

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-6

Study No.: 230692

Title: Influence of total length and condition at stocking on Chinook salmon survival and time at large.

Period Covered: October 1, 2004 to September 30, 2005

Study Objectives: There are six main objectives identified for this project. 1) To evaluate the influence of the total length of stocked Chinook salmon on post-stocking survival. 2) To evaluate the influence of total length of Chinook salmon at stocking on the age and size of fish returning to spawn. 3) To evaluate the cost per return of small versus large stocked Chinook salmon. 4) To evaluate the influence of condition on survival of Chinook salmon stocked at the same size. 5) To evaluate the influences of high and low condition on the return size and age of Chinook salmon stocked at similar sizes. 6) To determine the cost per return of Chinook salmon at two condition levels.

Summary: Fish for this study have been stocked for five years, beginning in 2001. The portion of the study evaluating the condition of Chinook salmon at stocking has not yet been initiated due to delays in hatchery renovations at the Thompson hatchery and the need to work out appropriate rearing techniques to complete this objective. Returns of tagged fish from the size at stocking evaluation are increasing; four year-classes have fully entered the fishery. At the time of completion of this report, 2,036 fish have been returned and analyzed from all years and sites.

Findings: As amended for 2005-06, Jobs 1, 2, 3, and 4 were scheduled for 2004-05, and progress is reported below.

Job 1. Title: Stock Fish.—Study fish have been stocked into Lake Michigan and Lake Huron tributaries for five years (2001, 2002, 2003, 2004 and 2005; Table 1). Fish quality assessments have been conducted on each treatment prior to stocking, and data are being compiled for evaluation.

Job 2. Title: Recover tags.—At this time, a total of 2,036 tagged study fish have been returned. In 2002, 115 fish were returned and over 70 percent of these were larger fish planted from the Wolf Lake hatchery. A similar yet less pronounced pattern was observed in 2003, when 666 heads were returned, 406 (61 percent) of which were from the Wolf Lake hatchery. Preliminary data in 2004 (891 heads) indicate that returns from the two hatcheries are approaching a 50:50 ratio and this trend appears to be continuing in 2005 (Table 2). The majority of the fish returned were stocked at Medusa Creek (N=1,276) and the greatest number of salmon heads were returned from the Charlevoix, Grand Haven, Manistee, South Haven and Ludington fisheries in Lake Michigan (N=317, 257, 240, 173 and 157).

Job 3. Title: Analyze data on length.—The lengths of 40-60 randomly sampled fish were obtained within 7 d prior to stocking. Lengths were to be obtained from each hatchery at each stocking location. Samples were not collected at all facilities and sites (Table 3). Fish from Wolf Lake tended to be longer than fish from the Platte River Hatchery, and pen-reared fish were longer than direct-plant fish.

Job 4. Title: Analyze data on condition.—Dry weights were also obtained from a random sample of 40-60 fish collected 7 d prior to stocking from each hatchery at each stocking location. The percent water provides an indication of the fat content and therefore condition of fish. The higher the water content, the lower the condition. The water content of fish from the two facilities was more similar than total length. When differences did occur, larger fish from Wolf Lake had lower water content and therefore were in better condition (Table 4).

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Table 1.—Number of Chinook salmon stocked (recoverable tags) per stocking location and hatchery (treatment), 2001 to 2005.

Stock site Hatchery	Swan River		Medusa Creek		Little Manistee River		St. Joseph River	
	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte
2001	102,749	84,703	94,462	75,348	98,978	79,719	71,029	67,085
2002	84,027	95,473	96,524	100,424	96,424	91,137	73,562	68,496
2003	100,698	94,038	98,471	98,768	98,057	94,284	70,943	71,201
2004	86,606	88,705	84,849	97,326	86,790	93,879	68,513	74,009
2005	89,314	95,703	88,414	97,420	80,814	97,330	64,231	73,118

Table 2.—Number of Chinook salmon heads returned and tags recovered annually, 2001 to 2005.

Year	Total heads returned	Number of heads with tags	Number and hatchery origin of tags from study 692	
			Platte	Wolf Lake
2001	414	304	0	1
2002	892	670	34	81
2003	1,790	1,432	260	406
2004	1,861	1,515	428	463
2005	463	385	197	166
Total	5,420	4,306	919	1,117

Table 3.—Average length (mm) \pm standard deviation of Chinook salmon stocked annually, 2001 to 2004. ND represents “no data”.

Stock site Hatchery	Swan River		Medusa Creek (net pen)		Little Manistee River		St. Joseph River (net pen)	
	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte
2001	96 \pm 9	78 \pm 5	111 \pm 10	105 \pm 8	96 \pm 9	74 \pm 6	ND	78 \pm 6
2002	ND	ND	ND	ND	ND	ND	ND	ND
2003	84 \pm 6	ND	108 \pm 10	102 \pm 7	92 \pm 8	ND	111 \pm 9	98 \pm 7
2004	90 \pm 9	79 \pm 4	ND	ND	92 \pm 9	77 \pm 4	93 \pm 8	73 \pm 4

Table 4.—Average percent water of Chinook salmon stocked annually, 2001 to 2004. ND represents “no data”.

Stock site Hatchery	Swan River		Medusa Creek		Little Manistee River		St. Joseph River	
	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte	Wolf Lake	Platte
2001	77.0	77.1	77.6	76.5	76.6	80.3	ND	79.6
2002	ND	ND	ND	ND	ND	ND	ND	ND
2003	79.6	ND	76.0	77.1	76.9	ND	74.5	74.0
2004	77.9	79.4	ND	ND	79.8	79.6	76.5	78.6