



5 June, 2016

The Pacific Northwest Native Freshwater Mussel Workgroup is asking for your help to collect data on freshwater mussel die-offs in the northwestern states and adjacent provinces so we can better track, investigate, and mitigate these events. The freshwaters of the Pacific Northwest are home to several species of mussels (field guide at: https://pnwmussels.org/wp-content/uploads/2016/07/pnw_mussel_guide_2nd_edition.pdf). Freshwater mussels provide important ecosystem services that benefit fish and other wildlife. Northwestern mussels experience multiple stressors and many populations are in decline. Anecdotal observations of large numbers of dead or moribund mussels have been made in recent years, but die-offs have not been tracked systematically.

Die-offs may be due to changes in flow (i.e. drought, stream diversions, impoundment drawdowns), water quality degradation (i.e. thermal stress, toxins, low dissolved oxygen), or disease. When mussel mortality is caused by de-watering, a rapid drop in water levels can expose large numbers of stranded mussels that died *in situ*. When de-watering is slower, tracks are often seen in the substrate from mussels moving to areas of remaining water. The most obvious signs of dead or dying mussels include:

- delayed and/or weakened valve (shell) closing when touched or removed from the substrate
- mussels lying flat on the substrate or floating in the water
- valves gaping wide open
- an extremely foul odor

In contrast, indications of healthy mussels include:

- valves may be slightly open but close quickly when mussel is handled
- mussels usually anchored upright in the substrate by their extended foot
- mantle (body) tissue and/or feeding siphons may be visible

If you see a freshwater mussel die-off, record as much of the following as you can: date; water body name and location (geographic coordinates if possible); observations of die-off (habitat conditions, approximate number and description of dead/dying mussels); mussel species (if known); and potential reason(s) for the die-off. Please take photos or video to document the event and facilitate species identification. Please enter your observation at <https://arcg.is/OKOSHG> or e-mail your name, contact information, and the data and images to Emilie Blevins (Xerces Society for Invertebrate Conservation) at emilie.blevins@xerces.org.

Note that if a mussel valve/shell is observed without tissue, found piled with other shells (i.e. a shell midden), and is broken or covered with scratches or bite marks, it may be evidence of predation by river otters or raccoons and does not count as a die-off event. Observations of healthy mussels and middens are also of interest and can be reported at the workgroup's iNaturalist project (<https://www.inaturalist.org/projects/freshwater-mussels-of-the-western-u-s>).

With your help, the Pacific Northwest Native Freshwater Mussel Workgroup can better monitor and conserve our vulnerable native mussel species.