

MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION
JOB PROGRESS REPORT

State: Montana Title: Southwestern Montana Fisheries Study
Project No.: F-9-R-22 Title: Investigation of the Fishery of the
Lower Big Hole and Jefferson Rivers.
Job No.: IV-a
Period Covered: July 1, 1973 - September, 1973

OBJECTIVES

Preliminary ground work and planning was done to design a study of the fisheries of the Big Hole and Jefferson Rivers. A fishery investigation was deemed necessary because of increased stream alteration and water use and because of the proposed Riechle Dam on the Big Hole River.

ABSTRACT

Habitat was evaluated by photos and direct observation of the Big Hole and Jefferson Rivers. Six electrofishing stations were chosen, three on the Big Hole River and three on the Jefferson River. Four thermograph stations were established and maintained in 1973. Highest temperature recorded was 81° F on the lower Big Hole River. A creel census sample was done on the two rivers in early July. Inaccessability and area size were two problems encountered. Flow records for the two rivers were thought to be inadequate and recommendations were made to supplement present data from USGS.

FINDINGS

Habitat Evaluation

Aerial and ground photographs were taken of habitat problems on the Big Hole and Jefferson Rivers. In 1972, I counted 40 irrigation diversion dams impairing the natural river flows between Divide Dam and the mouth of the Big Hole River. In 1973, the number of diversions in this section had increased to 44. In 1970, 26 diversions were counted in this section of the Big Hole River (unpublished field notes).

Electrofishing Stations

The Jefferson River was floated a number of times and three tentative electrofishing sites chosen as follows:

1. Confluence of Big Hole River to Hell Canyon Creek. The distance is approximately 4 miles and access points are available.

2. From the Burdick Stone ranch to the Silver Star Bridge, a distance of approximately $1\frac{1}{2}$ miles with good access.
3. From the Parsons Bridge to Renova, a distance of approximately 7 miles with limited access between these two points. Possible access may be gained at the Hot Spring Cave point two miles upstream from Renova.

These three sections on the Jefferson River vary in length and therefore some sections may be shortened depending upon the number of fish worked and time involved.

Three electrofishing sites on the Big Hole River were chosen for this study. Two previously established electrofishing sections would be used so as to obtain data that can be compared and one new station would be established.

Proposed Big Hole River electrofishing sites are as follows:

1. The Melrose section from Melrose to Brown's Bridge. This section was electrofished in the fall of 1969, spring of 1970, fall of 1970 and spring of 1971.
2. The Reichle section from the Reichle Dam site at the gap to near Pete Naranche ranch. This section was electrofished in the fall of 1971, spring of 1972, fall of 1972 and spring of 1973.
3. From the Pennington Bridge to the Children's Center Bridge. Exact length of electrofishing section to be determined by number of fish captured and time limitations.

Water Temperature

During 1973, water temperature was recorded on a 7-day continuous recorder at four locations on the two rivers. Thermographs were maintained June through September. The four themograph locations are as follows:

1. Melrose on Big Hole River. Thermograph site was same as the USGS station on US Highway 91, 7 miles south of Melrose.
2. Reichle on Big Hole River. Tehmograph located immediately downstream of gap where proposed dam to be constructed.
3. Children's Center Bridge on Big Hole River. Bridge is approximately one mile upstream from Twin Bridges.
4. Silver Star Bridge on Jefferson River. Thermograph site same as USGS station at town of Silver Star.

Highest maximum temperature recorded at the four stations was 81° F at the Children's Center Bridge on the Big Hole River (Table 1). This high temperature was in part because of extreme low water flows on the lower Big Hole River in the summer of 1973.

Evaluation of a Fishing Census

During the first two weeks of July, fishermen were contacted on the Jefferson and Big Hole Rivers to obtain an indication of fishermen success and to ascertain

TABLE 1. Maximum water temperature ($^{\circ}\text{F}$) recorded at four sites on the Big Hole River and Jefferson Rivers, 1973.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
DAY																															
<u>Melrose Site Big Hole River</u>																															
June																		65	67	61					61	64	66	68	66	68	
July	64	68	69	68	68	68	66					70	70	72	72	72	70	68	62	62	60	64	63	69							73
Aug.	72	71	64	67	69	71	70	71	72						71	70	69	68	67	68	62	62	66	61	64	62	64	65	65		
<u>Reichle Site-Big Hole River</u>																															
June																		60	65	69	69										
July			64	67	71	71	71	68	72	72	73	70	70	70	71	73	72	73	70	72	67	64	59	67	68			73	71	70	73
Aug.	72	73	66	70	70	73	73	74	76	75	73	75	75	77	75	76	77	75	72	75				65	69	62	69	62	67	68	
<u>Children's Center Bridge-Big Hole River</u>																															
June																		59	64	68	70	65	63	65	62	66	69	70	68		
July	67	65	65	68	71	66	71	70	71	73	74	78	73	74	76	75	75	74	75	65	69	61	70	72	73	75	76	79	79	75	81
Aug.	80	79	68	74	70	74	76	78	79	78	72	78	77	79	79	80	80	77	74	79	70	71	72	75	63	74	66	73	74	71	
<u>Silver Star Bridge-Jefferson River</u>																															
June																		55	67												
July	65	64	66	69	70	69	69	71	74	75	71	71	69	72	73	73	73	69	72	65	65	61	64	67	67	71	72	74	73	71	73
Aug.	73	72	67	67	66	69	70	70	71	71	70	72	72	75	73	74	72	70	68	69	64	64	65	66	62	63	61	63	65	62	

the feasibility of a creel census on the two rivers. Although insufficient sampling was done to make statistically sound catch estimates, I have listed the results in Table 2.

TABLE 2. A sample of fishermen catches on the Big Hole and Jefferson Rivers, July, 1973.

River	No. of People Contacted	Total Hours Fished	Catch ^{1/}					Catch/Hr.
			LL	Rb	EB	WF	Gr	
Big Hole	58	153	11	31	23	27	4	0.63
Jefferson	15	41	11	1	0	0	0	0.29

^{1/} LL = brown trout; Rb = rainbow trout; Eb = Eastern brook; WF = whitefish; and Gr = grayling.

Large area and inaccessability via road are two major problems in assessing fishermen harvest on the Big Hole and Jefferson Rivers. At the present time, I believe we should rely on mail questionnaires to obtain a fishermen harvest and pressure estimate. Fishing pressure estimates would of necessity have to be done by airplane which would entail an expenditure of a large sum of money.

Flow Records

USGS flow records are sketchy for the Big Hole and Jeffersons Rivers. Records include:

1. Big Hole River near Melrose - 1923 to present.
2. Jefferson River near Twin Bridges - 1940-1943, 1957-1972. Station flooded out in 1972 not replaced.
3. Jefferson River at Silver Star - 1972 to present. No established recorder. Recordings once daily from float gage.
4. Jefferson River at Sappington - 1895-1905, 1938-1969. Discontinued 1969.

Actually, there is now only one good recording gage on the Big Hole River and one visually read float gage read once daily on the Jefferson River.

Recommendations

Electrofishing should be conducted on the Jefferson River in order to evaluate fish species present and relative abundance. Electrofishing should also be conducted on the Big Hole River in the area near the mouth to compare with upstream data.

Thermographs should be operated for another year so as to have two years of data. Thermographs should be operational from June 1 through September.

Fishermen harvest information should be obtained viar mail questionnaires.

The USGS should be requested to 1) establish a flow station near the mouth of the Big Hole River, 2) reestablish the flow station on the Jefferson River near Twin Bridges, and 3) reestablish the Sappington station on the Jefferson River.

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Waters referred to:

Big Hole River (Sec. 1) 3-02-0425-1

Jefferson River 3-10-3840-1

