



# Best Management Practices for Construction and Development Projects Freshwater Mussels

## Purpose and Use

The information in this document is to be used to help avoid and minimize species impacts due to construction practices. It is not intended as a guide to manage habitat for a given species. Please contact the Department of Conservation if habitat management information is needed. Because every project and location differ, following the recommendations in this document does not guarantee impacts will not occur to the species and additional information may be required in certain instances. Following the recommendations in this document does not complete Endangered Species Act consultation that may be necessary for species listed under the federal Endangered Species Act; please contact the U.S. Fish and Wildlife Service for more information.

## Ecology

Mussels are relatively immobile animals that are vulnerable to pollutants, sediment, channel alterations, and other activities which may negatively impact their habitats. Mussels can be found in a variety of aquatic environments. A majority prefer permanently flowing water over a stable substrate. They are generally found buried in clean, silt-free substrates composed of sand, gravel, cobble, and boulder mixtures throughout many streams and rivers. Some mussel species are also found in oxbow lakes, backwaters, and side-channels of rivers which may include muddy habitats. Some species have narrow ranges and are restricted to a few rivers (and some to just a few locations). Other species are widespread and may be encountered throughout the state. For several rare/endangered species, Missouri's rivers are home to some of the best, last remaining populations.

Mussels obtain their food by siphoning and filtering surrounding materials from the water. One individual may filter several gallons of water per day to gather necessary nutrients. All of Missouri's mussel species depend on a vertebrate host, usually fish, to complete their life cycle. Because of this they begin life barely visible to the eye which also makes them extremely prone to impacts within their environment. However, if conditions remain suitable, mussels are known to live for extremely long periods, some for over 80 years or more.

## Reasons for Decline

Direct and indirect alteration and degradation of stream habitats have contributed to the decline of many mussel species. Such practices include gravel mining, removal of trees and undergrowth along the streambank,

nonpoint source pollution from agriculture and urban areas, dredging, channelization, dams and impoundments, work pads and coffer dams. These practices have reduced available habitat, increased stagnation, and siltation, and possibly eliminated or reduced numbers of necessary hosts.

## Specific Recommendations

Freshwater mussels can be negatively impacted at any time of the year by direct substrate disturbance, destabilization of the stream bank, sedimentation following substrate or bank disturbance, introduction of chemical or organic pollutants, or indirectly through impacts to the fish host. These recommendations identify practices that will help avoid and minimize some project impacts.

If historical records occur within or near the project area and a supplementary survey has indicated that mussels or suitable habitat is present, please contact MDC and FWS for additional information. The following recommendations are provided and meant for all projects which may potentially impact mussels or their habitat.

- Have a trained biologist conduct a mussel survey in the project area to identify habitat or mussel occurrences.
- No work should be conducted below the high bank of the waterway between dates shown in Figure 1 to allow for successful reproduction and recruitment of these species.
- Prevent/avoid activities that alter or destabilize stream bottoms or banks or introduce sediment, chemical or organic pollutants or impact fish hosts.
- Avoid crossing flowing water but, if unavoidable, minimize crossing distance perpendicular to the flow of water and use temporary crossings that do not restrict water flow.
- Dams and other water impoundment structures, including culverts and causeways, that alter substrate stability and composition, or water depth should be avoided in creeks and rivers that contain mussel habitat. If temporary culverts must be installed, they should be sized and installed such that all possible flows can be successfully conveyed.
- Temporary instream workpads should be sized and situated such that they do not affect overall hydrology of the location.
- Maintain and reestablish forested riparian corridors at least 100-feet wide along streams to help reduce erosion and buffer potential land-use impacts.
- All equipment that enters the waterway should be washed and checked for juvenile zebra mussels

before entering another body of water. This will help prevent the spread of this exotic Eurasian mussel species that can negatively affect native aquatic organisms and mussel species.

- All equipment used in or near the waterway should be properly maintained such that gasoline, oil, and other fluids do not spill into the waterway.
- Gravel mining activities should at a minimum adhere to all Missouri guidelines for the extraction of gravel.
- [Pre-Construction Notification \(PCN\)](#) must be provided to the District Engineer for any regulated activity in waters listed at The submitted PCN will be coordinated in accordance with General Condition 32(d) with the U.S. Fish and Wildlife Service as determined appropriate by the Corps.

## General Recommendations

Refer to *Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams*.

If your project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or the [Missouri Department of Transportation Environmental Studies webpage](#) for additional information on recommendations.

## Information Contacts

For further information regarding regulations for development in rivers and streams, contact:

For species information:

[Missouri Department of Conservation](#)  
Science Branch  
P.O. Box 180  
Jefferson City, MO 65102-0180  
Telephone: 573-751-4115

For species information and Endangered Species Act Coordination:

[U.S. Fish and Wildlife Service](#)  
Ecological Services  
101 Park Deville Drive, Suite A  
Columbia, MO 65203-0007  
Telephone: 573-234-2132

For Clean Water Act Coordination:

[Missouri Department of Natural Resources](#)  
Water Protection Program  
P.O. Box 176  
Jefferson City, MO 65102-0176  
Telephone: 573-751-1300, 800-361-4827

[U.S. Army Corps of Engineers](#)  
Regulatory Branch  
700 Federal Building

Kansas City, MO 64106-2896  
Telephone: 816-389-3990

[U.S. Environmental Protection Agency](#)  
EPA Region 7 Water Division  
11201 Renner Boulevard  
Lenexa, KS 66219  
Telephone: 913-551-7977

## Disclaimer

These Best Management Practices were prepared by the Missouri Department of Conservation with assistance from state and federal agencies, contractors, and others to provide guidance to those who wish to voluntarily act to protect wildlife and habitat. Compliance with these Best Management Practices is not required by the Missouri wildlife and forestry law nor by any regulation of the Missouri Conservation Commission. Federal laws such as the Clean Water Act and the Endangered Species Act, and state or Local laws need to be considered for construction and development projects and require permits and/or consultation with the appropriate agency. Following the recommendations provided in this document will help reduce and avoid project impacts to the species, but impacts may still occur. Please contact the appropriate agency for further coordination and to complete compliance requirements.



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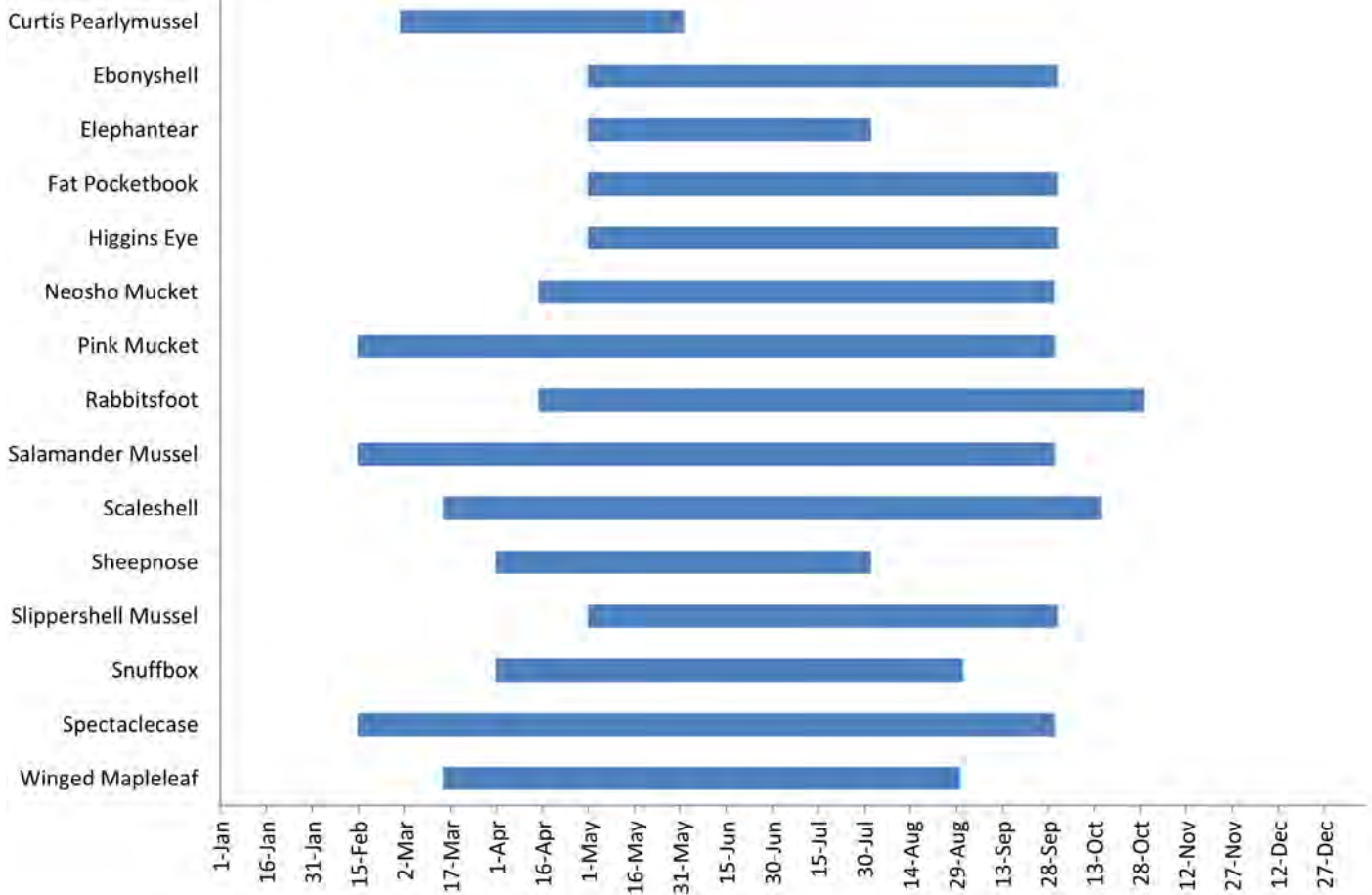


Figure 1. Mussel species avoidance period recommendations for construction activities planned below the high stream bank.