**Sheboygan River Area of Concern Mussel Surveys Scope of Work- 2016 Repeat Verification Monitoring**

**Problem Definition/Background**

Developing a fish and wildlife management and restoration plan for the Sheboygan River Area of Concern (AOC) required synthesizing a variety of sources of background information. Mussel surveys were initially conducted in 2011 in order to gather baseline data, which was used in the development of the Rapid Ecological Assessment for the Sheboygan River Area of Concern. These data helped to prioritize ecologically important sites and the conservation of rare species. The mussel surveys will be conducted again in 2016 to document the overall health or condition of the mussel populations within the AOC and to help determine if the Sheboygan River AOC is meeting determined delisting targets in order to remove the “Degradation of Fish and Wildlife Populations” and the “Loss of Fish and Wildlife Habitat” Beneficial Use Impairments (BUIs).

**Project/Task Description**

The habitat restoration projects identified by the Sheboygan River AOC Technical Advisory Committee were implemented in 2012. The mussel surveys will provide detailed information on the current status of the mussel population along the Sheboygan River.

Mussel surveys will be performed in the Sheboygan River AOC. Data generated from these surveys will be used to do the following: 1) Provide information on the health, condition and location of mussel populations including any Endangered/Threatened/Special Concern and regionally rare mussel species in the AOC; 2) Provide a comparison of current mussel population data to baseline data from 2011 that is represented in the Rapid Ecological Assessment; 3) Serve as evidence in support or rejection of meeting the delisting targets of the “Degradation of Fish and Wildlife Populations” BUI; and 4) Serve as evidence of success of the habitat restoration projects through any noted improvements in mussel populations or available habitat.

**Methods**

A WDNR-contracted mussel surveyor will conduct qualitative and quantitative mussel surveys within the Sheboygan River AOC. At each location surveyed, the surveyor will compile a list of mussel species found, and make notes on the apparent overall health or general condition of the mussel community, approximate individual species abundance, and evidence of recent recruitment. He or she will record the GPS coordinates of the site. The surveyor will also take pictures of live specimens and empty valves of each target species as photo vouchers. The surveyor will record the survey data on paper, and then enter the data into a spreadsheet. The surveyor will be responsible for ensuring that the data are transferred and entered correctly. The surveyor will submit the spreadsheet along with photo vouchers and a final report.

Survey locations will be chosen based on the items requested in the final report. The first survey locations will be repeated from the initial, baseline surveys done in 2011. This will allow for a comparison of mussel populations and changes that may have occurred from 2011 to 2016. In addition, where baseline surveys do not overlap with habitat restoration areas along the Sheboygan River AOC, new survey locations will be added. This will allow for an analysis of suitable habitat in the new restoration areas and indicate the health and condition of the mussel populations in those new habitat restoration areas. Survey sites will also be selected in order to provide an AOC-wide assessment of the health and condition of populations of mussels and the availability of suitable habitat throughout the AOC. The surveyor will identify the survey locations using recent aerial photos, USGS 7.5’ topographic maps, various Geographic Information System (GIS) sources, information from past survey efforts, the list of target species habitat requirements, locations of restoration efforts (provided), and the expertise of biologists familiar with the properties or with similar habitats in the region. The surveyor will focus on habitats that have the potential to support rare species. Sampling locations may include the following:

• Shallow-water areas

• Exposed sand and gravel bars

• Rivers during low-water periods (droughts, drawdowns, etc.) too deep to wade otherwise

• Islands and streambanks for middens

Following is a list of possible methods:

* Casual collection of specimens (no measure of time, area, or effort)
* Number per unit of time (number per person-hour – e.g. 2 people searching for one hour = 2 person-hours)
* Number per unit of area (e.g., number per unit area – e.g. 10 mussels per meter squared)
* Number per unit of distance (e.g., number per distance – e.g. 20 in 100 meters of shoreline)

Data collected will include the following:

* GPS coordinates
* Species
* Number (or number/time, number/area, number/effort)
* Specimen condition (living, recently dead, etc.)
* Invasive bivalve data (Asian clam presence, Zebra or Quagga mussel presence)

Note that there will be no live samples collected for this survey. Mussels may be removed briefly for identification and photograph documentation of species and condition. Empty shells may be photographed for species photo vouchers. If identification is not certain, dead shells may be collected for verification purposes. All observations will be made at the site.

The mussel surveyor will be responsible for collecting the data as contracted, and will take corrective actions as needed. Corrective actions will be documented in the field log or data report at the time of decision, and will accompany all reports after analytical results are returned.

Weather is the major variable for this work, but there will be enough time throughout the field season to coordinate survey effort so that optimal weather conditions can be met. Also, since much of the land adjacent to the AOC is privately owned, access could be an issue. Due to Wisconsin’s Public Trust Doctrine, the surveyor can legally use and perform mussel surveys in all sections of the river itself, but cannot cross private lands to get to the river without permission. The Project Leader and the surveyor will ensure that landowner permission is granted before any work is done on private property. If necessary, alternative river access sites will be found.

The surveyor will prepare a final report and supporting materials of inventory and monitoring results. This report will discuss the findings for each site, include a comparison of mussel populations from 2011 to 2016, provide a summary of historical records~~,~~ detailed survey records, GPS coordinates of individuals encountered or important habitat features, and a summary of habitats present for mussels on the lower Sheboygan River. A comparison of mussel populations from 2011 to 2016 in the previously surveyed areas will indicate the health and condition of the populations and how populations, density, etc. have changed over time. A separate section of the report will specifically address mussel populations’ health and condition in the new habitat restoration areas and note suitable habitat and which species are utilizing the new habitat. An AOC-wide assessment will also be included in another section to address the health and condition of the mussel populations and the availability of suitable habitat throughout the entire AOC area. Background data could be augmented with recent records or information provided through citizen based monitoring efforts within the AOC. This report will present the findings of the survey and will include the overall health of the mussel population as well as species presence and abundance. A summary report will include discussion of species’ status, ecologically important areas and habitats, and threats observed. In addition, the report will include an analysis of the mussel surveys and whether the population data meets the delisting targets for the “Degradation of Fish and Wildlife Populations” BUI. A report on the condition and availability of suitable mussel habitat should be included in the analysis of these assessments. The surveyor is required to do a historical data / literature review of the areas surveyed, and to include the findings in the final report. This information is supplemental to the study, and will be used to provide background information on historical mussel populations. The surveyor should only include data that are from peer-reviewed journals or other sources that are known to be accurate and reliable.

After verification, WDNR NHI staff will enter rare species and high-quality natural community locations into the NHI database, the central repository for rare species and high-quality natural community data for Wisconsin. All data added to the NHI database go through a quality control process to ensure their validity and accuracy.

Project Timeline:

June-September 2016— Mussel surveys completed.

January 1, 2017— Initial findings available.

June 30, 2017— Final report.

**Quality Objectives & Criteria**

The primary objectives of this segment of the project are to conduct an inventory and comparison of current mussel species to previous efforts in 2011, from select areas within the AOC; assess mussel populations’ health and condition in the new habitat restoration areas noting suitable habitat and which species are utilizing the habitat; and assess mussel populations’ health and condition throughout the entire AOC noting the availability of suitable habitat. The information provided by the surveyor from this project through a final report will provide screening-level data, allow biologists and planners to understand the distribution of rare and representative species within the AOC, and provide comparison to species presence, distribution, and representativeness from the surveys performed in 2011. These data will also contribute to the overall knowledge for certain rare species, identify threats to these populations, and provide evidence of the effects of the implemented habitat restoration improvements. The information collected will be used to support or reject the delisting targets for the “Degradation of Fish and Wildlife Populations” BUI.

**Precision & Accuracy/Bias**

This method of surveying mussels does not support measurable precision nor

accuracy/bias calculations. The surveyor chosen for this project will be knowledgeable and experienced, with identification skills that we trust. Also, the surveyor will be required to take photos of representative organisms of each species at each site. These photo vouchers will be verified by Lisie Kitchel, WDNR mussel biologist. If the WDNR biologists disagree with an identification made by the surveyor, and there is a question as to its true identity, the information will be kept on file, but will be disregarded in the final report and will not be added to the NHI database. If the specimen can be clearly identified as something other than what the contractor recorded, then the species will be changed for the records and the database. Any changes will be recorded and included in the final report. Since a single person will be performing all of the surveys, the methods should be consistent among sites. The surveyor will be required to use a GPS device that is accurate to 10 meters or better.

**Data Representativeness**

The primary purpose of this survey is to discover rare species presence and some general indices of relative abundance within this AOC. Survey locations will be based upon previous surveys with new sites chosen to maximize the chance of discovering any rare species and assessing effectiveness of habitat restoration efforts and the condition of mussel populations throughout the AOC as a whole. Data collected in this fashion will be representative of current mussel habitat present at the selected sites within the AOC.

**Comparability**

The procedures used in this project will be comparable to those used in other Rapid Ecological Assessments performed by WDNR Bureau of Natural Heritage Conservation (NHC). Specific mussel survey methods will be at the discretion of the surveyor. Methods and procedures will be documented in the final report.

**Completeness**

The project completeness goal is 100%. The contractor must deliver the specified report as a condition of the contract.

**Special Training/Certification**

We will not be providing special training to the mussel surveyor. He or she will be hired already fully qualified to perform the necessary tasks. We will use a list of contractors that we have historically worked with in the past and any others that are recommended to us. We will choose from this list based on location in the state for the project and the contractors’ knowledge of those landscapes, their availability, and interest. We will generally choose from those who we know and trust from previous work that they will deliver the high-quality products required.

**Documents and Records**

Using Natural Heritage Inventory (NHI) methodology (see http://www.natureserve.org/prodServices/heritagemethodology.jsp), the surveyor will document target rare mussel occurrences. All mussel populations will be documented including target species listed on the Wisconsin Natural Heritage Working List. Documentation will include a spreadsheet of target species locations that contains the following: species common name, scientific name, waypoint number, Latitude & Longitude of waypoint taken (which should be in decimal degrees with Datum of WGS 84), number of individuals observed, date, habitat type, and observer name. Documentation will also include photographs of specimens for species verification. In addition, the surveyor will document sites that were surveyed without finding any target or common species, noting habitats present and what potential target species could utilize those areas. Documentation of private landowner contact will be provided in cases where the surveyor contacts landowners directly for permission to access survey sites via private property.

The surveyor will prepare a final report and supporting materials of inventory results:

Report will be organized to include the following sections: Introduction, Methods, Results (organized by site), and Summary.

1. Introduction will include general background information.
2. Methods will discuss the inventory methods used by the contractor.
3. Results will discuss findings for each site.  Information should include summary of historical records, detailed survey records, comparison efforts and findings from 2011 and 2016 surveys, and GPS coordinates of species records and sampling sites.
4. Summary will include discussion of species’ status, overall health or condition of the population throughout the entire AOC as well as in the new habitat restoration areas, ecologically important habitats, threats observed, a comparison of 2016 data to data collected in 2011, and an analysis of the mussel surveys and whether the population data meets the delisting targets for the “Degradation of Fish and Wildlife Populations” BUI.

After verification, WDNR NHI staff will enter rare species and high-quality natural community locations into the NHI database, the central repository for rare species and high-quality natural community data for Wisconsin. All data added to the NHI database go through a quality control process to ensure their validity and accuracy.

The surveyor shall, for a period of three years after completion and acceptance by the mussel survey project leader, maintain books, records, documents and other evidence directly pertinent to performance on work under this contract in accordance with generally accepted accounting principles and practices.

Natural Heritage Inventory (NHI) data are exempt from Wisconsin’s Open Record Law. All data collected under this project/contract become part of this inventory and should be treated as sensitive data. Distribution of inventory data and reports resulting from the work overseen by the Natural Heritage Inventory will primarily be the responsibility of the NHI Program. Any requests for this data should be directed to the WDNR project liaison who will coordinate distribution. Publication of data by surveyors is permitted if locations of element occurrences are generalized to prevent harm to the elements. The surveyor can distribute reports that do not contain precise locations of element occurrences. A list tallying where these records are distributed will be provided to the project liaison.