



# Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

## ENDANGERED SPECIES TRANSLOCATION GUIDELINES: *Freshwater Mussels (May 2013)*

### PURPOSE

The Natural Heritage and Endangered Species Program (NHESP) may request that a project proponent relocate (translocate) state-listed freshwater mussels away from project impact areas to *nearby suitable* habitat in order to:

1. avoid or minimize project-related impacts to imperiled state-listed species, and/or
2. avoid a “take” of imperiled state-listed species (MA Endangered Species Regulations, 321 CMR 10.00).

### IN ADVANCE OF THE TRANSLOCATION

- The translocation must address all *state- and/or federally listed mussel species identified by the NHESP*.
- *The NHESP MUST pre-approve the candidate mussel biologist who can demonstrate adequate field experience before translocation work begins.* The ability to locate and identify state-listed freshwater mussel species and their habitat(s) is required for an adequate freshwater mussel translocation. The NHESP may reject translocations that are not conducted by qualified individuals.
- Please forward the resume of the candidate mussel biologist to the NHESP for approval prior to the initiation of any translocation work.
- The mussel biologist is required to obtain a *Scientific Collection Permit* from the Division of Fisheries and Wildlife to handle live or dead state-listed mussels. If federally listed mussel species are present, the mussel biologist may also need a permit from the USFWS (e.g., to collect vouchers).
- The mussel biologist shall submit a proposed Scope of Work for the mussel translocation (e.g., methods, timing) with their application for a Scientific Collection Permit; the Scope of Work shall follow the *Key Elements* of the *NHESP Endangered Species Translocation Guidelines: Freshwater Mussels* (described below) and must be approved in writing by the NHESP. The required *Key Elements* may be modified after consultation with the NHESP due to project scope, current site conditions, habitat availability, and existing mussel information.
- Mussel surveys may be required prior to translocation and survey methods shall follow the *NHESP Endangered Species Survey Guidelines: Freshwater Mussels (draft May 27, 2009)*. If surveys are required, survey results shall be reported to NHESP. Translocation shall only occur after NHESP has reviewed and approved of the survey report, and approved of the translocation.
- Handling of mussels can cause the premature release of glochidia and spermatozoa so attempts shall be made to schedule translocation to avoid female brooding periods and spawning periods for given species; this is particularly important for sites that support **state-endangered** species.

[www.nhesp.org](http://www.nhesp.org)



**Natural Heritage & Endangered Species Program**

North Drive, Route 135, Westborough, MA 01581 Tel: (508) 389-6360 Fax: (508) 389-7891

- If translocation is approved by NHESP, collection and relocation of mussels shall occur no more than two weeks prior to the commencement of project construction. If project construction is delayed or interrupted by a period of two weeks an additional mussel survey shall be conducted and any state-listed mussels found shall be relocated (with NHESP approval) to nearby suitable habitat as described below.
- The NHESP shall be notified in writing one week prior to the initiation of the mussel translocation.

## REPORTING REQUIREMENTS

1. A narrative report that addresses all the *Key Elements* (see below) of the Freshwater Mussel Translocation, including: **Methods, Existing Conditions, and Maps.**
2. The report should also include:
  - A description of the study area including location, water body, size (area) of survey areas.
  - Description of translocation methods used:
    - Collection methods (snorkel, SCUBA, bucket, # surveyors).
    - Temporary holding technique (cooler, moist burlap etc.), marking techniques, and transport method.
    - Time spent collecting, transporting, and relocating mussels and weather conditions.
  - Summary of Results including:
    - List of all species translocated from the source site, including abundance estimates, shell lengths, and general shell condition for state-listed mussels.
    - Habitat descriptions at source and translocation and control sites.
    - Descriptions of subsurface excavation sites and findings.
    - Fish species observed.
    - Problems encountered or threats observed.
  - A monitoring plan for state-listed mussels within the translocation, control, and source plots.
3. Photographs of the representative habitat(s) at the source site and translocation and control sites.
4. Photographs of representative species tagged for translocation.
5. The location of state-listed mussel species or concentrations at the source site, translocation plot, and control plot should be mapped and overlaid on an ortho-photo (e.g., most recent MassGIS color orthos) with an indication of scale.
6. Rare Animal Observation Forms for state-listed species should be completed and forwarded to NHESP within 45 days of observation.
7. Names, qualifications, and contact information of all surveyors.
8. The report should be submitted by December 31 of the same calendar year of survey completion.
9. All other items specifically requested by the NHESP.
10. Number of copies of the Mussel Survey report to be submitted to the NHESP:
  - If you observe a state-listed species: 2 paper + 1 copy on CD
  - If you do not observe a state-listed species: 1 paper + 1 copy on CD

**Mail Report To:**

Regulatory Review  
The Natural Heritage & Endangered Species Program  
One Rabbit Hill Road  
Westborough, MA 01581

## REQUIRED KEY ELEMENTS OF THE ENDANGERED SPECIES TRANSLOCATION: *Freshwater Mussels*

MUSSEL TRANSLOCATION METHODS

1. Translocations must be conducted during June through September, during periods of low flows, and only during periods lacking significant rainfall.
2. Surface and subsurface searches, as described in the NHESP Endangered Species Survey Guidelines: Freshwater Mussels (draft May 27, 2009), shall be conducted to locate state-listed mussels within the entire portion of river, stream, lake, or pond associated with the project and its potential direct and indirect impacts (e.g., from bank clearing, downstream sedimentation, equipment staging, access, etc.). The NHESP may modify the standard survey distances based on the project type, existing site conditions, habitat availability, and existing mussel information. For example, if the survey area does not encompass all direct/indirect project impacts, the NHESP may expand the survey area as necessary.
3. Estimates of abundance shall be made using Catch Per Unit Effort and number of mussels found per species per square meter of survey area.
4. All state-listed mussels within these project impact area(s) shall be collected and relocated as soon as possible to *nearby suitable* habitat beyond project impact area(s); upriver from the project except in cases where suitable habitat is not available upriver.
4. The *mussel community* and the *habitat characteristics* at the translocation site shall be *similar* to those at the source site. Suitable mussel habitat at the translocation site is critical to the survival of relocated mussels; factors that must be considered when selecting the translocation site include: water quality, substratum composition and stability, water velocity and depth during seasonal extremes in river discharge, and availability of appropriate fish host species, if known (Sheehan et. al. 1989, Dunn et. al. 1999).
5. Mussels collected for translocation shall be kept moist (moist burlap or towels) or in water and may be temporarily held (for less than 8 hours) in coolers filled with river/lake water from the collection area; aerial exposure shall be limited (e.g., for tagging). Mussels being relocated shall not be exposed to extreme changes in water and air temperatures; translocation must be conducted during a time of year with moderate air and water temperatures and avoid periods with rapidly declining water temperatures. Overcrowding during translocation shall be avoided (Dunn and Sietman 1997).
6. All collected state-listed mussels shall be identified to species, counted, measured (length in mm), and marked or tagged and *carefully* rebedded into *stable* substrate, posterior end up, at the **translocation plot**. Uniquely numbered marks or tags must be applied using a method that has been demonstrated to remain legible for at least one year (see LeMarie et al. 2000); these tag numbers shall correspond with length measurements. Permanent marker is not a sufficient marking method. The translocation site shall be demarcated in the field, and clearly identified in the report, so that it can be readily located for future monitoring.
7. A nearby (5-10 feet away) **control plot** comparable in size to the translocation plot will be marked in a similar fashion and a complete tally of resident species will be made.
8. The **translocation plot, control plot, and source site** shall be visited one month and one year post translocation (duration and extent of follow-up monitoring may depend on the significance of the mussel population(s) being translocated).
9. At each follow-up visit to the **translocation plot** a complete tally of all mussel species shall be made and all state-listed translocated (marked) and resident (unmarked) mussels shall be monitored for survival, movement, and growth (length measurements not necessary at one month follow-up) (Villella et al 2004). If translocated mussels are not found, limited substrate excavation and/or searches outside the plot shall be employed to determine if marked mussels can be detected (Waller et. al. 1993).
10. At each follow-up visit to the **control plot** a complete tally of all mussel species shall be made and any movement and mortality will be noted. At each follow-up visit to the **source site** a complete tally of all mussel species will be made and habitat conditions will be noted.

<b>EXISTING CONDITIONS</b>	<ol style="list-style-type: none"> <li>1. <b>Habitat Description and Analysis</b> - Describe the habitat at the source site and translocation and control plots (e.g., substrate composition, flow, stream gradient, water quality, water clarity, stream depth and width, aquatic vegetation, bank and riparian areas, adjacent landuse etc...) and evaluate its quality and variation in regards to its suitability for state-listed mussels.</li> <li>2. <b>Host Fish</b> - List any fish species observed.</li> <li>3. <b>Other important site features</b> - Both natural and human-induced features of the source and translocation and control areas, such as existing disturbance or development (e.g., paved roads, bridges, pipes, culverts, docks, impoundments, dams, eroding banks, scouring, recreational use, predation, areas of recent forest clearing) should be described as well as any <i>off-site habitat features</i> that may be important to state-listed mussels.</li> <li>4. <b>Representative Photographs</b> - Photos of the source site and translocation and control sites, including pictures representative of the habitats encountered, shall be provided; indicate the photograph date, location (e.g., site #), and cardinal direction of view (e.g., photo #1; looking northeast) or a symbol on the site map which indicates where the photo was taken.</li> </ol>
<b>MAPS</b>	<ol style="list-style-type: none"> <li>1. <b>Habitat Map:</b> overlaid on current ortho-photo of the project site with an indication of scale <ul style="list-style-type: none"> <li>• All portions of the source site and translocation and control sites should be classified and mapped based upon its ability to provide habitat for the relevant species (e.g., substrate composition, flow (pools, runs, riffles), depth, aquatic vegetation, bank and riparian areas, adjacent landuse etc.)</li> </ul> </li> <li>2. <b>Mussel Distribution Map:</b> <ul style="list-style-type: none"> <li>• The location(s) of state-listed specimen(s) or concentrations from the source site (including subsurface excavation or nursery sites) and translocation and control plots shall be mapped.</li> <li>• The Mussel Distribution Map should be overlaid on an ortho-photo of the project site (e.g. current MassGIS color orthos) with an indication of the scale.</li> </ul> </li> </ol>
<p><b>IF STATE-LISTED SPECIES ARE OBSERVED, OBSERVATION FORM(S) MUST BE SUBMITTED TO THE NHESP WITHIN 45 DAYS THE OBSERVATION.</b></p>	

Dunn, H.L. and B.E. Sietman. 1997. Guidelines used in four geographically diverse unionid relocations. pages 176-183 in K. S. Cummings, A. C. Buchanan, C. A. Mayer, and T. J. Naimo. 1997. Conservation and management of freshwater mussels II, Initiatives for the future. Symposium Proceedings UMRCC, Oct. 1995, St. Louis, Missouri. UMRCC, Rock Island, Illinois.

Dunn, H.L., B.E. Sietman, and D.E. Kelner. 1999. Evaluation of recent Unionid (Bivalvia) relocations and suggestions for future relocations and reintroductions. Proceedings of the First Freshwater Mollusk Conservation Society Symposium, 1999, pages 169-183.

Lemarie, D.P., D.R. Smith, R.F. Vilella, and D.A. Weller. 2000. Evaluation of tag types and adhesives for marking freshwater mussels (Mollusca: Unionidae). Journal of Shellfish Research, Vol. 19, No. 1, pp. 247-250.

Sheehan, R.J., R.J. Neves, and H.E. Kitchel. 1989. Fate of freshwater mussels transplanted to formerly Polluted Reaches of the Clinch and North Fork Holston Rivers, Virginia. Journal of Freshwater Ecology, Vol. 5, No. 2. pp. 139-149.

Vilella, R.F., D.R. Smith, and D.P. Lemarie. 2004. Estimating Survival and Recruitment in a Freshwater Mussel Population Using Mark-Recapture Techniques. American Midland Naturalist, Vol. 151, No. 1, pp. 114-133.

Waller, D.L., J.J. Rach, W.G. Cope, and J.A. Luoma. 1993. A sampling method for conducting relocation studies with freshwater mussels. Journal of Freshwater Ecology, Vol. 8, No. 4.