

## STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-7

Study No.: 230464

Title: Statewide coded-wire tagging and tag recovery program.

Period Covered: October 1, 2005 to September 30, 2006

**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 725,000 Chinook salmon *Oncorhynchus tshawytscha* were marked with a coded-wire tag and adipose fin clip in 2006. Tag retention for Chinook salmon ranged from 80-86% and averaged 82%. Marked and unmarked Atlantic salmon *Salmo salar*, brown trout *Salmo trutta*, Chinook salmon, coho salmon *Oncorhynchus kisutch*, lake trout *Salvelinus namaycush*, and rainbow trout *Oncorhynchus mykiss* were sampled from index surveys, sport fisheries, tribal fisheries, weirs, and fish ladders. Approximately 3,400 salmonines with CWTs were processed from the 2005 collections. Chinook salmon (N=2,440), lake trout (N=873), and rainbow trout (N=46 fish) accounted for the majority of fish collected in 2005 for CWT processing.

**Findings:** Jobs 1 through 5 were scheduled for 2005-06, and progress is reported below.

**Job 1. Title: Mark fish and conduct quality control.**-Approximately 729,000 Chinook salmon were marked with a coded-wire tag and adipose fin clip in 2006. Tag retention was lower than in previous years, averaging 82% and ranging from 80-86% across stocking sites (Table 1). Approximately 8,000 lake sturgeon *Acipenser fulvescens* were also marked with a coded-wire tag in 2006 (Table 2). The total number of fish marked in 2006 was similar to 2005 (Table 2).

**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 2005 from assessment samples, sport fisheries, tribal fisheries, and harvest weirs (Table 3). These collections resulted in proportional samples of marked and unmarked fish. Due to reduced budgets for state workers in summer 2005, tag collection efforts (proportional samples) were significantly reduced compared with previous years.

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 230487). Collection of marked and unmarked fish is ongoing during 2006, from the same sources used in 2005.

**Job 3. Title: Read CWT and OTC marked fish.**-All adipose-clipped fish collected during the 2005 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 3,367 CWT fish collected in 2005 have been processed at the Charlevoix Fisheries Research Station (Table 3). This number probably represents most of the fish collected in 2005 with CWTs that will be turned in for analysis, although volunteer anglers may continue to return some fish. Chinook salmon (N=2,440) were the species with the highest number of CWTs recovered and processed, followed by lake trout (873) and rainbow trout (46). The majority (44%) of tag collections were from sport fisheries, through volunteer, creel census program (Study 230427), and headhunter returns. The total number of fish processed in 2005 was slightly lower than the average for the period 1990-2004 (Table 4).

**Job 4. Title: Prepare annual report.**-This performance report was completed as scheduled. Presentations of coded-wire tag results were made to various sport-fishing groups. Project personnel also collaborated with other researchers in the preparation of annual Performance Reports (Studies 230482, 230485, 230487, 230692), peer-reviewed publications (Adlerstein et al., several publications in review), and a Great Lakes-wide fish marking initiative.

**Job 5. Title: Develop data base structures and do data entry.**-Database maintenance and improvement work is ongoing. 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.

Data entry has been completed for all CWTs collected during 2005 using the standard entry format that was developed previously. The entry form used 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 and movement analyses.

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**Date: September 30, 2006**

Table 1.—Number of spring fingerling Chinook salmon marked with coded-wire tags and stocked in 2006, 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)
230513/230692	Medusa Creek, Charlevoix	202,483	84.3	06-01-06	Yes
230692	St. Joseph River	121,645	85.8	05-15-06	Yes
230513/230692	Swan River, Rogers City	200,055	79.6	05-17-06	No
230513/230692	Little Manistee River	200,869	79.6	05-12-06	No
Overall		725,052	82.3		

Table 2.—Number of fish marked with coded wire tags, 1990-2006. Number tagged is not corrected for tag retention or fin clip rates.

Year	Atlantic salmon	Chinook salmon	Lake trout	Rainbow trout	Lake sturgeon	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
2003	0	763,238	0	0	5,291	768,619
2004	0	760,079	0	0	7,322	767,401
2005	0	759,959	0	0	0	759,959
2006	0	725,052	0	0	7,962	733,014
Total	433,976	15,091,711	725,341	1,802,922	48,340	18,102,290
Average (1990–2005)	27,124	897,916	45,334	112,683	2,524	1,085,580

Table 3.—Number of fish collected in 2005 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.

Gear type	Atlantic	Brown	Chinook	Coho	Lake	Rainbow	Other	All species	
	salmon	trout	salmon	salmon	trout	trout		no	(% of total)
<u>Assessment/Index samples</u>									
Gill net	0	0	2	0	168	0	0	170	(5.0)
Electrofishing	0	0	3	1	0	0	0	4	(0.1)
<u>Sport-caught</u>									
Charter boat	0	0	41	1	9	3	0	54	(1.6)
Creel clerk	0	0	240	1	130	8	0	379	(11.3)
Headhunter	0	0	97	1	7	0	0	105	(3.1)
Tournaments	0	0	200	0	81	3	0	284	(8.4)
Volunteer	0	4	491	0	148	29	0	672	(20.0)
<u>Tribal samples</u>									
Gill net	0	0	0	0	330	0	0	330	(9.8)
<u>Weir samples</u>									
Harvest weirs	0	0	1,340	0	0	0	0	1,340	(39.8)
Fish ladders	0	0	16	0	0	3	0	19	(0.6)
<u>Other</u>									
Unknown	0	0	10	0	0	0	0	10	(0.3)
All sources (% of total)	0 (0.0)	4 (0.1)	2,440 (72.5)	4 (0.1)	873 (25.9)	46 (1.4)	0 (0.0)	3,367	(100.0)

Table 4.—Number of fish collected from various sources and examined for the presence of coded wire tags, 1990-2005. 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	3,821	27	7,210
2001	16	771	7	1,834	2,630	17	5,275
2002	1	1,794	48	1,431	1,423	10	4,707
2003	1	3,268	22	1,249	304	2	4,846
2004	0	3,705	30	928	107	14	4,784
2005	0	2,440	4	873	46	4	3,367
Total	1,118	37,316	489	29,118	20,900	262	89,203
Average (1990-2004)	75	2,325	32	1,883	1,390	17	5,722