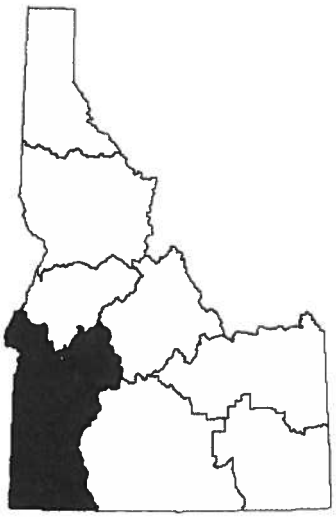
FISHERY MANAGEMENT INVESTIGATIONS

IDAHO DEPARTMENT OF FISH AND GAME

FISHERIES MANAGEMENT ANNUAL REPORT

Virgil Moore, Director



SOUTHWEST REGION

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River and Stream Investigations

South Fork Boise River Tributaries Evaluation Of Rainbow Trout Populations Downstream Of Anderson Ranch Dam

ABSTRACT

Five tributaries to the South Fork Boise River (SFBR) were sampled in 2010 to evaluate presence, population density, and size distribution of fish populations within these tributaries. Seven sites in Dixie, Granite, Pierce, Rock, and Rough creeks were sampled between June 8 and July 26, 2010. Rainbow trout were collected in two of the five streams sampled in 2010. A total of 48 fish were collected at three sites in Pierce and Rock creeks. No redband trout were sampled in Dixie, Granite, and Rough creeks, and only Dixie Creek contained enough water to support a fish population. Rainbow trout density for the three sites ranged from 6 to 12.1 fish/100 m^2 in Pierce Creek, and 0 to 8.7 fish/100 m^2 in Rock Creek. Nearly 70% of the fish captured were less than 100 mm, and length frequency distributions show that all fish captured were between 50 - 180 mm. The 2010 stream surveys provided an important first step towards prioritizing SFBR tributaries for habitat work such as barrier removal.

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INTRODUCTION

The South Fork Boise River (SFBR) downstream of Anderson Ranch Dam is a nationally renowned tail-water trout fishery and was the first river section in Southwest Idaho to be managed under "Trophy Trout" regulations. The total reach is 43 km, with road access along the upper 16 km, and the remaining section accessible only by non-motorized boat. Regulations prohibit the use of bait and barbed hooks from Neal Bridge (Forest Road 189) upstream to Anderson Ranch Dam. Rainbow trout harvest is restricted to 2 fish, none under 20 inches. The fishery is supported by a population of wild rainbow trout and mountain whitefish. Migratory bull trout are present at very low densities, and native nongame fish include largescale suckers, northern pikeminnow and sculpin. Approximately 15,000 rainbow trout were stocked annually in SFBR between Anderson Ranch Dam and Cow Creek Bridge until 1976, when management emphasis shifted towards wild trout (Beach 1975; Moore et al. 1979).

Rainbow trout populations in the SFBR have been monitored in a 9.6 km section upstream from Danskin Bridge every three years since 1994 (Butts et al. 2011). Mark-recapture techniques are used to estimate abundance of trout and mountain whitefish in three sections of the SFBR. Results have suggested that rainbow trout populations in the SFBR have been relatively stable, but the relative absence of trout in the 200 to 400 mm length range upstream of Danskin Bridge is puzzling. The numbers of trout greater than 400 mm are currently providing an excellent fishery despite the relative lack of smaller trout in the roaded survey sections. A population survey in the canyon section downstream of Danskin Bridge in 2008 showed that rainbow trout between 250 - 400 mm were present in higher proportions than observed in the tail-water section (Kozfkay et al. 2010). The SFBR wild trout population is thought to be supported primarily through main-stem spawning of fish with little input from tributaries, as migration barriers are known to be present on most tributaries with spawning habitat (Moore et al. 1979).

Recently, interest has increased in restoring connectivity to tributaries to the SFBR below Anderson Ranch Dam. Specifically, biologists wish to determine whether or not the tributaries currently have fish populations, contain spawning habitat, if barriers to fish migration exist, and if the potential exists to provide spawning opportunities if barriers were removed. Surprisingly, there is little information on fish populations within these tributaries. A number of tributaries were sampled in 2008 by United States Forest Service (USFS) biologists to obtain samples for a genetic study on rainbow and redband trout within the SFBR drainage. However, little or no population information was collected during these surveys. Prior to this, Moore et al. (1979) characterized the majority of the SFBR tributaries below Anderson Ranch and evaluated streams both for the presence of spawners and spawning habitat. However, changes in land use practices, roads, and climate may have altered habitat and fish communities over the past 30 years. To properly describe current habitat conditions and prioritize barrier removal projects, new surveys were initiated in 2010.

METHODS

Five tributaries to the SFBR were sampled in 2010 to evaluate fish spp. presence, population density, and size distribution. Seven sites in Dixie, Granite, Pierce, Rock, and Rough creeks were sampled between June 8 and July 26, 2010 (Figure 41). Sample sites were selected from a 1:100,000 hydrography layer through the Environmental Protection Agency's Environmental Monitoring and Assessment Program (see Stevens and Olsen 2004). Sampling

occurred during base flow conditions so that streams could be evaluated as to whether they contained enough water to support fish and so that migrations barriers could be better assessed.

At each site that contained enough water to support fish, we used depletion electrofishing to determine the abundance of salmonids, using a backpack electrofisher (Smith-Root Model 15-D) with pulsed DC. Block nets were installed at the upper and lower ends of the sites to prevent fish from leaving or entering a study site during the survey. Study sites were generally 100 m in length of shockable stream; sections of stream where vegetation was too thick to sample effectively, were not included in the sample site. Fish were identified, enumerated, measured to the nearest mm (total length, TL) and g, and released downstream of the study sites. Nongame fish and amphibian species were also recorded if observed. Maximum-likelihood abundance and variance estimates were calculated with the MicroFish software package (Van Deventer and Platts 1989). When no trout were captured on the final pass, we estimated abundance to be the total catch. Because electrofishing is characteristically size selective (Sullivan 1956; Reynolds 1996), trout were separated into two length groups (<100 mm TL and ≥100 mm TL) and abundance estimates were calculated individually for each size group. Depletions were attempted only for salmonids, whereas relative abundance was recorded for all nongame fish and amphibian species.

Various habitat measurements were recorded at ten equally spaced transects within the sample site. Stream width was measured at each transect and depth (m) was measured at ¼, ½, and ¾ distance across the channel. The sum of these depth measurements was divided by four to account for zero depths at the stream margins for trapezoidal channels (Platts et al. 1983; Arend 1999). Wetted stream width (m) was calculated from the average of all transect measurements. In most cases, stream temperature (°C) and conductivity (µS/cm) were measured at the bottom of a site with a calibrated hand-held meter accurate to ± 2%. Various other habitat measurements such as percent substrate composition, percent shading, and bank stability were measured, but the results are not reported here and are instead stored in the IDFG Standard Stream Survey database.

RESULTS

Rainbow trout were collected in two of the five streams sampled in 2010. A total of 48 fish were collected at three sites in Pierce and Rock creeks. No redband trout were sampled in Dixie, Granite, and Rough creeks, and only Dixie Creek contained enough water support a fish population. Sculpin and tailed frogs *Ascaphus truei* (adults and tadpoles) were also collected in Pierce and Rock creeks.

Rainbow trout density for the three sites ranged from 6 to 12.1 fish/100 m^2 in Pierce Creek, and 0 to 8.7 fish/100 m^2 in Rock Creek (Table 21). Nearly 70% of the fish captured were less than 100 mm and capture probability for that size ranged from 50 - 83%. The lower capture probability of Pierce Creek is likely a result of the electrofisher being unable to reach all areas of the stream within each section because of the thick vegetation surrounding the stream. Capture probability for fish ≥ 100 mm ranged from 75 - 100% in both streams. Length frequency distributions show that all fish captured were between 50 - 180 mm (Figure 42).

DISCUSSION

These stream surveys provided important first steps towards prioritizing SFBR tributaries for habitat work such as barrier removal. Granite and Rough creeks did not contain adequate water to sustain fish populations in June. However, 100 spawning female rainbow trout were observed in Rough Creek and 30 in Granite Creek in 1978 (Moore et al. 1979). The previous year, which was considered a drought year, no spawning fish were observed in either stream. Therefore it is possible that both streams have historically contained large, fluvial rainbow trout under higher stream flows. Additionally, both streams contain culverts at the FS113 road crossing, which appears to limit upstream migration from the SFBR main stem, at least during low flows.

Pierce Creek sites 1 and 5 contained rainbow trout, sculpin, and tailed frogs and site 9 was high gradient and low flow, preventing fish from residing in the upper drainage. Pierce Creek does have a formidable culvert at the FS113 crossing and the 2010 sampling likely occurred too late to observe any spawners using the tributary. In 1977 and 1978, 100 and 200 female spawners were estimated to have used Pierce Creek, respectively. Pierce Creek also receives a great deal of sediment and silt from erosion below a poorly installed culvert on the Smith Prairie Grade (FS113). Given that Pierce Creek contains fair densities of smaller redband trout and good spawning habitat; it should be considered a high priority for future habitat improvements.

Rock Creek was the largest stream sampled in 2010 and appears to offer good trout habitat throughout much of its drainage. Fish were found higher up in the drainage at Rock Creek site 9, approximately 7.5 km upstream from the confluence of SFBR. However, at site 5, 3.7 km above the confluence, no fish were collected and water temperatures reached 31 °C. The warm temperatures may be a result of irrigation withdrawal and returns along the Smith Prairie. In addition, approximately 3 km above the confluence with SFBR, FS113 crosses Rock Creek, with a culvert that appears to be a substantial barrier to upstream migration. Improving this culvert has the potential to open up an addition 5 km of spawning habitat above the culvert. However, irrigation diversion and practices on Rock Creek need to be further investigated to understand the source for the high stream temperatures at site 5. Finally, Neville and Dunham (In Press) found that 32 fish collected from Rock Creek in 2008 were rainbow x cutthroat trout hybrids. Although there appears to be no barriers to downstream movement, further discussion will be needed regarding the implications of reconnecting Rock Creek to SFBR in terms of upstream migration. Sites below the culvert will need to be sampled in 2011 to assess the fish community below the barrier and whether summer stream temperature may limit trout residence downstream to the confluence.

More tributary sampling will be conducted in 2011, with most in the roadless section downstream of Danskin Bridge. In addition, the presence of an irrigation return or intermittent dewatering on Rock Creek will be further investigated.

MANAGEMENT RECOMMENDATIONS

1. Install temperature a logger in Rock Creek above culvert crossing to assess seasonal stream temperatures.

2. Continue SFBR tributary inventories downstream of Danskin Bridge.

Table 21. Rainbow trout population and density (fish/100 m^2) estimates by length group, and stream temperatures (°C) at 7 monitoring sites during June-July 2010 in the Dixie, Granite, Pierce, Rock, and Rough Creek drainages.

				< 100 mm		≥ 100 mm		Total	
Stream	Site	Temp (°C)	Passes	Estimate	95% CI	Estimate	95% CI	Estimate	fish/100m^2
Dixie Creek	DX1	11.1	1	-	-	-	-	-	-
Granite Creek	GC1	18.4	1	-	-	-	-	-	-
Pierce Creek	PC1	15.2	3	19	12-26	3	2-4	22	12.1
Pierce Creek	PC2	13.1	3	6	2-10	3	3-3	9	6
Pierce Creek	PC5	-	1	-	-	-	-	-	-
Rock Creek	RK5	31.2	1	-	-	-	-	-	-
Rock Creek	RK9	14.8	2	10	8-12	9	9-9	19	8.7
Rough Creek	RG1	18.1	1	-	-	-	-	-	-

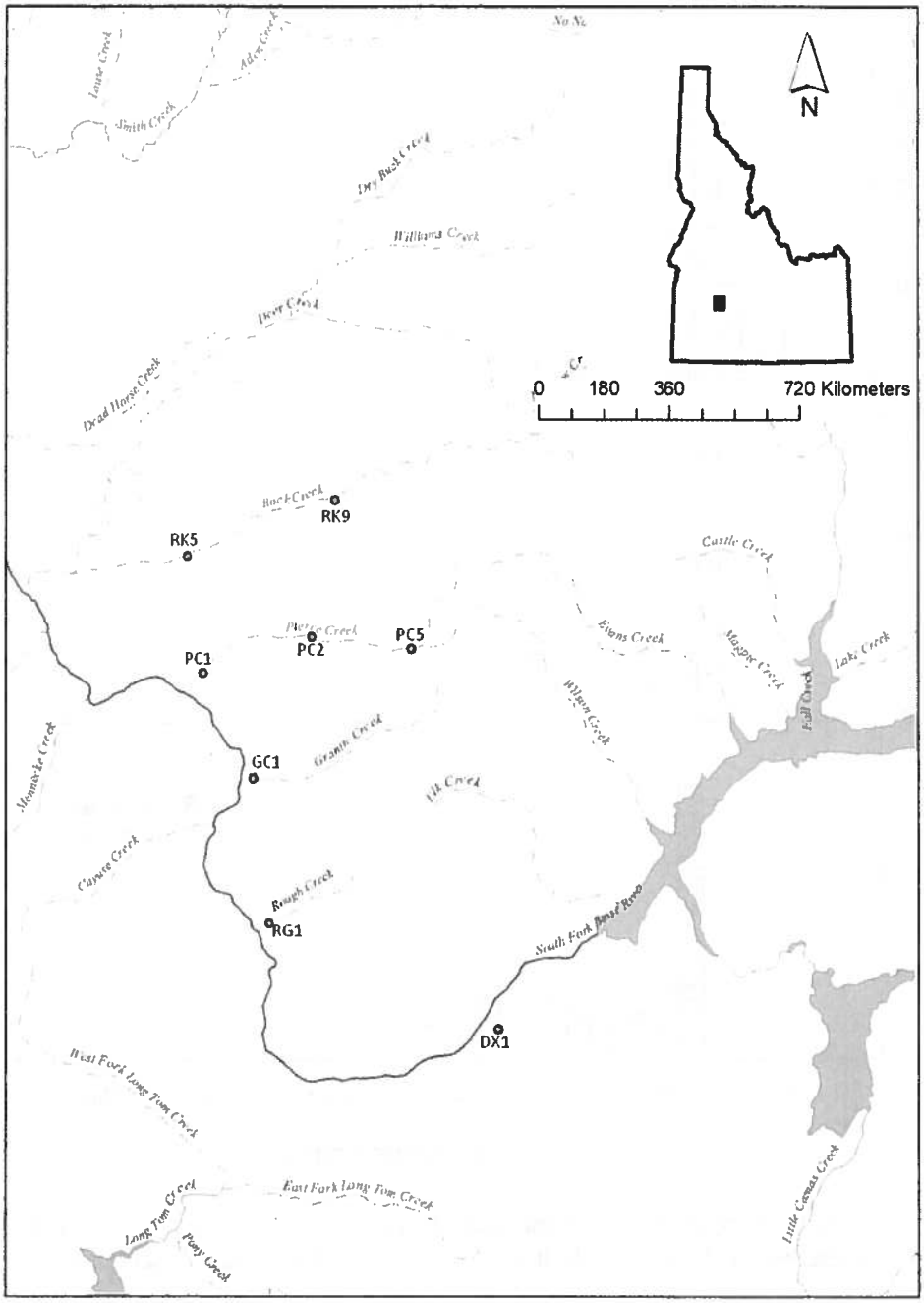

Figure 41. Map of the South Fork Boise River drainage, Idaho and the seven sites sampled to assess fish populations within the drainage during June - July 2010.

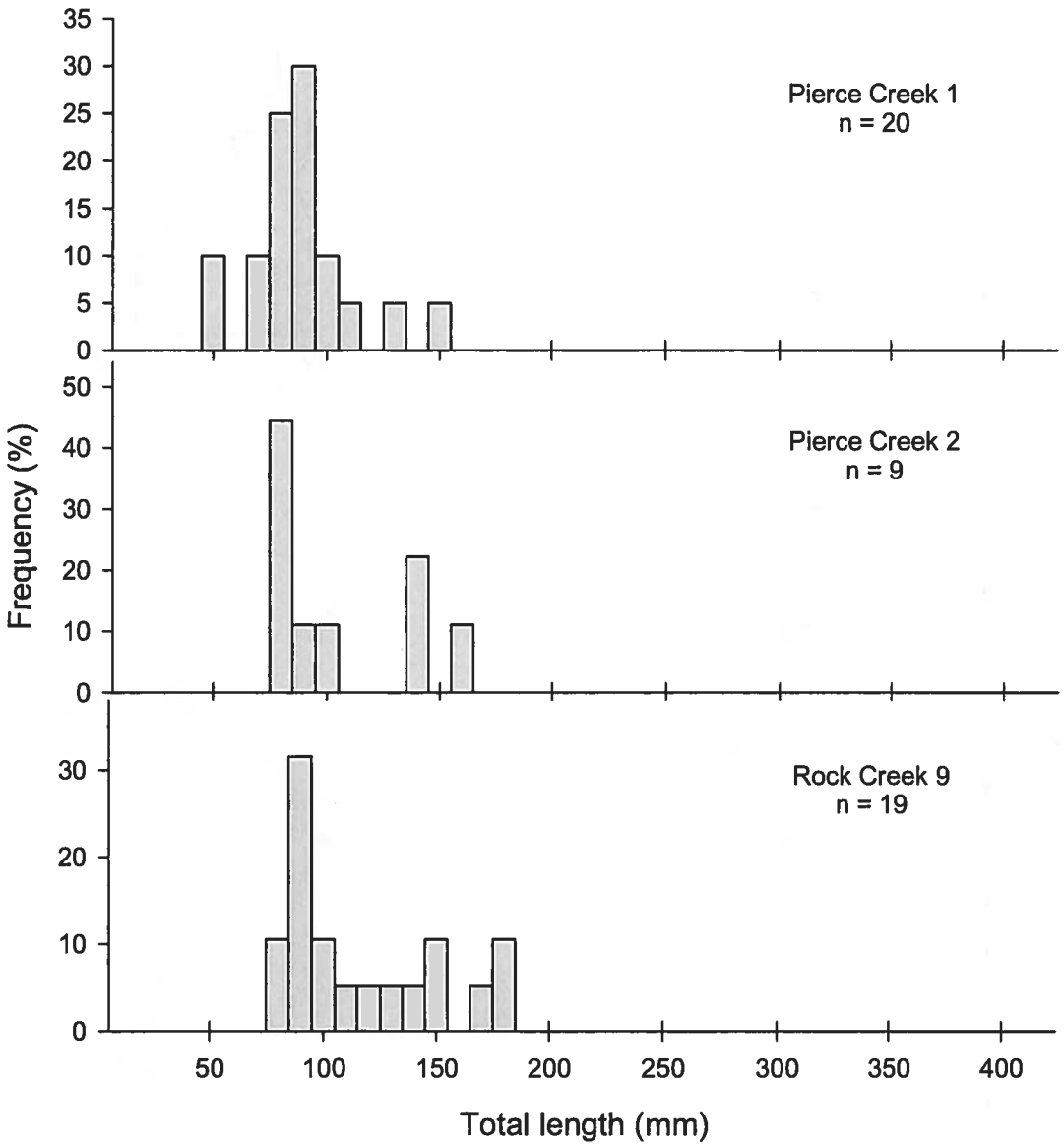

Figure 42. Rainbow trout length distribution (%) of fish captured in June - July 2010 at 3 sites with fish present in the Pierce and Rock Creek drainages.