

*Final*

Preliminary Mussel Survey in the Susquehanna River in the  
Vicinity of the Proposed Bell Bend Nuclear Power Plant Site,  
Luzerne County, Pennsylvania



**Submitted to:**  
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September 2008

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## **INTRODUCTION**

Bell Bend Nuclear Power Plant (BBNPP) is proposed to be sited adjacent to the Susquehanna Steam Electric Station (SSES) in Salem Township, Luzerne County, Pennsylvania (Figure 1). As part of the environmental siting studies, Normandeau Associates, Inc. was contracted by AREVA NP, Inc. to assess the mussel community of the Susquehanna River in the vicinity of the proposed BBNPP intake and discharge structures. At the time of the survey, the exact locations of the proposed intake/discharge structures were unknown, thus sampling effort focused on the approximate locations, which are in the vicinity of the SSES intake and discharge structures.

Several mussel species of interest to the Pennsylvania Fish and Boat Commission (PFBC) are known from the Susquehanna River less than 10 miles downstream of the proposed BBNPP site. Therefore, this survey focused on determining the community composition of mussels inhabiting the Susquehanna River in the general vicinity of the expected location of the proposed intake and discharge structures.

## **METHODS**

Two Normandeau staff members experienced with performing river mussel surveys (William S. Ettinger and Michael K. Mettler) performed this qualitative mussel survey on October 1 and 2, 2007. The site was evaluated by wading and viewing the river bottom with and without the aid of a transparent-bottomed bucket. Therefore, only wadeable sections of the river were surveyed. The survey entailed visually searching the river bottom with some disturbance of substrate materials by hand. No systematic excavation of substrate materials for the purpose of uncovering buried mussels was performed. The survey focused on areas of substrate that would most likely be inhabited by mussels, including sand, gravel, and cobble, although all substrates types including silt, boulders, and bedrock were surveyed.

Five locations within the Susquehanna River were surveyed (Figure 2). Station 1 was located along the east shoreline of the River at Bell Bend, which is approximately 0.6 miles downriver from the existing SSES intake. Station 2 was located along the east shoreline, across from the SSES intake. Station 3 was located along the river shoreline on the opposite (east) side of the river at the confluence of Little Wapwallopen Creek, and approximately 0.3 miles upstream of the SSES intake. Station 4 was located at the downstream end of the island, approximately 1.1 miles upstream of the SSES intake and Station 5 was located along the west shoreline, approximately 0.4 miles upriver of the SSES intake.

All observed mussels were identified to species and subsequently returned to the approximate location of collection. Weather conditions were good with low flows (discharge = 1,780 cubic feet per second at the USGS gage at Danville on October 2) and clear water yielding high visibility.

## RESULTS

Live individuals of five species of mussels were observed during the 2-day effort (Table 1). No mussels were observed at Station 4. However, all five species were collected, for the most part, from each of the other four stations. With exception of the eastern elliptio, dozens of individuals of each species were collected. None of the collected species is listed as Threatened or Endangered by the commonwealth of Pennsylvania or the Federal government. However, the Pennsylvania Fish and Boat Commission considers the yellow lampmussel (*Lampsilis cariosa*) to be a species of special concern.

The yellow lampmussel (*Lampsilis cariosa*) is a medium-sized mussel attaining a maximum length of 125 mm. It commonly inhabits medium and large rivers, but is known from lakes and ponds in the northern part of its range. Distribution ranges from Nova Scotia south to Georgia and west to West Virginia. This species occurs in the Susquehanna and Delaware River drainages in Pennsylvania and its populations are considered to be vulnerable to relatively stable by the Pennsylvania Natural Heritage

Program (PNHP 2007a). Though it appears to be relatively abundant within the main stem Susquehanna River, it is less common in tributaries and other river systems. Its preferred substrate includes sand, silt, cobble, and gravel, especially in riffles and flowing portions of rivers. White perch and yellow perch are the only known larval host for this species. The yellow lampmussel is thought to be mildly tolerant of eutrophication and siltation and intolerant of toxins.

In addition to the mussels observed in this survey, a single specimen of another species, green floater (*Lasmigona subviridis*), was identified in a benthic macroinvertebrate sample collected with a dome sampler upstream of the SSES intake on August 15, 2007 (Ecology III 2008). The collection location of this individual was within the vicinity of where the present survey was completed. The green floater is a mussel that is imperiled throughout much of its historic range and is considered imperiled by the Pennsylvania Natural Heritage Program (PNHP 2007b). It occurs throughout the Atlantic Slope from North Carolina to New York, as well as in the Kanawha River basin in West Virginia. This species is not common in Pennsylvania, but is known to occur in the Susquehanna, Delaware, and Ohio River drainages. It is a small mussel that is typically less than 55 mm in length that prefers to inhabit gravel and sand substrate in water depths of 1 to 4 ft. This species inhabits pools and other calm areas of hydrologically stable creeks and rivers and it is intolerant of strong currents (Strayer and Jirka 1997). A decline in population numbers of this species has occurred throughout much of its range. The green floater is hermaphroditic and the hosts for its larval stage (glochidia) are not known.

## CONCLUSIONS

This preliminary survey will serve to inform discussion and coordination with the PFBC related to any additional investigations that may be necessary as construction plans for BBNPP become more definite. The survey results show the relatively wide distribution and common occurrence of four species of mussels, including the yellow lampmussel, in the vicinity of the proposed plant. In addition, macroinvertebrate sampling has

confirmed the presence of a fifth species, the green floater, in the vicinity of the proposed plant.

## REFERENCES

Ecology III 2008. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 2007 water quality, benthic macroinvertebrates, and fishes. Prepared for PPL Susquehanna, LLC.

Strayer, D. L., and K. J. Jirka. 1997. The pearly mussels of New York State. The New York State Education Department, Albany N. Y. 113 pp and plates.

Pennsylvania Natural Heritage Program (PNHP) 2007a, Yellow Lampmussel, Website: <http://www.naturalheritage.state.pa.us/factsheets/12214.pdf>, date accessed, April 3, 2008.

Pennsylvania Natural Heritage Program 2007b, Green Floater, Website: <http://www.naturalheritage.state.pa.us/factsheets/12224.pdf>, date accessed, April 10, 2008.

Table 1. Species of mussels observed during a survey of the Susquehanna River completed near the proposed BBNPP site, October 2007.

Common name	Scientific name
Eastern Elliptio	<i>Elliptio complanata</i>
Eastern Floater	<i>Pyganodon cataracta</i>
Elktoe	<i>Alasmidonta marginata</i>
Triangle Floater	<i>Alasmidonta undulata</i>
Yellow Lampmussel	<i>Lampsilis cariosa</i>
<sup>1</sup> Green Floater	<i>Lasmigona subviridis</i>

<sup>1</sup> This species was not collected during the mussel survey. However, a single individual was identified in a macroinvertebrate sample collected by dome sampler upstream of the SSES intake



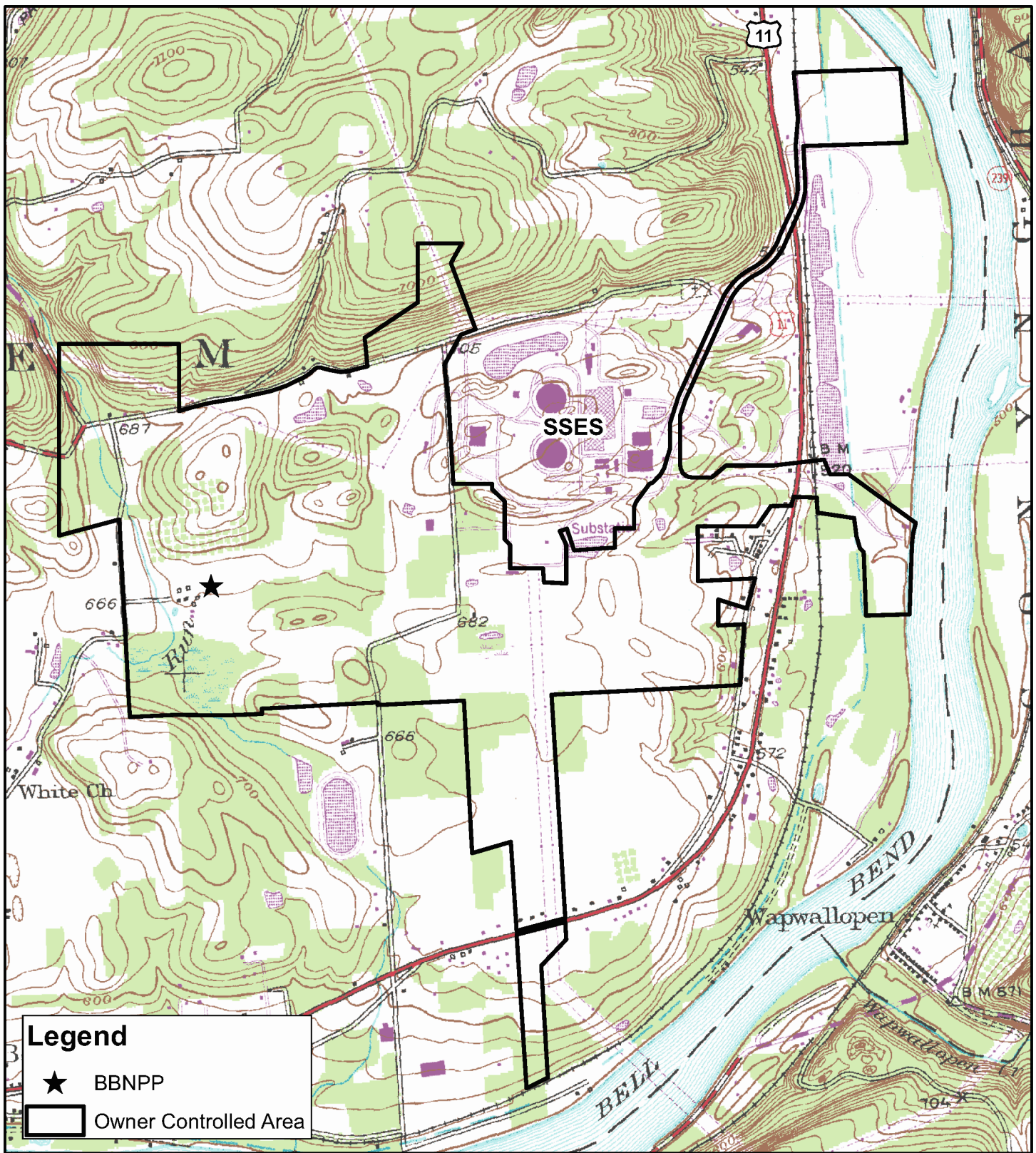


Figure 1.  
Location of Proposed BBNPP.

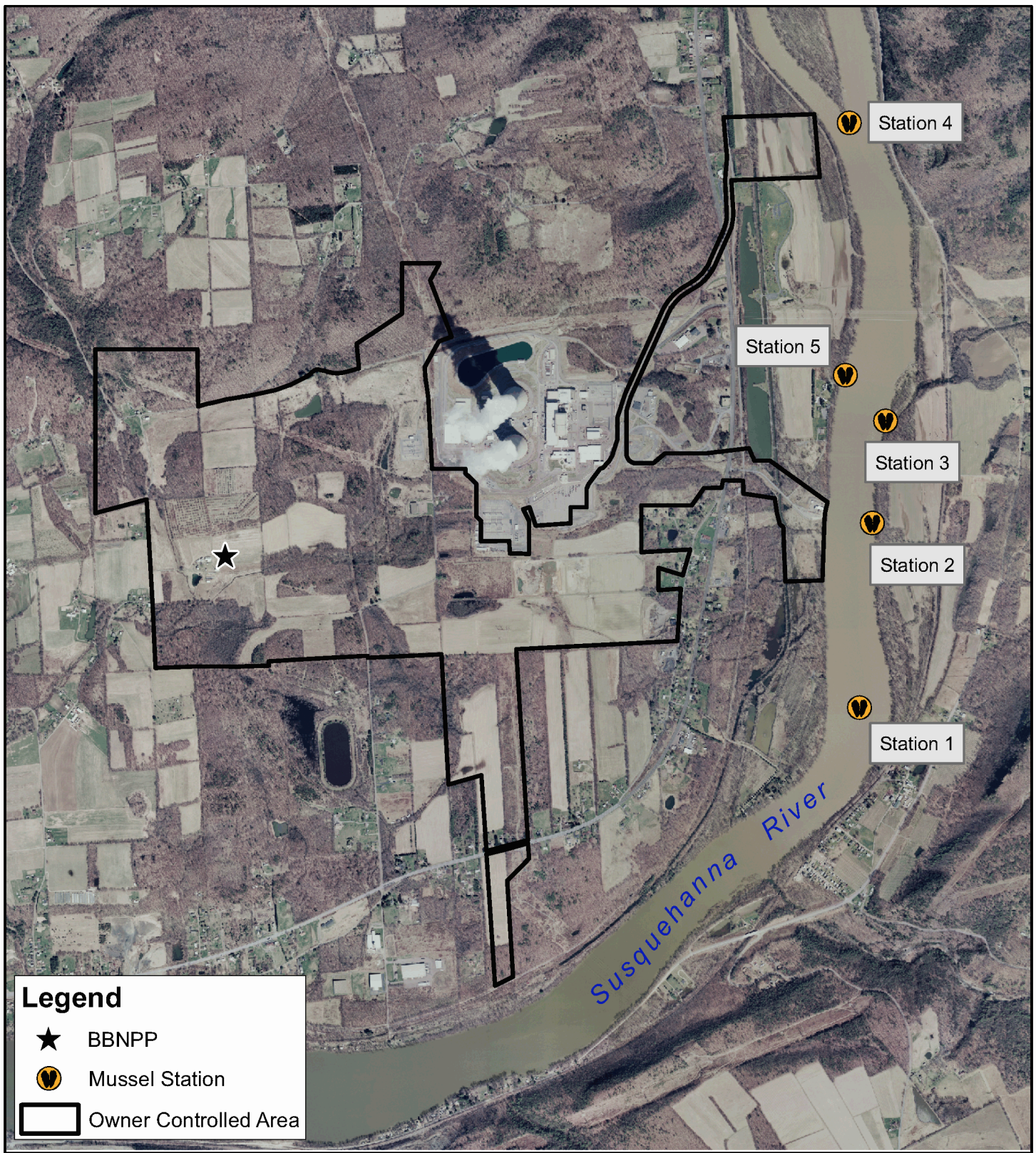


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PAMAP Color Orthophoto of PA, 2005

0.5 0.25 0 0.5 Miles

Figure 2.  
**Location of mussel survey stations  
in the Susquehanna River.**



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