

FISH SURVEYS CONDUCTED IN THE LOGAN RIVER DRAINAGE
BY THE
WASATCH-CACHE NATIONAL FOREST
DURING 1999

By

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INTRODUCTION

During the summer of 1999 the staff of the Wasatch-Cache National Forest, Region 4 of the Forest Service, surveyed tributaries of the Logan River Drainage (Figure 1). This is considered within the range of the Bonneville cutthroat trout. The main purpose was to identify fish species compositions and to identify to what extent the tributaries were occupied by fish. All of the streams in the Logan River Drainage (Table 1) were sampled. A Utah Division of Wildlife Resource crew collected fish samples to determine genetic purity and base flow distribution of fish. Additional information acquired included population estimates for fish within the stream and age class distribution of the population (See Appendix).

METHODS

Crews typically started at the mouth of the stream and traveled upstream to identify the extent fish used the tributaries. They sampled at least one location on each stream surveyed. Crews consisted of two to three people. One person ran the electro-fishing equipment and, depending on the individual, may also have assisted in netting fish. The second person netted fish while a third person also netted fish and carried a bucket to hold captured fish. A hip chain or a measuring tape would be used to determine the ending point of the 100 M section sampled. The survey reach was located where fish were last found in the stream. All possible attempts were made to locate sampling sections where a crew, in future years, could relocate and re-sample the same stream sections.

The sample sections were approximately 100m in length and started and ended at distinguishable habitat breaks. All side channels were sampled within this survey reach. Fish collected within the sampling section during each pass were placed in a bucket of fresh water until weight and total length could be measured. Photographs were taken of the sample site and the cutthroat trout collected at the site.

Figure 1. Map of the Logan River Drainage, Utah and sample sites surveyed in 1999.

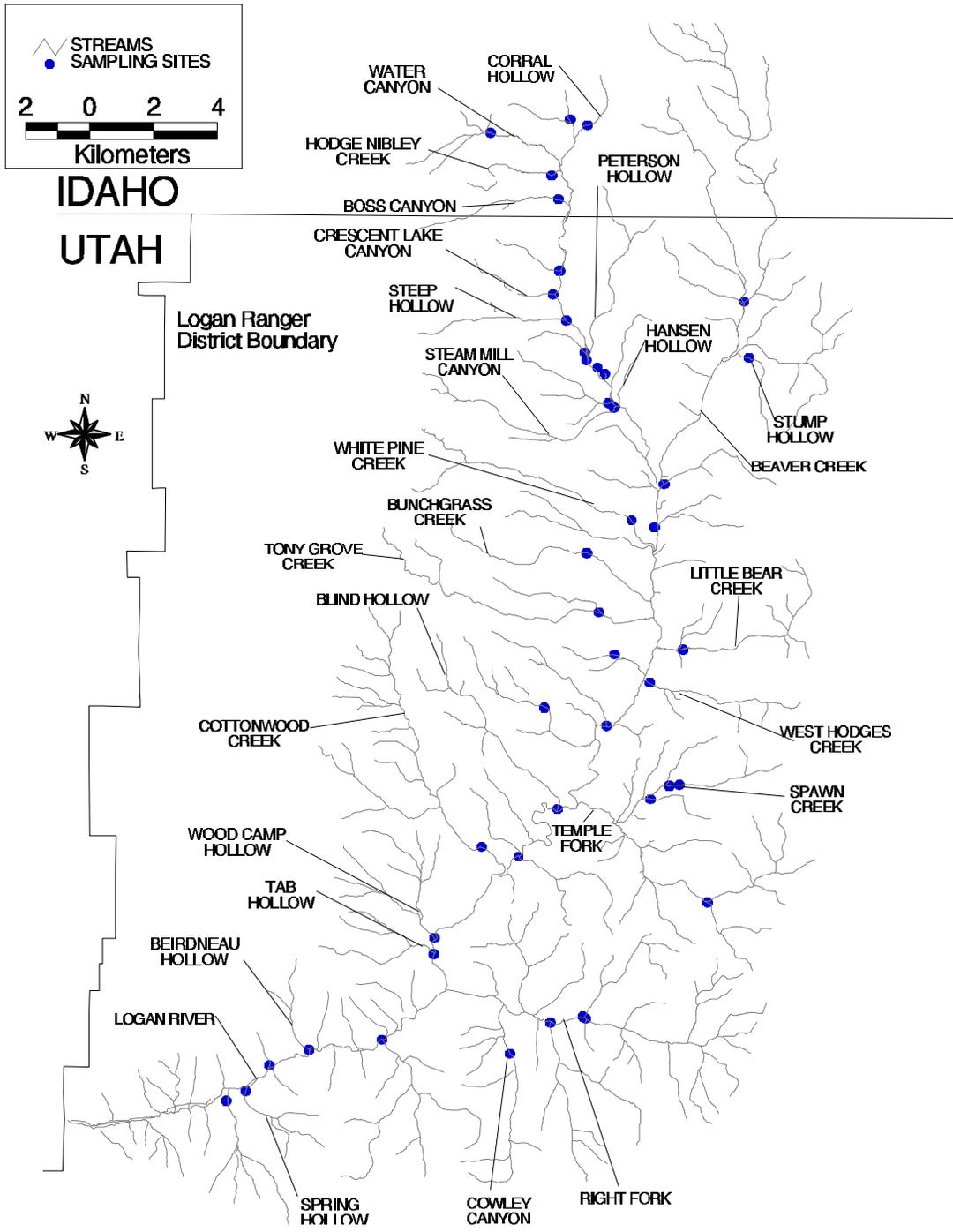


Table 1. Fish sampling location for streams surveyed in the Logan River Drainage, Caribou and Wasatch-Cache National Forest in 1999 and UTM coordinates where sampled. The streams are in order of location starting at Third Dam and going upstream.

Stream	Specific Location	Elevation (Meters)
Mill Hollow	X439900(E) Y4622000(N)	1609
Spring Hollow	X440523(E) Y4622307(N)	1537
Wind Cave Spring	X441750(E) Y4326500(N)	1548
Beirdneau Creek	X442500(E) Y4326650(N)	1561
Card Canyon	X444750(E) Y4623970(N)	1564
Right Hand Fork	X451150(E) Y4624578(N)	1860
Cowley Canyon	X448780(E) Y4623463(N)	1764
Ricks Canyon	X450010(E) Y4624500(N)	1719
Willow Creek	X451047(E) Y4624635(N)	1744
Tab Hollow	X446400(E) Y4626600(N)	1612
Wood Camp Tributary	X446413(E) Y4627102(N)	1627
Cottonwood Creek	X447905(E) Y4629936(N)	1820
Chicken Creek	X449000(E) Y4629500(N)	1701
Blind Hollow	X450200(E) Y4632020(N)	1756
Right Fork Temple Fork	X454975(E) Y4628199(N)	2026
Spawn Creek	X454090(E) Y4631890(N)	1972
Spawn Creek	X453773(E) Y4631864(N)	1947
Bear Hollow Creek	X449849(E) Y4634305(N)	2115
Twin Creek	X451791(E) Y4633727(N)	1839
West Hodges	X463146(E) Y4635084(N)	1884
Theurer Hollow	X452050(E) Y4635976(N)	2042
Little Bear Creek	X454209(E) Y4636127(N)	1958
Tony Grove Creek	X451565(E) Y4637307(N)	2062
Bunchgrass Creek	X451180(E) Y4639153(N)	2115
White Pine Creek	X452585(E) Y4640158(N)	2046
Rigby Hollow	X453300(E) Y4639950(N)	1975
Brush Canyon	X453550(E) Y4641250(N)	2006
Logan River	X450653(E) Y4652731(N)	2438
Stump Hollow	X456260(E) Y4645260(N)	2134
Sink Hollow	X456100(E) Y4647000(N)	2158
Steam Mill Creek	X452050(E) Y4644250(N)	2097
Hells Kitchen Creek	X451900(E) Y4644100(N)	2097
Unnamed Spring	X451170(E) Y4645187(N)	2154
Unnamed Tributary	X451122(E) Y4645419(N)	2163
Unnamed Tributary	X451755(E) Y4644750(N)	2138
Peterson Hollow	X451510(E) Y4644963(N)	2151
Steep Hollow	X495050(E) Y4647500(N)	2219
Crescent Lake Canyon Creek	X450150(E) Y4648700(N)	2256
Unnamed Tributary	X450250(E) Y4648000(N)	2274
Boss Canyon	X450296(E) Y4650240(N)	2377
Hodge Nibley	X450083(E) Y4650975(N)	2390
White Canyon	X448185(E) Y4652311(N)	2426
Corral Canyon	X451203(E) Y4652540(N)	2487
Upper Logan River	X450653(E) Y4652731(N)	2414
Mill Creek	X522270(E) Y4530460(N)	2691
Mill Creek	X522800(E) Y4527990(N)	2944
Provo River	X503588(E) Y4497193(N)	2679
Beaver Creek	X483537(E) Y4497460(N)	2128
Centerville Creek	X427447(E) Y4529622(N)	1426
Centerville Creek	X429157(E) Y4529775(N)	1890
Farmington Creek	X426486(E) Y4539090(N)	1536

S=SOUTH, N=NORTH, E=EAST, W=WEST

A population estimate was made for each section where possible. Some populations were not estimated because the sampling assumptions were violated. The assumptions for making population estimates are: (1) equal sampling efforts, (2) the probability of capture for any individual in the population is equal, and (3) the population is closed, no movement, deaths or births occur during or between sampling efforts (White et al. 1982). The probability of capture for any individual is also supposed to be equal between passes. Riley and Fausch (1992) found that this might not always be the case. They suggest that at least three passes be done to test capture probability. In most situations only two passes were conducted because of limited money, time and other resources.

Fish populations were estimated for fish 100mm and over. The probably, for capturing fish under 100mm, is believed to be too low to make an accurate estimate. With electrofishing, the larger the fish, the higher the probability of capture (White et al. 1982). Fish under 50mm were assumed to be age 0 fish. Fish from 51 to 100mm were believed to be age 1 fish. It is realized that in many situations, because of local environmental factors, this generalization may not hold true.

The calculations used to make the population estimate was:

$$N = U1 / (1 - (U2/U1))$$

where

- N = population estimate for the section sampled
- U1 = fish captured during the first sample
- U2 = fish captured during the second sample

The probability of capture (P) is estimated by using:

$$P = 1 - (U2/U1).$$

Results from calculation using this formula suggest that if more fish are captured during the second pass than the first pass a violation of the assumptions has occurred and the population estimate is of no value. Also if no fish are captured during a second pass a capture probability of 100 has occurred and all fish in the population have theoretically been captured. An upper and lower bound was placed on the population estimate. The formula used was:

$$CI \approx N \pm 1.96 \sqrt{N \cdot P \cdot (1-P)}$$

where:

CI = 95% confidence interval.

In some cases the lower confidence limit was below the number of fish taken from a survey reach. In such cases the lower limit was set as the number of fish, 100mm and longer of a particular species, captured from the stream section.

Streams surveyed outside of the Logan River Drainage are included in the tables for ease of documentation for work completed during 1999 but will not be discussed in the body of the text.

RESULTS

Electrofishing surveys were conducted on 43 stream sections on the Caribou and Wasatch-Cache National Forest in the spring of 1999 (Table 1). All of these with the exception of the Provo River and Mill, Beaver, Centerville and Farmington creeks were in the Logan River Drainage. The tributaries on the Logan River were sampled between May 10 and July 15. Of these 43 streams, six contained no water during spring runoff, six contain water but no fish and the other 31 contained at least one species of fish. These streams were composed of a number of fish species (Table 2).

LOGAN RIVER

This survey started at Third Dam and went upstream to the headwater. No fish are able to move upstream over Third dam. It was therefore used as the starting point for the survey work.

MILL HOLLOW

Mill Hollow is a tributary of the Logan River that enters just upstream of Third Dam, the most upstream impoundment on the river. Mill Hollow was surveyed on May 11, 1999. Surveyors found no evidence of perennial flows.

Table 2. Fish species collected in the Logan River Drainage, Caribou and Wasatch-Cache National Forest in 1999 and in other locations on the Forest. The Logan River streams are in order of location starting at Third Dam and going upstream.

Stream	Species collected (Meters)
Mill Hollow	No water
Spring Hollow	cutthroat trout, brown trout
Wind Cave Spring	Cutthroat trout, brown trout
Beirdneau Creek	No fish
Card Canyon	Brown trout, rainbow trout
Right Hand Fork	Cutthroat trout
Cowley Canyon	Brown trout
Ricks Canyon	No water
Willow Creek	Brown trout
Tab Hollow	No water
Wood Camp Tributary	Cutthroat trout
Cottonwood Creek	Cutthroat trout
Chicken Creek	Cutthroat trout
Blind Hollow	No water
Right Fork Temple Fork	Cutthroat trout
Spawn Creek	Brook trout, cutthroat trout
Bear Hollow Creek	Cutthroat trout
Twin Creek	Cutthroat trout
West Hodges	Cutthroat trout
Theurer Hollow	Cutthroat/rainbow trout
Little Bear Creek	Cutthroat trout
Tony Grove Creek	Cutthroat trout
Bunchgrass Creek	Cutthroat trout
White Pine Creek	Cutthroat trout
Rigby Hollow	No water
Brush Canyon	Cutthroat trout
Stump Hollow	Cutthroat trout
Sink Hollow	No water
Steam Mill Creek	No fish
Hells Kitchen Creek	No water
Unnamed Spring	Cutthroat trout
Unnamed Tributary	Cutthroat trout
Unnamed Tributary	Cutthroat trout
Peterson Hollow	Cutthroat trout
Steep Hollow	No fish
Crescent Lake Canyon Ck.	No fish
Unnamed Tributary	No fish
Boss Canyon	Cutthroat trout
Hodge Nibley	Cutthroat trout
White Canyon	Cutthroat trout
Corral Canyon	Cutthroat trout
Upper Logan River	No fish
Mill Creek	Cutthroat trout
Mill Creek	Cutthroat trout
Provo River	Cutthroat trout, brook trout, rainbow trout, scu.
Beaver Creek	Cutthroat and rainbow trout, scu, msc, mwf
Centerville Creek	Rainbow trout
Centerville Creek	Rainbow trout
Farmington Creek	Rainbow trout

SCU=SCULPIN, MSC=MOUNTAIN SUCKER, MWF=MOUNTAIN WHITEFISH

SPRING HOLLOW

Spring Hollow enters the Logan River at Third Dam near the Spring Hollow Campground. The stream temperature was 7.0°C (45°) when surveyed on May 12, 1999 (Photo 3). As the stream enters the campground it divides into several channels with the majority of flow going to the east. Near camp-site #11 the left channel contains a fish passage barrier (Photo 1, 2). No fish were found above this barrier when surveyed on May 12, 1999 even though the right channel has no barriers to fish passage.

A 100m section was surveyed below the barrier (Photo 3) and contained a fish population consisting of both brown and cutthroat trout. A total of 15 brown trout were captured during the survey along with 7 cutthroat trout (Photos 4-10). The total length of brown trout captured ranged from 76 to 268mm and averaged 147.4mm (5.8in.). They weighed from 4g to 220g and averaged 50.8g (1.8oz.). No population estimate was made for brown trout with more brown trout being captured during the second pass than the first pass. The total length of cutthroat captured ranged from 89 (Photo 9) to 169mm (Photo 4) and averaged 123.7mm (4.9in.). Their weight ranged from 8g to 50g and averaged 21.7g (0.8oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 6 and ranged from 6, the number of fish captured, to 8 fish.

WIND CAVE TRAIL SPRING

This short tributary originates near the Wind Cave trailhead, flows underneath the highway and down into the main Logan River (Photos 11, 12). This stream was 9°C (48°F) when surveyed on May 12, 1999.

A 164m length of the stream was surveyed consisting of brown and cutthroat trout. A total of 20 cutthroat trout (Photos 13,14) and 5 brown trout were captured. The total length of cutthroat trout captured ranged from 50 to 157mm and averaged 74.5mm (3in.). They weighed from 1g to 50g and averaged 5.9g (0.2oz). The total length of brown trout captured ranged from 134 to 198mm and averaged 161.6mm (6.4in.). They weighed from 32g to 98g and averaged 56.7g (2oz.). No population estimate was made for cutthroat or brown trout because fewer fish were captured during the first pass than the second pass.

BEIRDNEAU HOLLOW

This tributary crosses the highway approximately 0.5 miles above Guinavah Campground, near a summer home site (Photos 15-21). Beirdneau Hollow was surveyed on May 15, 1999. Investigators found water flowing in several channels near the Logan River confluence. However electro-shocking produced no fish in any of the channels.

CARD CANYON

Card Canyon flows towards the Logan from the Southeast, joining the main Logan just upstream from the Card Canyon Guard Station. Card Canyon was surveyed on May 13, 1999. Surveyors found two man made barriers near the confluence (Photos 22-23). Above the lower barrier no fish were found. From the confluence upstream to the lower barrier (10m), 2 brown trout and one rainbow trout were captured. The brown trout were 294 and 303mm and weighed 234g and 290g respectively. The rainbow trout captured was 239mm and weighed 132g. No stocking is to occur above the Third Dam reservoir. This rainbow trout traveled about 4 miles upstream from the stocking point.

Above the barriers the stream appeared to be able to support fish during the May survey (Photos 24-25). However, when reviewed on 14 July 1999 the stream was dry.

RIGHT FORK

The Right Fork of the Logan River was 7°C (45°F) when surveyed on May 18, 1999. An 88m section was electro-fished yielding cutthroat trout. This section started at the upper end of a number of beaver ponds located at 0451150E 4624578N at an elevation of 6102 feet (total variance was ±6.6m, Photos 26-29). A total of 4 cutthroat trout were captured in the survey section (Photos 30-33). They ranged in length from 167 to 310mm and averaged 263.3mm (10.4in.). They weighed from 48g to 332g and averaged 235.5g (8.3oz.). Visibility during the survey was limited. The population estimate for cutthroat trout, 100mm and over, in this section was 5 and ranged from 4, the number of fish captured, to 6 fish.

Above the survey section the canyon narrows and contains several natural fish barriers. On 7 July 1999, the stream was checked above these natural barriers and no fish were found. The stream has a good natural meander pattern but shows down cutting of banks with absence of willow vegetation along the upper section.

COWLEY CANYON

Cowley Canyon drains into the Right Fork approximately 0.25 miles above Lodge Campground. The stream was 6°C (43°F) when sampled on May 13, 1999. The survey reach started approximately 15M upstream from the gate across the road by the Logan MIA camp (Photos 34-35). Brown trout were the only species found in the 74m section surveyed. The seven brown trout captured ranged in length from 185 to 271mm and averaged 241.4mm (9.5in.). They weighed from 70g to 232g and averaged 164g (5.8oz). The population estimate for brown trout, 100mm and over, in this section was 7 fish with no fish being captured during the second pass.

RICKS CANYON

Ricks Canyon is a tributary of the Right Fork, which is a tributary of the Logan River. Ricks Canyon joins the Right Fork approximately 1 mile upstream of the Lodge Campground. The drainage was surveyed on May 17, 1999. Investigators found a dry channel and no evidence of perennial flows in the canyon.

WILLOW CREEK

This stream is a tributary of the Right Fork, which is a tributary of the Logan River. The Willow Creek drainage angles in from the northeast to join the Right Fork. This stream was 11°C (52°F) when surveyed on May 18, 1999 (Photos 36-37). The section surveyed was 117m in length and started at the mouth and went up to a footbridge. The surveying yielded a total of 6 brown trout. These fish ranged in size from 136 to 284mm and averaged 222.8mm (8.8in., Photos 38-39). They weighed from 28g to 298g and averaged 164.7g (5.8oz.). The population estimate for brown trout, 100mm and over, in this section was 8 and ranged from 6, the number of fish captured, to 11 fish.

TAB HOLLOW

Tab Hollow enters the Logan River approximately 0.25 miles downstream from Wood Camp Campground. The drainage was surveyed on May 17, 1999. Investigators found a dry channel with no visible flows.

WOOD CAMP HOLLOW

This tributary enters the Logan River just below the bridge at Wood Camp Campground. The stream was 10°C (50°F) when surveyed on May 18, 1999, starting at the confluence with the Logan River and going

upstream 58 meters (Photos 40-41). The electrofishing yielded 1 cutthroat and 1 brown trout. The cutthroat captured measured 315mm and 294g. The brown trout was 292mm and 294g.

This tributary was checked again on 8 July 1999. Cutthroat trout were found approximately 100 meters upstream from the upper end of the trailhead parking lot.

COTTONWOOD CREEK

Cottonwood Creek joins the Logan River just upstream from Logan Cave. On May 19, 1999, the date of survey, water temperature was 7.5°C (46°F). The survey reach is located approximately 1 mile above the confluence. The top of the electrofishing section is located at 0447905E 4629936N ±15m with an elevation of 5970ft (Photo 45). A spring comes in from the east at the bottom of the survey section (Photos 46). A 106m section of stream was surveyed yielding 17 cutthroat trout (Photos 47a-48). Cutthroat trout found ranged in size from 39 to 325mm and averaged 128.4mm (5in.). They weighed 1g to 418g and averaged 95.1g (3.4oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 9 and ranged from 8, the number of fish captured, to 12 fish.

Two migration barriers are located just upstream of the survey reach 0447318E 4630079N at an elevation of 5992 ft ±6.7m (Photos 43-44). No fish were found above the barrier although there was sufficient habitat to sustain them (Photos 47-48).

CHICKEN CREEK

Chicken Creek is a tributary of the Logan River that enters approximately 0.75 miles upstream from Logan Cave. The stream was surveyed on May 24, 1999; water temperature was 7°C (45°F). Electro-fishing a small 10m section near the mouth (Photo 49) revealed 2 cutthroat trout. The two fish were 278mm (Photo 51) and 51mm and weighed 242g and 1g respectively. This tributary likely flows at a very low level (if at all) later in the year. No fish were collect above the first 10 meters.

Significant head cutting is occurring high in the drainage causing significant sedimentation (Photo 50).

BLIND HOLLOW

This tributary of the Logan flows from the northwest and enters

just above upper twin bridge. On 07 June 1999, the stream was shocked from the mouth upstream approximately 1.0 mile and no fish were found. On 14 July 1999 the upper sections below the source springs were checked. Flows existing at that time were probably insufficient for fish. The stream was dry where it entered the Logan River. A Tiger salamander was found in Hansen pond, near the source of Blind Hollow.

TEMPLE FORK

Temple Fork is a tributary to the Logan River and is an important spawning area for cutthroat trout. It enters the Logan approximately 0.5 miles upstream from Upper Twin Bridge. On 6 July 1999 a section of the south fork, extending from the confluence of the north and south forks upstream 115m, was surveyed (Photos 59-60). Only one cutthroat trout was collected (Photo 62). It measured 245mm and weighted 156g. The north fork was also sampled from the footpath bridge upstream approximately 100m. No fish were found in this section and it contained 2 fish passage barriers that appeared to be head cuts (Photos 61-61a).

SPAWN CREEK

Spawn Creek is a tributary to Temple Fork, a Logan River tributary. It is also known to be an important spawning area for cutthroat trout. The stream was 8.5°C (47°F), when surveyed on May 25, 1999. The survey reach started 104.5 meters below an old green metal weir (Photo 52) and went up to the weir. The GPA location for the weir is 0454090 E. 4631890N ±6.1m with an elevation of 6471 feet. Thirteen brook trout were collected in this section. They ranged in size from 140 to 262mm and averaged 209.2mm (8.2in.). Their weight ranged from 32g to 186g and averaged 108.8g (3.8oz.). The population estimate for brook trout, 100mm and over, in this section was 15 and ranged from 14, the number of fish captured, to 19 fish.

A fish barrier falls is located a short distance downstream and another section was surveyed extending from the falls downstream 114m (Photo 58). This section yielded 13 brook and 4 cutthroat trout. Brook trout ranged in size from 110 to 270mm and averaged 188.1mm (7.4 in.). Their weight ranged from 12g to 220g and averaged 86.2g (3.0 oz.). The population estimate for brook trout, 100mm and over, in this section was 13 and ranged from 13, the number of fish captured, to 15 fish. The cutthroat trout ranged in

size from 185 to 238mm and averaged 207mm (8.1 in., Photos 58a-58d). Their weight ranged from 70g to 132g and averaged 93g (3.3 oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 5 and ranged from 4, the number of fish captured, to 6 fish.

SPRING TRIBUTARY TO SPAWN CREEK

A tributary to Spawn Creek, which flows from the south was also spot-checked (Photo 56-57). This side tributary has a number of limestone outcropping, which are causing a series of migration barriers. No fish were captured above the third waterfalls. Cutthroat trout were the only species captured below these falls on this tributary.

BEAR HOLLOW CREEK

Bear Hollow Creek is a tributary of the Logan entering approximately 1.0 mile above Ricks Spring. This stream was initially investigated for fish on 1 June 1999. When the upper limit of fish use had been located, the water level had risen so that accurate and safe sampling could not be conducted. This stream was sampled again on 7 July 1999 and fish were found approximately 0.25 mile further upstream than the earlier date. The sample site was approximately 35 meters below 0449849E 4634305N at an elevation of 6,940 feet. This is about 1.8 miles above the confluence with the Logan River. The upper end of the 102-meter sample section was a logjam located in a high gradient section (Photos 63-64). All fifteen fish collected in this section were cutthroat, with a length range of 97mm to 202mm and averaged 142.5mm (5.6 in.). They weighted from 4 to 98 grams and averaged 33.1g (1.2oz, Photos 65-78). The population estimate for cutthroat trout, 100mm and over, in this section was 14 and ranged from 14, the number of fish captured, to 17 fish.

TWIN CREEK

Twin creek is a tributary of the Logan River that joins the river approximately 2 miles above Ricks Spring. This stream was 9°C (48°F) when surveyed on May 27, 1999. A 23.8m section was sampled from the confluence upstream to the culvert at the highway crossing (Photos 79-80). Above this point no fish were found. Eight cutthroat trout were collected during the survey (Photos 81-87). They ranged in size from 147 to 273mm and averaged 207.5mm (8.2in.). They weighed from 32g to 202g and averaged 103.5g (3.7oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 9 and ranged from 8, the number of fish

captured, to 12 fish.

WEST HODGES CREEK

West Hodges Creek is a Logan River tributary that joins the river approximately 0.75 miles downstream from the USU Forestry Camp Bridge (UTM location 0453146E 4635084N elevation 6192 feet). This stream was 11°C (52°F) when surveyed on 2 June 1999. A 88m section was surveyed yielding 7 cutthroat (Photos 88-96). The captured fish ranged in size from 161 to 256mm and averaged 209.4mm (8.2in.). The fish ranged in weight from 46g to 166g and averaged 102.3g (3.6oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 7 and ranged from 7, the number of fish captured, to 9 fish.

THEURER HOLLOW

This stream is a Logan River tributary that joins the river from the northwest approximately 1 mile downstream from the Tony Grove turnoff. The stream was 7°C (45°F), when surveyed on 2 June 1999. A 97.9m section was electro-fished and 31 cutthroat trout were captured. The sample site started at the culverts that pass under the Tony Grove Road and went downstream 97.9M (UTM location was 0452050E 4635976N ± 48M elevation 6701 feet). The cutthroat trout ranged in size from 101 to 335mm and averaged 232.2mm (9.1in., Photos 99-130). They weighed from 12g to 340g and averaged 138.8g (4.9oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 32 and ranged from 31, the number of fish captured, to 36 fish.

LITTLE BEAR CREEK

Little Bear Creek is a tributary to the Logan River that enters just above the USU Forestry Field Camp Bridge. Sample section is located approximately a half a mile above the field camp. Stream at this site was divided into three channels. Stream temperature was 7°C (45°F) when surveyed on June 3, 1999. A 100m section was sampled including portions of all three channels (Photos 131-133).

A total of sixteen cutthroat trout were collected with total lengths ranging from 52mm to 212mm with an average of 90.6mm (3.6 in., Photos 134-137). Weights ranged from 2g to 120g with an average of 34g (1.2 oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 6 and ranged from 6, the number of fish captured, to 8 fish. No population estimate with the number of fish over 100mm captured during the first pass equaled the number of fish captured during the second pass.

TONY GROVE CREEK

Tony Grove Creek enters the Logan River just upstream of the turn-off for the Tony Grove Lake recreation area. The upper limit of the sample area was located in the left fork approximately 17m upstream from the confluence of the left and right forks of Tony Grove Creek (Photos 138-139). The length of the sample unit was 95m. The temperature was 7°C (45°F) when sampled on June 2, 1999. A total 16 cutthroat trout were collected ranging in size from 42mm to 121mm with an average of 73.2mm (2.9 in., Photos 138-143). Weights ranged from 1g to 16g with an average of 4.2g. The population estimate for cutthroat trout, 100mm and over, in this section was 5 and ranged from 4, the number of fish captured, to 6 fish.

The channel in this area was unstable with the stream flowing in several different channels and was flowing out of its banks in several different areas.

BUNCHGRASS CREEK

Bunchgrass Creek is a tributary to Logan River entering approximately 0.5 miles above Tony Grove Creek. When sampled on June 7, 1999 the temperature was 8°C (47°F). The sample site is located approximately 0.25 miles below Goring Pond and the top of the unit is approximately 20m upstream from a tributary entering on the left (Photos 144-145). The length of the survey section was 100m. A total of 16 cutthroat trout were collected. Lengths ranged from 53mm to 292mm with an average of 239.8mm (9.4 in., Photos 146-158). Weights ranged from 1g to 260g with an average of 153.1g (5.4 oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 16 and ranged from 15, the number of fish captured, to 19 fish.

WHITE PINE CREEK

White Pine Creek enters the Logan River approximately 0.25 miles above Red Banks campground. Fish were collected approximately 1 mile upstream from the mouth however a population survey was not conducted due to high flows and risk to crew. Stream temperature was 7.5°C (46°F) on June 28, 1999. Six cutthroat trout were collected for photos (Photos 159-166). Lengths ranged from 110mm to 287mm with an average of 232.2 mm. (9.1 in.). Weights ranged from 14g to 284g with an average of 161.7 grams (5.7 oz.). Good habitat extended for at least 0.5 miles upstream with no barriers

detected. Safety considerations precluded crews from make a standard sample.

RIGBY HOLLOW

Stream enters Logan River at approximately 0.5 miles below Franklin Basin road. When it was inspected on June 7, 1999, there was very little flow and no fish found.

BRUSH CANYON

Enters Beaver Creek approximately 0.25 miles below Franklin Basin Road. Stream was 10°C (50°F) when inspected on June 7, 1999. Stream was shocked from confluence at Beaver Creek upstream to Highway 89 culvert (Photo 167). Distance is approximately 15m. Two cutthroat trout were found with lengths of 306mm and 184mm with weights of 408g and 56g, respectively (Photos 168-169). Channel below culvert was poorly formed with high gradient and choked with brush. Stream was shocked above culvert for about 50m and no fish were found.

AMAZON HOLLOW

Amazon Hollow is a tributary to Beaver Creek. At the time it was inspected on June 8, 1999, flow was very low. No fish were found.

STUMP HOLLOW SPRING

Stream is tributary to Beaver Creek and enters approximately 0.2 miles below turn-off to Beaver Mountain Ski Resort. It has a confluence with Amazon Hollow just above confluence with Beaver Creek. The majority of flow comes out of Stump Hollow drainage. The survey reach was located about 40 M below the bridge on the Great Western Trail (UTM 0456260E 4645260N ±6.9M with an elevation of 7000 FT., Photos 170-171). The survey section extended downstream from this point 100m. The stream was sampled on June 8, 1999 and had a temperature of 5°C (41°F). A total of four cutthroat trout were collected with lengths ranging from 172mm to 225mm with an average of 202mm (8 in., Photos 172-175). Weights ranged from 50g to 128g with an average of 93g. The population estimate for cutthroat trout, 100mm and over, in this section was 5 and ranged from 4, the number of fish captured, to 6 fish. The channel showed evidence of much lower flow later in the year.

SINK HOLLOW

Sink Hollow drainage is tributary to Beaver Creek. When inspected on June 8, 1999, no flow was found.

STEAM MILL CREEK

Steam Mill Creek was surveyed on 9 June 1999. The stream was electrofished from the mouth to above the road. No fish were seen or collected.

HELLS KITCHEN CREEK

The channel enters the Logan River approximately 0.25 miles upstream from Steam Mill Creek. When inspected on 9 June 1999, the channel was dry.

UNNAMED SPRING

This spring flows from underneath the right edge of the Franklin Basin Road. When sampled on 9 June 1999, the spring contained a very high flow with a wide channel (UTM 0451170E 4645187N \pm 8.0m elevation 7,066 ft., Photo 176). Safety considerations precluded crews from making a standard sample. Only one cutthroat trout was collected with a length of 243mm and a weight of 194g (Photo 177)

UNNAMED TRIBUTARY

An unnamed tributary, located between Hells Kitchen and Steep Hollow, was surveyed on 9 June 1999. The stream is approximately 0.25 miles down from Steep Hollow. The survey section started approximately 20M above the confluence with the Logan River and went upstream 96m (UTM 0451122E 4645419N \pm 8.3m with an elevation of 7097 feet, Photos 178-179). A total of nine cutthroat trout were collected with lengths ranging from 129mm to 380mm with an average of 261mm (10 in., Photos 180-188). Weights ranged from 22g to 582g with an average of 242g (8.5 oz.). Most of these fish were taken in the first 10 meters of the 96-meter section. No population estimate was made because the number of fish which had been captured during the first and second passes could not be determined from the data sheet.

UNNAMED TRIBUTARY

An unnamed tributary, located between Peterson and Hanson Hollow and us approximately 0.25 miles upstream from Hanson Hollow. It was surveyed on 15 June 1999. This tributary has a UTM coordinate of 0451755E 4644750N \pm 6.4m at an elevation of 7016 feet. The survey section started approximately 50M from the spring source and goes downstream 106m (Photos 189-192). A total of 25 cutthroat trout were collected with lengths ranging from 90mm to 296mm with an average of 205.1mm (8.1 in., Photos 193-210). Weights ranged from 4g to 250g with an average of 107.8g (3.8oz.). The population estimate for cutthroat trout, 100mm and over, in this section was 26 and ranged from 24, the number of fish captured, to 30 fish.

PETERSON HOLLOW

Peterson Hollow enters the Logan River from the east side and flows from a spring at the mouth of Peterson Hollow into what appears to be a manmade channel. This channel directs the flow parallel to the Logan River until it confluences with a spring just upstream from Hansen Hollow(Photos 217-218). The survey section starts 100 meters below the UTM coordinate of 0451510E 4644963N \pm 5.7m at an elevation of 7057. The stream was 7°C (45°F) when inspected on 19 July 1999. Distance is approximately 15m. Three cutthroat trout were collected with a total length that ranged from 112 to 227mm and averaged 169mm (6.7 in.). The cutthroat trout weights ranging from 12 to 104g and averaged 57.3g (2oz., Photos 219-221).

STEEP HOLLOW CREEK

Steep Hollow enters the Logan River from the west approximately two miles downstream from the Idaho State line. When sampled on 9 June 1999, no fish were found from the mouth to 100m upstream from the Franklin Basin Road. The stream has a high gradient. The stream continued to have flowing water in it when checked in mid September.

CRESENT LAKE CANYON CREEK

The stream from Crescent Lake Canyon enters the Logan River from the west 1.5 miles downstream of the Idaho State Line. No fish were seen when checked on 9 June 1999. From the mouth upstream 20m, the channel is very steep with numerous cascades.

BOSS CREEK

Boss Creek is a tributary of the upper Logan River within Franklin Basin. The stream joins the main stem approximately 0.25 miles upstream from the Utah-Idaho border within the Caribou National Forest. Boss Creek was surveyed on June 23, 1999 at which time the stream was running at bank full flow, with winter snow pack still present throughout its upper reaches. No fish migration barriers were seen in the first 2 miles above confluence. Habitat appeared to be favorable for fish, including an old beaver complex and spawning size gravel at the lower end of the 2 miles of stream surveyed. However, the only fish observed were in the lower 0.25 miles of the stream and no fish were captured within the 100 meters of stream electro-shocked. The water temperature on this date was 3.5°C (38.3°F). It is possible that this cold temperature may explain the lack of fish in what otherwise appears to be good habitat.

HODGE NIBLEY

Hodge Nibley Creek flows into the Logan from the west, approx. one mile above the Utah-Idaho border. Hodge Nibley Creek was surveyed on June 14th, 1999. For the first 1.25 miles Hodge Nibley Creek is a series of old beaver complexes. Some ponds still maintain depth, while others have been totally silted in, with the Creek now flowing in a channel through the old ponds. Because of the beaver complex influence, Hodge Nibley Creek has a very high percent silt substrate (95%), throughout the first 1.25 miles. Spot check shocking was conducted on the first 1.25 miles of the creek with very few, (~8) cutthroat trout captured. There was still a winter snowpack on the upper 0.5 mile surveyed, and a water temperature of 4.0°C (39°F) was recorded at the top of the survey section.

WHITE CANYON CREEK

White Canyon Creek flows into the Logan River from the west approximately 1.1 miles upstream from the Utah-Idaho State border. Located on the Caribou National Forest, White Canyon Creek is the northern most significant tributary to the Logan. This creek appears to be one of the more important tributaries within the Franklin Basin in terms of both flow and utilized fish habitat. Approximately 2 miles of the stream was surveyed. The lower mile of stream above the confluence is low gradient and contains several beaver complexes separated by a relatively deep, narrow stream channel. Spot-checking with electro-fishing gear was used to find the top of utilized fish habitat.

The survey section started where the old White Canyon road crossed the stream approximately 1.5 mile up from the mouth. The survey was conducted on June 23, 1999 at which time the water temperature was 10.5°C (50.9°F). A 72m unit was electro-fished near the top of

utilized habitat yielding 8 cutthroat trout. Their lengths ranging from 151 to 238mm and averaging 197.5mm and weighing from 34 to 136g and averaging 84g. The population estimate for cutthroat trout, 100mm and over, in this section was 8 and ranged from 8, the number of fish captured, to 10 fish.

CORRAL HOLLOW

Corral Hollow Creek flows into Logan River from the east, approximately 1 mile below the source of the Logan. Corral Hollow Creek appears to be a seasonal snowmelt tributary. When surveyed on 06/26/99 there was a significant flow, with cutthroat present and observed spawning for the first 1/8th of a mile. Above this point was also shocked for another 1/8th of a mile with no fish found, and no fish barriers were observed. On 06/24/99 the creek was approximately 2 meters wide with an average depth of approximately 0.25 meters, and a water temperature of 9°C. On 14 July 1999 we returned to Corral Hollow Creek and found a dry channel at its crossing with the Franklin Basin road. It appears that Corral Hollow Creek is used by Cutthroat trout in the spring, but due to the seasonal flow of the creek, it is unable to support a year-round population.

LOGAN RIVER

The Logan River was surveyed just above the mouth of Corral Creek going upstream 100 meters (UTM 0450653E 4652731N ±6.1m elevation 8000). No fish were collected in the survey reach. However, one fish was seen just upstream of this survey reach.

OPPORTUNITIES AND RECOMMENDATIONS

Opportunities mean many different things to different people. In this report, I have viewed opportunities from a fish management perspective. Ecosystem management principles would suggest that we manage for all resources so as to not lose any one part. In this report I have dealt with mainly fish issues or habitat issues which were obvious at a glance. No habitat surveys were conducted to identify specific habitat projects.

Streams like Cowley Canyon, Bear Hollow, Little Bear Creek, and other are not large enough to make it worthwhile to conduct fish habitat surveys on. This does not however diminish their importance

as tributaries used by spawning fish.

MILL HOLLOW

No improvement projects were identified for Mill Hollow.

SPRING HOLLOW

Two migration barriers were identified on Spring Hollow Creek (Photo 1, 2). The first migration barrier is approximately 2.1 meters (7 feet) high and is located on the east channel 122.8 meters up from the mouth. The second barrier is located just above the first barrier and is approximately 1.1 meters high (3.5 feet). To pass fish above these barriers would require substantial investment. Three hundred meters of stream could be gained from allowing passage. Sloughing of the banks was identified as a common problem just below the falls. This may be a natural process or related to the high recreational use in Spring Hollow Campground. Sufficient water exists to provide habitat year round as evidenced by late summer flows.

Competition and/or predation, from rainbow and brown trout, may also be a problem in Spring Hollow Creek. The brown trout in Spring Hollow Creek have almost 100mm size advantage (Figure 02). Predation on juvenile cutthroat trout by adult brown trout could easily occur.

Whirling disease is also a potential threat to the fish at Third Dam. With the stocking of rainbow trout in the area, the potential for a disease outbreak is increased.

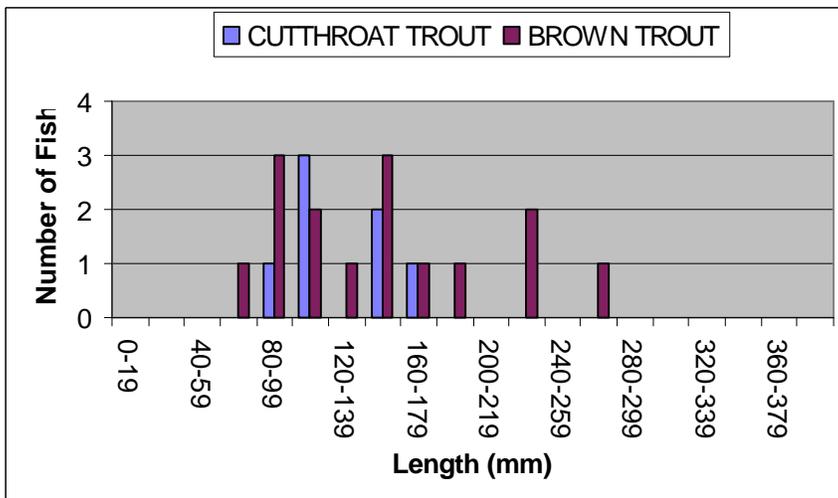


Figure 2. Length frequency histogram of fish collected from Spring Hollow Creek, 1999.

WIND CAVE TRAIL SPRING

Although this is a short tributary, it appears to be an important area for rearing juvenile fish. Here again competition from non-native brown trout has the potential to impact the native cutthroat trout. The average brown trout is approximately 90 mm larger than the average cutthroat trout (Figure 3). By 13 September 1999 water temperatures were 7°C.

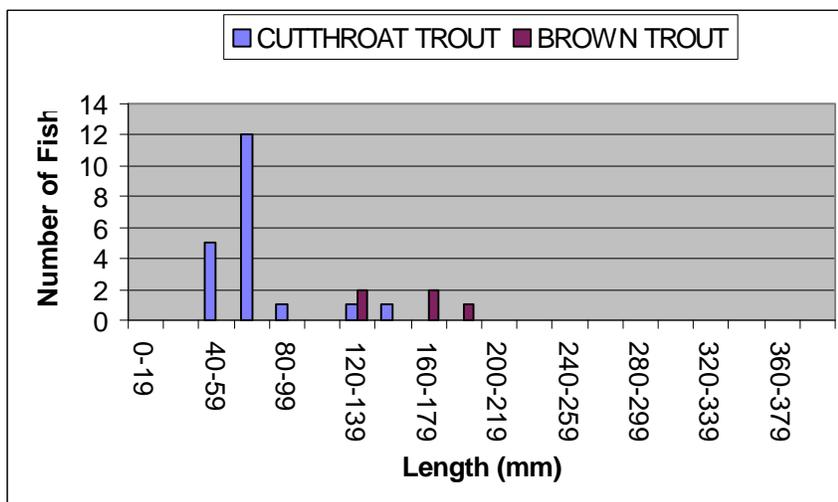


Figure 3. Length frequency histogram of fish collected from Wind Cave Trail spring, 1999.

BEIRDNEAU HOLLOW

Beirdneau Hollow creek is isolated from the Logan River by two roads and two culverts. There were sufficient flows throughout the year to provide limited fish habitat. To allow for migration out of the river the channel and road crossings would have to be altered. This would allow for an additional 1/4 mile of habitat to be accessed. By 13 September 1999 water temperature were 6.5°C.

CARD CANYON

No improvements were identified for Card Canyon. The stream was dry on July 14, 1999 when crews did a follow-up check. They continued to be dry into September when checked on 13 September 1999.

RIGHT HAND FORK

Fish management objects need to be established for the Logan River and Right Hand Fork. If the objective for the Logan River and the Right Hand Fork is for long-term preservation of the Bonneville cutthroat trout, the opportunity exists to treat the Right Hand Fork to remove all non-native fish. Right Hand Fork could then be restocked with pure fish below and above the migration barrier. This barrier is located just above the mouth on Willow Creek. This would add an additional 4 miles of habitat. Prior to stocking these headwater areas surveys would need to be conducted to species of limited distribution that may be impacted by placing a new predator in the area. There appears to be sufficiently volume and quality of water in the area to support fish.

Another action, which could be taken up the Right Hand Fork, is the hardening of the road adjacent to the Right Hand Fork.

COWLEY CANYON

No other actions were identified besides those listed under the Right Hand Fork. Cowley Canyon was dry when checked on 13 September 1999.

RICKS CANYON

No opportunities were identified for Ricks Canyon.

WILLOW CREEK

No other actions were identified besides those listed under the Right Hand Fork.

TAB HOLLOW

No opportunities were identified for Tab Hollow.

WOOD CAMP HOLLOW

Here again depending on the objects for the Logan River, it may desirable to remove non-native fish.

COTTONWOOD CREEK

No opportunities were identified for Cottonwood Creek. Seasonal use by cutthroat trout, for spawning, suggests more emphasis should be placed on minimizing sediment runoff from the adjacent trail.

BLIND HOLLOW

No opportunities were identified for Blind Hollow.

CHICKEN CREEK

The head cutting that is occurring in Chicken Creek needs to be corrected. This appears to be a significant problem and is contributing sediment into the mainstem Logan River.

TEMPLE FORK

The Temple Fork Drainage has been the site for some of the most land altering changes over the past two years. Three miles of the historic road have been relocated away from the stream and put up along the ridgeline. The camping has been relocated away from the stream and the historic road, for this three miles, has been rehabilitated, excluding a narrow (24 inch) non-motorized trail.

SPAWN CREEK

The road up Spawn Creek was closed in 1999 and an ATV trail was hardened to a bridge crossing the creek. Non-native brook and brown trout could be removed from Spawn Creek. The brook trout appear to be having little impact on the native cutthroat trout in this area. This is quite different than other subspecies where brook trout directly out compete cutthroat trout.

BEAR HOLLOW CREEK

No opportunities were identified for Bear Hollow Creek.

TWIN CREEK

It appears that the culvert under Highway 89 is a block to fish migration north of the Highway. If this could be correct an additional 1.75 miles of stream could be accessed. This is a map distance and the stream has not been hiked to identify other potential barriers.

WEST HODGES CREEK

No opportunities were identified for West Hodges Creek.

THEURER HOLLOW

The culverts passing under the Tony Grove Road form a migration barrier for cutthroat trout. If these were replaced with fish passable structures an additional 1.75 miles of stream would be accessible.

LITTLE BEAR CREEK

A single culvert crosses over Little Bear Creek close to the USU Forestry Camp. It provides access to a trailhead in the area. Periodically this culvert will be blocked with debris causing the stream to flow over the road. This culvert could be removed and the natural stream bank restored. The trailhead could be moved to the west side of the stream minimizing the need for the culvert.

TONY GROVE CREEK

No opportunities were identified for Tony Grove Creek.

BUNCHGRASS CREEK

There is a trail parallels Bunchgrass Creek and crosses over the stream in a number of locations. This trail could be relocated away from the stream and the stream crossings rehabilitated. The stream should narrow back down and the depth would increase allowing for better passage. The culvert under highway 89 has been

identified as a partial barrier for upstream migration. The Utah Division of Wildlife Resources and the Forest Service have discussed the replacement of the structure to allow for better fish passage but have come to the conclusion that this partial barrier may be preventing non-native fish from migrating upstream from the Logan River.

WHITE PINE CREEK

No opportunities were identified for White Pine Creek.

RIGBY HOLLOW

No opportunities were identified for Rigby Hollow.

BRUSH CANYON

Enters Beaver Creek approximately 0.25 miles below Franklin Basin Road. Stream was 10°C (50°F) when inspected on June 7, 1999. Stream was shocked from confluence at Beaver Creek upstream to Highway 89 culvert (Photo 167). Distance is approximately 15m. Two cutthroat trout were found with lengths of 306mm and 184mm with weights of 408g and 56g, respectively (Photos 168-169). Channel below culvert was poorly formed with high gradient and choked with brush. The stream was shocked above the culvert for about 50m and no fish were found.

AMAZON HOLLOW

No opportunities were identified for Amazon Hollow.

STUMP HOLLOW SPRING

No improvements were identified for Stump Hollow Spring.

SINK HOLLOW

No opportunities were identified for Sink Hollow.

STEAM MILL CREEK

No opportunities were identified for Steam Mill Creek.

HELLS KITCHEN CREEK

No opportunities were identified for Hells Kitchen Creek.

UNNAMED SPRING

This spring flow from underneath the right edge of the Franklin Basin Road. No opportunities were identified for the tributary.

UNNAMED TRIBURARY

This unnamed tributary is located between Hells Kitchen and Steep Hollow. No opportunities were identified for the tributary.

UNNAMED TRIBURARY

This unnamed tributary is located between Peterson and Hanson Hollow and is approximately 0.25 miles upstream from Hanson Hollow. No opportunities were identified for the tributary.

PETERSON HOLLOW

No opportunities were identified for Peterson Hollow.

STEEP HOLLOW CREEK

No opportunities were identified for Steep Hollow.

CRESENT LAKE CANYON CREEK

No opportunities were identified for Crescent Lake Canyon tributary.

BOSS CREEK

No opportunities were identified for Boss Creek.

HODGE NIBLEY CREEK

No opportunities were identified for Hodge Nibley Creek.

WHITE CANYON CREEK

There is a road that goes up White Canyon. This road has been closed where it crosses White Canyon Creek with a large pile of dirt with a hole in front of it. The road has not been rehabilitated or turned over above the roadblock to discourage use.

Trespassing around the block is occurring with motorized vehicles being driven through the stream. The road above the block should be scarified and a better location for the road closure should be installed to prevent unauthorized access.

CORRAL HOLLOW

No improvements were identified for Corral Hollow Creek.

LOGAN RIVER

A few roads cross the upper Logan River in Idaho. Most of these are well-armored fords. While surveying these areas during spring runoff, many of these fords were crossable during the morning. By late afternoon the river had swelled making such crossings dangerous. The roads also would soften up allowing for damage as

vehicles crossed over them. I would suggest some time of seasonal closure to minimize driving hazards and to prevent road damage.

Discussion

The survey work in the Logan River Drainage during the spring of 1999 was critical in better understanding the role small, unnamed tributaries and less recognized tributaries play in the long-term conservation of cutthroat trout in the drainage. It also identified the current range of cutthroat trout, and the expanded distribution of non-native fish in drainage. Of the 43 tributaries and tributaries of the tributaries surveyed in 1999, 6 contained no water, 8 contained water but no fish, and 29 contained fish. Of those containing fish, 10 were found or are known to contain brown trout, two are known to contain brook trout (Table 3).

Cutthroat trout numbers were expanded to determine relative density in fish-per-mile of stream. This density was determined by dividing the number of cutthroat trout over 100mm capture in the survey reach by the length of the survey and then multiplying this number by 1,609.34, the number of meters per mile. The population estimates were not used due to the number of stream where a population estimate could not be determined because of failure to meet the assumption of fewer fish being caught during the second pass than the first pass. These densities ranged from 541 fish/mile, Twin Creek, to 14 fish/mile, the right fork of Temple Fork. These densities should be referenced with care and the environmental conditions reviewed.

Twin Creek, with a density of 541 fish per mile, could be viewed as a critical tributary with such a high density. However with approximately 23 meters of accessible stream, the number of fish in this tributary is estimated to be 13 or fewer. Theurer Hollow had the next greatest density at 510 fish per mile. Again the length of accessible stream to fish is less than a mile. The next most densely populated stream is an unnamed tributary between Peterson and Hanson hollows. Again less than a mile is accessible.

Another potential index to use would be fish per 100 M² surface area. Here cutthroat trout densities ranged from 28 fish/100 M² for Twin Creek down to 0 for the right fork of Temple Fork and 1 fish/100 M² for Wind Cave Spring and Wood Camp Tributary.

In the past it was thought that stream such as Beaver, Temple, Spawn, Bunchgrass and Little Bear Creek provided the bulk of the Logan River recruitment for the cutthroat trout population.

After this year's work, the importance of the smaller and less

well-known tributaries has been better documented. Streams like Bear, Theurer, Hanson, and Bunchgrass creeks provide important rearing areas for cutthroat trout. Cottonwood Creek, although subsurface during later parts of the year, also provides some spawning and rearing habitat for fish.

Table 3. Streams sampled in 1999 including species composition, length, width and depth of survey reach and fish densities in fish per mile and fish per 100 meter ².

LOCATION ID #	DRAINAGE	STREAM	DATE	TROUT OVER 100 mm IN LENGTH					Length (mm)	Width (M)	Depth (M)	Fish mile	Fish 100M ²
				CUT	CUT/RAIN	RAIN	BRK	BRN					
128	LOGAN RIVER	SPRING HOLLOW	12-May-99	6	no	no	no	10	122.8	2.5	0.3	79	2
129	LOGAN RIVER	WIND CAVE SPRING	12-May-99	2	no	no	no	5	164.5	1.0	0.3	20	1
130	LOGAN RIVER	CARD CANYON	27-May-99	no	no	1	no	2	10.0	1.3	0.3	--	--
131	LOGAN RIVER	RIGHT HAND FORK	18-May-99	4	no	no	no	no	88.0	1.5	0.4	73	3
132	LOGAN RIVER	COWLEY CANYON	17-May-99	no	no	no	no	7	74.0	1.7	0.3	--	--
133	LOGAN RIVER	WILLOW CREEK	18-May-99	no	no	no	no	6	117.4	1.0	0.4	--	--
134	LOGAN RIVER	WOOD CAMP TRIBUTARY	18-May-99	1	no	no	no	1	58.0	2.0	0.3	28	1
135	LOGAN RIVER	COTTONWOOD CREEK	19-May-99	9	no	no	no	no	106.0	2.5	0.4	137	3
136	LOGAN RIVER	CHICKEN CREEK	24-May-99	1	no	no	no	no	8.0	1.0	0.2	201	13
137A	LOGAN RIVER	SPAWN CREEK	25-May-99	no	no	no	13	no	104.5	2.5	0.4	--	--
137B	LOGAN RIVER	SPAWN CREEK	25-May-99	4	no	no	13	no	114.0	2.0	0.4	56	2
137C	LOGAN RIVER	SPRING TRIB, RIGHT HAND SPAWN CREEK	24-Jun-99	yes	no	no	no	no	--	2.0	0.2	--	--
138	LOGAN RIVER	RIGHT FORK TEMPLE FORK	07-Jun-99	1	no	no	no	no	115.0	2.5	0.4	14	0
139	LOGAN RIVER	BEAR HOLLOW CREEK	07-Jul-99	14	no	no	no	no	102.0	1.3	0.1	221	11
140	LOGAN RIVER	TWIN CREEK	27-May-99	8	1	no	no	no	23.8	1.2	0.3	541	28
141	LOGAN RIVER	WEST HODGES	02-Jun-99	7	no	no	no	no	88.0	0.5	0.4	128	16
142	LOGAN RIVER	THEURER HOLLOW	02-Jun-99	31	no	no	no	no	97.9	1.3	0.3	510	25
143	LOGAN RIVER	LITTLE BEAR CREEK	03-Jun-99	4	no	no	no	no	100.0	2.5	0.6	64	2
144	LOGAN RIVER	TONY GROVE CREEK	02-Jun-99	4	no	no	no	no	95.0	2.0	0.3	68	2
145	LOGAN RIVER	BUNCHGRASS CREEK	07-Jun-99	15	no	no	no	no	100.0	1.0	0.2	241	15
146	LOGAN RIVER	WHITE PINE CREEK	28-Jun-99	yes	no	no	no	no	--	9.0	0.4	--	--
147	LOGAN RIVER	BRUSH CANYON	07-Jun-99	2	no	no	no	no	15.0	0.5	0.3	215	27
148	LOGAN RIVER	STUMP HOLLOW	08-Jun-99	4	no	no	no	no	100.0	1.5	0.4	64	3
149	LOGAN RIVER	UNNAMED SPRING	09-Jun-99	yes	no	no	no	no	--	5.0	0.4	--	--

Table 3 continued.

LOCATION ID #	DRAINAGE	STREAM	DATE	TROUT OVER 100 mm IN LENGTH					Length (mm)	Width (M)	Depth (M)	Fish mile	Fish 100M ²
				CUT	CUT/RAIN	RAIN	BRK	BRN					
150	LOGAN RIVER	UNNAMED TRIBUTARY BETWEEN HELLS KITCHEN AND STEEP HOLLOW	09-Jun-99	9	no	no	no	no	96.0	3.0	0.3	151	3
151	LOGAN RIVER	UNNAMED TRIBUTARY BETWEEN PETERSON AND HANSON HOLLOW	15-Jul-99	24	no	no	no	no	106.0	1.0	0.3	364	23
152	LOGAN RIVER	PETERSON HOLLOW	19-Jul-99	3	no	no	no	no	100.0	0.8	0.1	48	4
153	LOGAN RIVER	WHITE CANYON CREEK	23-Jun-99	8	no	no	no	no	72.0	3.0	0.2	179	4
154	LOGAN RIVER	MILL HOLLOW	11-May-99	no	no	no	no	no	--	--	--	--	--
155	LOGAN RIVER	BEIRDNEAU CREEK	13-May-99	no	no	no	no	no	--	--	--	--	--
156	LOGAN RIVER	RICKS CANYON	17-May-99	no	no	no	no	no	--	--	--	--	--
157	LOGAN RIVER	TAB HOLLOW	17-May-99	no	no	no	no	no	--	--	--	--	--
158	LOGAN RIVER	BLIND HOLLOW	14-Jul-99	no	no	no	no	no	--	--	--	--	--
159	LOGAN RIVER	RIGBY HOLLOW	07-Jun-99	no	no	no	no	no	--	--	--	--	--
160	LOGAN RIVER	LOGAN RIVER	24-Jun-99	yes	no	no	no	no	100.0	2.5	0.3	--	--
161	LOGAN RIVER	SINK HOLLOW	08-Jun-99	no	no	no	no	no	--	--	--	--	--
162	LOGAN RIVER	STEAM MILL CREEK	09-Jun-99	no	no	no	no	no	--	1.5	0.4	--	--
163	LOGAN RIVER	HELLS KITCHEN CREEK	09-Jun-99	no	no	no	no	no	--	--	--	--	--
164	LOGAN RIVER	STEEP HOLLOW	09-Jun-99	no	no	no	no	no	50.0	0.5	0.2	--	--
165	LOGAN RIVER	CRESENT LAKE CANYON CREEK	09-Jun-99	no	no	no	no	no	20.0	0.6	0.4	--	--
166	LOGAN RIVER	UNNAMED TRIBUTARY BETWEEN CRESCENT LAKE CANYON AND BOSS CANYON	15-Jul-99	no	no	no	no	no	--	--	--	--	--
167	LOGAN RIVER	HODGE NIBLEY CREEK	14-Jun-99	yes	no	no	no	no	--	--	--	--	--
168	LOGAN RIVER	BOSS CANYON	23-Jun-99	yes	no	no	no	no	100.0	5.0	0.4	--	--
169	LOGAN RIVER	CORRAL HOLLOW	24-Jun-99	yes	no	no	no	no	--	2.0	0.3	--	--
170	BEAR RIVER	MILL CREEK	19-Aug-99	36	no	no	no	no	100.0	3.0	0.2	579	12
171	BEAR RIVER	MILL CREEK	19-Aug-99	5	no	no	no	no	85.0	3.0	0.3	95	2

Table 3 continued.

LOCATION ID #	DRAINAGE	STREAM	DATE	TROUT OVER 100 mm IN LENGTH					Length (mm)	Width (M)	Depth (M)	Fish mile	Fish 100M ²
				CUT	CUT/ RAIN	RAIN	BRK	BRN					
172	PROVO RIVER	UPPER PROVO RIVER	17-Aug-99	2	no	yes	yes	no	100.0	5.0	0.2	32	0
173	WEBER RIVER	BEAVER CREEK	17-Aug-99	17	no	yes	no	no	101.3	5.8	0.2	270	3
174	GREAT SALT LAKE	CENTERVILLE CREEK	28-Jul-99	no	no	34	no	no	50.4	1.8	0.2	--	--
175	GREAT SALT LAKE	CENTERVILLE CREEK	28-Jul-99	no	no	53	no	no	59.0	1.7	0.2	--	--
176	GREAT SALT LAKE	FARMINGTON CREEK	26-Jul-99	no	no	37	no	no	38.0	3.0	0.3	--	--
177	GREAT SALT LAKE	FARMINGTON CREEK	26-Jul-99	no	no	no	no	no	--	--	--	--	--

CUT=cutthroat trout, RAIN=rainbow trout, BRK=brook trout, BRN=brown trout

Yes=fish species present, No=fish species not present

-- no data collected or calculated

The greatest potential threats to the native fish in the drainage remain those introduced by man. These include:

- Whirling Disease: First found in the drainage in 1999, it is distributed as high up as Little Bear Creek. Most likely introduced by an unsuspecting fisher (a man or woman who fish).
- Non-native fish introductions: Yellowstone cutthroat, rainbow, brown and brook trout have all been introduced into the Logan River over the past 50 years.

Yellowstone cutthroat trout were stocked throughout the drainage. Researchers with limited use of meristics, electrophoresis, mitochondria and Nuclear DNA analysis have been unable to identify crossbreeding that may have occurred among the native cutthroat and Yellowstone cutthroat trout (Martin & Shiozawa 1981, Shiozawa and Evans 1995, Shiozawa & Evans 1998). For all practical purposes it probably makes little difference. The cutthroat trout of the Bear River may be offspring of the fish from the Snake River trapped there when historic Lake Bonneville flowed north into the Snake River.

Utah Division of Wildlife Resources continues to stock only rainbow trout. These are stocked at the mouth of Spring Creek (Third Dam) downstream. Fish from these stocking have been seen up to 13 miles above the point of stocking.

Brown trout were generally found in the mainstem and some of the major tributaries. These tributaries include: Spring Hollow, Wind Cave Spring, Card Canyon, Right Fork, Cowley Canyon, Willow Creek, Wood Camp Hollow and have been collected in the past in Temple Fork, Spawn Creek, and Little Bear Creek. It is this author's opinion that Brown trout pose the greatest threat to the native cutthroat trout.

Brook trout were found only in the highest reaches of Spawn Creek and Beaver Creek.

- Fishing can also have a direct impact to cutthroat trout populations. Though it is generally assumed that populations have harvestable surpluses, collection of fish by fishers or scientists can affect populations.

- Habitat alteration from road construction, grazing or recreational sites can affect a population's carrying capacity. Direct mortality can also occur as individuals and animals wade in the streams from May through mid August.
- Spills: With a major transportation corridor being located along the river for over 20 miles, with a number of sharp curves, a toxic spill is very likely to occur. In the past five years one car and two large trucks have gone into the river.

As efforts are made to conserve cutthroat trout throughout the west all things need to be taken into consideration. Historical values are shifting and the need for resource conservation for the future is being recognized. Threats need to be dealt with to minimize future losses. For the cutthroat trout of the Logan River Drainage the best chance for survival exists on the Wasatch-Cache National Forest. Conservation minded management of public lands for the long-term survival of these native fish is critical. Some would argue that a preservation "hands off" approach is sounder. This "hands off" approach, however, fails to recognize man's introduction of non-native fish, the significant habitat changes which have and continue to occur, and the public demand to see changes occur at a faster pace than generations.

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APPENDIX