KOOTENAI FALLS AQUATIC ENVIRONMENT MONITORING STUDY

Third Annual Report
for the period
January 1, 1981 - December 31, 1981

Submitted by:

Montana Department of

Fish, Wildlife and Parks

and

Montana Department of

Natural Resources and Conservation

March, 1982

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In preparation, NLI contracted with DNRC in 1978 to conduct baseline studies of the aquatic environment in the project area. The results of that study were completed in 1979 (Graham 1979).

To keep the data base current and to gather additional information on year-to-year variation, NLI contracted with DNRC in 1979 to monitor certain aquatic resources in the study area on a continuing basis. Results of the first two years' monitoring effort have been presented by Huston (1979, 1981).

This third annual report presents results from 1981. Unless otherwise noted, all data reported here were gathered by the Montana Department of Fish, Wildlife and Parks (MDFWP) under contract to DNRC. Joe Huston of MDFWP authored the report, and technical editing was done by Carol Kopec and Larry Thompson of DNRC.

METHODS

White Sturgeon Sampling

From June 1 through 4 and September 8 through 11, 1981, MDFWP sampled for white sturgeon in river pools above and below Koot Creek and in the "sturgeon hole" 2.2 miles downstream from Kootenai Falls. Sampling gear consisted of set lines baited with night-crawlers and beef. These lines were fished continuously for three days at each sampling area. The Idaho Department of Fish and Game sampled selected Montana sites (see appendix) for sturgeon in the Kootenai River downstream from the Yaak River. This was done June 1 through 3, 1981 and September 7 through 9, 1981. Rod and reel, set lines, catfish traps, and gill nets were used as gear. Idaho's sturgeon sampling in Montana was funded by the U.S. Army Corps of Engineers.

Population Trend Sampling

Graham (1979) proposed that fish population estimates be obtained from the impoundment area of the proposed Kootenai River Hydroelectric Project in late August or early September of each year. Huston (1981) recommended that fish population work be limited to collection of trend data since obtaining sufficient sample size for population estimates could not be guaranteed each year. It was also recommended that population trend sampling be limited to the upper two-thirds of the Kootenai Falls-China Rapids section.

Trend sampling using boat-mounted electrofishing gear was done September 1 and 2, 1981 and was limited to the upper two-thirds of the China Rapids-Kootenai Falls section. Fish species studied were limited to rainbow

trout (*Salmo gairdneri*) and mountain whitefish (*Prosopium williamsoni*) seven inches long or longer. Fish caught each night were measured, marked or tagged and released the next day. Scale samples for age-growth determinations were taken from all rainbow trout and from a representative sample of whitefish. Whitefish and rainbow trout over 10 inches total length were given a numbered anchor tag and released.

During sampling, river flow at Libby Dam was regulated at 9,000 cfs by the Corps of Engineers. Flow in the sampling area was somewhat larger due to tributary stream input and was estimated at about 9,500 cfs. During the three months prior to sampling (June, July and August), river flows varied from 8,500 cfs to 40,000 cfs. This was due to above-average inflows at Lake Koocanusa. Normally, summer releases from Lake Koocanusa range from 4,000 to 10,000 cfs.

Aquatic Insect Sampling

To determine which species of aquatic insects inhabit the Kootenai River below Kootenai Falls, three square-foot bottom samples were collected on May 13, 1981. These samples were taken from a riffle area of the Kootenai River located immediately upstream from the KOA campground about three miles west of Troy, Montana. Insects collected were identified to genus and species where possible.

RESULTS AND DISCUSSION

White Sturgeon Sampling

No sturgeon were caught during the study period. The appendix to this report contains two letters describing the sturgeon sampling effort

in more detail.

Population Trend Sampling

The Kootenai Falls-China Rapids section is divided by swift rapids into three distinct pools and runs. The upper two pools and runs (subsections 1 and 2) were electrofished the nights of September 1 and 2, 1981. Catch-per-boat-night of rainbow trout and mountain whitefish in these subsections is shown in Table 1. Also given are the results of sampling done in these same subsections in 1978 through 1980.

Table 1. Catch-per-boat-night of effort of rainbow trout and mountain whitefish, subsections 1 and 2 of Kootenai Falls-China Rapids section of Kootenai River, Montana, 1978, 1979, 1980 and 1981.

	Catch-per-boat-night					
	Subsection 1			Subsection 2		
Sampling period	(boat-nights)	RB 1/	MWF 1/	(boat-nights)	RB	MWF
August 1978	2	94	401	2	48	212
October 1979	2	25	35	2	14	12
September 1980	2	84	169	2	62	80
September 1981	1	13	89	1	30	210

1/ RB = rainbow trout, MWF = mountain whitefish

The data presented in Table 1 indicate variable catch rates between the sampling years. These rates are probably not closely related to population numbers, but rather to other factors such as river flow during sampling, river flow for the weeks prior to sampling, presence or absence of aquatic insect hatches, and atmospheric light available for night-time boat operation.

The mechanics of the effects of flow rate changes upon a fish population before or during an electrofishing operation are not well understood or documented. The effects of flow changes during electrofishing are very well known to electrofishing crews, and invariably result in a reduced

catch per unit of effort. The 1979 sampling was done when river flows varied from 4,000 cfs to 15,000 cfs during a 24 hour period.

River flow during the 1978, 1980 and 1981 sampling was maintained at a stable volume throughout the entire sampling period. Catch rates were good in 1978 and 1980, but poor in 1981. The lower catch rates in 1981 were thought to be related to electrofishing during the "dark of the moon" phase and during a time when drifting and hatching insects were not abundant. Discharge from Libby Dam in June, July and August, 1981 ranged from 40,000 cfs to 8,500 cfs. Normally it varies from 4,000 cfs to 8,500 cfs, and this change may have affected insect availability.

The Jennings section of the Kootenai River (3 miles below Libby Dam) was electrofished the same nights as the Kootenai Falls-China Rapids section. Catch of both mountain whitefish and rainbow trout was much lower than expected in this river section also (May, personal communication).

Fish caught in 1981 were examined to determine age class. Data for rainbow trout are given in Table 2. The small number of rainbow trout collected in 1981 precludes comparison of age-class structure with previous years' data. However, it is notable that the age structure given in Table 2 is similar to that found in March of 1981 at the Flower-Pipe section of the Kootenai River, where most of the rainbows captured were also of age-class II (May, personal communication).

Table 2. Age-class distribution of rainbow trout caught by electrofishing in Kootenai Falls-China Rapids section of Kootenai River in 1981. (Scale samples from two of the 43 rainbow trout caught were unreadable.)

Age-Class	Number	Percent
1	12	29.3
2	27	65.8
3	2	4.9

Growth rates of rainbow trout captured in 1981 are presented in Table 3 according to age at emigration from the natal stream into the Kootenai River. Rainbow trout smolt into the river as young-of-the-year (X_0), as one-year old fish (X_1), and as two-year old fish (X_2). Growth data for mountain whitefish caught in 1981 are shown in Table 4.

Table 3. Growth of X_0, X_1, and X_2 migration-class rainbow trout captured in the Kootenai River, 1981.

Migration-class	Average length in inches at annulus		
	I	II	III
X_0	4.1(3)[1/]		
X_1	2.7(33)	9.0(24)	12.6(1)
X_2	2.4(5)	4.6(5)	11.6(1)

1/ Sample size in parenthesis.

Table 4. Growth of mountain whitefish collected from Kootenai Falls-China Rapids section of Kootenai River in 1981.

Year	Average length in inches at annulus					
	I	II	III	IV	V	VI
1981	4.4(113)[1/]	9.8(86)	12.3(67)	13.8(21)	15.9(8)	16.6(1)

1/ Sample size in parenthesis.

Tag Returns

During calendar year 1981, 11 tags from the 389 rainbow trout tagged in 1980 were returned by anglers. Five of the tagged fish were caught within the Kootenai Falls-China Rapids section, four were caught above the section, and two were caught below Kootenai Falls. One rainbow trout tagged in 1981 was caught in 1981. It came from within the Kootenai Falls-China Rapids area. No tags from fish tagged in 1978 or 1979 were returned

by anglers in 1981.

Aquatic Insect Studies

The list of aquatic insect species developed from May, 1981 sampling near Troy can be compared to a species list compiled from the river above Kootenai Falls. Table 5 presents the list of insects found below Kootenai Falls; those not found above Kootenai Falls are denoted by an asterisk.

The species list shown in Table 5 is likely to be incomplete since samples were collected only in May, 1981. The species list for the Kootenai River above Kootenai Falls is thought to be complete, since it was developed from a two-year long aquatic insect sampling program that included monthly bottom sampling, drift sampling, and streamside sampling.

Table 5. Aquatic insect species list, Kootenai River near Troy, Montana Below Kootenai Falls. Those not found above Kootenai Falls are denoted by an asterisk (*). Species found above Kootenai Falls but not below are not included in this table.

Species	Species
EPHEMEROPTERA - May flies	TRICHOPTERA - Caddis flies
*Ameletus cooki	Hydropsyche occidentalis
Baetis tricaudatus	Hydropsyche oslari
Baetis hageni	Cheumatopsyche sp.
Rhithrogena hageni	Rhyacophila bifila
Epeorus longimanus	Glossosoma velona
*Epeorus grandis	Brachycentrus occidentalis
Cinygmula spp.	Brachycentrus sp.
Ephemerella inermis	Lepidostoma sp.
Ephemerella flavilinea	*Psychomyia sp.
Ephemerella tibialis	
Ephemerella heterocaudata	COLEOPTERA - Beetles
*Ephemerella edmundsi	Optioservus quadrimaculatus
*Ephemerella hecuba	Dytiscidae
Paraleptophlebia heteronea	
Paraleptophlebia memoralis	DIPTERA - True flies
	Chironomidae
PLECOPTERA - Stone flies	Antocha sp.
Pteronarcella badia	Simulium sp.
Classenia sabulosa	Tipulid sp.
Hesperoperla pacifica	
Calineuria californica	OTHER INVERTEBRATES
Isoperla fulva	Turbellaria
*Isoperla sp.	Lumbriculidae
Cultus sp.	Hydracarina
*Cultus pilatus	Lymnaea sp.
Sweltsa coloradensis	
Suwallia sp.	
small Chloroperlid	
*Triznaka diversa	
Zapada cinctipes	
*Prostoia besametsa	

LITERATURE CITED

Graham, Patrick J. 1979. Kootenai Falls Aquatic Environment Study, Final Report. Mont. Dept. Fish, Wildlife & Parks, Helena, Mt. 84pp.

Huston, Joe E. 1979. Kootenai Falls Aquatic Environment Study, Progress Report. Mont. Dept. Fish, Wildlife & Parks, Helena, Mt. 4pp.

Huston, Joe E. 1981. Kootenai Falls Aquatic Environment Study, Progress Report. Mont. Dept. Fish, Wildlife & Parks, Helena, Mt. 9pp.

STATE OF MONTANA

DEPARTMENT OF

FISH AND GAME

June 17, 1981

Fred Robinson
Facility Siting Division
32 South Ewing
Helena, Montana 59601

Dear Mr. Robinson:

This letter is in regards to sampling for white sturgeon that took place in the Kootenai River from June 1, to June 4, 1981. Personel from the Montana Department of Fish, Wildlife and Parks fished set lines near the mouth of Koot Creek and in the "Sturgeon hole" at the mouth of the canyon. Biologists from the Idaho Fish and Game Department fished set lines in seven pools from the mouth of the Yaak River to Boulder Creek. The flows during the sampling period ranged from 10,000 cfs to 20,000 cfs and nightcrawlers were utilized as bait.

The total catch consisted of a few suckers and one northern squawfish (Table 1). No sturgeon were caught or observed. The high flows hindered the fishing effort and would have been a factor in the paucity of fish caught. We would like to repeat the sampling again in July when flows are lower.

Sincerely yours,

Bruce May
Rt. 1, Box 1270
Libby, Montana 59923

BM/pd
enc.

Table 1. Catch of set lines in the Kootenai River from Kootenai Falls to Boulder Creek, June 1-4, 1981

Location	Date	Number set lines	Number hooks	Catch
Mouth Koot Cr.	6/1-6/4/81	1	16	0
Sturgeon Hole	" "	2	32	0
Mouth of Yaak-Boulder Creek	6/1/6/3/81	8	48	several suckers one squawfish

STATE OF MONTANA

DEPARTMENT OF
FISH AND GAME
Region One
P.O. Box 67
Kalispell, MT 59901
September 29, 1981

Larry Thompson, Facility Siting Division
Montana Department of Natural Resources
and Conservation
32 South Ewing
Helena, Montana 59620

Dear Mr. Thompson:

Please consider this letter and the attached letter from Idaho Department of Fish and Game as the final report describing sturgeon sampling on the Kootenai River below Kootenai Falls the week of September 7 through 11, 1981.

The table below lists the sampling done by Montana Department of Fish, Wildlife and Parks. Sampling efforts below Kootenai Falls and near Koot Creek are combined into above-below Koot Creek.

Table 1. Sturgeon sampling in Kootenai River below Kootenai Falls, September 7 through 11, 1981.

Area Sampled	Number of hooks	Hours Fished	Number of Stur caut	Number of fish caut
Above-below Koot Creek	48	72	0	0
"Sturgeon hole"	48	24	0	0
" "	24	48	0	0

Sampling gear consisted of set-lines which had eight hooks per line. Hooks were 2/0 to 4/0 size and were baited with nightcrawlers, liver, and beef. The lines were fished individually or ganged together so that both shallow and deep water was fished. The lines were checked daily and hooks rebaited each day.

Sampling done by Montana and Idaho in June 1981 and the sampling done in September 1981 would seem to indicate that few, if any, sturgeon were present in Kootenai River during the respective time periods.

Sincerely,

Joe E. Huston

Joe E. Huston
Supervisory Fishery Biologist
JH/mjw
cc: Larry Petermen

STATE OF IDAHO

DEPARTMENT OF FISH AND GAME

REGION 1
2320 GOVERNMENT WAY
COEUR d'ALENE, IDAHO 83814

Sept. 14, 1981

Joe Huston
Montana Department of Fish, Wildlife and Parks
P.O. Box 67
Kalispell, Montana 59901

Dear Joe,

The following is a report on the success (or lack of) on our sturgeon sampling in the Kootenai River, Montana below the mouth of the Yaak River during September 7-9, 1981.

Sampling gear consisted of setlines which had six hooks of 4/0 and 6/0 size baited with night crawlers and cut pieces of nongame fish, an experimental gill net with mesh varing from .75 inch to 3 inch, 15inch diameter catfish traps and rod and reel. All gear was checked daily.

Areas sampled were the following:

Hole .25 mi below the mouth of the Yaak River- one setline, 3days, 0fish; one trap, 3 days, 0 fish; rod and reel, 4 rd hrs, 1 peamouth.

Hole opposite the railroad tunnel in sec 34,T33N, about .75 mi above Pine Creek- one setline, 3 days 2 largescale suckers (LsSu); one over night gill net set, 2 squawfish (sqf) and 1 LsSu

Hole in front of rock butte, .5 mi below Pine Creek- one setline, 3 days, 1 LsSu; one trap, 3 days, 0 fish; one over night gill net set, 1 rainbow 390mm released, 1 bull trout 405 mm, 3 sqf 245, 250, 330 mm, 16 LsSu 215, 220, 220, 225, 225, 310, 315, 320, 320, 330, 350, 355, 360, 335, 450, 485 mm rod and reel, 18 rd hrs, 0 fish.

Hole by rock island .25 mi below Rocky Creek- one setline, 3 days, 0 fish.
Hole along north shore across from rock quarry .75 mi below Rocky Creek- one setline, 3 hours, 0 fish.

The hole at the mouth of Boulder Creek in Idaho was also fished with one setline for 3 days and caught 1 sqf and 1 LsSu.

It does not appear that there is a large number of sturgeon using this section of the river since we haven't caught any in the two trips this year.

Sincerely

Fred E. Partridge
Fishery Research Biologist