

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-53-R-14

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

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 data bases for research studies which utilize coded-wire tags (CWT) or oxytetracycline (OTC), harvest weir data, and survey data from Charlevoix Fisheries Station research studies. To convert all past Charlevoix Fisheries Station main frame and personal computer data files into a common personal computer-based format.

Summary: Michigan and Skamania strain steelhead trout were marked with fin clips and CWT for study in five Lake Michigan streams and one Lake Huron stream. Steelhead trout were marked at Wolf Lake State Fish Hatchery and Bodine (Indiana) State Fish Hatchery. Marked lots received quality control checks for fin clip quality and CWT retention. Atlantic salmon were marked with fin clips and CWT at the Lake Superior State University Aquatics Laboratory. Marked lots received quality control checks for fin clip quality and CWT retention. Chinook salmon were also marked with an adipose fin clip and CWT at Platte River State Fish Hatchery and received quality control evaluations for fin clip quality and for retention of CWT. Marked and unmarked steelhead trout, Atlantic salmon, and chinook salmon and were sampled at harvest weirs, from survey vessels and electrofishing surveys, during creel surveys, by roving head hunters, and at fishing tournaments. All adipose clipped steelhead trout, Atlantic salmon, and chinook salmon collected during the 1997 field season were examined for presence of a CWT; tags were read and recorded in a database. Vertebrae were collected from chinook salmon during various surveys and examined for the presence of an OTC mark. Good progress was made in development of MSACCESS based databases for various survey data. Good progress was also made in converting older survey data to the new database system. Some work was completed in development of standard queries and tables for summarization of survey data.

Job 1. Title: Mark fish and conduct quality control.

Findings: Michigan strain steelhead trout were marked with an adipose fin clip and CWT at Wolf Lake State Fish Hatchery (Table 1). Skamania strain steelhead trout were marked with an adipose fin clip and CWT at Bodine Indiana State Fish Hatchery (Table 1). Steelhead trout also received quality control evaluations for fin clip quality and for retention of CWTs (Table 2). Initial retention of CWT generally ranged 85 to 100 percent in 1996 and 1997 except for a lot stocked at Henning Park on the Muskegon River, in which retention was only 62 percent. Retention of tags to 30-days post marking ranged 76 to 100 percent except for the Henning Park lot (57 percent). In addition, all other steelhead trout stocked into Lakes Huron and Michigan were marked with a right pectoral fin clip. Atlantic salmon were marked with an adipose fin clip and CWT at the Lake Superior State University Aquatics Laboratory. Chinook salmon were marked with an adipose fin clip and CWT at Platte River State Fish Hatchery and received

quality control evaluations for fin clip quality and for retention of CWTs (Table3). Losses of marked fish in the hatchery and at stocking sites ranged from zero to 1.6 percent and zero to one percent, respectively. Tag retention ranged from 82 to 96 percent and good clips ranged from 88 to 100 percent. An additional 250,000 chinook salmon were marked with a right pectoral fin clip and stocked at Nunn's Creek for the 1836 Treaty tribes.

Job 2. Title: Sample marked and unmarked fish.

Findings: Marked and unmarked steelhead trout, Atlantic salmon, and chinook salmon were sampled at harvest weirs, from survey vessels and electrofishing surveys, during creel surveys, by roving head hunters, and at fishing tournaments. These collections result in proportional samples of marked and unmarked fish. Additional, non-proportional samples of marked fish are obtained from fishers who observe an adipose fin clipped fish and voluntarily turn in the head at a drop off site.

Job 3. Title: Read CWT and OTC marked fish.

Findings: All adipose clipped steelhead trout, Atlantic salmon, and chinook salmon collected during the 1997 field season were examined for presence of a CWT; tags were read and recorded in a database. Data were provided to other researchers and managers for use in their studies.

Vertebrae were collected from all chinook salmon sampled during vessel surveys on Lake Michigan and from electrofishing surveys in the Muskegon and Big Manistee Rivers. Vertebrae were cleaned and examined under ultraviolet light for the presence of a fluorescent mark. Data were provided to other researchers and managers for use in their studies to estimate the extent of natural reproduction.

Job 4. Title: Prepare annual report.

Findings: I prepared the 1997-98 Study 464 Performance Report (F-53-R-14).

Job 5. Title: Develop data base structures and do data entry.

Findings: Databases currently in use are often created using differing software and generally are not linkable to one another. This job is to create database structures utilizing a common software, common file structures to the extent possible, and having one or more common linkable fields. In addition to work on Charlevoix Fisheries Station databases, we have worked with the MDNR Fish Health Laboratory, State Fish Production Section, and Information Management Section to ensure compatibility of their databases with ours.

Creel survey site codes: A database assigning a numeric code to specific creel survey sites was developed. This database contains a site number, port, lake, county, DNR district number, and Great Lakes statistical district associated with the site number.

Creel survey biological data: Creel survey biological data have been stored in a database created in K-Man software since 1983. These data are being converted to MSACCESS based files.

Fin clip codes: A database was developed assigning an alpha code to various fin clips, fin clip combinations, no clips, and external tags. Algorithms to convert previously used numeric codes will be written as necessary.

Species codes: A database was developed assigning an alpha code to various fish species, and to non-fish species that are common in fish diets. This database also includes a field for the fish strain when it is appropriate. Algorithms to convert previously used numeric codes will be written as necessary.

Survey and fishery monitoring data: All survey and fishery monitoring data that were previously on mainframe computer at The University of Michigan have been down loaded as ASCII files. Personal computer based file structures in MSACCESS have been created for physical and sampling location data, summarized catch data, individual fish data, and prey item data.

Quality control: In order to assign correction factors to numbers of fish tagged and/or clipped, evaluations must be made to determine percentage of fish that have lost tags or did not receive proper fin clips. Protocols for evaluating CWT retention and fin clip quality were developed along with forms for recording data and data base structures for data storage. These databases contain fields that are common with other databases in use by research stations, fish hatcheries, and Fisheries Division central office.

Job 6. Title: Convert historic data sets.

Findings: Vessel survey data from 1983 to the present have been converted to personal computer based data files (MSACCESS) from mainframe-based files. These files will be compatible with other Charlevoix Fisheries Station databases as well as many statewide databases. Future conversions will concentrate on data from onboard monitoring of commercial gill net fishers for use in quantifying non-target catch in fisheries for lake whitefish and deepwater ciscos.

Job 7. Title: Develop standard queries and tables.

Findings: Standard queries and tables have been developed for summarization of data from salmon harvest weirs. These tables are in support of reporting requirements for weir operations done under contract to remove surplus salmon.

Work is progressing on development of MSACCESS based queries and tables that will summarize Great Lakes fisheries survey and monitoring data.

Much of the success of the CWT program is dependent on cooperating fishers. Development of Visual Basic based software to do automated mailings to cooperating fishers is nearly complete. These mailings provide information about the CWT program, data on individual fish caught, and a fishing lure to the cooperating fisher. A cooperating fisher database has been converted to MSACCESS and has been made easier to search and edit.

Table 1.—Number of Skamania and Michigan strain steelhead marked with coded-wire tags and stocked, by stocking location, in tributaries of Lakes Michigan and Huron in 1996 and 1997.

River	Stocking Location	1996		1997	
		Skamania	Michigan	Skamania	Michigan
St. Joseph	Pier 33		9,961	15,811	15,076
	Sportsman's Club-Arden Pond	10,723	10,921	15,440	11,000
	Shamrock Park-Berrien Springs		9,847	15,666	14,911
	Buchanan City Launch-Smittys	10,697	9,801	15,672	14,780
	St. Patrick's Park			15,535	
	Mishawaka-Lincoln Park			31,755	19,819
				(31,209) ¹	
	Indiana-Merrifield Park S. Bend		20,931		
Manistee	Manistee		14,795		15,000
	High Bridge	15,357	15,787	16,494	14,787
	Tippy Dam	21,340	15,950	16,000	15,005
Manistique	Manistique Public Access Site		8,161		8,549
Muskegon	Muskegon Lake Outlet		10,163		10,056
	Henning Park		21,489		19,965
	Pine Street		22,072		20,198
Sturgeon	Big Bay DeNoc-499 Bridge	5,397	5,430	5,020	5,110
	Sturgeon River	6,284	5,345	4,998	4,983
Au Sable	Harbor		28,426		2,995
	Rea Road		27,172		24,712
Total		69,798	236,251	183,600	216,946

¹ Late released Skamania strain steelhead.

Table 2.—Coded-wire tag retention of Skamania (SK) and Michigan (MI) strain steelhead stocked in Lakes Michigan and Huron in 1996 and 1997. Tag retention was determined at 0 days (initial) and 30 days after marking.

River	Stocking Location	Strain	1996		1997	
			Initial	30 day	Initial	30 day
St. Joseph	Pier 33	MI	90	-	98	97
	Pier 33	SK	-	-	83	-
	Sportsman's Club-Arden Pond	MI	85	85	-	-
	Sportsman's Club-Arden Pond	SK	85	-	-	-
	Shamrock Park-Berrien Springs	MI	85	-	100	-
	Shamrock Park-Berrien Springs	SK	-	-	84	-
	Buchanan City Launch-Smittys	MI	85	-	99	99
	Buchanan City Launch-Smittys	SK	85	-	91	-
	St. Patrick's Park	SK	-	-	92	-
	Mishawaka-Lincoln Park	MI	-	-	96	93
	Mishawaka-Lincoln Park	SK	-	-	76	-
	Mishawaka-Lincoln Park ¹	SK	-	-	90	-
	Indiana-Merrifield Park S. Bend	MI	86	-	-	-
Manistee	Manistee	MI	98	97	98	97
	High Bridge	MI	98	97	99	96
	Tippy Dam	MI	98	97	98	97
	High Bridge	SK	93	-	98	-
	Tippy Dam	SK	95	-	98	97
Manistique	City of Manistique Pass	MI	100	-	99	-
Muskegon	Muskegon Lake Outlet	MI	94	-	98	-
	Henning Park	MI	62	57	97	-
	Pine Street	MI	99	-	100	-
Sturgeon	Big Bay DeNoc-499 Bridge	MI	97	-	98	-
	Sturgeon River	MI	98	-	98	98
	Big Bay DeNoc-499 Bridge	SK	94	-	98	-
	Sturgeon River	SK	95	-	96	96
Au Sable	Harbor	MI	100	-	98	98
	Rea Road	MI	98	99	100	100

¹Late released Skamania strain steelhead.

Table 3.—Number of chinook salmon marked (coded-wire tags (CWT) and adipose fin clips) and stocked, by stocking location and tag number, in Lake Huron in 1995-1997. All fish were marked at the Platte River State Fish Hatchery.

Year and stocking location	Net pen (Y/N)	CWT number	Number marked	Mortalities		Tag retention (%)	Good clips (%)	Recoverable tags
				Hatchery	Stocking site			
<u>1995</u>								
Harbor Beach	N	59-47-16	106,208	69	300	91	99	95,350
Harbor Beach	Y	59-47-19	102,104	0	0	90	98	90,056
Lake Huron - 3 Mile Park	Y	59-47-52	102,029	2	0	87	96	85,213
AuSable River - Whirlpool	Y	59-47-50	101,292	0	0	85	98	84,376
Swan River	N	59-47-55	103,607	1,607	950	93	98	92,097
<u>1996</u>								
Harbor Beach	N	59-47-56	102,145	0	211	86	99	86,787
Harbor Beach	Y	59-49-01	103,788	0	56	91	99	93,452
Lake Huron - 3 Mile Park	Y	59-49-04	102,558	0	0	82	100	84,098
AuSable River - Whirlpool	Y	59-47-62	103,651	0	0	89	98	90,404
Swan River	N	59-47-56	103,140	0	100	96	93	91,994
<u>1997</u>								
Harbor Beach	N	59-49-02	103,206	0	0	87	99	88,891
Harbor Beach	Y	59-47-07	103,076	0	40	94	96	92,980
Lake Huron - 3 Mile Park	Y	59-49-04	101,509	239	0	90	88	80,206
AuSable River - Whirlpool	Y	59-49-08	102,793	0	73	95	89	86,850
Swan River	N	59-49-11	102,354	0	40	90	98	90,241

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