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IMPACT REPORT
NORTH FORK DUCHESNE RIVER

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Impact Report - North Fork, Duchesne River

This report concerns flood damages to the fishery resource of the Duchesne River, incurred June 16, 1963, when Little Deer Creek Reservoir broke. A preliminary survey of the drainage indicated that channel damage on the main river was not too severe; therefore, efforts were concentrated on the North Fork.

Objective: To photograph, and record specific damages to the stream channel of the North Fork, and to make general recommendations for rehabilitation. To sample the area for fish survival, and food availability.

Methods: Iron Springs Camp Ground was chosen as a starting point for the Impact report. Mileage was measured along the road on the truck speedometer. Station numbers begin with number 100 at Iron Springs, and increase downstream. All stations within the first mile are numbered between 100 and 200. All stations within the second mile are numbered between 200 and 300. This method of location was used throughout the eight mile length of the North Fork, from Iron Mine campground downstream to the confluence with the West Fork. No attempt was made to locate the stations more specifically, other than within the mile, with notations as to relative location to various campgrounds and other landmarks. The station numbers are shown in the photographs. Throughout this report the letter "T" will indicate a typical shot of an area showing damages, with no specific reference for rehabilitation. The letter "L" will indicate a station showing specific damage which needs rehabilitation.

First Mile

"L" Station 99 - This is a shot upstream from Iron Springs Campground. Iron Springs is the starting point of the survey, it is also the first part of the North Fork drainage, where the flood had a chance to widen out. Little Deer Creek Reservoir was located approximately 5 miles above this point.



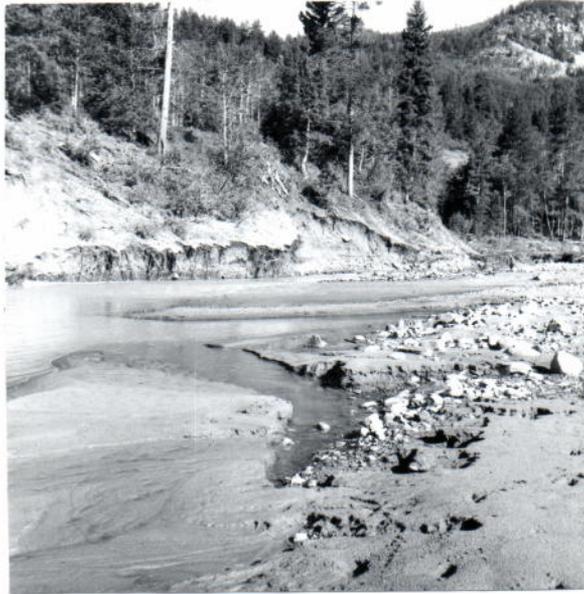
"T" Station 101 - Is photographed from the center of the channel which is approximately 120' wide. Stream is split into two sections, with most of the water on the left side. Banks are rocky and fairly stable. The main impact is debris along the banks and separation of the stream.



"T" Station 102 - The channel width was left denuded of all bottom types except boulders and rubble. The center of the channel, where the stream flows is gouged in some areas and heaved up in others. The overall impact is complete loss of streamside vegetation, and an increase in gradient.



"L" Station 103 - Is located downstream approximately 200' from station 102. The right bank is high cut and needs protection. All streamside vegetation along the left bank is gone. Here again the channel was widened. It is suggested that an anchored, cut tree revetment be installed along the right bank to prevent erosion, and encourage regrowth of vegetation.



"T" Station 104 - The flood widened out to 300' to 400' here. Debris is scattered throughout the area, and willow bunches are severely damaged. The left bank was left quite unstable, but should re-establish itself with the regrowth of vegetation. The stream is scattered in several small channels throughout the area. Some are original channels, some probably new.



"T" Station 105 - Typical shot of denuded stream banks in the willow bunch meadow above Defa's Dude Ranch. Good chance for regrowth of vegetation in some areas, other questionable because most of the soil is gone.



Second Mile

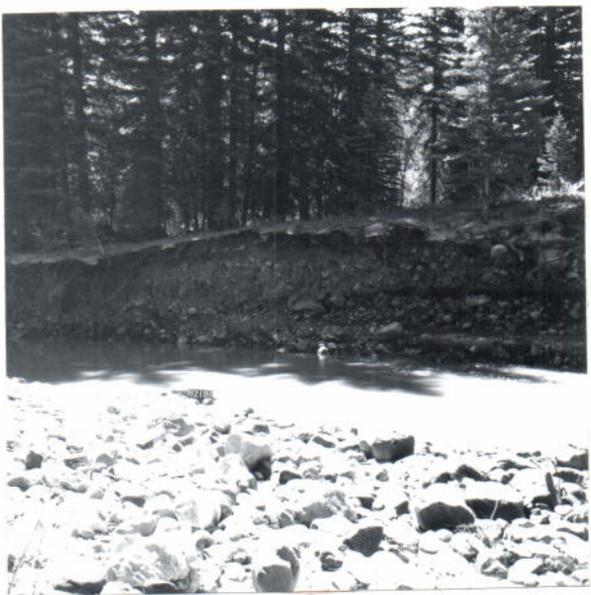
"T" Station 216 - Is located within the boundaries of the Defa's Dude Ranch. This stillwater area did not receive extensive, permanent damage because the flood widened out, and did not follow the channel. Good chance for regrowth of vegetation to re-stabilize banks.



"T" Station 217 - The stream is still in good condition in the section of stillwater area, just upstream from where Hades Creek enters. Flood also widened out in this area resulting in considerable damage to Hades Camp Ground. Note high waterline on right bank.



"L" Station 218 - High cut right bank just downstream from where Hades Creek enters. This bank is rocky and would probably sluff off and stabilize itself; however, placement of an anchored, cut tree revetment might hold enough soil for regrowth of vegetation.



"L" Station 219 - Shear cut left bank approximately 18' high. Stream has moved 30' to 40' to the left leaving a very hazardous bank. Measures should be taken to prevent further erosion and encourage regrowth of streamside vegetation. Two views of this station.



"L" Station 220 - Is located 2 miles downstream from the starting point. Left bank is high cut and needs protection. Right bank, not shown also needs protection. Channel is gouged and the gradient has been increased.



Third Mile

"L" Station 308 - Is located 100' downstream from station 220. This is the head end of a long channel change within the upper half of mile 3. The material, which blocked the original channel, must have come from the high cut banks at stations 219-220-308. Unable to locate the original channel definitely, downstream from this station. Believe it to be far to the right side of present channel. The left bank at this station is high cut and needs protection. The new channel has an excessive gradient, is made up of loose rock, lacks vegetation, and appears to be permanent. Did not investigate possibility of putting stream back into original channel.



"L" Station 309 - The stream is separated into two channels. The right side is believed to be part of the original channel, or at least heading in its direction. There are sections with unstable banks, and the channel is made up of loose rock.



"L" Station 310 - Shows a deeply gouged new channel. Not positive as to location of original channel, however, believe a portion of it shows in background of left side of this photo. The impact is the increased gradient, lack of vegetation, effect on downstream banks, and loss of all bottom types except boulders. The possibility of returning the stream to its original channel should be investigated. Location of the original channel is probably 200' to 250' to the right.



"L" Station 311 - Is a section of what is believed to be a new channel. The "new channel" is deeply gouged and the left bank is unstable. Again, investigations should be made to determine the possibility of putting stream back into original channel.



"L" Station 312 - Is more of same shown at station 311. Material gouged from this area is deposited at station 313, resulting in a channel change. The original channel at this station is believed to be 200' to 250' to the right.



"L" Station 313 - Is a new channel gouged out 50' to the right of the original. There is a great pile of loose rock heaved up into the original channel. Change appears permanent, gradient is increased, banks may stabilize.



"L" Station 314 - Loose rocks have blocked the natural channel, diverting most of the stream into a new and permanent channel. The gradient has been increased considerably. This is just upstream from station 315.



"T" Station 315 - The stream is separated into 3 channels. Impact is loss of shade and depth.



"T" Station 316 - The stream is widened out and lacks depth. The original channel probably was located in the area where the large conifer lays.



"T" Station 317 - Is typical of many channel changes, where banks are erosive, stream lack depth, and shade has been lost. Time will heal these areas somewhat. Main channel is on left side of stream.



"L" Station 318 - Shear cut left bank needs protection. Anchored, cut tree revetment might do nicely.



"L" Station 319 - Quite a typical shot of stream bank damage. Some vegetation remains, but left bank in background needs protection, or may heal itself in time.



"L" Station 320 - Is three miles downstream from starting point. This station has unstable banks with a fair chance of regrowth of vegetation. Considerable loss of shade on right bank.



Fourth Mile

"L" Station 401 - Is a channel change, permanent type. Change probably occurred before flood. Both banks are undercut and channel is gouged. Banks should be protected to save large conifers and cottonwoods.



"L" Station 402 - Original channel, conifers both sides. Channel gouged 3-4' deep. Banks are mostly rock, and will probably stabilize, with some chance for regrowth of vegetation. Location is near River Side Camp Ground.



"L" Station 403 - Channel just down from station 402 is gouged 3-4' deep. Undercut banks need protection to preserve large conifers.



"L" Station 404 - Is just downstream from station 403. Channel gouged 3' to 4' deep. Right bank is high cut and needs protection.



"L" Station 405 - Is located at the top end of Swift Creek Camp Ground. This high cut bank varies from 12 to 20' in height. It is located on a bend and needs protection and sloping. The opposite bank remains stable and is well vegetated. This is half way point of fourth mile.



"T" Station 406 - Lower end of Swift Creek Camp Ground. Stream moved to left about 20'. Conifers along left bank will be lost, unless stream is turned. It may be necessary to return stream to original channel at this point.



"L" Station 407 - Just downstream from station 406. Stream is out of channel and most of the water is running down through the trees. Not too difficult to return stream to original channel here.



"L" Station 408 - Water that left the normal channel at station 407 re-enters through trees approximately 200' downstream. Boulder island in foreground blocks a large portion of the original channel. Right bank, not shown in photo needs protection.



Fifth Mile

"L" Station 502 - Stream scattered and almost split into two channels. Appears that stream will stay in original channel. Placement of boulder deflector would avert channel change.



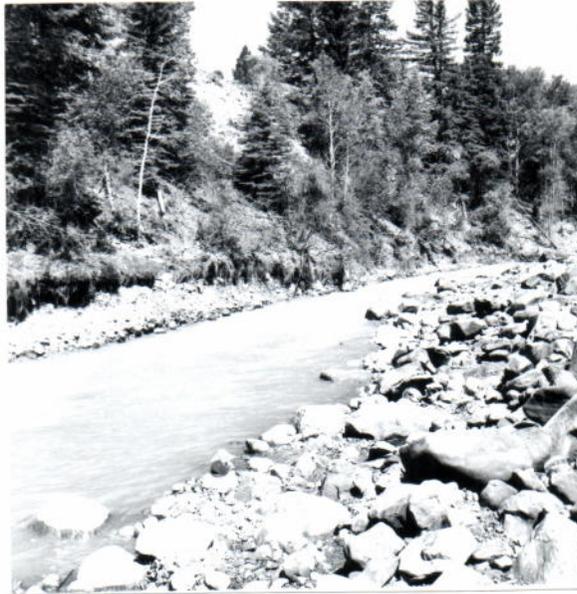
"L" Station 503 - Location just upstream from Swale Camp Ground, downstream 75' from station 502. Channel is gouged 3' to 5' deep. Right bank is unstable, and protection will be required to save large conifers.



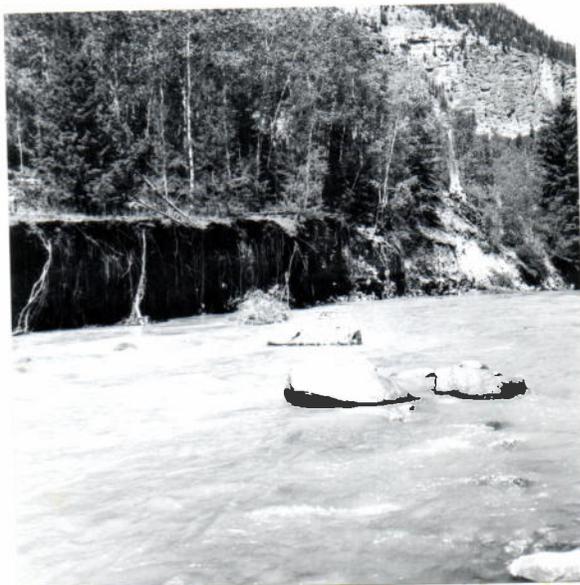
"L" Station 504 - Short channel separation, with gouging and an increase of gradient. Original channel narrowed by loose rock deposit. Location just downstream from Swale Camp Ground.



"L" Station 505 - Channel has been gouged 4' to 5' deep. Rocks deposited by flood cover nearly one-half of the original channel's width. Bank may stabilize itself.



"L" Station 506 - Location approximately 200' downstream from station 505. Right bank very unstable, needs protection, approximate length 250'.



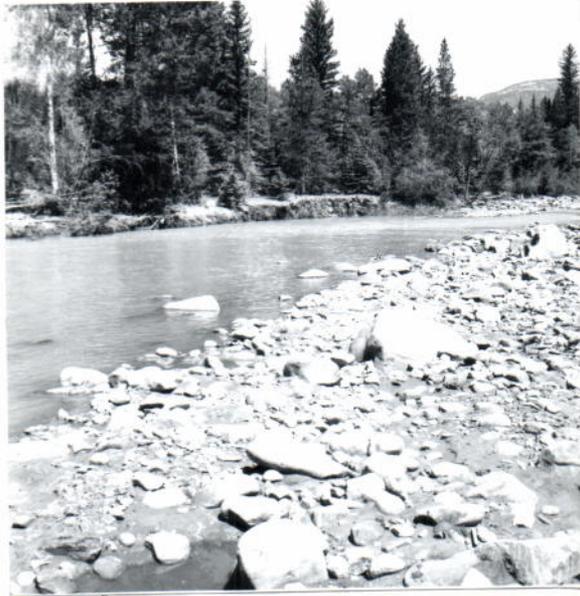
"L" Station 507 - Channel is gouged possibly 10' deep for a distance of 150'. No chance for regrowth of streamside vegetation. Location is alongside of road. Depth and cover are still adequate for trout habitat.



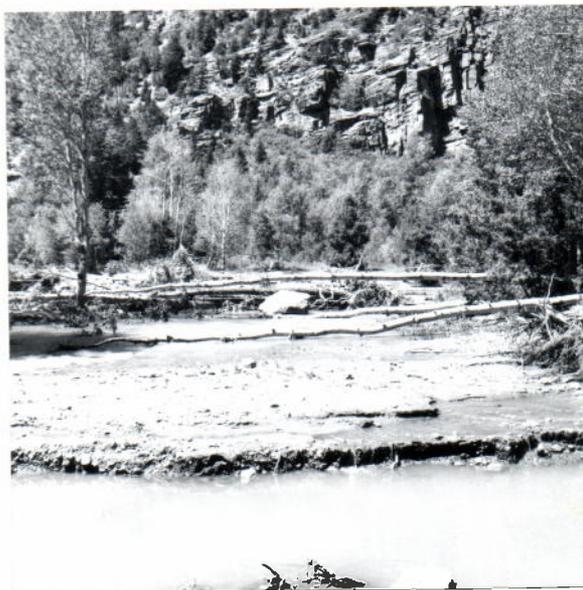
"L" Station 508 - Loose rock heaved up, and blocks some of the original channel. No streamside vegetation left, or chance for regrowth along right bank. Downstream section gouged 3' to 4'.



"L" Station 509 - Location is Aspen Camp Ground, where flood wiped out wide stretch of vegetation along left bank, and forced part of stream into new channel. Unstable bank on right side of stream needs protection. It is quite likely that the stream will be put back into its original channel at this station and station 510 because (1) it is running through Aspen Camp Ground, (2) The original channel downstream is in good condition.



"L" Station 510A - This picture is taken across the section of Aspen Camp Ground, where the flood made a swath 200' to 250' wide. A good share of the stream now flows through the camp ground here. It is quite likely that the stream will be returned to the original channel at this station.



"L" Station 510B - The loose rock material shown here prevents the stream from flowing in the original channel. It is likely that the same material will be used to return the stream to its original channel, which is in good condition downstream from this station.

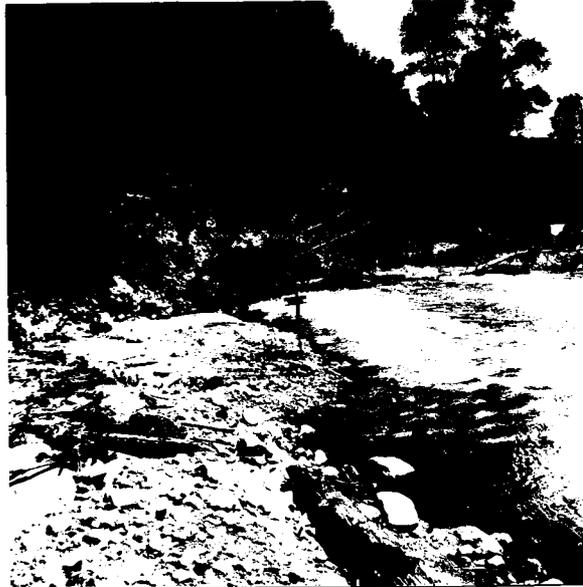


"T" Station 511 - Shows water lost from normal channel at station 510, returning to the normal channel 300' to 400' downstream.



Sixth Mile

"L" Station 601 - This station is located 150' above a diversion dam. The left bank is high cut and needs protection.



"L" Station 602 - The right bank just downstream from the diversion dam needs protection.



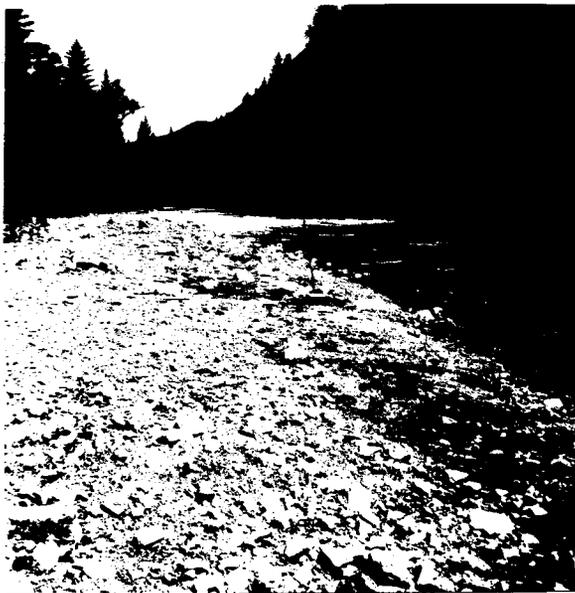
"L" Station 603 - Shows canal repair by (U.S. Army). This is just downstream from diversion dam. Disturbance is only temporary, providing that adequate protection is given the dike.



"L" Station 604 - Just downstream from where canal is taken out. Right bank is unstable for a distance of 300' + , and needs protection. Appears that the channel has been gouged 2' to 3' at this station.



"L" Station 605 - Just downstream from Station 604. Stream moved 15' to the right. Right bank somewhat unstable. No streamside vegetation on left side.



"L" Station 606 - Just downstream from 605; left bank is unstable, and channel is gouged 2' to 3' deep.



"L" Station 607 - The original channel is 40' to the left. It is plugged with boulders. The right bank is unstable and needs protection.



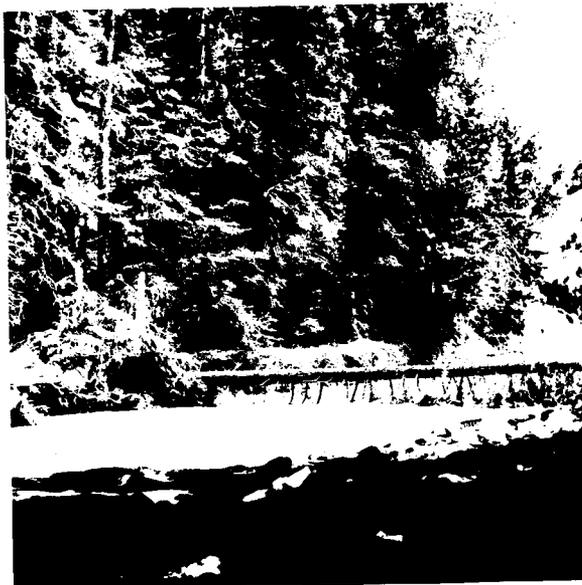
"L" Station 608 - Is approximately 100' downstream from station 607. The loose rock projecting into the stream, on the left side of picture is probably where channel should be. The stream has moved to the right and the right bank needs protection.



"T" Station 609 - Attempt to show large deposit of rock which blocks what was probably the streams channel. Most of the water now flows to the right of the rocks.



"T" Station 610 - Left bank is undercutting, and there will be some loss of conifers unless bank is protected.



Seventh Mile

"L" Station 701 - Approximately one-tenth mile above start of seventh mile. Right bank is high cut and needs protection. Stream again has moved to the right, and the original channel is plugged with rock.



"L" Station 702 - Taken from center of original channel, which is now a pile of rock. The right bank is unstable and the water is undercutting the conifers.



"L" Station 703 - Right bank is cut and unstable. Needs protection to preserve shade.



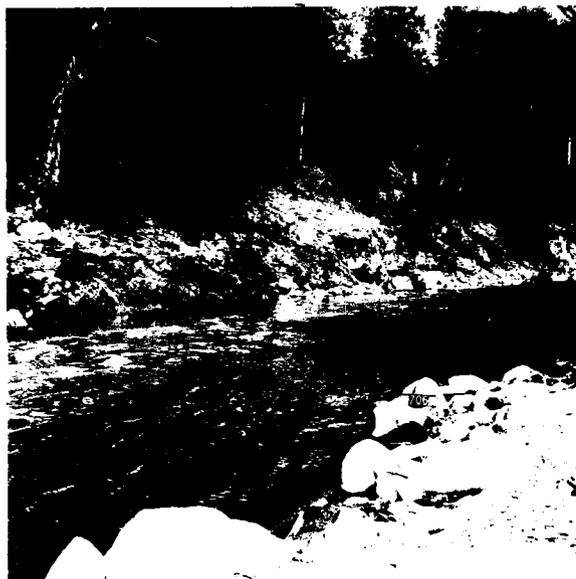
"L" Station 704 - Shows the normal channel plugged on the right, forcing the stream into the left bank, which is high cut, and needs protection.



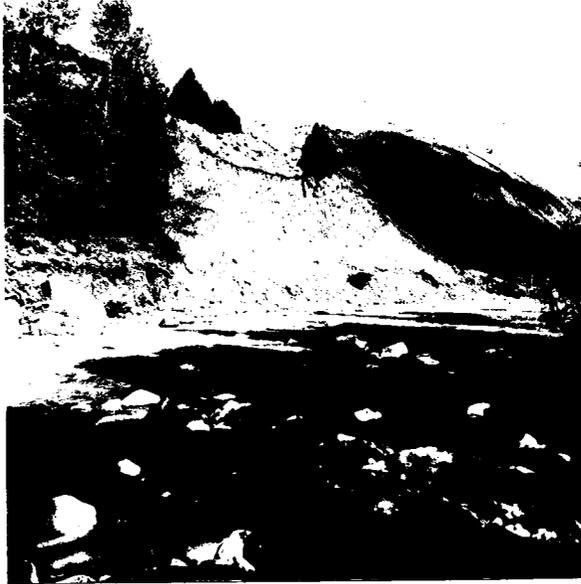
"L" Station 705 - Stream moved to the right approximately 25' undercutting the right bank. This bank needs protection to save conifers. Nice spring here.



"L" Station 706 - This mile of stream looks the best so far as pool-to-riffle ratio, and other habitat factors go. At this station the left bank, for a distance of 400-500', is unstable. Some of this area needs protection to preserve shade cover, other parts will stabilize with time.



"L" Station 707 - High cut left bank near the end of the seventh mile.
Requires protection and sloping.

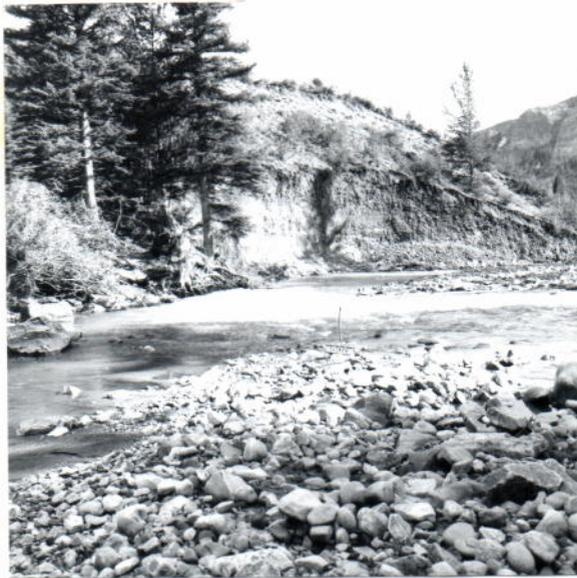


Eighth Mile

"L" Station 801 - High cut left bank, on bend needs protection.



"I" Station 802 - High cut left bank on bend, needs protection.
Channel has narrowed, velocity of stream increased.



"I" Station 803 - High cut left bank, on bend. Should be protected.



Discussion: The main stream was not surveyed in any detail for damage to the fishery resource. Generally speaking the major impact was loss of game fish and bottom feed. The channel was scoured, and boulders were rolled for a considerable distance; however, the channel was not severely gouged, and the banks for most part remained stable.

Damages on the North Fork are outlined above. Much of the impact area will never regain its former value, other areas might be rehabilitated. Electro-fishing showed no apparent survival of trout, and aquatic plants and insects were virtually wiped out. There were many major channel changes, resulting in severe damage. There was in some areas, complete loss of all bottom types except large boulders. Stream banks were left highly unstable, and long stretches of streamside vegetation were wiped out. In some areas there is a good chance for regrowth of vegetation, in other areas more vegetation will be lost as banks undercut, unless preventive measures are taken. Debris is scattered all through the drainage, and in some areas makes access to the stream difficult.

The section of the North Fork, above Iron Mine Camp Ground, was not surveyed. There is approximately 5 miles of stream between Iron Mine and the Little Deer Creek Reservoir. This area could be surveyed by letting a man out at the reservoir site, so that he could work his way through the drainage, and be picked up at Iron Mine Camp Ground.

In order to provide an insight to the existing fishery resource, before the flood, the following information has been summarized from a stream survey conducted by Department personnel in 1957. This survey is available in the form of a Federal Aid Report, number F-2-R-4, and published by the Utah Fish and Game Department.

Table I

Stream Survey - North Fork Duchesne, 1957

	<u>Upstream Section</u>	<u>Downstream Section</u>
Elevation of Survey	7400	7000
Velocity, Feet per second	2.4	2.0
Volume, cubic feet per second	56	70
Width in feet	28	40
Depth in inches	10	10
Number pools per mile	100	150
Area of pools, square feet	1:246	1:300
Depth of pools, inches	8	12
Rating of stream shade	Poor (0-25%)	Poor (0-25%)
Rating of watershed	Excellent	Excellent
Rating of turbidity	Excellent	Excellent
Rating of pollution	Excellent	Excellent
Rating of bottom type	Good (50-75% gravel&rubble)	Excellent (75-100% gravel&rubble)
Rating of bottom fauna	* Poor (rare)	* Poor (rare)
Rating of aquatic vegetation	* Poor (rare)	* Poor (rare)

* The "poor" rating recorded for bottom fauna, and aquatic vegetation may be due to the time of the year that the survey was conducted.

The 1957 stream survey crew also attempted to estimate the standing crop of trout in the Duchesne River and North Fork. This information has been expanded and summarized (Table II) to provide an index to the fish loss.

TABLE II

Summary of Standing Crop of Trout in the North Fork and Duchesne Rivers. (Compiled from 1957 Stream Survey)

<u>Name of Water</u>	<u>Species</u>	<u>Average Number Per Mile</u>	<u>Number of Miles</u>	<u>Total Estimated Number</u>
North Fork	Rainbow	75	8	600
Duchesne River	Rainbow	206	11	2266
Duchesne River	Brown	26	27	1048
Duchesne River	Whitefish	100	16	1600
Total Number Game Fish -----				5514

Fish stocking records for 1963, before the flood, show that 6025 catchable size rainbow were planted in the North Fork, and 14427 catchable size rainbow in the Duchesne River proper. In addition, there were 48000 brown trout fry planted in the Duchesne River.

From all indications, there was a complete loss of fish life on the North Fork, and the upper Duchesne River. A spot check, with electro fishing gear, showed no survival. Hundreds of game fish were washed out into the fields near Tabiona, and many were found stranded in the fields along the river, all of the way to Duchesne.

The calculated loss of catchable size game fish, based on the above information, is 27000. This does not include game fish in the fingerling or fry stage. No attempt was made to determine the number of fish caught, during the first two weeks of the fishing season, before the flood occurred.