A PRELIMINARY REPORT OF FISHERY INVESTIGATIONS ON THE CLARK FORK RIVER DURING MARCH, 1960, by Arthur N. Whitney, District Fish Manager.

This report concerns the investigation of the Clark Fork River, in the vicinity of Missoula, Montana, by District Two fishery personnel. A copy of the original field notes is attached to this report as Appendix No. 1. Nine photographs, showing various phases of the investigational work constitute Appendix No. 2. Investigations were made immediately following the appearance of a rusty-reddish-orange color in the Clark Fork River below the Montana Power Company Dam located at Milltown, Montana.

Throughout the months of January and February, 1960, various District Two personnel, including the author, noted a gradual rise in the apparent turbidity of the Clark Fork River from the Milltown Dam, upstream to the vicinity of Warm Springs. Because of severe ice conditions in this section of the river during this period, and further because this section is classified for industrial and agricultural use only, until 1964; no immediate fishery evaluation was deemed advisable. However, all personnel were alerted to watch for the appearance of this color below the Milltown Dam.

The last time that normal winter color was recorded below this river section was on March 11, when Ralph Boland and Tommy Smith (District Two fishery biologists) observed the river immediately below the dam. On March 14, these same two men, enroute to Butte from Missoula, noted visible color in the water between East Missoula and Milltown. This condition was reported to the author on March 15, and on this date the river was checked at many road access points from Milltown Dam to Sawmill Gulch, a distance of about 47 river miles. A noticeable turbidity, best described as a rusty-reddish-orange color, gradually decreased throughout this section, but was still readily apparent at the lower end (Sawmill Gulch). On this date, and at the times they were occasionally checked throughout the study, the streams and rivers tributary to this section of the Clark Fork River were clear.

Depths at which the bottom of the Clark Fork was visible ranged from less than 6 inches above the town of Missoula to 1½ to 2 feet at Sawmill Gulch. No dead fish were seen, however, it would have been almost impossible to see any object on the river's bottom, due to the turbidity of the water. The visible portions of the river bottom were covered with a slimy, reddish-orange, silt throughout this section. This was most noticeable at the lower station because the bottom was most readily observed there.

On March 15, Robert Averett, pollution control biologist for the Fish and Game Department, who works with the State Board of Health, was notified of the situation. Mr. Averett arrived in Missoula on the evening of March 15, and worked with District Two fishery personnel on this investigation through March 24.

Our knowledge and estimation of the situation on March 15 may be summarized as follows:

a. An unknown substance was causing a very abnormal color, turbidity and silt condition in a section of the Clark Fork River, which is classified for a use that includes fish and wildlife.

b. This substance was not coming from any of the tributaries of the Clark Fork below Milltown Dam.

c. Because the Clark Fork, upstream from Milltown Dam to Warm Springs, had shown this same color for the previous two months, our most logical assumption was that the substance was coming from the Anaconda Company's operations at Butte or Anaconda.

d. With our limited knowledge of the chemistry of the Anaconda Company's mine wasteflow, it appeared probable that the substance in the river would consist of some heavy metal compounds, most likely iron or copper.

e. Because various compounds of both these metals have been reported lethal to fish in very low concentrations (as low as 1.2 ppm for iron and .002 ppm for copper), we were concerned over the probability of a fish kill.

Since the river was too turbid to either observe for dead fish or to attempt to sample for surviving fish by any of our standard methods, we decided our most suitable method of evaluation would be to suspend live game fish in the river in test cages and observe their reaction.

On March 16, from 0800 to 1500 hours, three live cages of nylon-bobbinett-covered, wood-frame construction, were installed in the Clark Fork and one was placed in Rattlesnake Creek as a control. Cages were set in from two to three feet of water, in areas of light to moderate current flow, and deflectors were installed to prevent small ice and debris particles from ripping the bobbinet mesh. Following is a description of the location of the stations:

Station 1: On the Vern Peterson ranch, approximately three miles upstream from Milltown Dam.

Station 2: About half-way between the old East Missoula bridge and the gas line crossing.

Station 3: Near the east end of the first bridge above the turn-off for the west side Rattlesnake Creek road.

Station 4: Behind the breakwater, just upstream from the Deep Creek bridge.

From 1500 to 1700 hours, on March 16, rainbow trout (5-7" in length) from the Arlee hatchery were placed in these live cages. Six fish each were placed in the cages at Stations 2, 3, and 4 and nine fish in the cage at Station 1. Condition of the fish in these cages has been checked at least daily for as long as fish survived since March 16, and these observations are summarized through March 20 on Table 1.

Note that fish showed abnormal activity at stations 1 and 2 within 19 hours and all were dead within less than 67 hours. Fish at Station 4 did not show signs of distress until 67 hours and four of the six had died within 90 hours. Fish at Station 3 showed normal activity throughout the entire 90-hour period.

When the fish in the cage at Station 4 began to die on March 19, it became necessary to set up more stations downstream from this point, in an effort to determine the maximum downstream extent of the effect which this pollution had on fish. On March 20, three more cages were installed in the river, similarly to the first four, as follows:

Station 5: Sawmill Gulch (below Alberton).

Station 6: Forest Grove (between Tarkio and Superior).

Station 7: Sloway Camp (between Superior and St. Regis).

Five, 5-7" rinbow trout from the Arlee hatchery were placed in the cages at Stations 5 and 6 and 6 in the cage at Station 7.

Observations on the condition of these fish, and also those remaining at Stations 3 and 4, have been made at least daily since March 20 and are summarized on Table 2, through March 27. None of the fish in the lower three stations showed any signs of distress throughout this period, and the fish in the control station continued to show normal activity. One of the remaining two fish at Station 4 died on March 25, and the other has apparently recovered from its previous exposure to toxic substances.

It is likely that sometime between March 20-25 either the dilution from increasing spring runoff, or the reducing of the introduction of toxic materials (or both), lowered the concentration of polluting materials to where they were no longer toxic to fish.

Distances of all live-cage stations and other points mentioned in this report, above and below Milltown Dam, are given in Table 3.

Fish, which expired in the four upper live cages, showed the following characteristics and symptoms. Within from 19 to 67 hours (time appeared to depend primarily on concentration of lethal substances at each station and also apparently depended somewhat on the resistance of individual fish), the fish first showed a general listlessness with some spotting on the mucous body covering. The discolored spots gradually became larger and a reddish-orange precipitate appeared to lodge on the affected areas. Within various lengths of time after this, fish developed a deep leghargy, lost equilibrium, became moribund and died. On all moribund and dead fish examined, the gills were plugged with a clotty mucous which was discolored by strings and globules of the reddish-orange precipitate, which was noted earlier on the external mucous covering of the fish. The State fish pathologist (Mr. Jack Bailey) examined four of these fish on March 20. No abnormal internal symptoms were found to add to the above description of external characteristics.

From original field notes and observations, the following descriptions of wild fish are summarized.

On March 16 and 17, three longnose dace were noted at Station 4 showing abnormal activity. One, resting on a rock in 2-3" of water, barely eluded capture by hand. Two others were swimming feebly about 2-4" below the surface over about 2-3 feet of water. These two fish avoided capture by sinking slowly, [illegible] out of sight, in the turbid water rather than by darting swiftly to the bottom, as is common with this species.

A few dead fish were seen throughout the course of this investigation. These were mostly single fish, lodged on a rock or ice cake and most were in an advanced state of decomposition.

On March 24, Warden Jim Ramsey reported to the author that a small number of dead fish had been located, lodged in the lower side of a beaver dam near the mouth of Geyser Slough. It is likely that these fish became entangled in this dam during their efforts to reach the clear water of Geyser Slough. Two of the fish (longnose suckers) were examined by the author and even though partly decomposed, appeared to show the same discoloration of the external body covering that was noted in the trout which died in our live cages.

On March 19, several brown trout were noted in a clear-water slough, just above Station 1. Turbid water was beginning to enter the mouth of this slough, due to an increase in the river's flow, and the fish attempted to avoid us by darting in and out of this reddish-muddy "cloud". From the way that they continually re-appeared, it was obvious that they were not going out into the main river.

A rapid field examination of bottom samples taken by Robert Averett on March 16, showed that bottom organisms ranged from approximately 95% dead at Station 1 to about 10% dead at Station 4. All organisms were alive in the sample from the control Station 3. Due to an increase in the flow of the Clark Fork River, it was impossible to repeat these samples during the course of the investigations.

From this investigation, it is apparent that some pollution damage has occurred to the fishery resource of the Clark Fork River above Milltown Dam and of at least a 20-mile section downstream. This is apparent from the following biological facts:

1. Rainbow trout, held in live cages in the lower portions of this river section, died in from 23 to 90 hours, from March 16 through March 20. This was coincident with the appearance of an abnormal, reddish-orange, turbidity in this river section.

2. During this same period, and continuing through March 27, similar rainbow trout, held in an identical live cage in Rattlesnake Creek remained in apparent good condition.

3. Another group of rainbow trout, held in similar live cages, downstream from this river section remained in apparent good condition from March 20 through March 27.

4. An abnormally high number of dead bottom organisms were noted in this river section, coincident with the unusual turbidity and color mentioned in No. 1 above.

5. Abnormal activity of three longnose dace, and several dead fish of other species, were noted in this river section during the course of the investigation.

The actual degree of damage is impossible to assess at the present time. Although we know that some fish have escaped this lethal flow by going up side streams and backwaters, we have no good estimate of what portion they were of the total population. Also, the fact that some bottom organisms have been killed may reduce this streams fishing quality for several years, or the effect may be noticeable only for a short period. The adequate sampling, necessary to better determine the extent of damage, is made impossible by the spring run-off which has already started in the Clark Fork. Also, the rate of recovery of damaged populations is an unknown factor, which only the continued study of this river can solve.

Table 1. Condition of fish in live cages, March 16-20, 1960.

Date	Station 1 (3 mi. above dam)	Station 2 (E. Missoula)	Station 3 (Rattlesnake Cr.)	Station 4 (Deep Creek)	Approx. Time
March 16, 1960 1500-1700	Normal activity 9 fish	Normal activity 6 fish	Normal activity 6 fish	Normal activity 6 fish	0 hr.
March 17, 1960 0800-1100	8 listless 1 lethargic	5 listless 1 moribund	Normal activity	Normal activity	19 hr.
1500-1600	3 dead (c) 1 moribund 5 listless	1 dead (c) 1 moribund (c) 1 lethargic 3 listless			23 hr.
1930	1 dead (c) 2 moribund 3 listless				27 hr.
March 18, 1960 0900-1000	4 dead (c) 1 lethargic	2 dead (c) 1 moribund 1 lethargic	Normal activity	Normal activity	41 hr.
1600-1700	1 lethargic	1 moribund 1 lethargic			48 hr.
March 19, 1960	2 dead (c)	2 dead (c)	Normal activity	1 moribund (c) 1 lethargic 4 normal activity	67 hr.
1730				1 lethargic 2 listless 2 normal activity	72 hr.
March 20, 1960			Normal activity	2 dead (c) 1 moribund (c) 2 normal activity	90 hr.

(c) = fish collected.

Table 2. Condition of fish in live cages, March 20-27, 1960.

Date	Station 3 (Rattlesnake Cr.)	Station 4 (Deep Creek)	Station 5 (Sawmill Gulch)	Station 6 (Forest Grove)	Station 7 (Sloway Campground)
March 20, 1960 1100-1730		2 fish Normal activity	5 fish Normal activity	5 fish Normal activity	5 fish Normal activity
March 21, 1960	6 fish Normal activity	Normal activity	Normal activity	Normal activity	Normal activity
March 22, 1960	Normal activity	Normal activity	Normal activity	Normal activity	Normal activity
March 23, 1960	Normal activity	Normal activity	Normal activity	Normal activity	Normal activity
March 24, 1960	Normal activity	Normal activity	Cage gone	Normal activity	Normal activity
March 25, 1960	Normal activity	1 dead (c) 1 normal activity		Normal activity	Normal activity
March 26, 1960	Normal activity	Normal activity		Normal activity	Normal activity
March 27, 1960	Normal activity	Normal activity		Normal activity	Normal activity

(c) = fish collected.

Table 3. Distances of various stations and points above or below Milltown Dam. Distances are in river miles, obtained with a map wheel from 1/2" = 1 mi. U.S.F.S. maps.

LOCATION	DISTANCE
Station 1: Vern Peterson Ranch	3 miles above
Milltown Dam	0
Station 2: Old county bridge & pipeline crossing	2 miles below
Lincoln-Russell Street bridge	7 miles below
Bitterroot River	13 miles below
Station 4: Deep Creek	22 miles below
Sixmile Creek	34 miles below
Ninemile Creek	38 miles below
Station 5: Sawmill Gulch	50 miles below
Station 6: Forest Grove	65 miles below
Superior	76 miles below
Station 7: Sloway campground	84 miles below

The damage described by the investigations in this report may be further substantiated by the chemical analysis data from several water samples collected by the State Board of Health and Fish and Game Department workers during the course of this study. These data show that both iron and copper were present in concentrations which have been lethal to fish in other areas.

APPENDIX NO. 1

Copy of field notes concerning placing and inspection of five cages of rainbow trout in the Clark Fork River, from March 15 through March 1960.

Original notes by Whitney, Averett, Huston, Boland and Smith.

Following is a copy of the original field notes, recorded by District Two Fishery personnel, during the investigation of the Clark Fork River, from March 15 through March 1960.

March 15, 1960

1425 - Below Bonner Dam on powerhouse side. 33°F, water temperature. Color denser (more turbid) in water over dam than in water through powerhouse. Sample collected from powerhouse side.

1445 - At old East Missoula bridge. Color (or turbidity) distributed evenly across channel. Would be impossible to observe for dead fish due to turbidity. Could not see bottom in 6" of water. 33°F water temperature. Water sample collected.

1505 - Samples taken at both ends of Lincoln-Russell street bridge. On south side, a stream of sawdust was on the surface, coming from the Intermountain Lumber Company. Because of sawdust in sample, took second sample from north side. Turbidity appeared less intense than at last station, still could not see bottom to observe for fish. Two water samples collected.

1545 - Deep Creek Bridge. Water temperature 38°F. Water somewhat clearer, color from distance in shade resembles normal spring-runoff turbidity. Close up, or in direct sunlight, has definite turbidity which is dilute enough here to almost be called a dark, straw-yellow. Bottom was visible at 1½ to 2 feet. Rusty-orange silt covered all visible portions of bottom. No live organisms seen on five rocks which were turned over. Water sample collected.

March 16, 1960

0800-1500 - With crew, placed 4 live cages and took insect samples (Averett's notes). Last car at Deep Creek.

1520 - Deep Creek: Met Campbell and put in 6 rainbow, 5-7", in live car. Truck temperature 49°F, river 39°F, 5 minutes tempered to 41°F.

1555 - Rattlesnake Creek (Control Station): 6 rainbow, 5-7", truck 49°F, water 40°F, tempered fish 4 minutes to 42°F.

1630 - East Missoula Station (about 1/2 way between old bridge and pipeline crossing in eddy on main channel): 6 rainbow, 5-7", water 34°.

1700 - Vern Peterson ranch (3 miles above Bonner dam): 9 rainbow, 5-7", river 33°, tempered fish. Water had raised about 2-3" since car was set.

When car was placed at Deep Creek (about 1500), two dace were noted in distress. One (about 3") on rock in very shallow water (less than 4") and one (about 2") swimming feebly just below surface in about 2' water.

March 17, 1960

0845 - Station 1: Car 6" under water, lid still held down by rocks. Nine fish in this car. All alive, but listless, one lethargic. All fish spotted with ppt from water collecting on slime coat. Water 35°F.

0930 - Station 2: Water 33°F. Six fish, one lethargic, rest listless. All covered with spots on slime as if chemical or ppt from water is affecting mucous covering.

1000 - Station 3: All fish alive and very active. Noticeably and audibly hit sides of live car as we approached. Water 38°F.

1100 - Station 4: All 6 fish alive and active, although not as violently so as fish at Station 3. No spots noticeable on mucous covering. Water 36°F.

Returned to Missoula on south side of river. About 2 miles west of Bitterroot, south side of river was noticeably less turbid than north side. Two pictures taken.

1530 - Station 1: 9 fish - 3 totally dead, 1 moribund, 5 listless. Water 39°F. Dead fish collected and preserved. Water had dropped about 2".

1555 - Station 2: 6 fish - one totally dead, one moribund (both collected), one lethargic, the rest listless. Water 33°F.

1930 - Station 1: One dead, two moribund, 3 listless. Dead fish collected and preserved.

March 18, 1960

0830 - Station 3: Water 34°F. All six fish alive and active.

0850 - Station 2: Water 32°F. Two dead, 1 moribund, 1 lethargic.

0915 - Station 1: Water 33°F. Four dead, 1 lethargic.

1015 - Station 4: Water 36°F. All fish alive and active.

1615 - Station 1: One fish still lethargic.

1640 - Station 2: Water 38°F. One lethargic, one moribund.

March 19, 1960

0830 - Station 2: Water 34°F. Both remaining fish dead, live car removed. Water depth up 1 foot since yesterday.

0900 - Station 1: Water 34°F. One remaining fish dead, live car removed. Water up 8", live car completely covered. Turbidity diluted by increased runoff. Few live brown trout seen in clear slough, just above station.

1000 - Station 3: All fish alive and active. Water temperature 38°F.

1130-1200 - Station 4: One fish almost dead, one lethargic, rest slightly active. Water 38°F. Car was almost submerged, pulled one stake, moved car to shallower water and set new deflection with 3 stakes and 2 boards.

Fish almost dead had rigor mortis over rear 3/4 of body, especially in discolored spots, but gills still worked feebly when touched. Naturally, equilibrium was completely gone on this fish. Lethargic fish was also getting discolored spots.

1730 - Station 4: Water 40°F. One fish lethargic to moribund (extremely spotted and losing equilibrium). Rest moderately active. Water up 4" since 1200 today, deflector raised.

March 20, 1960

0815 - Station 3: All fish alive and active, water 36°F.

0930 - Station 4: Water 36°F. Three fish dead, one as yesterday, two fish left mildly active.

1130 - Station 5: On flat at Sawmill Gulch, water 39°F. Five fish (5-7" rainbow), truck temperature 49°F., tempered to 41°F in 5 minutes. This station is directly across from dynamite sampling station. Condition of fish good.

1200 - Station 6: Forest Grove, just upstream from dump sign, water 40°F, 5 fish (5-7" rainbow). Truck temperature 49°F, tempered to 41°F in four minutes. Condition of fish good. This station below Fish Creek and above Trout Creek.

1530 - Station 7: Sloway camp, 8 miles below Superior: Water 42°F. Six rainbow, 5-7", (had 7, 1 escaped in river), truck 50°F, tempered 4 minutes to 43°F. This station is below Dry Creek and above Cold Creek. Condition of fish good.

1630 - Station 4: Both fish alive and somewhat active. Water 41°F.
The lower stations Nos. 4 through 7 can be described in highway miles west of Missoula (Lincoln-Russell Street bridge) as follows:

Deep Creek	No. 4	10 miles
Sawmill Gulch	5	31 miles
Forest Grove	6	45 miles
Sloway camp	7	65 miles

March 21, 1960

0630 - Station 4: Water 36°F. Both fish alive and active. Water down 2".

1400 - Station 5: Sawmill Gulch: All fish appear lively and in good health. Water 40°F.

1430 - Station 6: Forest Grove: All fish appeared lively and in good health. Water 40°F.

1500 - Station 7: Sloway camp: All fish appear lively and in good health. Water 43°F.

1700 - Station 4: Deep Creek: Two remaining fish in good condition. Water 43°F.

March 22, 1960

1330 - Station 3: Rattlesnake Creek: All fish alive and active. Water 42°F.

1245 - Station 4: Deep Creek: All fish alive (both of them). Water 40°F.

1200 - Station 5: Sawmill Gulch: All fish alive and active. Moved live car to shallow water. Water 39°F.

1130 - Station 6: Forest Grove: All fish alive and active. Move cage to shallow water. Water 41°F.

1045 - Station 7: Sloway camp: All fish alive and active. Moved cage to shallow water. Water 41°F.

March 23, 1960

0915 - Station 7: Sloway camp: All fish alive. Moved live car to shallow water. Water 41°F.

1030 - Station 6: Forest Grove: All fish alive, did not have to move cage. Water 40°F.

1100 - Station 5: Sawmill Gulch: One fish moribund, all the rest okay. Did not have to move live car. Water 40°F.

1300 - Station 4: Deep Creek: All fish alive. Checked again at 1900 hrs, all fish alive, moved live car to shallow water. Water 46°F.

1635 - Station 3: Rattlesnake Creek: All fish alive. Did not have to move live car. Water 40°F.

March 24, 1960

1000 - Station 7: One fish dead, all the rest okay. Moved live car to shallow water. Water 41°F.

0930 - Station 6: All fish alive. Moved live car to shallow water. Water 40°F.

0900 - Station 5: Live car gone. Removed posts and tried to locate live car. Wire holding live car was broken. Could not locate live car. Water was rising and velocity had increased in vicinity of live car.

0830 - Station 4: All fish alive, that is, the two remaining fish were okay. Anchored live car to post in shallow water. Water 40°F.

March 25, 1960

1430 - Station 6: All fish alive and in good condition. Water 44°F.

1515 - Station 7: All fish alive and in good condition. Water 45°F.

1730 - Station 4: 1 fish alive and in good condition, one fish dead. Rattlesnake Creek -- all fish alive.

March 26, 1960

1315 - Station 4: Deep Creek: 1 fish remaining alive and in good shape. Water 43°F.

March 27, 1960

1245 - Station 4: Deep Creek: 1 fish still alive, appears lackadaisical.

1345 - Station 6: Forest Grove: All fish alive and in good condition. Water 44°F.

1430 - Station 7: Sloway campground: All fish alive and in good condition. Water 45°F.

1630 - Rattlesnake Creek: All fish alive and in good shape.

March 28, 1960

Rattlesnake Creek -- 1030 hrs. -- 1 fish dead, other alive. Dead fish not discolored, but large bruise on side. Possible exhaustion. Water level and current up, live car moved to shallower water.

0945 - Station 7: The five fish in the cage were active, apparently in no distress. None of the fish had unnatural coloration nor unnatural markings. Water 44°F.

1030 - Station 6: The five fish in the cage were in the same condition as those in the cage at Station 7. There were quite a bit of wood chips and sawdust around the live cage here. Water 44°F.

1145 - Station 4: The single fish in the cage was quite active, possibly more so than the ones downstream. This fish appeared to have a lighter overall coloration than the fish in the two live cages down river. Water 44°F.

APPENDIX NO. 1 (cont'd).

Copy of the original field notes concerning the Clark Fork River Live Car Study from March 29 through April 7, when the live cars were removed.

March 29, 1960

1000 - Station 7, Sloway Campground. All fish alive and in good condition.
1045 - Station 6, Forest Grove. All fish alive and in good condition.
1145 - Station 4, Deep Creek. Remaining fish alive. Appears more lively than in past few days.
1315 - Rattlesnake Creek. Five fish alive and in good shape. Fish that died Monday collected and preserved.

March 30, 1960

1215 - Station 3, Rattlesnake Creek. All fish alive, good condition and active.

March 31, 1960

0930 - Station 4, Deep Creek. One fish alive and active.
1030 - Station 6, Forest Grove. All fish alive and active.
1100 - Station 7, Sloway Campground. 3 fish alive and active. Two fish belly-up on bottom of cage. One of these collected and preserved. Gills full of silt, but not mucus. Fish had washed-out, silvery coloring from anal fin to tail, front of fish much darker. Area with silvery coloring was stiff as if rigor mortis had set in. Front end of fish was barely alive.

April 1, 1960

1030 - Station 7, Sloway Campground. One fish very sick, belly-up and rear half of body discolored (whiteish) and stiff. Other three fish in good shape.
1100 - Station 6, Forest Grove. Four fish alive and in good shape. One fish dead, but did not show unusual symptoms.
1145 - Station 4, Deep Creek. One fish alive and in good shape.

April 2, 1960

1100 - Station 3, Rattlesnake Creek. Four fish in good condition and one fish completely missing. (Probably removed by spectators.)

April 3, 1960

1045 - Station 4, Deep Creek. Remaining fish okay.
1130 - Station 6, Forest Grove. Four fish alive and in good condition.
1200 - Station 7, Sloway Campground. One fish dead, three remaining fish alive and in good shape. Dead fish was discolored and stiff in region posterior to dorsal fin.

April 7, 1960

1030 - Station 7, Sloway Campground. All fish alive and in good condition. Fish released in river and live car removed. Water temperature 50°F.
1115 - Station 6, Forest Grove. All fish alive and in good condition. Fish released and live car removed. Water temperature 49°F.
1200 - Station 4, Deep Creek. Remaining fish alive and in good condition. Fish released and live car removed.
1330 - Station 3, Rattlesnake Creek. All fish alive and in good condition. Live

car removed and fish destroyed. (Rainbow were not released in Rattlesnake Creek because the stream population is cutthroat.)

APPENDIX 2:

Nine photographs showing various phases of investigation work on Clark Fork River, March 16 through March 27, 1960.