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Hooking Mortality of Trophy-Sized Wild Brook Trout Caught on Artificial Lures

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Abstract.—The average hooking mortality per capture event for 630 trophy-sized wild brook trout (mean total length 33.9 cm) caught on five hardware lures was 4.3% during the first 48 hours after capture. Mortality was 8.3% for trout caught on Mepps spinners and Cleo spoons equipped with a treble pointed hook whereas fish caught on the same lures with a single-pointed hook died at a significantly lower rate of 2.4% per hooking event ($P < 0.05$). There was no mortality among 126 trout caught with Rapala lures rigged with two treble hooks. We believe that the differences in mortality of trout caught with different lures are due primarily to differences in the frequency and extent of damage to the gill arches and esophagus area. Certain lures were more likely to be engulfed deeply, particularly by larger trout, and thus were more likely to cause death. Lures which exhibit vigorous wobbling action when retrieved appear less likely to be deeply engulfed and consequently cause less mortality. Hooking mortality estimates for trout caught on Mepps or Cleo lures were positively and significantly correlated with size of fish. The probability of death within 48 hours of capture for heavily bleeding trout which were hooked in the gills and/or throat increased rapidly with increasing water temperature. Trout which did not bleed heavily following capture with Mepps and Cleo lures equipped with treble hooks which did not penetrate the gill or throat region were unlikely to die due to temperature effects until temperatures rose to approximately 14°C. The probability of death was not significantly associated with temperatures ranging from 5.6 to 17.8°C when trout were hooked with single-pointed hooks which penetrated anatomical sites other than the gills or throat and did not bleed heavily. Present regulations on Michigan's trophy trout lakes, which restrict lures to single pointed hooks and forbid harvest of fish less than 38.1 cm, appear quite adequate to minimize losses due to hooking mortality.

Large minimum size limits and no-kill regulations are two methods fisheries managers use to increase both the size and number of fish caught. Special regulations of artificial lures with single hooks, a creel limit of two fish per day, and a 38.1-cm minimum length size limit apply on 12 of Michigan's designated trout lakes. These regulations are designed to provide opportunities for trophy brook trout (*Salvelinus fontinalis*) fishing. Since brook trout in most inland lakes in Michigan do not grow to 38.1 cm until approximately age 4 or 5, they are subject to many years of catch-and-release angling before they can be harvested. Although many studies of salmonid hooking mortality have been reported, we could find no references concerning mortality of large brook trout. The sample size (number of hooking events) in most studies we reviewed were generally far smaller than the 630 hooking events examined in this study. Moreover, many studies have employed hatchery trout as their test fish