal requirements are important. A large percentage of the annual flow to the UBWPAD is a result of infiltration/inflow in the system. In its NPDES permit re-application, UBWPAD indicated that I/I is approximately 15 million gallons per day. *See* NPDES Permit Application at page 7. Improved control of I/I would minimize discharges that do not receive full treatment and would also reduce energy and chemical use associated with the transport and treatment of the extraneous flow. *See also* Response #F8 below.

**Comment #A5:** The Riverways Program commented that continuous chlorine monitoring is an important addition to protect aquatic life.

**Response #A5:** We agree that continuous chlorine monitoring is an important addition to the permit's monitoring requirements and will help to protect aquatic life by providing instantaneous detection of equipment or operational problems with the disinfection system. We do not believe that the use of grab samples alone to measure chlorine is sufficient where wastewater flow and chlorine demand vary significantly throughout the day. The fluctuation of flow at this facility is of particular concern in light of CSO contributions and the high volume of I/I in the sewer system.

**Comment #A6:** The Riverways Program commented that whole effluent toxicity testing of outfall 001A is appropriate.

**Response #A6:** We concur. Because discharges through outfall 001A will receive only primary treatment and disinfection, whole effluent toxicity testing during periods when outfall 001A is activated is necessary to ensure that the resulting discharge does not have a toxic effect on the receiving water.

**Comment #A7:** Trout Unlimited commented that the permit should address concerns with aluminum toxicity.

**Response #A7:** We agree that aluminum toxicity is a potential concern. The final permit contains a monitoring requirement in order to obtain more information relative to the potential to violate receiving water criteria for aluminum. If the data indicate that there is a reasonable potential to violate receiving water criteria, future permit actions will include an aluminum limit.

**Comment #A8:** The Blackstone Headwaters Coalition and the Blackstone River Coalition commented that the proposed limit of 0.1 mg/l total phosphorus may not be sufficiently low because the upstream water contains some phosphorus. Several commenters (Blackstone Headwaters Coalition, Congressman McGovern, City Councilor Frederick Rushton, John Reed) noted that impoundments should be considered.

**Response #A8:** The calculations assuming zero upstream phosphorus were included to demonstrate that both the limit of 0.75 mg/l in the expired permit or a limit of 0.2 mg/l (as MassDEP has interpreted the "highest and best practicable treatment" requirement in

its standards in the context of certain other permitting decisions) are insufficient to ensure that the downstream concentration of phosphorus does not exceed 0.1 mg/l. Because the available dilution is very small relative to the design flow of the treatment facility, and because the upstream dilution water will contain some phosphorus, we have established the effluent limit at 0.1 mg/l to ensure that the discharge does not cause or contribute to a downstream exceedance of the 0.1 mg/l target.

We agree that downstream sediments may be a source of phosphorus. While the improved treatment required by this permit will have a beneficial effect relative to the accumulation of phosphorus in downstream sediments, we believe that this issue warrants further evaluation upon completion of the treatment upgrades. If sediment sources of phosphorus are demonstrated to be causing or contributing to non-attainment of water quality standards, then either sediment remediation and/or lower permit limits may be pursued. In addition, the permit includes a winter phosphorus limit from November through March to ensure that the higher level of phosphorus discharged in the winter period does not result in the accumulation of phosphorus in downstream sediments. MassDEP has indicated its intent to develop a phosphorus TMDL (*see* Comment #E3 below). A better understanding of the role of downstream sediments should be an important component of any TMDL effort.

**Comment #A9:** The Blackstone River Coalition, Save The Bay, Conservation Law Foundation, and Stephanie D. Matheny all commented that cost is not an appropriate basis for establishing permit limits. Save The Bay also commented that the limits do not represent an unfair and disproportionate burden to sewer ratepayers. Donald Pryor commented that water and sewer costs in Worcester are a lower percentage of median household income than costs in Rhode Island. Mass Audubon noted that the costs of the current upgrade are primarily to address CSO issues rather than nutrient reduction and that, while we do need to be mindful of Worcester's sewer fees, we also need to note that other communities are doing more than their share to improve water quality by paying \$750 million to address CSO issues. Mark A. Briggs commented that necessary funding to bring the facility up to current standards must be supplemented from sources beyond Worcester and the Blackstone Valley. The Blackstone River Valley National Heritage Corridor Commission commented that a number of downstream communities are strenuously working to achieve higher water quality standards and that the UBWPAD also must achieve improved water quality discharge.

**Response #A9:** We agree that cost and technological considerations are not appropriate factors to consider in establishing water quality-based effluent limits. *United States Steel Corp. v. Train*, 556 F.2d 822, 838 (7<sup>th</sup> Cir. 1977); *see also In re City of Moscow*, 10 E.A.D. 135, 168 (EAB 2001). We also recognize, however, that the improvements necessary to meet the new permit limits will result in sewer rate increases. As discussed earlier, if a permittee cannot immediately meet new water quality-based limits because of the need to design and construct additional treatment facilities, EPA may establish a compliance schedule, which we intend to do for this discharge (*see* Response #A2).

State regulations also include provisions for allowing a revision or variance from water quality standards under specific conditions. One of the conditions is if the cost of controls necessary to attain the existing water quality standards would result in widespread economic and social impact. If such a condition were shown to exist, relief could be granted through a revision or variance to water quality standards (*see* Massachusetts Surface Water Quality Standards, 314 CMR 4.03(4); Rhode Island Water Quality Regulations, Rules 19 and 20. *See also* EPA's Use Attainability Analysis regulations at 40 CFR §131.10(g) and Interim Economic Guidance for Water Quality Standards, March 1995.

For additional discussion regarding evaluation of cost impacts in the context of setting water-quality based effluent limitations, *see* Responses #F1, #F2 and #F4 below.

**Comment #A10:** The Conservation Law Foundation (CLF) commented that the warm weather total nitrogen limit should be no higher than 3 mg/l (limit of technology as defined by Rhode Island Department of Environmental Management) and that the warm weather total phosphorus limit should be no higher than 0.1 mg/l. CLF further indicated that the permit must quantify any further contribution of nitrogen and phosphorus to the present water quality standards violations and must include further conditions and limitations designed to ensure that there is no remaining contribution from the UBWPAD to the violations. CLF commented that such additional conditions and limitations should be an offset to known discharges from the plant.

**Response #A10:** While RIDEM's nitrogen reduction analysis (referenced in the comment) suggests that permit limits for nitrogen based on the limit of technology may be necessary to achieve water quality standards, there are uncertainties associated with use of a physical model such as the MERL tank experiments. As noted in the Fact Sheet and further detailed in this response to comments, the MERL tank experiments cannot completely simulate the response of chlorophyll *a* and dissolved oxygen to nitrogen loadings in a complex, natural setting such as the Upper Narragansett Bay. These differences may overestimate the impact that a given nitrogen load would have on the Seekonk and Providence River system. *See* Response #F18A. Consequently, we believe that the significant nitrogen reductions required by the permit, as well as other permits in the watershed, are consistent with achieving water quality standards. Further limitations (including offsets) are not warranted at this time. We also recognize the importance of monitoring the receiving water response to these nitrogen reductions; as noted in the Fact Sheet at page 14, RIDEM has, in partnership with several research and academic institutions in Rhode Island, established an extensive monitoring network in order to provide the data necessary to evaluate compliance with water quality standards upon implementation of the recommended nitrogen reductions. If warranted, further reductions will be required.

The final permit includes a phosphorus limit of 0.1 mg/l. We concur it cannot be higher and ensure attainment of water quality standards. The phosphorus limit in the permit is based on an analysis of the limit necessary to achieve water quality standards. It is not a

technology-based limit nor does it reflect the limits of available technology. Available technology is capable of achieving phosphorus limits lower than 0.1 mg/l.

**Comment #A11:** CLF commented that, in addition to the currently documented dissolved oxygen stress in Narragansett Bay, the NPDES permit should consider the added impacts that will result from global warming over the life of the permit. CLF argues that this supports that no higher TN limit than that technically achievable should be permitted.

**Response #A11:** We agree that this is a concern that needs further consideration in the future. While temperature changes in Narragansett Bay are expected to be small over the life of this permit (five years), increasing temperatures are a significant concern over the longer term. EPA will work with RIDEM to ensure that the post nitrogen reduction monitoring and evaluation effort includes consideration of the effects of global warming on water quality standards attainment.

**Comment #A12:** CLF commented that the seasonal CBOD of 10 mg/l should be required year round. Acknowledging that the 10 mg/l limit is of maximum benefit in the warm months, CLF comments that the River system should benefit year-round from UBWPAD's investment to achieve 10 mg/l.

**Response #A12:** Treatment plants designed to meet a CBOD limit in the summer period may not be able to meet the same limit in the winter period due to the effects of colder temperatures on treatment efficiencies. In addition, the dissolved oxygen waste load allocation used to establish the effluent limits for CBOD in both the previous permit and this reissued permit indicates that minimum dissolved oxygen criteria will be met in the receiving water during the winter period. (Note that the CBOD limits are the same in the expired permit and this reissued permit).

**Comment #A13:** CLF commented that the limited flushing capacity of this system, combined with the persistence of phosphorus and nitrogen in the system, warrant consideration of year round application of nutrient controls.

**Response #A13:** In typical wastewater treatment plant effluent, both phosphorus and nitrogen are present in the dissolved phase. Typical effluent also includes particulate phosphorus, but very little particulate nitrogen. The predominate form of nitrogen in municipal wastewater discharges is dissolved inorganic nitrogen (primarily ammonia, nitrite and nitrate). Also, dissolved inorganic N forms, especially nitrite and nitrate, are highly soluble and do not precipitate easily or sediment out when freshwater enters the brackish zone of estuaries as inorganic P is likely to do. *See Nutrient Criteria Technical Guidance Manual, Estuarine and Coastal Marine Waters (EPA-822-B-01-003, October 2001).*

The RIDEM nitrogen reduction analysis and supporting scientific documentation indicates that the winter contribution is not significant. *See, e.g., RIDEM Response to Comments on Total Nitrogen Permit Modifications, June 27, 2005, page 26.* However,

in light of the uncertainties with the fate and transport of winter contributions of nitrogen through the system and the potential that these contributions will add to the pool of nitrogen available during critical periods, the permit requires that UBWPAD optimize the treatment facilities in the winter period in order to minimize the potential for higher winter loadings to prevent attainment of water quality standards.

For phosphorus, we agree that there is a significant potential for particulate phosphorus loadings to settle and accumulate in downstream impoundments during non-growing seasons and to contribute to impairments in the Blackstone River during the summer growing period. Consequently, the permit includes a winter phosphorus limit of 1.0 mg/l to ensure that the particulate fraction of the phosphorus is removed prior to discharge to the River. The limit assumes that the vast majority of the phosphorus discharged will be in the dissolved fraction and that dissolved phosphorus will pass through the system and not accumulate in the sediments. The limitation is higher than the seasonal limit of 0.1 mg/l because EPA has assumed, based on experience with other treatment facilities, that achieving a limit of 1.0 mg/l will result in the removal of the majority of the particulate fraction of phosphorus in the discharge. For instance, water quality surveys conducted in the Assabet River indicate that 90% of the total phosphorus in the discharge of four wastewater treatment facilities was in the dissolved form. *See Assabet River TMDL for Total Phosphorus, Report Number: MA82B-01-2004-01.* To verify the dissolved fraction of phosphorus discharged, a dissolved orthophosphorus monitoring requirement is included in the permit; if water quality monitoring indicates that it is accumulating, then lower winter limits will be required in the future.

**Comment #A14:** The Blackstone River Watershed Council commented that EPA “should re-invest its efforts to forge a watershed-wide planning team and enable this team to engage both RIDEM and MADEP (and their legislators) to sync the actions to be taken to invest and improve upon the whole watershed. Whether it’s the planning for a ‘river wide’ TMDL, fish passage planning and implementation strategies, bike path connections, or standardized NPDES permits to limit nutrients and other impairments, we believe EPA needs to play a larger role.” Several other commenters noted the importance of coordinated efforts to improve water quality in the River and watershed.

**Response #A14:** EPA will continue to support the Blackstone River Watershed Council/Friends of the Blackstone and its partner, the Blackstone River Coalition, in their many efforts to bring about improvements along the Blackstone. EPA, RIDEM, MassDEP and the watershed organizations all play important roles in protecting and improving water quality in the Blackstone River watershed. We agree that coordination of efforts is important. Currently, EPA is working closely with both MassDEP and RIDEM to ensure that we address nutrient discharges from municipal treatment plants in a coordinated fashion. We intend to continue to play an active role in this and other issues related to improvement of the watershed.



## **PART B.**

**Some commenters (including Grace Ross, Tatnuck Brook Watershed Association, and City Councilor Frederick Rushton) focused on alternatives to the low nutrient limits.**

**Comment #B1:** Wastewater source reductions (phosphate free detergents and alternative chemicals for copper control in the water supply) and non-point source reductions (organic lawn care and other storm water controls) should be pursued instead of another expensive upgrade.

**Response #B1:** Regarding the attainment of the new water quality-based effluent limitations for UBWPAD, the Clean Water Act (CWA) and EPA's regulations do not dictate the method by which UBWPAD must meet the new water quality-based effluent limits. While the suggested source controls would have positive benefits and we encourage the permittee to pursue them, they would not be sufficient to achieve the necessary effluent limits. The commenters' suggested source controls for phosphorus would have the benefit of reducing phosphorus in the influent, which should reduce the chemicals and energy used to treat for phosphorus. However, there is a significant amount of phosphorus that is inherent to human waste and will not be affected by source controls. The level of treatment to be provided in the current upgrade is not sufficient to meet the permit limits, even with a significant reduction in the influent concentration of phosphorus from other sources.

While efforts to reduce non-point sources of phosphorus and nitrogen are encouraged and would have beneficial effects, the available science indicates that the significant majority of the total phosphorus loads to the Blackstone River (*see* Reports cited in the Fact Sheet at page 8) and of the total nitrogen loads to Narragansett Bay (*see* Response #F40 below) are from point sources. Even a high level of non-point source nutrient reductions would not preclude the need for significant point source reductions. *See also* Response #C1 below.

**Several commenters in addition to UBWPAD (including elected officials, representatives of organizations and members of the public) expressed concern as to the lack of funding to meet the new permit limits. With regard to cost considerations in establishment of water quality-based effluent limits, please see Response #A9. Some suggested that the new permit limits represent an unfunded mandate.**

**Comment #B2:** The need to comply with the limits is an unfunded mandate.

**Response #B2:** We interpret the reference to "unfunded mandates" as a reference to the requirements of the Unfunded Mandate Reform Act of 1995 (UMRA). The UMRA, however, is inapplicable to this permitting action. The UMRA applies to rulemaking, and not individual NPDES permit decisions. For example, in *In re City of Blackfoot Wastewater Treatment Facility*, NPDES Appeal No. 00-32 (EAB September 17, 2001)

the Environmental Appeals Board denied a petition for review of compliance with UMRA on grounds that UMRA applies only to regulations, not to individual NPDES permits, which are more akin to licenses than a regulation.

In addition, EPA helps to finance the cost of treatment needed to achieve compliance with the Clean Water Act through the Clean Water Act State Revolving Fund (SRF). Through the SRF program, Massachusetts maintains revolving loan funds to provide low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the SRF program are provided through federal government grants and state matching funds (equal to 20% of federal government grants). EPA has provided Massachusetts with a total of \$956,861,571 in Clean Water Act SRF grant funds for the period from 1989 through July, 2008.

### **PART C.**

**Comments were received from Dr. Mauri S. Pelto, Department of Environmental Science, Nichols College on May 24, 2007. Dr. Pelto's letter, in its entirety, is included below:**

**Comment #C1:** The goal of everyone is to achieve a clean Blackstone River by 2015. I have spent seven years working with the BRC (Blackstone River Coalition), BHC (Blackstone Headwaters Coalition), and BRWA (Blackstone River Watershed Association) to setup a system to monitor the water quality and quantity of the Blackstone River Watershed. My role with the BRC has been to establish rating curves at monitoring stations in all significant tributaries to the Blackstone River in Massachusetts. On the second Saturday of each month from April-November, the BRC volunteers and coordinators collect data from throughout the watershed. Through use of the rating curves established by myself, discharge is also determined at many of the locations. Availability of discharge data allows determination of phosphorus load, or more appropriately the mass balance, in the system on a given day based on the measured concentrations. These data fill a key gap in data collected by the DEP and EPA, which have not routinely monitored tributaries to the Blackstone.

One key to achieving a healthy Blackstone River is to minimize the tremendous load of nutrients in the river. The question is how best to do this, given the limited monetary resources that can be allocated. I feel that informed management decisions cannot be made until we attempt to determine the mass balance of phosphorous in this watershed. Data collected by the BRWA provide the ability to do this for select days, although a more continuous mass balance would be ideal. The latter can only be provided by a model, tested against the field data.

I have developed a mass balance for the watershed based on orthophosphate concentrations and discharge measured by the BRWA in 2005 and 2006. These data provide a conservative (low) estimate for total phosphorous loading from the tributaries at the time of measurement as other forms of phosphorus are not accounted for. In addition, not all tributaries are monitored every month, thus additional loading can be

expected from unmonitored tributaries. I was careful to include only non-redundant measurements, that is not utilizing an upstream station and a downstream measurement station that is fed by that upstream station. Values were utilized from either Middle River or Leesville Outflow for the Worcester Headwaters. The main stem tributaries utilized include the Mumford River, West River, Mill River, Mill Brook, Emerson Brook, Cold Spring Brook, Peters River, Quinsigamond River Singletary Brook and Broad Meadow Brook. In each case, the most downstream station for which data were available was used. Data for all of the above noted stations were only available during one month. Thus, as noted above, the measured load in kg/day is conservative because of the use of orthophosphate measurements and the lack of completely comprehensive data.

The attached file has the loading data for 2005 and 2006 measured by BRC and that discharged by waste water treatment plants along the river. Treatment plant load data were provided by Paula Rees, from UMass, based on data acquired from the plants to facilitate their model development at UMass. Data for plants other than the Upper Blackstone plant are not yet available for 2006. Tributary loading has been compared to discharge from the Upper Blackstone plant on two figures, one for 2005 (Figure 1) and one for 2006 (Figure 2). Note that on figures 1 and 2, there are two values presented for the phosphorous load emitted from the Upper Blackstone plant on each date (provided by Dr. Rees), in addition to the load monitored in the tributaries, based on the BRWA data. The first plant load estimate is based on the observed plant effluent discharge and total phosphorus concentration for the given day. The second plant load estimate is based on the observed plant effluent discharge and a total phosphorus concentration of 0.6 mg/L total phosphorus. The concentration of 0.6 mg/L is the target total phosphorus concentration the on-going construction at the plant is designed to meet (or 80% of the allowed limit of 0.75 mg/L). It is conservatively assumed that all of the total phosphorus is actually dissolved orthophosphorus. Additional figures (not numbered) compare tributary loading against loading from other treatment plants along the river in addition to the Upper Blackstone. In these figures, a third estimate of load from the Upper Blackstone has been added. This load is based on the observed plant effluent discharge and a total phosphorus concentration of 0.09 mg/L, or 90% of the proposed future total phosphorus limit for the plant. Load estimates for both the on-going construction and proposed limit were also provided by Dr. Rees.

The data suggest that the main source of phosphorous after the current upgrades are in place will not be from the Upper Blackstone waste water treatment facility. It is also worth noting that the current loading from the treatment plant is typically of the same magnitude as the conservative measure of phosphorous loadings from the tributaries feeding the Blackstone River. This leads me to several conclusions;

1. I have spent more than 300 different days in our streams, and seen countless examples of cappuccino colored brooks indicating the substantial nutrient loading and turbidity issues of our brooks feeding the Blackstone River.
2. That after the current upgrades with respect to phosphorous, Upper Blackstone's output except during low water events, will be much smaller than contributions from the basin's non-point sources. This needs our attention.

3. That support of BRC-BRWA-BHC is providing us with the data to identify these problems specifically and through their advocacy to try to address them.
4. These preliminary investigations indicate the value that can be gleaned from this system of volunteer monitoring and professional coordination. This system needs to be further supported to enhance the data, and to provide a better answer to the TMDL question for the Blackstone River Watershed, sooner rather than in 2013.
5. This field data in combination with the UMASS model can provide us with a preliminary understanding of the phosphorous mass balance of the watershed, that in turn would allow quantitative determination of the best management practices to reduce nutrient loading.

As noted in a letter from the BRC, by Donna Williams, "DEP also calls for a TMDL for Phosphorous to be performed for the Blackstone by 2013. The BRC supports the development of TMDLs for nutrients on the Blackstone, however the TMDL should be completed as soon as possible. It could, in fact, indicate the need for even stricter limits." The BRC, through its tireless efforts, has acquired the resources and the data to provide a preliminary answer to this question and spurs us to do more. This organization is invaluable in addressing this question today and in the future and spreading solutions in the communities through its advocacy.

I look forward to continuing to work with the many people and organizations seeking to clean the Blackstone River and seeing the results with my own eyes, in clearer water.

**Response #C1:** We commend the efforts of organizations such as the Blackstone River Coalition and volunteers to monitor water quality and to improve the Blackstone River and its watershed.

The analysis provided is difficult to review given the lack of supporting information. Flow and concentration data, sampling locations, and precipitation information are not provided. Key to the loading estimates are the rating curves for estimating flow, but no information is provided as to how the rating curves were developed or how well they calibrate to data from USGS permanent gage sites.

In addition, most of the data provided is not from low flow conditions. The only data set in 2005 from typical low flow periods was the July data set and it rained 2.5 inches the day before the sampling. In 2006 there were only two data sets from typical low flow periods (July and September) and the non-point source loadings during July and September were much lower than at other times of the year.

The permit limits are established to meet water quality criteria under 7Q10 low flow conditions. Under these conditions, non-point sources are minimal and controlling the point source discharges is critical. Under 7Q10 conditions, point sources will continue to be the dominant source of phosphorus loadings even after the current upgrade is completed. However, on an annual basis, loadings from non-point sources are significant and are an issue that warrants further attention, especially to the extent that these loadings may accumulate in downstream impoundments. The storm water permits issued to most

communities in the Blackstone River watershed will help address the non-point sources but more targeted Best Management Practices (BMPs) in future storm water permits will likely be necessary. We agree with the commenter's statement that the usefulness of this type of data is to help allow a quantitative determination of BMPs.

#### **PART D.**

**Comments were received from the Rhode Island Department of Environmental Management (RIDEM) in a letter dated May 18, 2007. RIDEM noted the significance of the UBWPAD permit relative to water quality in the Blackstone River and Narragansett Bay and expressed support for the nutrient limits in the draft permit. RIDEM also commented that the available science supports the conclusion that attenuation of nitrogen in the Blackstone River is low and urged EPA to ensure the expeditious implementation of WWTF modifications. (See Responses #A2 and #E2 relative to a compliance schedule). Other specific comments are as follows:**

**Comment #D1:** The assumption that the concentration of metals in the upstream water is zero is not reflective of actual conditions and when coupled with allocation of the entire criteria, results in permit limits that cause violations of the downstream Rhode Island Water Quality Standards. Copper, zinc, and cadmium criteria at the state line, based on a hardness value of 50 ug/l which RIDEM has determined is appropriate for the Rhode Island portion of the Blackstone River, would be exceeded by 18%, 16%, and 5% respectively.

In addition, the Fact Sheet indicates that MassDEP has submitted revised site-specific water quality criteria for dissolved copper of 18.1 ug/l chronic and 25.7 ug/l acute. The Fact Sheet further indicates that if EPA approves these criteria, the limits in the final permit will be based on the revised criteria, the available dilution at 7Q10 flow, and the upstream concentration of copper under low flow conditions. Using these new criteria and EPA's monthly average permit limit calculation procedures, the copper concentration at the state line will be 17.6 ug/l, or 241% over the Rhode Island criteria of 5.2 ug/l. RIDEM strongly objects to establishment of permit limits using the site-specific criteria. The metals limits in the draft permit must ensure that Rhode Island water quality criteria will be met at the state line.

**Response #D1:** The assumption of pollution concentrations of zero above the UBWPAD discharge has a minor effect on the calculations because the UBWPAD discharge reflects over 90% of the receiving stream flow at the point of the discharge. In addition, the Rhode Island analysis of in-stream metals concentrations indicating exceedances of the Rhode Island criteria at the state line assumes that metals are 100% conservative in the water column. However the river flows for approximately 28 miles from the UBWPAD discharge to the state line. Analyses of metals in the receiving water conducted under near 7Q10 flow conditions indicate that there is a significant reduction in metals concentration and loads from the UBWPAD discharge to the state line. The average results for two low flow surveys – conducted in July and August 2001 – indicate that the

reduction in copper loading between the UBWPAD discharge and the state line is approximately 20%. The surveys showed an average reduction of cadmium of approximately 52%. Zinc was not included in these analyses. (The data from these surveys can be found in the Blackstone River Initiative, May 2001). These reductions were measured notwithstanding other point source discharges downstream from the UBWPAD facility. Taking into account the reduction of metals concentrations as the discharge flows downstream, we believe that the metals limits in the permit are sufficient to ensure that Rhode Island water quality standards are met at the state line.

With regard to the new Massachusetts site-specific criteria for copper, we concur that a significant increase in the draft permit limit based on the recently approved Massachusetts site-specific criteria would result in a reasonable potential to exceed the Rhode Island criteria at the state line. The revised chronic criterion for dissolved copper is 18.1 ug/l and the revised acute criterion for dissolved copper is 25.7 ug/l. Using a dilution factor of 1.1 (*see* Attachment B to the Fact Sheet), the new criteria would result in the following limits:

Monthly Average Limit = (chronic criterion) (dilution factor) = (18.1 ug/l)(1.1) = 19.9 ug/l

Daily Maximum Limit = (acute criterion) (dilution factor) = (25.7 ug/l)(1.1) = 28.3 ug/l

Even accounting for an approximate 20% reduction of copper concentration as the discharge flows downstream, it appears that copper concentrations would be well in excess of the Rhode Island water quality standard for copper of 5.2 ug/l at the state line. Accordingly, the final permit limits for copper are the same as in the draft permit. We note, however, that Rhode Island has also been evaluating development of a site-specific water quality criteria for copper. If such criteria are adopted by the State and approved by EPA, it may be appropriate to evaluate a modification of the copper limit.

**Comment #D2:** EPA should utilize effluent data collected as part of the bioassay testing to determine whether reasonable potential exists for the UBWPAD facility to cause or contribute to water quality violations for additional pollutants. Since EPA does not enter pollutant data collected as part of the bioassay testing into ICIS, RIDEM was unable to evaluate reasonable potential for the following pollutants: Chromium, lead, nickel and aluminum. At a minimum, based on typical lead levels seen in effluent from Rhode Island waste water treatment facilities, it appears that the UBWPAD would have "reasonable potential" for lead and therefore would require lead limits. To ensure that bioassay pollutant monitoring data is readily available for review, RIDEM requests that EPA list the pollutants monitored during the bioassay testing in Part I.A.1 of the permit.

**Response #D2:** We reviewed the bioassay reports from 2005 and 2006. The effluent chromium data are all below detection levels (detection levels ranged from 5 – 10 ug/l) and well below the applicable ambient criteria values in state standards. The effluent nickel data ranged from 5 – 20 ug/l which also is well below ambient criteria values. The effluent lead data are all below detection levels (detection levels ranged from 5 – 10 ug/l). However, the detection levels are higher than the ambient criteria values. Consequently,