Cooke Dam Pond

Iosco County, T24N, R06/07E
Au Sable River watershed, last surveyed 2008

Alex Hondzinski, Michigan State University, Tim Cwalinski, Michigan DNR

Environment

Cooke Dam Pond is the fifth impoundment in a series of six along the Au Sable River and is located in Iosco County, approximately 12 miles west of Oscoda Michigan, in the Lower Peninsula (Figure 1). Cooke Dam Pond is approximately 1,942 surface acres in size, just over 7 miles long and typically less than one mile wide. Approximately 50% of the pond is greater than 15 feet deep. The bottom substrate of Cooke Pond is sand and gravel near shore, silt, sand and clay in deeper areas, and woody debris is abundant in the impoundment. There are a variety of aquatic plants in the system which include Coontail, Milfoil, Water Celery and Curly Pondweed.

Construction on the Consumer's Energy dam began in 1910 and operation began in December 1911. This dam was the first of six hydroelectric dams built along the Au Sable River. The dam has a head of nearly 41 feet and provides 9,000 kilowatts of power. Collectively all six dams provide 41,000 kilowatts of power. This is enough energy to provide approximately 20,500 people with electricity (Consumers Power Company). The dam completely prevents upstream fish passage. Some while downstream passage and entrainment of fish through the turbines does occur.

Consumers Energy and the U.S. Forest Service own approximately 99% of the riparian zone on Cooke Dam Pond. Recreational opportunities around the impoundment include 7 miles of hiking and skiing trails, and 42 primitive campsites, and 3 recreation destination points. There are two public boat launches that provide public access to Cooke Dam Pond (Figure 1). Pine Akers boat launch is located on the west end of the impoundment and north side of the river and is accessible from Pine Akers Road off of M36. It's a small, secluded boat launch used primarily for river access, with minimal parking available. The second launch site is on the east end of the impoundment and is accessible from Cooke Dam Road. This launch is larger than the western launch and provides numerous car, truck, and trailer parking spots.

History

Stocking

The Michigan Department of Natural Resources (MDNR) began stocking Tiger Muskellunge and Walleye in Cooke Dam Pond in the 1980s (Table 1). Stocking of Tiger Muskellunge continued through 1991 and was reinitiated in 2006 when MDNR updated stocking plans for Northern Muskellunge and Walleye. The updated plans justified predator stocking to increase utilization of the available forage fish in the system. More recently, MDNR Fisheries Division modified two aspects of the statewide Muskellunge stocking program. The Northern strain Muskellunge was replaced with the native performing Great Lakes strain Muskellunge and stocking rates were reduced (Table 1). Walleye stocked in the Lower Peninsula originate from eggs collected from fish in the Muskegon River. Walleye are typically stocked every other year in Cooke Dam Pond. Target stocking densities are 40

spring fingerlings per acre and numbers are constrained by supply as production in rearing ponds can be highly variable.

Surveys

The Michigan Department of Conservation (MDOC), precursor to today's Michigan Department of Natural Resources conducted initial surveys of Cooke Dam Pond from 1924 to 1927 noting the presence or absence of fish species and other generalized habitat observations. Some reports from anglers were also recorded. The first survey in 1924 found a fish community comprised of Pumpkinseed, Yellow Perch, Rock Bass and several species of shiners. The 1927 observations of the pond noted turbid waters with abundant vegetation and algae. Reports of rare catches of Rainbow Trout and Northern Pike were noted.

Periodic angler surveys were conducted from 1940 to 1962 by MDOC. The primary game fish caught in Cooke Dam Pond were Pumpkinseed, Rock Bass, Bluegill, Yellow Perch and Northern Pike. Other species present were Smallmouth Bass and small numbers of Walleye indicating the potential for increasing Walleye numbers in Cooke Dam Pond.

In August of 1950 the MDOC conducted a water quality survey for Cooke Dam Pond. The survey measured factors that indicate water quality and included measures of temperature, dissolved oxygen, carbon dioxide, and pH. Measurements were taken at a series of depths ranging from the surface of the pond to the bottom up to 40 feet. The pH, oxygen, and temperature measures were relatively consistent with noted decreases in oxygen levels in the deepest portions of the pond. Cooke Dam Pond did not stratify during the summer indicating a system conducive to warm and some cool water fish species.

In September of 1956 the MDOC conducted fish surveys with gill nets. The gill nets were 150 foot long, multi-mesh nets sizes (xx in to xx inch stretch), and were set in various lake depths with a total effort of 5 overnight set lifts over two days. The survey effort documented species similar to those in the 1920s, and one new species was observed, the Smallmouth Bass.

In the spring of 1972 the MDOC conducted a fish community survey using electrofishing, trap nets, and gill nets on Cooke Dam Pond. The survey was conducted to collect information on the growth and abundance of fish in Cooke Dam Pond in response to angler concerns. The survey effort included 12 experimental gill net (120 ft long) lifts, 8 large mesh trap net lifts, and 240 minutes of shoreline electrofishing (likely alternating current). The survey took place over three days in May.

A diverse group of fish species were captured during the 1972 spring survey which generally reflected species compositions observed in previous surveys. Black spot disease was observed on perch, panfish and Northern Pike in Cooke Dam Pond. Black spot is caused by a parasite that lives in the fish's skin and causes black cysts to appear and is fairly common in many northern Michigan lakes. Catch results indicated a normal warm and cool water fish community dominated by Northern Pike, Yellow Perch, Pumpkinseed, Rock Bass, and Black Bullhead. Walleye numbers were low in this survey. The size distribution of perch and Pumpkinseed were on target with expectations while the Northern Pike were considered stunted. Prior to the survey anglers were reporting that the pike population appeared to be stunted, and expressed a desire to see Walleye numbers increased in Cooke Dam Pond.

In the spring and fall of 1991 Consumers Energy conducted benthic invertebrate and fish community assessments on Cooke Dam Pond (Lawler et al.). The invertebrate surveys found healthy invertebrate populations with a variety of species collected across a range of substrate types. Hexagenia limbata were present in the system and can be an important food resource during the spring. The fish community survey indicated a warm water community with shiners and sunfish most prevalent (Emerald Shiners, Black Crappie and Pumpkinseed). Yellow Perch were the most frequently captured species in the survey (Lawler et al.).

In June, July and August of 1992 MDNR conducted water quality investigations. The investigations resulted in findings similar to the 1950 MDOC survey. Temperature varied with depth but oxygen levels remained consistent except at the deepest portions of the pond where decreases in oxygen levels were observed. A lack of stratification would be expected because Cooke Dam Pond is an impoundment on the river which provides constant flow. A constant flow of water should keep oxygen levels and water temperatures consistent throughout the water column. These factors again indicate a healthy environment for warm and cool water fish species.

In early May of 1994 the MDNR and U.S. Forest Service conducted a joint fish community survey to evaluate the general health of the fish population as well as the success of the recent Walleye stocking efforts (Kinney and Hanchin 1997). The survey took place over four days and utilized various trap and fyke net sets totaling 27 net nights. The nets were tended every day. Fourteen species of fish were captured during the sampling event and this included Walleye as well as Northern Pike, Largemouth and Smallmouth Bass, and Yellow Perch.

Walleye and Tiger Muskellunge had been stocked for a number of years prior to the 1994 survey (Table 1). Walleye and Muskellunge stocking efforts were intended to introduce a predator that would reduce the abundant rough fish community which dominated by redhorse suckers. At the time of this survey it was clear that the Walleye population had been established but there was no evidence to suggest that Tiger Muskellunge stocking efforts were succeeding. Management recommendations resulting from the 1994 survey effort called for improvements to habitat and spawning substrate. Fingerling Walleye stocking was to continue and Tiger Muskellunge stocking was to be discontinued.

In September of 1995, efforts were made to evaluate the stocking of 90,000 fingerling walleye that had taken place in June of that year. Nighttime electrofishing (direct current) surveys were along the shoreline and four juvenile Walleye were collected. Despite the low numbers recovered in the survey, it was apparent that at least some portion of the stocked fish survived.

In fall of 2003, Walleye stocking evaluations were conducted with nighttime boomshocking surveys. After two hours of shocking over 4.3 miles of shoreline, no walleye were collected. During this survey, the crew noted difficulty in electrofishing with steep drop offs near shore. Additionally, concerns were expressed over the stocking site which was in close proximity to the dam. Given the noted concerns regarding stocking site selection and the survey gear the discontinuation of Walleye stocking was not recommended.

In fall 2006, MDNR conducted a stocking evaluation of the first stocking of non-hybrid Muskellunge fry in the previous year (Table 1). Nighttime direct current boom electroshocking for one hour and no fall fingerling Muskellunge were observed. A generator malfunction during sampling limited the

amount of effort that could contribute to evaluation of the survival of stocked Muskellunge fry. Because of the limitations of the survey effort it was recommended that Muskellunge stocking continue.

Current Status

The most recent survey of Cooke Dam Pond was a Status and Trends survey conducted by MDNR in 2008. The Michigan Status and Trends sampling program is a standardized sampling program for all Michigan lakes, where lake acreage dictates the amount and types of survey gear that would be used. The netting portion of this survey took place from June 9-12. Survey gear used included 9 experimental graded mesh gill net lifts, 10 large mesh trap net lifts, 2 mini-fyke net lifts, 9 large mesh fyke net lifts, and 2 small mesh fyke net lifts.

A total of 587 fish were collected during the survey (613 pounds; Table 2). Panfish species included Bluegill, Black Crappie, Pumpkinseed, Rock Bass, and Yellow Perch. Panfish comprised 45% of the catch by number, and 7% by weight. Predatory game fish such as Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye made up 13% by number, and 24% by weight. Non-game rough fish such as bullheads, Bowfin, Carp, and sucker species were a significant part of the fish community as indicated by both the number and weight captured in the survey (Table 2).

The majority of the Bluegill and Pumpkinseed were less than 7 inches in length (Table 3). Catches of very large Bluegill are frequently reported by anglers at the pond, but they were not well represented in the survey. All Bluegill captured in the survey were age-7 or less, and 2 and 3 year olds comprised the majority of the catch (Table 4). . Pumpkinseeds captured in surveys were less than age-8, and the majority of the catch was 2, 3 and 4 year old fish. Growth of both species was average relative to the statewide average (Table 4). Only two Black Crappie were collected, and they were age-4 and age-8. Yellow Perch collected in surveys were less than age-7, and the majority was 4 year olds. All specimens were less than 9 inches in length and growth was considered slow relative to statewide averages (Table 4).

Northern Pike were the most abundant large predator collected during the survey (Table 2). Thirty-three percent of the pike captured were legal size (24 inches or larger) and all fish were less than age-7 (Table 4). The growth of Pike in Cooke Dam Pond is low relative to the state average. Pike on average are two inches shorter at age in Cooke Dam Pond. Smallmouth and Largemouth Bass up to age-11 were collected in Cooke Dam Pond. The majority of the Bass captured in surveys were 10-15 inches in length and less than age-6 (Table 3 and 4). Walleye up to age-6 were collected during the survey, and most were less than the harvestable minimum size limit of 15 inches. Age-1 and age-2 Walleye were most abundant, and fish were present from both stocked and non-stocked years indicating that some natural recruitment may be occurring (Table 1).

The 2008 survey included documentation of riparian and limnological parameters in the waterbody. Collections occurred on August 20 and the alkalinity, chlorophyll-a concentrations, phosphorous levels, water temperature profile and oxygen profiles measured. Alkalinity was suitable at 144 ppm, chlorophyll-a and phosphorus levels were low relative to other systems. Chlorophyll-a is a measure of lake productivity, while phosphorus is a limiting nutrient in many northern Michigan lakes and is also linked to food production. The temperature and dissolved oxygen profile in the deepest area of Cooke Dam Pond (43 feet) indicated limited thermal stratification of the water column (surface 72F; bottom

60F). Dissolved oxygen levels were suitable to the survival and growth of fish until 5 feet from the bottom when levels declined precipitously. The shoreline of the pond was for the most part undeveloped and moderate levels of woody debris were present in the littoral zone.

Analysis and Discussion

The current fish community of Cooke Dam Pond can be generally characterized as: 1) a diverse panfish community with average growth rates and size at age. Rare individuals were able to attain larger sizes, 2) a reasonably diverse predator population that is supplemented by stocking of Walleye and Muskellunge, catch rates in surveys indicate relatively low predator abundance levels in the pond, 3) some Walleye may be naturally reproducing at low levels, 4) an abundant non-game fish community typical of that for a northern Michigan cool-warm water river impoundment, and 5) the survival and value of stocking Muskellunge is not well understood.

Management Direction

1) Continue stocking of fall fingerling Great Lakes strain Muskellunge and assess the costs and benefits of the practice. Muskellunge have a high potential to regulate abundant populations of prey in the Cooke Dam Pond. Muskellunge stocking has sporadically occurred for the last two decades in lower Au Sable River impoundments. To increase survival and the numbers of fish stocked, we propose to focus future stocking of Muskellunge within the Cooke Dam Pond and not in other lower Au Sable River impoundments. The target stocking rate is 2 fish per acre every two years or as available. We will attempt to improve assessments of future stocking efforts by initiating: a) nighttime electrofishing surveys in the upper impoundment and riverine reaches during the spring when spawning might occur, 2) monitor and archive records of angler reports, and 3) improve gill netting efforts in the impoundment to better target predator species such as muskellunge. Until more is known about the success of the current muskellunge stocking program, we will maintain a 42 inch size limit in Cooke Dam Pond.

2. Continue stocking of spring fingerling Walleye in alternate years to maintain the sport fishery. Target Walleye stocking densities are 40 fish per acre (approximately 77,680 fish per year) but occasionally may be increased in years of surplus production.

3. Improve understanding of the fishery and related harvest by developing relationships with anglers. Encourage communication and reporting of observations and numbers caught to fisheries managers. Angler reports have not been abundant for Cooke Dam Pond, but those that have surfaced have been positive for panfish and Walleye. As managers, we will learn more about changes or responses in the fishery by fostering communications with a wide variety of anglers through time than it is possible to discern from infrequent large scale survey efforts.

References

Kinney, J. , and Hanchin, P. 1997. Cooke Pond Au Sable River System. United Sates Forest Service Fisheries Survey. Huron National Forest.

Lawler, Matusky, and Skelly. 1991. Fisheries and Aquatic Resources, Au Sable River. Consumers Power Company. Jackson, Michigan.

Figure 1. Location of Cooke Dam Pond in Michigan's northern Lower Peninsula.

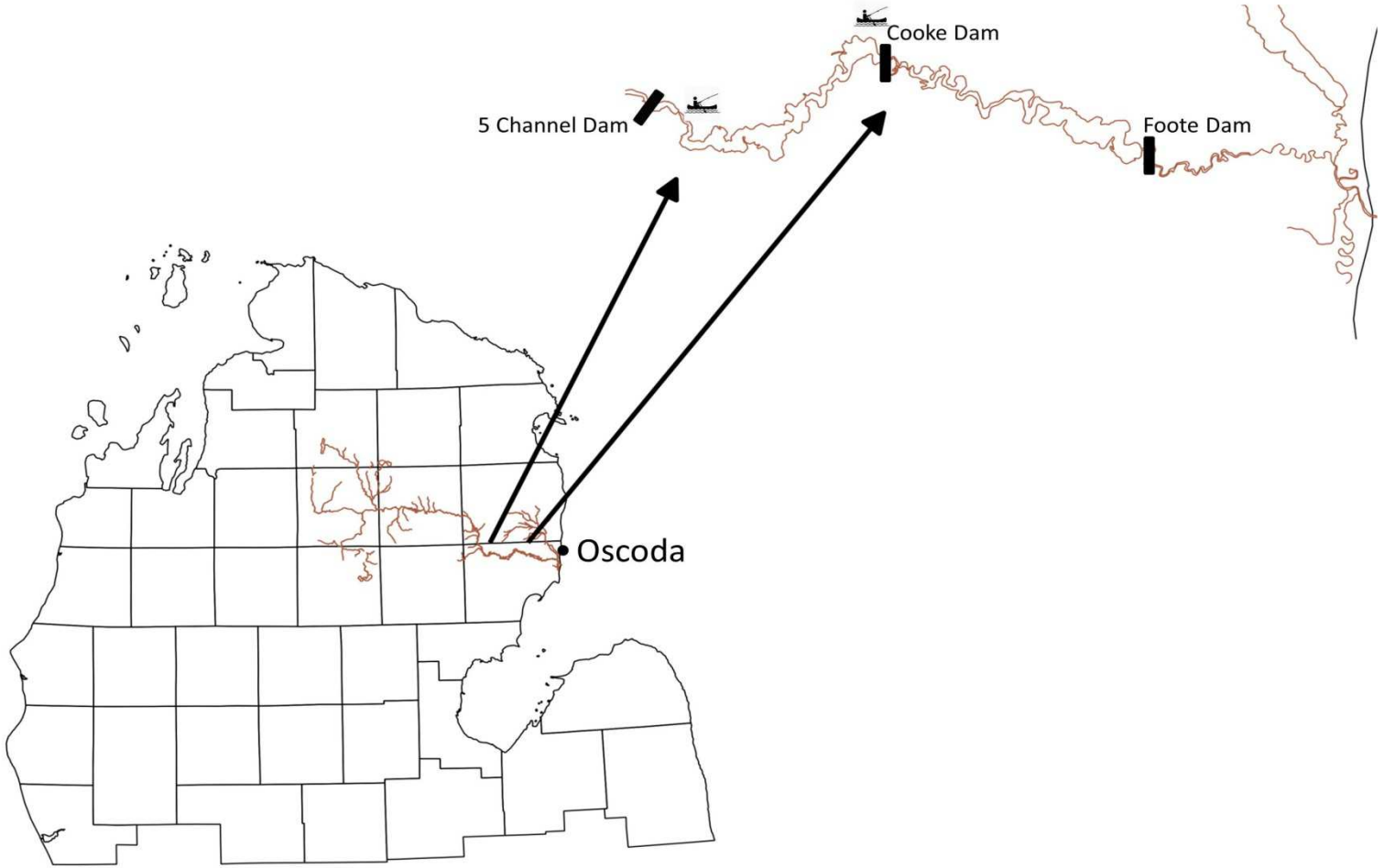

Table 1. Recent fish stocking efforts by MDNR at Cooke Dam Pond.

Year	Species	Strain	Number	Avg. Length (in)
1984	Tiger Muskellunge	--	14,000	6.9
1985	Walleye	Muskegon	38,670	1.4
1985	Tiger Muskellunge	--	8,000	6.1
1986	Tiger Muskellunge	--	10,000	6.4
1987	Tiger Muskellunge	--	10,000	9.8
1988	Tiger Muskellunge	--	8,600	9.3
1989	Tiger Muskellunge	--	20,002	8.1-9.6
1990	Walleye	Muskegon	58,693	2.2
1990	Tiger Muskellunge	--	10,000	8.7
1991	Tiger Muskellunge	--	15,980	9.2
1992	Walleye	Bay De Noc	7,654	1.9
1995	Walleye	Tittabawassee	92,354	1.1
2001	Walleye	Tittabawassee	78,771	1.8
2003	Walleye	Tittabawassee	57,708	1.4
2006	Walleye	Tittabawassee	92,197	2.0
2006	Muskellunge	Northern	50,000	0.3
2008	Muskellunge	Northern	7,397	9.6
2009	Walleye	Muskegon	60,404	1.5

Table 1 continued.

Year	Species	Strain	Number	Avg. Length (in)
2010	Walleye	Muskegon	66,993	1.7
2013	Walleye	Muskegon	108,200	1.4
2013	Muskellunge	Great Lakes	2,913	8.0
2014	Muskellunge	Great Lakes	2,913	8.0
2015	Walleye	Muskegon	121,522	2.0
2016	Muskellunge	Great Lakes	2,913	10.0
2017	Walleye	Muskegon	87,181	1.4

Table 2. Number and weight of fish captured in the 2008 fish community survey at Cooke Dam Pond.

Species	Number	Percent by number	Weight (lb.)	Percent by weight	Length range (in.)*	Average length (in.)	Percent Legal size**
Black Crappie	2	0.3	2.7	0.4	11-14	13.0	100
Bluegill	70	11.9	10	1.6	2-9	5.4	37
Bowfin	55	9.4	324.1	52.8	18-30	25.2	100
Brown Bullhead	24	4.1	15.6	2.5	5-13	11.1	100
Common Carp	5	0.9	58.8	9.6	24-36	28.9	100
White Sucker	3	0.5	8.2	1.3	15-20	19.3	100
Golden Shiner	4	0.7	0.0	0.0	2-3	3.2	100
Greater Redhorse Sucker	1	0.2	1.3	0.2	15-15	15.5	100
Largemouth Bass	9	1.5	14.9	2.4	7-19	13.5	56
Mimic Shiner	112	19.1	0.3	0.0	1-2	1.9	100
Northern Pike	36	6.1	93.3	15.3	13-29	22.3	33
Northern Redbelly Dace	2	0.3	0.0	0.0	2-2	2.5	100
Pumpkinseed	78	13.3	11.4	1.9	1-9	5.9	29
Rock Bass	102	17.4	17.3	2.8	3-9	6.0	45
Sand Shiner	11	1.9	0.1	0.0	2-2	2.5	100
Smallmouth bass	17	2.9	25.1	4.1	9-21	13.6	35
Stonecat	1	0.2	0.2	0.0	8-8	8.5	100
Walleye	16	2.7	14.2	2.3	8-19	13.7	25
Yellow Perch	11	1.9	1.2	0.2	3-8	6.3	27
Yellow Bullhead	28	4.8	14.5	2.4	7-12	10.2	100
Total:	587	100	613.2	99.8			

Table 3. Length-frequency distribution of certain game fishes collected at Cooke Dam Pond.

Length (in)	Bluegill	Largemouth Bass	Northern Pike	Pumpkinseed	Smallmouth Bass	Walleye
1				1		
2	1			5		
3	8			19		
4	8			15		
5	27			15		
6	18			11		
7	6	1		8		
8	1			3		2
9	1			1	1	2
10		1			3	3
11					2	
12		1			3	2
13			1		1	2
14		2	1		1	1
15		1	2		3	
16						1
17						
18		1	1			1
19		1	2		1	2
20			4			
21			4		1	
22			5			
23			4			
24			3			
25			5			
26			2			
27			1			
28						
29			1			

Table 4. Length at age of fish captured in the MDNR survey in 2008. Numbers in parentheses indicate the number of fish aged in the sample.

	Fish Average Length at Age from Status and Trends Survey (2008)												
	Fish Age												
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Mean Growth Index
Black Crappie				11.3 (1)				14.5 (1)					––
Bluegill		3.6 (13)	5.4 (22)	6.8 (2)	7.2 (4)	7.6 (2)	8.7 (2)						-0.2
Largemouth Bass			8.6 (2)	10.8 (1)	12.9 (1)		15.0 (3)			18.7 (1)	19.9 (1)		––
Northern Pike	13.9 (2)	16.2 (4)	20.3 (8)	21.8 (6)	26.9 (4)	25.3 (10)	27.1 (2)						-2.0
Pumpkinseed		3.1 (15)	5.0 (23)	6.4 (10)	7.2 (3)	8.2 (4)	7.8 (3)	9.6 (1)					-0.2
Rock Bass		3.8 (3)	4.2 (8)	5.4 (5)	5.8 (14)	6.8 (10)	7.4 (5)	8.7 (3)	8.0 (1)				-1.2
Smallmouth Bass			9.7 (3)	11.1 (3)	12.6 (5)	14.9 (3)	15.5 (1)			19.9 (1)	21.3 (1)		-2.0
Walleye	9.5 (7)	12.8 (3)	13.2 (1)	15.0 (2)	18.3 (1)	19.5 (2)							+1.4
Yellow Perch	3.4 (1)		5.8 (1)	6.05 (7)	7.7 (1)	7.2 (1)	8.6 (1)						-1.8