Zebra Mussel (*Dreissena polymorpha*)
Monitoring Program in the
Upper Susquehanna River, 1993

*Willard N. Harman*

**INTRODUCTION**

On March 19, 1992 Biological Field Station personnel attended a technical workshop on Zebra Mussel identification at the Susquehanna Energy Information center just south of Shickshinny, PA. The day’s activities were provided by the Susquehanna Basin Monitoring Workgroup and were sponsored by New York Sea Grant Extension and the U.S. Fish and Wildlife Service. After discussing sampling protocol and identification techniques at the above meeting, the BFS Zebra Mussel monitoring program was begun.

Data collected during the growing (reproductive) season in 1992 was presented in Harman (1993). No planktonic nor benthic mussels were reported.

**METHODS**

Artificial substrates were constructed and used in such a manner that several 15x15cm PVC plates would remain exposed for approximately 45 days before being examined for mussel colonization. A plankton net with 63µm mesh size was set up in combination with a portable water pump for collection of larval stages. Instruments to measure parameters indicated on Figure 1 (The Zebra Mussel Monitoring Reports) were isolated from our supply pool so proper procedures for preventing the inadvertent spread of Zebra Mussels could be facilitated.

Monitoring began on May 27, 1993 at 5 sites on the Upper Susquehanna:

<table>
<thead>
<tr>
<th>Site Description</th>
<th>Latitude</th>
<th>Longitude</th>
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<tbody>
<tr>
<td>Otsego Lake at the BFS</td>
<td>42°41'27&quot; N. Lat.</td>
<td>71°54'58&quot; W. Long.</td>
</tr>
<tr>
<td>City of Oneonta Mill Race auxiliary water intake, Oneonta, NY</td>
<td>42°23'05&quot; N. Lat.</td>
<td>75° 2'38&quot; W. Long.</td>
</tr>
<tr>
<td>Hallstead Pumping Station #2, Great Bend, PA</td>
<td>41° 1'45&quot; N. Lat.</td>
<td>75°43'45&quot; W. Long.</td>
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<tr>
<td>Binghamton municipal water intake, intake, Oneonta, NY</td>
<td>42° 7' N. Lat.</td>
<td>75°56' E. Long.</td>
</tr>
<tr>
<td>Athens-Sayer municipal boundary, Athens, PA</td>
<td>41°57'28&quot; N. Lat.</td>
<td>76°30'58&quot; W. Long.</td>
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</tbody>
</table>
Zebra Mussel Monitoring Report

Collector Name: Homburger/Harman  Collector Affiliation: BFS
Location: Binghamton Municipal Water Intake  Binghamton, New York

42°7' N. Lat  75° W. Long.

Physical/Chemical:
Date: 6/18/92  Time: 12:05 p.m.
Temp (°C) 21.5°  gauge height (ft)  19'6"
pH (units) 7.8  gauge location Deck
Total Calcium (mg/l)  Conductivity (umhos/cm)
or Salinity (ppt) 188
Current velocity (meters/sec) 0.11  Secchi Depth (m) .8m
Velocity measurement method M-MN CB Mod 2010 flowmeter

Biological:
Date: 6/19/92  Time: 8:45 a.m.

Mussels present? No  Life stages(s) Veliger Spat Adult

Estimated density - artificial substrate (mussels/m²)
- natural substrate (mussels/m²)
- water column (mussels/m³)

Substrate Area Sampled (m²) 0.09m²

Length of time of artificial substrate exposure 42 (hours or days)

Water Volume Sampled (liters) 50

Other Organisms noted: Ostracoda, Chironomidae

Comments plates taken from opposite clip end
All stations were visited on the same day by travel from Cooperstown to Sayer, PA and back (ca. 330 miles). We normally started about 6:30 a.m. and returned to Cooperstown about 4:00 p.m.

Collection sites were noted on the "Zebra Mussel Monitoring Report" (Figure 1). Physical and chemical analysis were completed. Artificial substrates were removed and placed on ice; new ones were placed for exposure and later removal. At least 50 liters of water were pumped through the plankton net. Samples were placed in bottles and put on ice for analysis. Natural substrates in the collection area were examined for mussels. All instruments were sterilized with 90% Ethyl Alcohol (alcohol was recycled and disposed of when the concentration dropped below 70%). Towards the end of the summer this procedure was modified by the use of a compound field microscope (Brock Optical, Inc., Box 940831, Maitlgood, PA 32794-0831) for immediate observation of PVC plates and plankton which precluded the necessity of maintaining samples for later analysis. We then proceeded to the next station.

After returning to Cooperstown the substrates were examined, under a dissecting microscope, for mussels. Plankton samples were observed with a compound microscope (100x) for larval stages. The "Monitoring Report" (Figure 1) was then completed. These steps were always completed by noon the day following sampling.

Collections were terminated on October 16, 1993. No mussels were found during the season's sampling.

It is our understanding that consultants at the N.Y.S.E.G. Goudy Station in Binghamton collected veligers during the spring of 1992 and 1993. As stated above we saw no evidence of Zebra Mussels at any of our collecting sites including the Binghamton Station less than 1/4 mile from N.Y.S.E.G. facility. The present most favored hypothesis would necessitate a colony of adult mussels occurring in a south flowing tributary to the Susquehanna upstream from the Goudy Station, minimal lateral mixing in the river for a considerable distance below the confluence and unsuccessful settling of veligers in the Susquehanna.

In order to test this idea, on September 3, 1993 we used standard procedures for plankton analysis, and macroscopically observed natural substrates for D. polymorpha at the following locations in the Chenango River drainage basin upstream from Binghamton (Figure 2):

1. Tioughnioga River at Chenango Forks
2. Chenango River at Chenango Forks
3. Tioughnioga River at Whitney Point
4. Whitney Point Reservoir at USACE offices
5. Tioughnioga River at Trout Brook (Polkville)
6. Otselic River at Willet
7. Genaganslet Creek at McDonough
8. Chenango River at Oxford
9. Chenango River at Norwich
Figure 2. Susquehanna Drainage basin in New York Station showing stations monitored for *Dreissena polymorpha* in the summer of 1993. The only site where Zebra Mussels (veligers) have been recorded is at NYSEG's Goudy power station in Johnson City (B).
On September 27, 1993, using the same methodology, we collected at:

10. East Sidney Dam Recreation Area (Owlcut Creek)
11. Susquehanna River at Unadilla
12. Unadilla River, Jct. Rts. 7 and 8

No Zebra Mussels were encountered.

REFERENCES