

Trout Hooking Mortality Research

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fishing and spinner fishing, and to test an active baitfishing technique that could substantially reduce post-release mortality.

Objectives:

1. To determine rates of mortality of wild stream brook trout and brown trout caught using an active baitfishing technique.
2. To determine if mortality, sublethal injury, ease of release and capture efficiency differed between barbed and barbless baited hooks.
3. To determine if mortality, sublethal injury, and capture efficiency differed between treble-hook and single-hook spinners having either barbed or barbless hooks.

Methods: The methodology for this study was described in detail in two *In press* reports. The general thrust of the experimental design was to capture wild stream trout from the Bois Brule River and tributaries using standard equipment by active bait fishing (tight line and immediate hook set) and by fishing size-1 Mepps spinners. When baitfishing, the focus was to capture near equal samples of brook trout with both barbed and barbless size 6 hooks. When spinner fishing, the focus was to capture near equal samples of rainbow trout, brown trout, and brook trout with single and treble hook spinners having either barbed or barbless hooks. Captured trout were given minimal tip-of-fin clips to indicate hook type and presence of sublethal injury. Captured trout were held in water-filled coolers, with the water changed frequently, for the duration of the outing. They were then transferred to instream holding cages and checked for mortality daily before release at either 48 or 72 hours. For each hook type we also recorded the total number of strikes, number of strikes missed, and number of hooked fish that were lost.

Partner Agencies and Organizations:

- Dept. of Wildlife Conservation, Fisheries Research Laboratory, OK
 - UW-Madison School of Veterinary Medicine, WI
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Fishery regulations on trout streams must be tailored to support management objectives for those fisheries. Management decisions about regulations should be based on sound scientific data demonstrating that the regulation in question will produce the biological gain desired. Managers of stream trout fisheries must often make regulatory decisions based on incomplete or contradictory information, and if these regulations do not produce the anticipated biological advantages, agency credibility can suffer. Unnecessary regulations that restrict angling opportunities without producing biological gains can be particularly damaging, especially in the current national situation of stagnant or declining license sales in most states. Two regulatory concepts that currently suffer from inadequate information concern the putative benefits on post-release survival of barbless hooks versus conventional hook having barbs, and the restriction of baitfishing from some special regulation fisheries because of the possibility of excessive post-release mortality.

The purpose of this study was to fill critical information gaps in the fisheries literature concerning barbed versus barbless hooks when bait

Preliminary Results: Both study components have been completed and are currently *In press* in the North American Journal of Fisheries Management. Sections of the Abstracts appear below:

Bait fishing component – Mortality by 72 h (2 to 7%), anatomical hooking locations, and eye damage (5% of captures) of brook trout did not differ between hook types. However, those brook trout that were deeply hooked were more likely to die when barbed hooks were used. Mortality and eye damage of brown trout were similarly low, but sample sizes were insufficient to test between hook types. Neither hooking efficiency, frequency of escape after hooking, nor the mean amounts of time that fish were held out of water for unhooking differed significantly between hook types. Active bait fishing resulted in levels of post-release mortality that were substantially lower than those often reported in bait fishing mortality studies.

Spinner fishing component - Mortality of rainbow trout, brown trout, and brook trout was low (< 4%) and did not differ among species. Hook types did not differ significantly in mortality, anatomical hooking locations, or eye damage of rainbow trout or brown trout. Cases of severe eye damage occurred to about 10% of trout landed (range 2 to 13% depending on species), with brown trout being least susceptible. Jaw injuries were found on about 6% of the catch. Barbed hooks hooked and held more trout than barbless hooks and treble hooks hooked and held more trout than single hooks. Barbless single hooks were quicker to remove than the other hook types, but the difference was insufficient to reduce mortality. Our results do not indicate a biological advantage with the use of single- or barbless-hook spinners when wild stream trout will be released.

Management Applications:

1. If fisheries managers can successfully educate the angling public about the benefits of active bait fishing, post-release mortality can be greatly reduced when bait is used.
2. Bait fishing may be having less negative impact on wild stream trout fisheries than previously thought because earlier studies have tended to overestimate baitfishing mortality and because evidence suggests that some anglers are already fishing actively.
3. Barbed hook restrictions are generally unnecessary (biologically ineffective at reducing

post-release mortality) when stream trout are caught with bait or spinners. However, in bait fisheries where rates of deep hooking are substantially higher than those we measured, barbless hooks may reduce mortality.

4. Anglers fishing with barbless and single-hook spinners can expect to land fewer trout per hour (i.e. experience reduced angling quality) than if conventional barbed treble-hook spinners are used.