

Department of Natural Resources
Madison, Wisconsin

Division of Fish, Game and Enforcement
Bureau of Fish Management
Management Report No. 31

Results of Chemical Fish
Eradication of Cox Hollow
Lake, Iowa County

by

Clifford Brynildson

September 1, 1970

Ten pounds of Bayluscide (Bayer 73) in a 70% wettable powder was received from the Chemagro Corporation, Kansas City, Missouri for the experimental use to control brown bullheads. On November 4 and 5, 1969 the Bayluscide was applied at the rate of 1 ppm to the tributaries entering the lake and isolated pools that resulted from the drawdown. Fluorescein dye was applied along with the Bayluscide. The Bayluscide flowed into the small pool that formed above the dam after the valve was closed. Water temperatures ranged from 46-47°F. Part of the Bayluscide was applied with a battery powered fuel pump that could be set to drip the toxicant to the stream at a fixed rate. The remainder of the Bayluscide was dispensed at intervals at predetermined rates by personnel walking the stream system. Water chemistries were taken at each major tributary just prior to application of the toxicant. This information is presented in Table 1.

One hundred thirty gallons of rotenone (pronoxfish) were applied at the rate of 7.5 ppm to isolated pools, stream system and the pool above the dam on November 6. The toxicant was applied with a Homelite pump.

Results of the Chemical Treatment

All water treated with Bayluscide showed evidence of distressed and dead fish within a few hours after the application. Mottled muddlers, northern creek chub, stickleback, white suckers and one rainbow trout were observed in the south tributary which has a flow of 1.6 c.f.s. and provides 60 percent of the water for Cox Hollow Lake. Primarily forage fish species were observed in the north tributary.

A few bluegills, white suckers, largemouth bass were eradicated in the pool above the dam. Sampling with the D.C. boom shocker in the pool on November 5 produced a fairly large sample of bluegills and a few whitesuckers and brown bullheads. Apparently the dilution of the pool (1100 gal./min.) was sufficient to negate the toxicity of the Bayluscide. After the application of the rotenone on November 6 an extensive mortality of the fish occurred (See Fi-327). Eradicated besides the predominant bluegills were brown bullhead, white suckers, largemouth bass and assorted minnows.

Observations made of the south tributary on November 7 revealed that an assorted group of organisms were killed by the toxicants. Frogs, caddis fly, fresh water shrimp, phantom larvae and Tendidipidae larvae were noted. As both rotenone and Bayluscide were applied the causative toxicant could not be identified.

Results of the Bioassays

The Bureau of Parks and Recreation made plans to remove fill from one bay of the lake and deposit it near the swimming beach where the shoreline is very steep. This activity could best be accomplished while the water levels were down following the chemical treatment. The possibility existed however, that some water had to be released downstream to Twin Valley Lake before the project by Parks personnel was completed.

Bioassays to test the toxicity of Cox Hollow Lake began on November 18, 1969. Three live traps containing walleye fingerlings and brown trout were used for the initial test. Brown trout yearlings were used as the test fish after that time. The results of the bioassays are summarized in Table 2. The traps were examined every day until the test fish died.

BUREAU OF FISH MANAGEMENT

MANAGEMENT REPORT NO. 31

RESULTS OF CHEMICAL FISH ERADICATION

OF COX HOLLOW LAKE, IOWA COUNTY

by Clifford Brynildson

Introduction

Cox Hollow Lake, as a new recreational fishing lake, produced excellent fishing in its early years. But fishing later dropped off as a stunted bluegill population became dominant. Rehabilitation then became the most feasible method of improvement. To rehabilitate the lake new toxicants and combinations of toxicants were tried. This report summarizes the results.

Cox Hollow Lake, a 96 acre impoundment located in Governor Dodge State Park, was first opened to fishing on June 1, 1960. Excellent fishing for northern pike and largemouth bass occurred seasonally through 1962. The development of a bluegill population in 1963 altered the fish species composition and eventually the fishing success for the game fish species decreased.

As the bluegills increased their dominance in the following years, fishing interest diminished. The northern pike catch was very low, although bass fishing was quite good through 1969. To bolster the fishery, five hundred rainbow trout yearlings were stocked in Cox Hollow Lake in the spring of 1969 with very little return to the sport fishery.

Past survey and research effort included (1) a research project that measured the harvest and development of the fish population initiated in early 1960 by fish management personnel and taken over by research personnel in 1966; (2) an Aero-Hydraulic system installed in 1967 to improve water quality. The results of its effect on the lake ecology has been reported by Russell Dunst of the Bureau of Research. As the research project on Cox Hollow Lake was scheduled for termination in October 1969, plans were formulated to chemically eradicate the fish in late autumn using Bayluscide and rotenone.

Procedure

The water level of Cox Hollow Lake was lowered to stream level by opening the sluicewell. Prior to this time Twin Valley Lake located one-half mile downstream was lowered to accept the excess water from Cox Hollow Lake. Considerable effort was expended to rescue the northern pike, largemouth bass and bluegills. These fish were placed in holding ponds or in case of the larger game fish released in waters that had been recently rehabilitated.

Activated carbon was placed below the outfall of the dam to neutralize any toxicant that may escape through the sluicewell. Cinders were placed around the valve to provide additional protection against leakage.

The air compressors were activated on December 2, 1969. We hoped that by increasing the aeration of the water detoxification would occur sooner. Trout continued to die within 24 hours until January 8, 1970. By January 14 the trout were living more than 48 hours in the test traps. One trout was alive but sick after 72 hours on January 19. Through the remainder of January and until February 5, 1970 similar results were obtained. The test fish continue to die after 72 hours exposure.

A large brown bullhead was placed in one of the traps on January 19. The bullhead was still alive on January 30 but in distress and died by February 5.

The valve was opened on the sluicewell by Parks personnel on February 2 to lower the water level to facilitate their re-shaping of the beach area. The initial bioassays were terminated on February 5, 1970. Additional bioassays conducted between February 27 to March 5, 1970 established that Cox Hollow Lake was detoxified.

Dissolved oxygen tests were conducted on January 12, 1970. Three readings taken at the surface, four and six feet at two sites were 4.0, 8.2, and 5.5 ppm respectively. The highest reading was obtained in the open water area created by the aerator (Helixor).

Discussion

Chemical fish eradication of the stream system and drained Cox Hollow Lake was accomplished by using Bayluscide and rotenone. Application rate of 1 ppm with Bayluscide was partially successful in eradicating a fish population of bluegills, bullheads, white suckers, forage fish species, mottled muddler and largemouth bass.

Rotenone applied at the rate of 7.5 ppm eradicated the remainder of the fish population. Water temperatures ranged between 46-47°F. Dilution at the rate of 4.8 A/Ft./day still required 90 days before the lake had detoxified sufficiently to support fish safely for more than 72 hours. Cox Hollow Lake was ice covered for most of this time and water temperatures ranged from 32-45°F. The rate of degradation was slow for rotenone at the temperatures prevailing at Cox Hollow Lake. The effect of the Bayluscide in prolonging the toxicity of the water is not known. A very small amount was used compared to rotenone.

Apparent synergism occurred in one test reported in the literature where Bayluscide was applied to a pond which had been previously treated with a product containing rotenone. This pond remained toxic to fish for six weeks. In most of the tests conducted with Bayluscide, degradation occurred within 48 hours at temperatures between 48-81°F. High and low alkalinity waters required slightly more Bayluscide for effective fish eradication.

Respirators and rubber gloves are required when handling Bayluscide in a powder form. The Bayluscide goes into solution readily and is easy to apply with the fuel pumps.

Additional field testing with Bayluscide would be desirable. The selective toxicity of the chemical to brown bullheads was not apparent at Cox Hollow. The brown bullhead population was relatively small, especially in the stream where the bulk of the Bayluscide was applied. Ideally selectively tests with brown bullheads should be conducted in small ponds where better control of the water supply and fish population is possible.

If Bayluscide proved to be an effective selective fish toxicant for brown bullheads, it would have great practical value. At 70¢/lb. the cost would be about \$2.50 - \$2.80 A/Ft. applied at the rate of 1 ppm. Even at higher rates the cost would be comparable to rotenone, and cheaper than antimycin.

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TABLE 1. Chemical Analysis of Cox Hollow Creek and Lake

<u>Location</u>	<u>Date</u>	<u>pH</u>	<u>Cond.</u>	<u>M.O.A.</u>	<u>Cl</u>	<u>NO 3</u>	<u>PO4(T)</u>	<u>PO4(D)</u>
South tributary	11/4/69	7.7	539	308	5.3	1.14	.61	.13
North tributary	11/4/69	7.9	557	325	6.6	1.06	.11	.10
Lake	7/12/60	7.7	-	230	4.4	.40	.18	.03

TABLE 2.: Bioassays of Toxicity of Cox Hollow Lake

<u>Date</u>	<u>No. of Test Traps</u>	<u>No. Test Fish</u>	<u>24 hrs.</u>	<u>48 hrs.</u>	<u>72 hrs.</u>	<u>72 + hrs.</u>
11/18/69	Trap #1	8 WE's 4 brown trout	All dead			
	Trap #2	4 WE's 2 brown trout	All dead			
	Trap #3	5 WE's 2 brown trout	All alive			
11/20/69	Trap #1	4 WE's	All dead			
	Trap #2	2 WE's	All dead			
	Trap #3	5 WE's 2 brown trout			All alive - trap discontinued	
11/25/69	Trap #1	5 brown trout	All dead			
	Trap #2	2 brown trout	All dead			
12/ 1/69	Trap #1	4 brown trout	All dead within 2 hrs.			
Air compressor #1 activated						
12/ 2/69	Trap #1	3 brown trout	All dead			
Air compressor #2 activated						
12/ 9/69	Trap #1	2 brown trout	Dead			
	Trap #2	2 brown trout	Dead			
12/16/69	Trap #1	2 brown trout	Dead			
	Trap #2	2 brown trout	Dead			
12/21/69	Trap #1	1 brown trout	Dead			
	Trap #2	1 brown trout	Dead			
12/29/69	Trap #1	2 brown trout	Dead			
	Trap #2	1 brown trout	Dead			
1/ 7/70	Trap #1	2 brown trout	Alive	Dead		
	Trap #2	2 brown trout	Alive	Dead		
1/ 9/70	Trap #1	2 brown trout	-	-	Dead	
	Trap #2	2 brown trout	-	-	Dead	
1/14/70	Trap #1	2 brown trout	Alive	Alive	Dead	
	Trap #2	2 brown trout	Alive	Alive	Dead	
1/16/70	Trap #1	2 brown trout	-	-	1 Dead 1 Sick	Dead
1/26/70	Trap #2	2 brown trout	(1) Sick	Sick	Dead	
1/30/70	Trap #1	2 brown trout	-	-	-	Dead
	Trap #2	2 brown trout	-	-	-	Dead
2/27/70	Trap #2	4 brown trout	-	-	-	Alive

Brown bullhead sick after 2 weeks. Died after 3 weeks.

Valve opened on February 2, 1970 by Parks personnel. Bioassays ended on February 5, 1970.

Figure 2

Field Report on
Results of Chemical Eradication

DATE OF TREATMENT
November 4-6, 1969

NAME OF LAKE Cox Hollow - Iowa County		LOCATION Section 10, 11 & 15	Township 6N	Range 3E
ACRES 5 and 10	MAXIMUM DEPTH 28'	ACRE FEET 5 and 60		
CHEMICAL USED Bayluscide and Rotenone	AMOUNT USED - Gallons Bayluscide-10#, Rotenone-130 gals.	CONCENTRATION (ppm) 1 and 5 ppm		
OPERATION BEGAN (2) 9:30 A.M. (1) 12:30 P.M.	OPERATION COMPLETED _____ A.M. (1) 4:00 P.M. (2) 2:30 P.M.	WATER TEMPERATURE 42 - 49°F		
PURPOSE OF TREATMENT Eradicate slow growing bluegills and bullheads				

ROUGH FISH ESTIMATE			GAME FISH RECORD				
Species	Total Pounds	Average Length	Species	Total Number	Estimated Weight	Size Range	Average Length
Carp, Jumbo (7 lbs. up)			Walleye				
Carp, No. 1 (5 to 7 lbs.)			Sauger				
Carp, No. 2 (3 to 5 lbs.)			Smallmouth Black Bass				
Carp, No. 3 (2 to 3 lbs.)			Largemouth Black Bass	200	50	3-12"	10"
Carp (under 2 lbs.)			Northern Pike				
White Carp			Muskellunge				
Buffalo Jumbo			Catfish				
Buffalo No. 1			Sturgeon				
Buffalo No. 2			Bullheads	300	35	4-11"	4"
Buffalo No. 3			Crappie				
Sheepshead			White Bass				
Suckers			Bluegill				
Bullheads No. 1			Perch				
Bullheads No. 2			Buffalo				
Bullheads No. 3			Suckers	200	100	5-17"	12"
			Bluegills	10,000	1,000	1- 9"	4"
			Creek Chubs	500	50	2- 9"	5"
			Mottled Muddler	300	15	2- 5"	3"
			Rainbow trout	2	1.5	10-12"	11"
Total Poundage			Total	11,502			

DISPOSITION OF FISH

How See remarks
 Where _____
 To Whom _____
 Other _____

REMARKS
 Most of the gamefish and bluegills removed with seine and placed in holding ponds.
 Some of the panfish buried.

NOTE:
 Describe any unusual observations on game fish, lake developments, or any other occurrence of public interest on back of report.

NOTED: Area Supervisor

SIGNED: Treatment Supervisor

Clifford Brynildson
 Clifford Brynildson, District Biologist