## Statewide Fish Marking and Mark Recovery Program

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### *Background*

Fish have been marked, using a variety of methods, for well over two hundred years. The first marks were simple external tags, such as wires or ribbons. In recent years, methods of externally marking fish have included branding, tattooing, and optical pattern recognition. Internal tags or marks have also evolved considerably in recent years, and now include both artificial as well as natural marks. Artificial marks include implanted coded-wire tags, dyes on otoliths ("ear bones") or other hard parts, visible implants, and radio and ultrasonic implants. Natural internal marks include genetic marks, chemical / elemental marks, and biological marks (e.g., unique parasites, others). All of these various methods are used extensively, and each has unique advantages that are dependent on the goals of the marking program.

Photo 1. Cooperating USFWS biologists tagging fish with coded-wire tags in an auto-fish marking trailer in support of the Great Lakes Mass Marking Program.

Coded-wire tag marking of fish by Fisheries Division began in the mid-1980s, and oversight of the program moved to the Charlevoix Fisheries Research Station around 1990. Since 1990, more than 25 million trout and salmon have been marked with coded-wire tags (Photo 1), and more than 100,000 tags have been recovered to provide information critical to the successful management of these important fish populations. In recent years, additional marking programs (e.g., oxytetracycline marking of Lake Michigan and Lake Huron stocked Chinook salmon, isotope analysis of Chinook salmon and steelhead, Great Lakes Mass Marking Program) have been initiated and play an equally important role in Great Lakes management efforts.

The objectives of the statewide fish marking program are to coded-wire tag and adipose fin clip experimental lots of fish at state fish hatcheries; to design, develop, and manage databases for research studies that use coded-wire tags and other identifying marks; and to coordinate activities conducted in Michigan related to the Great Lakes-wide Mass Marking initiative. Marking studies have been implemented for a variety of reasons—including estimating fish growth, mortality, exploitation (harvest), and movement—and fish marking data collected as a result of this program are used extensively in resource management decisions. For example, coded-wire tag marking has been used to measure relative return of Chinook Salmon and steelhead stocked by different methods (net pen v. direct plant) and at different sites (upstream v. downstream, different ports), to evaluate the success of the Atlantic Salmon stocking program, and in implementing the MDNR Lake Sturgeon rehabilitation plan to mention a few of the many ways this information gets put to work for Michigan's fisheries. Angler cooperation is an essential

component of most of these studies, as we need assistance in retrieving marked fish from our waters (Photo 2).

Photo 2. MDNR staff collecting information from tagged fish at a Lake Michigan tournament.

### *Key study results*

- Approximately 1,235,000 Chinook Salmon, 58,000 Rainbow Trout, 180,000 Atlantic Salmon, and 570 Lake Sturgeon were marked with a coded-wire tag (CWT) and adipose fin clip in 2015. The total number of fish marked in 2015 was slightly greater than the number marked in 2014.
- A total of 7,357 CWT fish collected in 2014 have been processed at the Charlevoix Fisheries Research Station. Chinook Salmon (N=5,906) were the species with the highest number of CWTs recovered and processed, followed by Lake Trout (943) and Rainbow Trout (482). Overall, the majority of tag collections were from sport fisheries (73%) and weir returns (21%). The total number of fish processed in 2014 was greater than the number processed in 2013, and above the average for the period 1990–2013. Processing of tagged fish from 2015 collections is still ongoing.

### *Where you can find study details*

Additional information concerning returns of tagged fish to specific Great Lakes ports can be found at http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_10949_11238_11359-171648--,00.html. Additional general information concerning the Fisheries Division fish marking program can be found at http://www.michigan.gov/dnr/0,1607,7-153-10364_52259_48361---,00.html and specific study details can be found at http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056-333302--,00.html.