

**BEFORE THE ENVIRONMENTAL APPEALS BOARD  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C.**

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ENVIR. APPEALS BOARD

**In re:**

**BARNHARDT MANUFACTURING COMPANY  
NPDES Permit No. MA0003697  
Colrain, Massachusetts**

**Exhibits**

- Exhibit A     Copy of Barnhardt's comment letter from its expert consultant, Cushing, Jammallo and Wheeler, Inc., dated May 14, 2010.
- Exhibit B     State's Water Quality Certification to the Region dated September 28, 2010.
- Exhibit C     Internal State E-mail (from John Fiorentino (DEP) to Paul Hogan (DEP)), dated February 14, 2006.
- Exhibit D     State's Deerfield River Watershed 2005 Benthic Macroinvertebrate Assessment, dated February 2009.
- Exhibit E     State Implementation Policy for Mixing Zones, January 8, 1993.

# CUSHING, JAMMALLO & WHEELER, INC.

May 14, 2010  
File No. 5236

Nicole Kowalski  
U. S. Environmental Protection Agency  
Office of Ecosystem Protection  
Five Post Office Square-Suite 100 (OEP06-4)  
Boston, Massachusetts 02109-3912

**Re: Comments on Draft NPDES Permit  
Barnhardt Manufacturing Company  
247 Main Road, Colrain, Massachusetts 01340  
NPDES Permit No. MA0003697**

Dear Ms. Kowalski:

Cushing, Jammallo & Wheeler, Inc. (CJW) has prepared this letter providing comments on behalf of Barnhardt Manufacturing Company, 247 Main Road, Colrain, Massachusetts (Barnhardt) on the draft National Pollution Discharge Elimination System (NPDES) permit No. MA0003697 issued to Barnhardt Manufacturing Company, 247 Main Road, Colrain, Massachusetts on April 14, 2010. This draft permit was prepared by the United States Environmental Protection Agency (USEPA) with the cooperation of the Massachusetts Department of Environmental Protection (MA DEP).

These comments have been provided to USEPA via email to Nicole Kowalski on May 14, 2010 as agreed in a telephone conversation between Ms. Kowalski and Richard Cushing of CJW on May 12, 2010. A hard copy of these comments has been forwarded to USEPA and MA DEP by U.S. Mail.

## BACKGROUND

The Barnhardt Manufacturing facility is located at 247 Main Road in Colrain, Massachusetts employing 47 people representing the largest employer in the Town of Colrain. The Barnhardt facility is involved in the cleaning and hydrogen peroxide bleaching of cotton fiber and as such generates waste water associated with its manufacturing operations but also includes the sanitary wastes from approximately 22 homes in the immediate vicinity of the manufacturing facility.

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## **COMMENTS FROM BARNHARDT MANUFACTURING COMPANY**

Comments of the draft NPDES permit are separated by issue and are discussed in the order in which they appear in the draft permit.

### **1. Reduction in Permitted Flow Volume**

The 2001 NPDES permit included a limitation on effluent flow of 1.35 million gallons per day (MGD). The draft permit includes a limitation on effluent flow of 0.89 MGD. Barnhardt acknowledges that effluent flow from current operations has been significantly less than the 0.89 MGD contained in the draft permit. However, if the Barnhardt facility were to increase its operating level at the facility, the potential increase in waste water generated may approach or exceed the draft permit amount. Barnhardt requests that the flow limitation be returned to the 1.35 MGD contained in the 2001 permit.

### **2. Justification for Reduced BOD<sub>5</sub> Limit**

The 2001 NPDES permit included an average monthly limit for BOD<sub>5</sub> of 323 pounds per day. The draft permit includes an average monthly limit of 300 pounds per day. Barnhardt has had one test in excess of the new 300 pounds per day limit. Barnhardt views this new limit as a reduction that could lead to an exceedance of a permit limitation. Since Barnhardt has not modified any of its treatment works that would lead to enhanced performance for BOD<sub>5</sub>, we do not believe that there is any justification for changing the limitation. Barnhardt requests that the limitation be returned to the 323 pounds per day contained in the 2001 permit.

### **3. Justification for Reduced TSS Limit**

The 2001 NPDES permit included an average monthly limit for TSS of 350 pounds per day. The draft permit includes an average monthly limit of 250 pounds per day. Barnhardt views this new limit as a reduction that could lead to an exceedance of a permit limitation. Since Barnhardt has not modified any of its treatment works that would lead to enhanced performance for TSS, we do not believe that there is any justification for changing the limitation. Barnhardt requests that the limitation be returned to the 350 pounds per day contained in the 2001 permit.

### **4. Total Chromium Limitation**

In the past, Barnhardt conducted extensive testing for Total Chromium concentrations in the facility effluent. This testing requirement was suspended by USEPA approximately four years ago. Barnhardt believes that the level of testing is sufficient to demonstrate that the presence of chromium in the facility effluent does not have an impact on the

receiving waters. Barnhardt requests that the requirement for testing total chromium be dropped from the final NPDES permit.

## **5. Whole Effluent Toxicity**

The draft permit contains an discharge limitation for Whole Effluent Toxicity (WET) that includes an acute LC50 of 100%.

### **Summary of Previously Proposed Limits**

Barnhardt's position relative to the limitation for Whole Effluent Toxicity was outlined in a series of letters from BBA Fiberweb to the MA DEP in March of 2005 and to USEPA in November of 2005. CJW has reproduced salient parts of the 2005 texts and request that USEPA and MA DEP consider the alternative approach presented in the letters. Excerpts of from the letters are presented below.

Taken from a letter from BBA Fiberweb (predecessor to Barnhardt Manufacturing Company) to Mr. David Pincumbe, USEPA dated November 30, 2005

"BBA believes that total dissolved solids (TDS) in this effluent are the most significant contributor to the toxicity issue. The TDS levels in the effluent have varied between approximately 1,800 and 3,800 mg/L. BBA has already taken proactive, constructive steps to mitigate acute toxicity that might be related to effluent TDS by modifying the effluent neutralization process. The primary source of TDS is from sodium hydroxide used to elevate the pH during the cotton bleaching process. Previously, the elevated pH bleaching effluent was neutralized with sulfuric acid prior to treatment in the activated sludge process. To minimize the impact of TDS, BBA modified the neutralization process to take advantage of carbon dioxide from the boiler flue gas as a replacement for most of the sulfuric acid demand. Sulfuric acid use has dropped by 75 percent since that change was made and the effluent TDS has decreased accordingly. However, the residual TDS remains at a level that, by itself, could result in a 50 percent mortality effect on test organisms in an acute toxicity test.

The attached Figure 1 illustrates the TDS concentrations measured in the 40 toxicity tests accomplished by BBA since June 2001. Note that only 18 of the tests were for compliance and the other 22 were accomplished at BBA's direction in efforts to investigate and understand the source of the toxicity issue. Two points should be observed in the data plotted in Figure 1. First, the general decreasing trend line of the data demonstrates that BBA has made progress in their efforts to reduce the TDS

present in the discharge. The second point is that the level of TDS in these toxicity tests has averaged 3,026 mg/L.

BBA believes that this circumstance of elevated TDS in a discharge into Massachusetts fresh waters is a relatively rare situation that justifies an individualized approach to its resolution. In a March, 2005, letter to Mr. Paul Hogan of the MA DEP, BBA proposed to use the COMIX model to define an acceptable mixing zone for the discharge in the North River, in accordance with the Massachusetts surface water quality standards (314 CMR 4.03(2)). Several technical publications that describe toxic effects due solely to ionic constituents were cited and attached to that letter. The publications make the point that toxicity due solely to TDS is less of a regulatory problem because of rapid dilution to below toxic levels and because these constituents do not present a bioaccumulation problem and have no human health impacts. BBA still believes that this mixing zone approach would be a proper response and would result in acute toxicity tests being accomplished at dilutions less than the 100 percent effluent currently used. Dilution in the toxicity tests that accurately reflect dilutions actually occurring in the receiving water would represent a more realistic test condition.”

Additional documentation supporting the use of a mixing zone was presented in a letter from RMT Consulting Engineers to Paul Hogan of MA DEP in a letter dated March 29, 2005. Excerpts from this letter are presented below.

BBA is proposing to conduct a computer-based dispersion/mixing model and use the results to quantify a “mixing zone” for BBA’s discharge. If use of a mixing zone is granted in the permit, the effect will be to change the permit test condition for acute toxicity from 100 percent effluent to a lower concentration because of the dilution afforded in the mixing zone.

The requirement for aquatic organisms to be able to live in 100 percent effluent, or to be able to live within BBA’s discharge pipe, is not a realistic requirement because that condition does not physically exist at any point in the North River. BBA’s discharge pipe is not in the river. Instead, BBA’s discharge exits the discharge pipe and has a freefall of several feet before impacting the river. The effluent receives immediate mixing upon contact with the receiving stream. There is no evidence that BBA’s effluent causes any of the deleterious effects that would prevent a mixing zone from being implemented.

According to United States Environmental Protection Agency's (USEPA's) *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/3-90-001), "it is not always necessary to meet all water quality criteria *within the discharge pipe* to protect the integrity of the water body as a whole. Sometimes it is appropriate to allow for ambient concentrations above the Criteria in small areas near the outfalls. These areas are called mixing zones".

The Massachusetts surface water quality standards (314 CMR 4.03(2)) allow incorporation of a mixing zone in NPDES permits, with certain qualifications. Based on a review of those qualifications, it appears that BBA can justify the use of a mixing zone for Outfall 004. A mixing zone is an area within a receiving stream where a discharged effluent undergoes initial dilution. Water quality criteria *can be exceeded* within that mixing zone as long as the wastewater does not interfere with migration or free movement of fish or other aquatic life, no nuisance conditions are created, and pollutants do not accumulate in the sediments or within the biota in toxic amounts.

RMT has successfully used the currently accepted mixing model, the Cornell Mixing Zone Expert System (CORMIX), to assess the impacts of the discharges into various receiving streams. CORMIX is a USEPA-approved software system (USEPA 1991, USEPA 1991B, and Jirka 1992) for the analysis, prediction, and design of aqueous discharges into diverse water bodies. The model can simulate BBA's discharge into the North River and will model the plume centerline, plume width and depth, and centerline dilution as the plume moves down river. This information can be used to determine the size of an acceptable mixing zone.

If a mixing zone is developed for BBA's discharge, the effect would be to change the concentration of effluent on which acute toxicity test is conducted. That concentration will be lower than the current 100 percent effluent and the diluted sample will have a much higher probability of passing the LC 50 requirement. The amount of dilution that might be allowed for the toxicity test will depend on the size of the mixing zone justified by the model. Since the permitted discharge is 1.35 mgd (2001 NPDES permit), the 7Q10 flow rate of the North River is 5 mgd, the *maximum* dilution that could be obtained would be 21 percent. That means that BBA could have no more than 50 percent mortality of *Ceriodaphnia dubia* in a sample that was 21 percent BBA effluent and 79 percent dilution water. However, it is unknown if the COMIX model would support a dilution at that ideal maximum value. The mixing zone modeling will likely suggest that acute toxicity tests conducted at some

immediate dilution, between 21 and 100 percent BBA effluent, will best characterize BBA's mixing within the North River.

Barnhardt's position for controlling toxicity has not changed since presenting these recommendations in 2005. Barnhardt requests that the toxicity requirement in the draft NPDES permit be modified to incorporate the use of a mixing zone.

#### **Alternative Approaches for Controlling Toxicity**

In addition to the approach recommended in the BBA Fiberweb letter, Barnhardt presents the further supporting information that previous biological studies conducted by MA DEP does not indicate the presence of any in stream toxicity in the North River associated with the effluent from the Barnhardt facility. Based on this lack of toxicity, an alternative approach for establishing a limitation that is still protective of the receiving waters would be the elimination of the acute toxicity limitation and relying on the proposed chronic toxicity limitation. Barnhardt believes that this is a conservative approach that will successfully control impacts to the North River.

Finally, since there is limited information supporting the notion that Barnhardt effluent is having a toxic effect on the North River, Barnhardt recommends consideration to changing the species used for the toxicity testing. Use of the *Ceriodaphnia dubia* consistently yields results indicating toxicity due to the presence of dissolved salt. Barnhardt recommends the consideration of an alternative species, such as *Daphnia magna*, that might be suitable substitute for the *Ceriodaphnia dubia*.

In summary, the toxicity limitation contained in the draft NPDES permit creates a permit condition that will not be possible for the existing Barnhardt treatment works to routinely meet. Barnhardt believes that previous testing conducted by MA DEP demonstrates that there is no evidence of toxicity related to Barnhardt effluent. Barnhardt believes that the required test is overly conservative and serves as the basis for committing Barnhardt to pursue a costly program aimed at removing salts from the wastewater discharge. Barnhardt requests modification of the WET limits in a manner that is still protective of the receiving waters.

#### **6. Testing Schedules**

Section 2 of the footnotes of Part I.A.1 specifies that quarterly samples will be collected during the second weeks of January, April, July and October. Section 5 of the footnotes requires toxicity testing in March, June, September and December. Barnhardt requests

that the testing schedule be combined into one specific month each quarter in order to minimize the potential for confusion of the required sample collection dates.

**7. Limitation of Temperature Rise of Receiving Water**

The draft permit includes a limitation indicating that the rise in temperature of the receiving water due to a discharge shall not exceed 3°F. While Barnhardt is not opposed to the concept of limiting temperature impacts on the receiving waters from the Barnhardt effluent, Barnhardt cannot accept the 3°F limitation without conducting research into determining what the appropriate limit might be and determining the proper methodology for monitoring the temperature rise in the receiving waters. Barnhardt recommends the reconsideration of this limitation in favor of collecting additional data that would support a later decision making on an appropriate limit.

**8. Development of BMP To Be Followed In Cleaning Tanks And Other Equipment**

Special Condition C.1 specifies a requirement for the development of a Best Management Practices plan to be followed in operating the facility for cleaning tanks and other equipment in order to minimize the amounts of pollutants discharged to surface waters. Barnhardt is not opposed to the preparation of management documentation aimed at reducing or eliminating discharging pollutant to surface waters. However, Barnhardt personnel indicate that operating procedures for their bulk storage of process chemicals has never involved the periodic clean out for any reason. Barnhardt has always been able to utilize methodology that does not involve the clean out of storage tanks to demonstrate that their storage tanks are suitable for use. Barnhardt has no plans to institute a program requiring the emptying of storage tanks as part of their routine operations. For this reason, Barnhardt requests the elimination of a requirement for a Best Management Practice Plan for the clean out of their storage tanks.

**9. Development of BMPs To Reduce Or Eliminate The Acute Toxicity In The Discharge**

Special Condition C.1.d specifies a requirement for the development and implementation of site specific Best Management Practices in order to reuse and/or eliminate the acute toxicity of the discharge. The requirement specifically identifies the need to investigate two alternative treatment technologies:

- Replacement to NaOH with enzymatic scouring, and,
- Use of microfiltration to recover NaOH

As discussed in Section 2, Barnhardt believes that the presence of salt in the effluent for the facility is a special condition that does not result in toxicity in the receiving waters.



Consequently, we believe that the evaluation and implementation of technologies aimed solely for the removal of salt imposes an unnecessary economic burden on Barnhardt without any measurable environmental benefit to the condition of the receiving waters. Barnhardt requests elimination of this provision of the draft permit until such time that it can be demonstrated that these investments are necessary for address toxicity in the receiving waters.

**10. Development of BMP In Order To Reduce The Sources of Nitrogen**

Section C.1.e requires Barnhardt to develop and implement site specific BMPs to reduce and/or eliminate the sources of nitrogen at the facility. In the supporting materials provided with the draft permit on P. 19, the justification for reducing the levels of nitrogen in the facility effluent is required by the need to reduce loading in the Connecticut, Housatonic and Thames River watersheds. While we understand the need to reduce nitrogen loading in these watersheds, it has not been demonstrated that there is any measurable benefit for either the North River or the Connecticut, Housatonic and Thames River watersheds by reducing nitrogen loading from the facility. In essence, Barnhardt is being told to bear the financial burden to reduce nitrogen loading in its effluent with no clear justification. Barnhardt requests that this provision of the draft permit be suspended until it can be demonstrated that there is a benefit associated with the requested activity.

**11. Conduct Study To Operate WWTP To Optimize The Removal of Nitrogen**

Section C.2 requires Barnhardt to complete an evaluation of alternative methods of operating the existing wastewater treatment facility to optimize the removal of nitrogen. In the supporting materials provided with the draft permit on P. 19, the justification for reducing the levels of nitrogen in the facility effluent is required by the need to reduce loading in the Connecticut, Housatonic and Thames River watersheds. While we understand the need to reduce nitrogen loading in these watersheds, it has not been demonstrated that there is any measurable benefit for either the North River or the Connecticut, Housatonic and Thames River watersheds by reducing nitrogen loading from the facility. In essence, Barnhardt is being told to bear the financial burden to reduce nitrogen loading in its effluent with no clear justification. Barnhardt requests that this provision of the draft permit be suspended until it can be demonstrated that there is a benefit associated with the requested activity.

**12. Error in Fact Sheet Related to pH Violation**

Page 12 of the Fact Sheet attached to the draft permit in Section 1c contained a statement indicating that the facility has violated the current low range pH of 6.5 SU on two

May 14, 2010

occasions. Barnhardt's review of the Discharge Monitoring Report information did not reveal any violations in pH over the life of the permit. Barnhardt requests that this statement be corrected in any future listing of factual information about Barnhardt's compliance with its pH limitation.

Barnhardt believes that this comments provided in this letter identify technical issues requiring further consideration by USEPA and MA DEP before issuing a final permit. Barnhardt requests the opportunity to meet with USEPA and MA DEP to provide further justification and to better understand the reasoning for the proposed limitations included in the permit.

Please notify Albert Sheridan at Barnhardt or Richard Cushing at CJW if you have any questions on the information presented in this letter.

Sincerely,

**CUSHING, JAMMALLO & WHEELER, INC.**

  
Richard J. Cushing  
Principal

cc: Kathleen Keohane, Massachusetts Department of Environmental Protection,  
Division of Watershed Management, Surface Water Discharge Permit Program,  
627 Main Street, 2<sup>nd</sup> Floor, Worcester, Massachusetts 01608

Albert Sheridan, Plant Manager, Barnhardt Manufacturing Company, 247 Main  
Road, Colrain, MA 01340



COMMONWEALTH OF MASSACHUSETTS  
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September 28, 2010

David Webster  
NPDES Industrial Permits Branch  
USEPA – New England  
5 Post Office Square, Suite 100 (OEP06-1)  
Boston, MA 02109-3912

Re: **Water Quality Certification**  
**NPDES Permit MA0003697**  
**Barnhardt Manufacturing Company, Colrain**


Dear Mr. Webster:

Your office has requested the Massachusetts Department of Environmental Protection to issue a water quality certification pursuant to Section 401(a) of the Federal Clean Water Act ("the Act") and 40 CFR 124.53 for the above referenced NPDES permit. The Department has reviewed the proposed permit and has determined that certain conditions of the permit listed below are more stringent than necessary to achieve compliance with sections 208(e), 301, 302, 303, 306, and 307 of the Federal Act, and with the provisions of the Massachusetts Clean Waters Act, M.G.L. c. 21, ss. 26-53, and regulations promulgated thereunder. The permit conditions are sufficient to comply with the antidegradation provisions of the Massachusetts Surface Water Quality Standards [314 CMR 4.04] and the policy [October 21, 2009] implementing those provisions.

- The acute tests are not indicative of the actual instream conditions. MassDEP and the facility have conducted instream chronic and acute tests which documented no evidence of instream acute toxicity. Therefore, the acute whole effluent toxicity (WET) testing required in Part I.A.1 should be replaced with more frequent chronic testing at 6 tests per year.

The Department hereby certifies the referenced permit modified as described above.

Sincerely,

  
Glenn Haas, Director  
Division of Watershed Management  
Bureau of Resource Protection

cc: Kathleen Keohane  
File



**From:** Fiorentino, John (DEP)  
**Sent:** Friday, February 10, 2006 2:09 PM  
**To:** Hogan, Paul (DEP)  
**Cc:** Johnson, Arthur (DEP); Nuzzo, Robert (DEP); Mitchell, Peter (DEP)  
**Subject:** biomonitoring at BBA Non-wovens

Paul,

DEP/Division of Watershed Management conducted point source investigations, in addition to routine assessment monitoring, in the Deerfield River watershed during September 2005. In the North River, DEP conducted benthic macroinvertebrate biomonitoring to investigate the potential impacts of the BBA Non-woven's wastewater discharge in Colrain. A site-specific sampling approach was implemented, in which the aquatic community and habitat downstream from the perceived stressor (downstream study site) were compared to an upstream reference station (control site) representative of "least disturbed" biological conditions in the North River. While the alternative to this site-specific approach is to compare the study site to a regional or watershed reference station (i.e., "best attainable" condition), the site-specific approach is more appropriate for an assessment of a known or suspected stressor, provided that the stations being compared share basically similar instream and riparian habitat characteristics. Since both the quality and quantity of available habitat affect the structure and composition of resident biological communities, effects of such features can be minimized by sampling similar habitats at stations being compared, providing a more direct comparison of water quality conditions.

Biomonitoring was conducted on 27 September 2005 immediately upstream from the BBA discharge (station BBA-up) (the reach was adjacent to the BBA property) and a short distance downstream from the discharge (station BBA-dn) (just downstream from Rt. 112); thus, the sampling efforts tightly bracketed the BBN facility. While the downstream study site ideally would have been established on the upstream side of the Rt. 112 crossing and any potential NPS inputs associated with it, benthos habitat just downstream from Rt. 112 was considered better and more comparable to

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\*  
ANNOTATIONS  
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the reference station.

An evaluation of instream and riparian habitat was conducted concurrent with the macroinvertebrate sampling effort at both the upstream-control (BBA-up) and downstream-study station (BBA-dn). An evaluation of physical and biological habitat quality is critical to any assessment of ecological integrity. Habitat assessment supports understanding of the relationship between physical habitat quality and biological conditions, identifies obvious constraints on the attainable potential of a site, assists in the selection of appropriate sampling stations, and provides basic information for interpreting biosurvey results.

BBA-up received a total habitat assessment score of 177 out of a possible score of 200. Habitat scoring reductions here were mainly attributed to the reduced riparian zone along the left bank in the vicinity of the BBN property.

BBA-dn received a total habitat assessment score of 141/200. Habitat scoring reductions were mainly a result of instream sediment deposition and associated embeddedness--probably originating from the Rt. 112 crossing and recent bridge work--and riparian disturbances related to an adjacent road. That habitat quality at BBA-dn was not highly comparable to conditions at BBA-up makes it difficult to completely eliminate habitat as a potentially limiting factor on the health of BBA-dn biota. That said, the overall habitat quality at BBA-dn, which was 80% comparable to habitat at BBA-up, and included optimally-rated epifaunal substrate quality, suggests that any gross impairment of the BBA-dn benthos community would probably be mainly attributable to water quality limitations here.

At this time, the biological data collected at both sites by DEP remains at family level taxonomic determinations. DEP's assessment guidance requires additional taxonomic effort (RBP III-genus/species level) before making any final impairment designations, or Aquatic Life Use determinations for 305(b) assessment reporting purposes. However, in this case, it appears that the preliminary, family level data generated at both stations contain enough information to make generalized statements--based on a combination of best professional judgement and a preliminary view of select community attributes (metrics)--regarding aquatic health downstream from the BBA facility.

In terms of family level Taxa Richness and EPT (EPTs are insect orders generally considered most sensitive to conventional organic and toxic pollutants) abundance, both stations appear comparable--14 different families were observed at BBA-up and slightly more (16) at BBA-dn. EPTs comprised 11 of the taxa at BBA-up and 10 at BBA-dn. Both assemblages are dominated by a single taxon--chironomids (midges) at BBA-up and hydropsychids (caddisflies) at BBA-dn. Densities of these taxa, though not considered hyperdominant in either assemblage, suggest slightly imbalanced communities possibly resulting from an overabundant food resource or other unknown causes.

Other biological attributes (i.e., metrics--DEP calculates and scores a suite of 7 metrics) DEP considers as part of its routine assessment of benthic communities have yet to be calculated; however, in reviewing the family level taxa list generated for BBA-up and BBA-dn, I don't anticipate any major differences in metric performance between the two stations.

In conclusion, preliminary results of benthos data collected by DEP at BBA-dn suggest the BBA discharge does not cause any obvious detriment (i.e., gross impairment due to toxicity or other pollutants) to biological integrity in this portion of the North River. Any impairment to the BBA-dn aquatic community is probably minimal at most, and habitat alone cannot be ruled out as the primary stressor.

Ultimately, additional taxonomy and metric analysis will separate the BBA-up and BBA-dn sites into one of four categories: non-impacted, slightly impacted, moderately impacted, and severely impacted. These results will be included in a published biomonitoring technical memorandum, as well as appended in DEP's 2005 Deerfield River Watershed Assessment Report, expected to be completed some time next year.

John

John F. Fiorentino  
MA DEP/Division of Watershed Management  
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2/14/2006