LIFE HISTORY, HABITAT AND DISTRIBUTION OF THE PALLID AND SHOVELNOSE STURGEON IN THE LOWER YELLOWSTONE RIVER

JOB COMPLETION REPORT

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INTRODUCTION:

Eastern Montana is rich in coal; coal with low sulfur, sodium and ash content, which in light of the national energy crisis, is a valuable natural resources. Recent coal development began in 1968, when Western Energy stripped at a rate of one-half million tons per year. In 1971, this operation expanded to an estimated 5 million tons per year. In 1968, Peabody Coal Company began supplying Minnesota Power and Light with 2 million tons annually, and in 1972, Decker Coal Company is expected to mine about 3.4 million tons of coal. Westmoreland Coal is scheduled to begin operations in the Sarpy Creek Basin early in 1974.

Currently, coal mined in southeastern Montana leaves the state to provide energy for urban areas of the mid-west. However, mine-mouth generating plants loom on the near horizon. The requirements for these types of installations are: proximity to fuel source, access to large quantities of condensing water, land available for plant construction, and a market. Southeastern Montana can meet the coal, water, and land needs while the urban areas of the mid-west provide the consumers. Two steam generating plants are being considered by Montana Power Company for the Colstrip area. Estimates of potential generating capacity vary, but water requirements for the plants and associated facilities have been projected as high as 2.6 million acre feet per year. The Yellowstone River at Miles City yields a mean annual flow of 8.2 million acre-feet, but in dry years, the river's flow is only one-half of its normal average. Thus, a reduction in yield as high as 81% could be facing the lower Yellowstone River System. Water needs will be met by large aqueduct systems transporting water from the Yellowstone River and its tributaries to the generating plants.

Two populations of sturgeon, the pallid (Scaphirhynchus albus) and the shovelnose (Scaphirhynchus platorynchus) currently inhabit the Yellowstone River. Life history information of these species is extremely limited. Held (1969), reported that the distribution of shovelnose sturgeon in the Missouri River has been limited by the construction of mainstem reservoir. Dam construction has been detrimental to sturgeon by prohibiting them from reaching traditional spawning areas and by reducing current in the river. Since the status of these species in the Yellowstone River is unknown, the proposed water conveyance systems may endanger the existance of these sturgeon.

The objective of the study was to collect information on distribution, population density, movement, angler harvest, habitat preference and the possible effects of the aqueduct systems on the pallid and shovelnose sturgeons in the Yellowstone River system.

PROCEDURES:

Sturgeon are generally found near the bottom of large rivers over firm, sandy bottoms where the current is strong (Brown, 1971). Previous attempts to collect sturgeon by conventional sampling methods (gill nets, seins, or electrofishing) have been unsuccessful due to their habitat preferences. The use of set-lines, however, has been successful (Haugen, 1969). The greatest effort to collect sturgeon was expended through the use of set-lines, each consisting of a nylon line, 50 feet in length, rigged with 6 to 25 hooks (size 6/0). Various baits, i.e. liver, minnows, cut fish, frogs and nightcrawlers, were utilized. Set lines were fished in various locations within the river.

Three sampling stations were established and fished at varying intervals. The areas and approximate river miles above the mouth of the Yellowstone were: Intake, 57; the mouth of O'Fallon Creek, 108; and above the mouth of the Tongue River, 154. Gill nets were also fished to determine the effectiveness of the set lines.

Length and weight information was also collected at Intake coincidental with the paddlefish creel census.

FINDINGS:

Set lines were fished in the Yellowstone River a total of 1,090 hours during 8 sampling periods (Table 1). A total of 38 fish were taken for a catch rate of 0.03 fish per set line hour. Channel catfish were the most abundant fish taken, making up 89.5% of the total sample. Only one shovelnose sturgeon was taken.

An additional 12 shovelnose sturgeon were collected at Intake coincidental with paddlefish sampling utilizing electrofishing gear. The fish ranged in length from 14.3 to 31.4 inches in length, with an average length of 20.6 inches. While this sampling method was not effective for paddlefish, it appeared to have potential for collecting sturgeon. Several shovelnose sturgeon were also measured at Intake during the paddlefish snagging season. One female pallid sturgeon, 57.0 inches in length, weighing 28.6 pounds was recorded at Intake on May 18. This fish was taken on a set line with night-crawler bait.

Gill nets fished in conjunction with set lines also proved ineffective for collecting sturgeon. One shovelnose (26.5 inches long) was taken at station 3 in July, 1972, but was subsequently cut up and utilized for set line bait. The most abundant species taken in gill net samples was goldeye (75.0% of the total). Other species collected included carp, river carpsucker, sauger, and burbot.

A total of 21 gill nets fished in March, 1973, and 10 gill nets fished in May, 1973 failed to catch any sturgeon. These nets were fished in conjunction with contract sampling in the vicinity of Armell's Creek near Forsyth. A total of 1,470 fish were collected during the two sampling periods with goldeye the predominant species. Electrofishing and beach seineing during the same time period also failed to collect any sturgeon, suggesting that these species were not present during this time of the year. These same stations

Table 1. Summary of set line catch statistics, Yellowstone River, 1972.

Area	Date	Set Line Hours	Hook Hours	No. Fish	Species	Avg.L (in.)	Avg. Wt. (lbs.)
1	6/12-13	456	1,824	4	C. Catfish	15.8	2.02
3	7/17-18	108	1,080	9	C. Catfish	17.9	2.86
				1	Shovelnose S.	27.5	2.97
3	7/18-19	108	1,080	5	C. Catfish	19.2	2.62
				2	Sauger	13.3	0.55
2	7/27-28	72	288	3	C. Catfish	17.7	1.38
3	8/25-26	80	480	7	C. Catfish	14.7	2.12
3	9/5-6	90	720	6	C. Catfish	16.5	2.53
1	11/8-9	66	462	0	-	-	-
1	11/20-21	110	616	1	Burbot	17.0	1.04
Total		1,090	6,550	38			

Area designations as follows: 1 - Intake 2 - O'Fallon Creek, and 3 - Tongue River.

will be re-sampled in August for species composition comparisons.

Two gill nets fished at station 1 in May, 1973, produced 2 small shovelnosed sturgeon. Both were tagged with Floy filament tags and released.

RECOMMENDATIONS:

Sampling of fish populations in the lower Yellowstone River is difficult due to habitat conditions. Deep pools, high velocities, large volumes of water, and debris prevent the effective use of conventional sampling tools. Gill nets, while effective in back water areas, will not sample areas with measurable current; and seines are ineffective because of bottom types and debris. Set lines are effective for catfish, but not for sturgeon. Electrofishing may be useful during low flow periods of the year, but will be limited to shallow areas.

It is recommended that sampling of shovelnose and pallid sturgeon continue during the summer of 1973 in an attempt to evaluate the effects of the proposed water conveyance systems. Emphasis, however, should be placed on developing sampling techniques which can be used to sample the fishery of the lower Yellowstone River.

LITERATURE CITED:

Brown, C.J.D. 1971. Fishes of Montana. Big Sky Books, M.S.U., Bozeman, Montana. 207 pp.

Haugen, G.N. 1969. Life history, habitat, and distribution of the lake sturgeon, Acipenser fulvescens, in the South Saskatchewan River, Alberta. Alberta Fish and Wildl. Div., Fisheries Sec. Res. Report Number 4. 27 pp.

Held, J.W. 1969. Some early summer foods of the shovelnose sturgeon in the Missouri River. Trans. Amer. Fish. Soc., 98(3): 514-517.

EXPENSES

Item	Cost
Set lines, hooks and miscellaneous fishing tackle	$ 34.13
Floy FD-67 Anchor tags and extra needles	119.80
Chatillon Instrument scales	60.00
Boat gas for July, August and September, 1972	28.76
Outboard motor oil	11.60
Total	254.29