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RIVERS AND STREAMS INVESTIGATIONS

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ABSTRACT

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The South Fork Boise River was electrofished in late October and early November 2003 from the Village Access downstream to 1.1 km below the Cow Creek Bridge. A population estimate of 5,975 rainbow trout >129 mm was generated for this reach. Total densities of 2.4/100 m² for rainbow trout >129 mm, and 1.38/100 m² for rainbow trout >239 mm were estimated in this reach. Total abundance estimates were similar to 2000 estimates, but considerably lower than 1994 estimates. Abundance of large (>400 mm) fish decreased slightly (5%) from the 2000 survey (180/km to 170/km). Quality Stock Density (QSD) of 400 mm increased from 20% in 1994 to 61% in 2003.

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South Fork Boise River Electrofishing

A mark-recapture trout population estimate for rainbow trout was conducted on the special regulations section of the South Fork Boise River (SFBR) below Anderson Ranch Dam. Comparable surveys were completed on this section in 1994, 1997 and 2000. The survey section extended from the Village access area to a take-out approximately 1.1 km downstream from the Cow Creek Bridge, a distance of 9.6 km.

Electrofishing equipment included a raft, two booms each supporting a 76 cm ring from which 8 dropper anodes were suspended, 11 m of .95 cm diameter stainless steel cable (cathode), and a Coffelt VVP-15. The VVP settings used to collect fish were 350 V and approximately 3 A, direct current. One person rowed the raft and one person actively attempted to capture all trout. River flow during electrofishing was approximately 8.5m sec⁻¹.

Mark runs were conducted on October 22, 24, and 28. Recapture runs were on November 7 and 10. During mark runs, rainbow trout collected were marked by

creating a hole in their caudal fin with a paper punch. During recapture runs, rainbow trout were marked by notching the anal fin. All unmarked rainbow trout collected were measured to the nearest mm and a subsample was weighted to the nearest g. Twenty rainbow trout between 120-125 mm were submitted to the Eagle Fish Health Laboratory (EFHL) for whirling disease analysis. During recapture runs, two additional personnel were utilized to work up captured fish, which allowed the electrofishing to continue without delays.

Population estimates and standard errors were calculated using the modified Petersen population and variance estimators (Seber 1973). Estimates were calculated by pooling mark-recapture data for all rainbow trout >129 mm. There was only one fish recaptured <239 mm. Population estimates were calculated for rainbow trout >129 mm, and >239 mm. These length groups correspond to estimates made in 1994, 1997 and 2000 (Allen et al. 2000a, 2000b and Flatter et al. In press).

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A density estimate (rainbow trout/100 m²) was made for a 1.4 km section of the SFBR beginning upstream (UTM = 11T 0618344 4801389) and ending at the Cow Creek Bridge. The boundaries of the section were chosen to simplify repeatability and to allow for habitats representative of the entire (9.6 km) study area to be included. The surface area of the 1.4 km section was determined using a hand held laser rangefinder (Leica LRF 800, to collect six widths), and All Topo map software (Version 2.0, to calculate the total section length). All fish were marked using a mid-caudal mark to distinguish them from fish marked in other areas of the SFBR. All marked and unmarked rainbow trout caught within the 1.4 km section were noted and used to calculate population and density estimates.

South Fork Boise River Electrofishing

Bull trout and wild rainbow trout were collected during electrofishing. In addition, mountain whitefish, bridgelip sucker *Catostomus columbianus*, largescale sucker *C. macrocheilus*, northern pikeminnow, dace *Rhinichthys spp.*, and sculpin *Cottus spp.* were observed but not collected.

The mean number of rainbow trout collected per day of electrofishing in 2003 was 123, compared to 155 in 2000, and 149 in 1997 (Allen et al. 2000b and Allen et al 2000a). Flows during electrofishing in 2003, 2000, and 1997 were essentially identical. During 1994 electrofishing, catch per day was 291 at flows of 8.5 m³ sec⁻¹ and 199 when flows were 17 m³ sec⁻¹. As observed in previous sampling, greater daily catch in the SFBR appears to be related to lower flow (Allen et al. 2000a).

Mark-recapture data for wild rainbow trout by cm size group are provided in Table 9. The pooled population estimates for rainbow trout >129 mm and >239 mm were 5,975 and 3,392, respectively (Table 10). In 2000, pooled population

estimates for >129 mm and >239 mm rainbow trout were 5,108 and 3,995, respectively. Based on overlapping confidence intervals, population estimates for 2000 and 2003 were not significantly different.

Although the size structure of the rainbow trout population changed dramatically between 1994 and 2000, little change occurred between 2000 and 2003. QSD (400 mm) has steadily increased in the SFBR, from 19% in 1994 to 38% in 1997, 59% in 2000, and 61% in 2003 (Figure 2). Past abundance estimates for fish > 400 mm have ranged from 686 (71/km) in 1994 to 1,725 (180/km) in 2000. In 2003, abundance of rainbow trout > 400 mm decreased slightly (5%) from the 2000 survey to 1,629 (170/km). Improved water conditions since the mid-1990s may have improved survival or growth rates for adult fish even though overall densities are slightly lower.

Our results indicate that the proportion of 100-239 mm fish in the cumulative sampling effort has increased from 17% in 2000 to 47% in 2003. During the past year, anglers have expressed concern about the apparent lack of sub-adult rainbows. Because sampling conditions were essentially the same as in 2000, it is likely that the observed increase in abundance of sub-239 mm rainbow trout reflects an actual increase. Continued population monitoring on a three-year cycle is adequate to document trends in abundance, size structure, and recruitment.

Although *Myxobolus cerebralis*, the causative agent of Whirling Disease, was detected in this drainage in 1995, there is still no indication of a reduction in recruitment sometimes associated with whirling disease outbreaks (Figure 3). All twenty fish in our rainbow trout sample tested positive for *M. cerebralis* spores, as did two of the mountain whitefish.

Rainbow trout densities for the 1.4 km stretch above Cow Creek Bridge were 1.24 and 0.69 fish/100m² for fish >150 mm and ³ 200 mm, respectively. For comparison, in 2002 the Box Canyon stretch of the Henry's Fork of the Snake River had a rainbow trout density of 3.2/100 m² (>150 mm) (Dan Garren, Department, personal communication). In 2003, four sections of the Big Wood River averaged 4 rainbow trout/100 m² (>200 mm) (Chuck Warren, Department, personal communication).

During the months of May and June 2003, the Bureau of Reclamation (BOR) conducted scheduled repairs of the Anderson Ranch Dam outlet works. The project required temporary conversion from deep to surface releases from Anderson Ranch Reservoir. Between June 9 and June 20, the BOR documented elevated temperatures downstream in the SFBR. During this period, the SFBR surface temperature (between Danskin Bridge and Neal Bridge) ranged from 18 to 24¼C. Water temperatures decreased to 11¼C on June 7 when deep-water releases from Anderson Ranch Dam resumed (Figure 4). No SFBR fish kills were

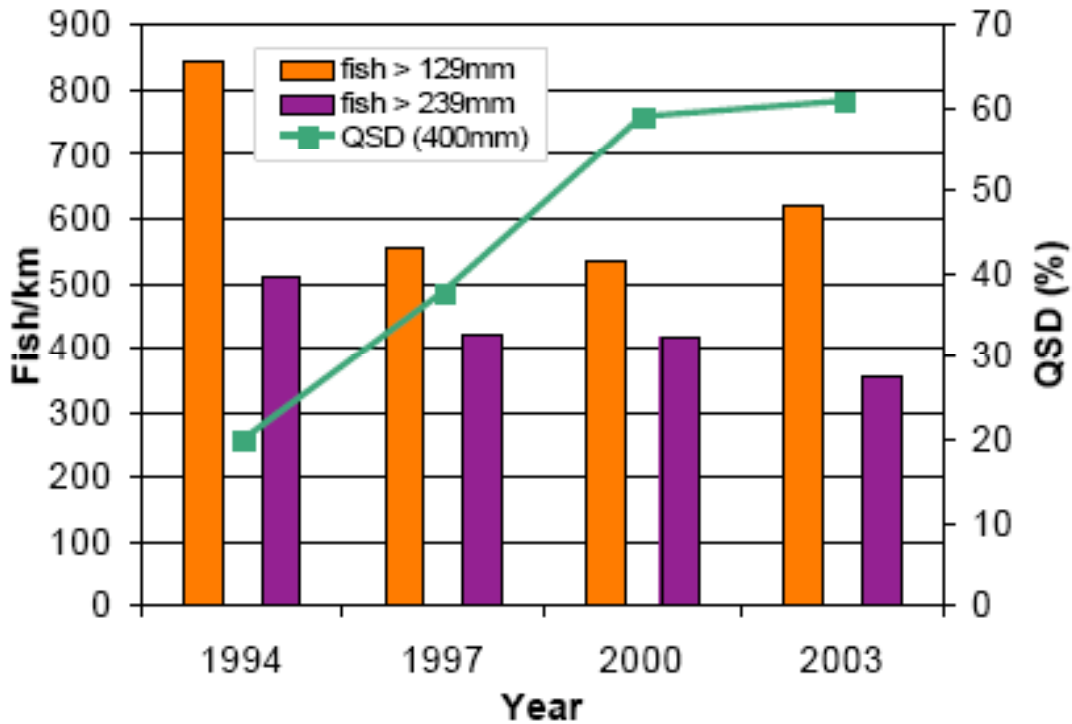
reported in 2003 and our population estimate does not suggest any population effects on wild rainbow trout. Radio tagged bull trout located in the SFBR prior to the dam repairs remained in the river during, and immediately following, the elevated temperature period (Tammy Salow, USBR, personal communication).

Table 9. Mark-recapture data for rainbow trout in the South Fork Boise River, October and November 2003

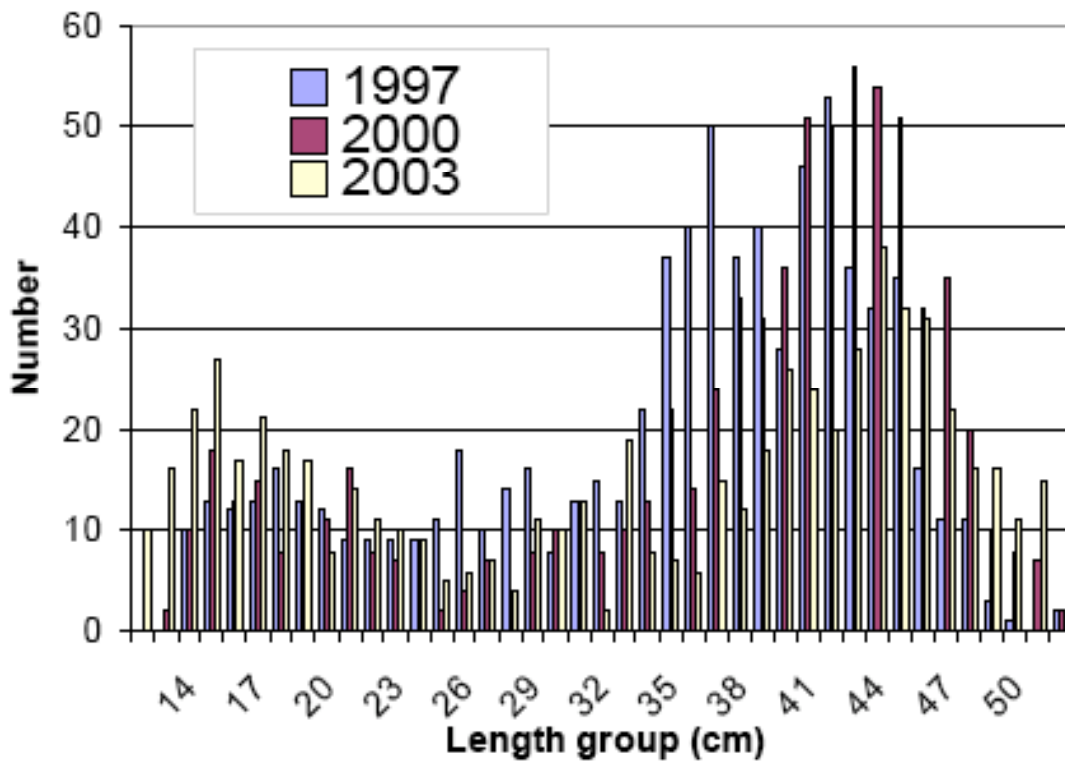
Length group (cm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)	Length group (cm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)
<11	1	7	-	-	-	-	-
11	1	2	-	32	2	0	1
12	5	6	-	33	2	7	-
13	7	9	-	34	4	4	-
14	15	6	-	35	4	3	-
15	9	17	-	36	4	2	-
16	12	5	-	37	10	5	-
17	9	12	1	38	3	9	-
18	12	6	-	39	6	13	1
19	7	10	-	40	11	16	-
20	5	3	-	41	10	12	-
21	7	8	-	42	9	12	1
22	8	3	-	43	9	19	2
23	5	4	-	44	17	22	1
24	5	4	-	45	13	19	-
25	4	1	-	46	16	15	1
26	3	4	-	47	14	9	1
27	4	3	-	48	9	7	3
28	2	1	-	49	9	7	1
29	4	8	-	50	7	3	-
30	5	6	1	>50	12	5	1
31	8	5	-	-	-	-	-

Table 10. Comparison of rainbow trout population estimates for the South Fork of the Boise River collected in 1993, 1994, 1997, 2000, and 2003. Ninety-five percent confidence intervals are presented in parentheses, if known.

Year	Size group (mm)	Population estimate (95% CI)
2003	>129	5,975 (3204<N<8746)
	>239	3,392 (1786<N<4998)
2000	>129	5,108 (3586<N<7474)
	>239	3,995 (2735<N<6023)
1997	>129	5,345
	>239	4,043
1994	>129	8,093
	>239	4,898
1993	>129	n/a
	>239	4,540



Densities per kilometer and QSD values for wild rainbow trout collected in the South Fork of the Boise River between Reclamation Village and a take-out 9.6 km downstream in 1994, 1997, 2000, and 2003.



Length frequency of wild rainbow trout captured by electrofishing in the South Fork Boise River below Anderson Ranch Dam in fall 1997, 2000, and 2003.