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Acute toxicity of the lampricide 4-Nitro-3-(trifluoromethyl)phenol (TFM) to *Obovaria subrotunda*, its host (*Percina maculata*), and a surrogate species (*O. olivaria*)

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#### **ABSTRACT:**

The risk of lampricide applications (such as 4-Nitro-3-(trifluoromethyl)phenol, TFM) to non-target fauna continues to be a concern within the Great Lakes Fishery Commission Sea Lamprey Control Program, especially among imperiled aquatic species—such as native freshwater mussels. The Grand River (Ohio, USA) is routinely treated for larval sea lampreys (*Petromyzon marinus*), and this river contains populations of the mussel *Obovaria subrotunda* which was Federally listed in 2023. Given this spatial overlap, information on the sensitivity of *O. subrotunda* to TFM is needed. Our objectives were to assess the acute toxicity of TFM to (1) adult *Obovara olivaria* (a surrogate for *O. subrotunda*), (2) glochidial larvae of *O. olivaria* and *O. subrotunda*, (3) juveniles of *O. olivaria* and *O. subrotunda*, and (4) adult *Percina maculata* (host for *O. subrotunda* glochidia). In acute toxicity tests, TFM was not toxic to glochidia and adult mussels at exposure concentrations that exceed typical treatment rates. Although significant dose-response relationships were observed in juveniles and host fish, survival was  $\geq 95\%$  (*P. maculata*),  $\geq 93\%$  (*O. olivaria*), and  $\geq 74\%$  (*O. subrotunda*) at typical treatment rates. However, the steep slope of these dose-response relationships indicates that a ~20% difference in the treatment level can result in nearly an order of magnitude difference in survival. Collectively, these data indicate that routine sea lamprey control operations are unlikely to acutely affect these species or their host. However, given that many mussel species are long-lived (30–100 y), the risks posed by lampricide treatments in the Great Lakes would be further informed by research on the potential long-term effects of lampricides on imperiled species.