STUDY PERFORMANCE REPORT

State: Michigan **Project No.:** F-80-R-3

Study No.: 464 **Title:** Coded-wire tag and oxytetracycline marking of salmonines in the Great Lakes and tributary streams and data base management for tagged fish returns and weir and survey data

Period Covered: October 1, 2001 to September 30, 2002

Study Objective: To coded-wire tag and adipose fin clip, or mark with oxytetracycline, experimental lots of fish at state fish hatcheries. To design, develop, and manage databases for research studies which utilize coded-wire tags (CWT) or oxytetracycline (OTC), harvest weir data, and survey data from Charlevoix Fisheries Research Station research studies. To convert all past Charlevoix Fisheries Research Station main frame and personal computer data files into a common personal computer-based format.

Summary: Approximately 1.1 million chinook salmon were marked with a coded-wire tag and adipose fin clip in 2002. In addition, 9,456 lake sturgeon were marked with CWTs. Tag retention for individual lots of chinook salmon ranged from 91-96% and averaged 94%. Marked and unmarked Atlantic salmon, brown trout, chinook salmon, coho salmon, lake trout, and rainbow trout were sampled from index surveys, sport fisheries, tribal fisheries, weirs, and fish ladders. More than 5,000 salmonines with CWTs were processed from the 2001 collections. Rainbow trout (N=2,488 fish), lake trout (N=1,801), and chinook salmon (N=752) accounted for the majority of fish collected in 2001 for CWT processing.

A 5-year report / draft manuscript will be submitted to the Fisheries Division's Editing and Finishing Process for Publication of Research and Technical reports by December 31, 2002. This manuscript will be published as a Fisheries Research Report during 2002-03, and submitted as a final report December 2003.

Findings: Jobs 1, 2, 3, 4, and 5 were scheduled for 2001-02, and progress is reported below.

Job 1. Title: Mark fish and conduct quality control.–Approximately 1,090,040 chinook salmon received a coded-wire tag and adipose fin clip in 2002. Tag retention was high, averaging 94%, and ranging from 91-96% for individual lots of fish (Table 1). In addition to chinook salmon, 9,456 lake sturgeon were marked with CWTs in 2002. The total number of fish marked in 2002 was less than in 2001(Table 2), but near the annual (1990-2001) average for MDNR coded wire tag operations.

Job 2. Title: Sample marked and unmarked fish.–Marked and unmarked Atlantic salmon, brown trout, chinook salmon, coho salmon, lake trout, and rainbow trout were collected in 2001 from assessment samples, sport fisheries, tribal fisheries, and harvest weirs (Table 3). These collections resulted in proportional samples of marked and unmarked fish. Additional, non-proportional samples of marked fish were obtained from the sport fisheries through creel census, fishing tournaments, and anglers and charter boat operators who observed an adipose-fin clipped fish and voluntarily returned the head to a designated drop-off site (Table 3). Some non-proportional

samples of CWT fish were also collected at fish ladders (Study 487). Collection of marked and unmarked fish is ongoing during 2002, from the same sources utilized in 2001.

Job 3. Title: Read CWT and OTC marked fish.–All adipose-clipped fish collected during the 2001 field season (see Job 2) were examined for presence of a CWT; tags were removed, read, and recorded in a database. Data were provided to other researchers and managers (both within and outside the MDNR) as requested. A significant portion of work in this job involves data sharing and exchange with other state and federal agencies.

A total of 5,079 CWT fish collected in 2001 have been processed at the Charlevoix Fisheries Research Station (Table 3). This number likely represents most of the fish collected in 2001 with CWTs that will be turned in for analysis, although volunteer anglers may continue to return some fish. Rainbow trout (2,488 fish) were the species with the highest number of CWTs recovered and processed, followed by lake trout (1,801) and chinook salmon (752). The majority (82%) of the returns were from the sport fisheries through volunteers and the creel census program (Study 427). The total number of fish processed in 2001 (5,079) was slightly lower than the average for the period 1990-2000 (Table 4).

Job 4. Title: Prepare annual report.–This Performance Report was completed as scheduled.

Job 5. Title: Develop data base structures and do data entry.–Databases have been corrected to standardize data codes and fields, allowing users to link and work with multiple databases. In addition to the databases maintained at Charlevoix Fisheries Research Station (surveys, creel census, coded-wire tag), compatibility with databases maintained by other Michigan Department of Natural Resources (MDNR) units has been ensured. These units include the Fish Health Laboratory, Fish Production Section, and Fisheries Information Management Section. Database maintenance and improvement work is ongoing.

Data entry has been completed for all CWTs collected during 2001 using the standard entry format that was developed previously. The entry form utilized simplifies the entry process and greatly reduces errors. Visual basic programming allows for automatic searches of the extensive volunteer and CWT databases.

Information on stocking and capture locations is entered in formats that are compatible with GIS (geographic information systems) mapping programs. Recording locations in decimal degree formats and standardizing entries allows for more efficient use of information obtained from within the coded-wire tag database when conducting spatial / movement analyses.

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Table 1.–Number of spring fingerling chinook salmon marked with coded-wire tags and stocked in 2002, by stocking location. Number tagged is not corrected for tag retention or fin clip rates. Overall values are total fish for number tagged and average percentage for tag retention.

Study number	Stocking site	Number tagged	Tag retention (%)	Stocking date	Net pen (Y/N)
513/692	Medusa Creek, Charlevoix	206,843	96.4	05-30-02	Yes
482	Port Sanilac	82,143	95.1	05-14-02	No
482	Lexington	82,250	94.9	05-15-02	No
482	Au Gres River	60,783	93.2	05-20-02	No
692	St. Joseph River	154,386	92.6	05-15-02	Yes
482	Mill Creek, Harrisville	101,827	91.0	05-00-02	Yes
482/513/692	Swan River, Rogers City	198,209	94.1	05-07-02	No
513/692	Little Manistee River	203,599	92.9	05-09-02	No
Overall		1,090,040	93.8		

Table 2.–Number of fish marked with coded wire tags, 1990-2002. Number tagged is not corrected for tag retention or fin clip rates.

Year	Atlantic salmon	Chinook salmon	Lake trout	Rainbow trout	Other	All species
1990	0	1,140,491	98,361	142,618	0	1,381,470
1991	50,315	1,464,558	97,344	0	0	1,612,217
1992	51,498	1,328,518	111,000	0	0	1,491,016
1993	78,580	1,420,863	0	32,597	0	1,532,040
1994	35,259	1,423,681	100,303	35,476	0	1,594,719
1995	70,853	515,240	107,957	36,320	0	730,370
1996	48,101	515,282	0	349,727	0	913,110
1997	45,211	512,938	0	435,148	0	993,297
1998	54,159	485,634	59,200	392,172	0	991,165
1999	0	270,280	0	378,864	3,195	652,339
2000	0	800,294	0	0	10,744	811,038
2001	0	1,115,262	151,176	0	4,370	1,270,808
2002	0	1,090,252	0	0	9,456	1,099,708
Total	433,976	12,083,293	725,341	1,802,922	27,765	15,073,297
Average (1990-2001)	36,165	916,087	60,445	150,244	1,526	1,164,466

Table 3.–Number of fish collected in 2001 from various sources and examined for the presence of coded wire tags. Tags were removed and read at the Charlevoix Fisheries Research Station. Percentage of total fish from each source and species is shown in parentheses.

Source	Gear type	Atlantic salmon	Brown trout	Chinook salmon	Coho salmon	Lake trout	Rainbow trout	Other	All species Total	All species % of total
Assessment -										
Index samples	Gill net	1	0	7	0	105	1	0	114	2.2
	Electrofishing	0	0	0	0	0	0	0	0	0.0
	Other	0	0	1	0	13	5	0	19	0.4
Sport-Caught	Charter boat	0	0	12	0	89	65	0	166	3.3
	Creel clerk	1	10	115	4	399	701	0	1,230	24.2
	Headhunter	0	1	96	0	353	152	0	602	11.8
	Tournaments	0	0	28	0	400	132	0	560	11.0
	Volunteer	13	4	145	3	370	1,076	0	1,611	31.7
Tribal samples	Gill net	0	0	0	0	72	0	0	72	1.4
	Other	1	0	0	0	0	0	0	1	<0.1
Weir samples	Harvest Weirs	0	0	348	0	0	1	0	349	6.9
	Fish Ladders	0	0	0	0	0	355	0	355	7.0
Total all sources		16	15	752	7	1,801	2,488	0	5,079	100.0
% of total		0.3	0.3	14.8	0.1	35.4	50.0	0.0		

Table 4.–Number of fish collected from various sources and examined for the presence of coded wire tags, 1990-2001. Tags were removed and read at the Charlevoix Fisheries Research Station.

Year	Atlantic salmon	Chinook salmon	Coho salmon	Lake trout	Rainbow trout	Other	All species
1990	0	276	66	343	857	3	1,545
1991	0	1,347	30	717	1,362	6	3,462
1992	2	2,193	22	929	2,146	8	5,300
1993	85	2,975	33	1,039	737	14	4,883
1994	268	4,141	18	1,771	386	21	6,605
1995	104	4,916	14	2,918	252	6	8,210
1996	81	3,638	55	3,493	440	29	7,736
1997	212	2,355	52	3,476	546	31	6,672
1998	166	1,447	59	3,115	2,110	22	6,919
1999	98	1,301	11	2,491	3,733	48	7,682
2000	84	749	18	2,511	3,812	27	7,201
2001	16	752	7	1,801	2,488	15	5,079
Total	1,116	26,090	385	24,604	18,869	230	71,294
Average (1990-2000)	100	2,303	34	2,073	1,489	20	6,020