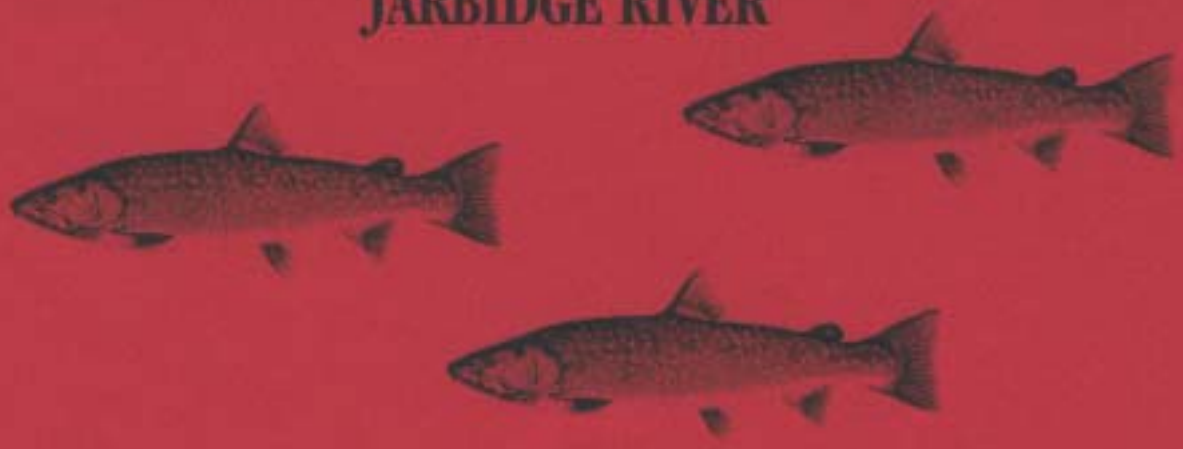
TECHNICAL BULLETIN NO. 98-9 IDAHO BUREAU OF LAND MANAGEMENT June 1998

MONITORING OF MIGRATING BULL TROUT IN THE JARBIDGE RIVER



by
Fred E. Partridge
Charles D. Warren

MONITORING OF MIGRATORY BULL TROUT IN THE JARBIDGE RIVER

Challenge Cost Share

Fred E. Partridge
Regional Fishery Manager
and
Charles D. Warren
Regional Fishery Biologist

Idaho Department of Fish and Game

1998

Prepared for the Lower Snake River District Office
Bureau of Land Management

ABSTRACT

Downstream movements of fish in the East Fork and West Fork Jarbidge rivers were monitored from late August to mid October, 1998 with fish weirs and box traps. Only one bull trout *Salvelinus confluentus* was captured in either trap. This fish measured 141 mm and was trapped in the West Fork on August 28, 1998. Other species sampled included rainbow/redband trout *Oncorhynchus mykiss*, mountain whitefish *Prosopium williamsoni*, bridgelip sucker *Catostomus columbianus*, shorthead sculpin *Cottus confusus*, redside shiner *Richardsonius balteatus*, longnose dace *Rhinichthys cataractae* and speckled dace *R. osculus*. Over four times as many rainbow trout were sampled in the East Fork (211) as in the West Fork (48) with greater numbers of all species except bull trout and shorthead sculpin being found in the East Fork.

Rainbow trout and mountain whitefish in the East Fork were captured in greater numbers later in the season while dace sp. were trapped in August and early September.

INTRODUCTION

The only native char in Idaho and Nevada is the bull trout *Salvelinus confluentus*. Bull trout were historically found primarily in anadromous waters of Idaho and Nevada but construction of dams, water diversions and habitat degradation have eliminated or severely reduced known populations. Due to reduction in population sizes and the lack of knowledge of bull trout biology, they are currently listed as a species of Special Concern by the State of Idaho and a C2 species by the federal government. Legal harvest by anglers of bull trout in Idaho was discontinued in 1994 and will stop in Nevada in 1998.

The Jarbidge River drainage which flows north from Nevada into Idaho has the only remaining population of bull trout south of the Snake River in Idaho. This population is isolated from northern populations by warmer waters in the Snake River plains and modern dams in the Snake River drainage. Recent surveys and observations by Idaho Fish and Game and Bureau of Land Management personnel confirmed migratory bull trout were still present in the Jarbidge drainage and seasonally using segments of the Jarbidge River, East Fork Jarbidge River (East Fork) and West Fork Jarbidge River (West Fork) located on lands managed by the Lower Snake River District of the Bureau of Land Management (Johnson 1990, Zoellick et al. 1996, Fred Partridge, IDFG, pers. obs.).

A culvert on Jack Creek (tributary to the West Fork) was discovered to be a fish migration barrier and was identified by the Jarbidge River bull trout task force as the greatest problem to maintaining bull trout in the drainage. The culvert was replaced with a bridge in late 1997. Population monitoring will be valuable for determining the benefits of removing the fish passage barrier and for evaluating trends in bull trout numbers in the drainage to determine if the population is stable or increasing or if further management actions are needed.

The purpose of this project is to count bull trout migrating downstream in late summer and early fall after spawning, to develop an index of the size of the population of migratory bull trout in the East and West forks of the Jarbidge River and obtain information on other migratory native fish in the drainage.

METHODS

Downstream movement of bull and rainbow/redband trout *Oncorhynchus mykiss* and other fish species were monitored in the East and West forks of the Jarbidge River, Idaho during August-October, 1998. Temporary fish weirs were placed in each fork near their confluence (Fig. 1). In the East Fork, weir location was approximately 100 m upstream of the confluence and in the West Fork, the weir was approximately 1.7 km upstream of the confluence. Weirs consisted of vertical conduit spaced 12.5 mm apart and covered the entire stream width. A tube placed at one opening in each weir funneled downstream moving fish into a trap box. Boxes were checked daily and total lengths were taken on all trout. All other species were counted and a sample of lengths

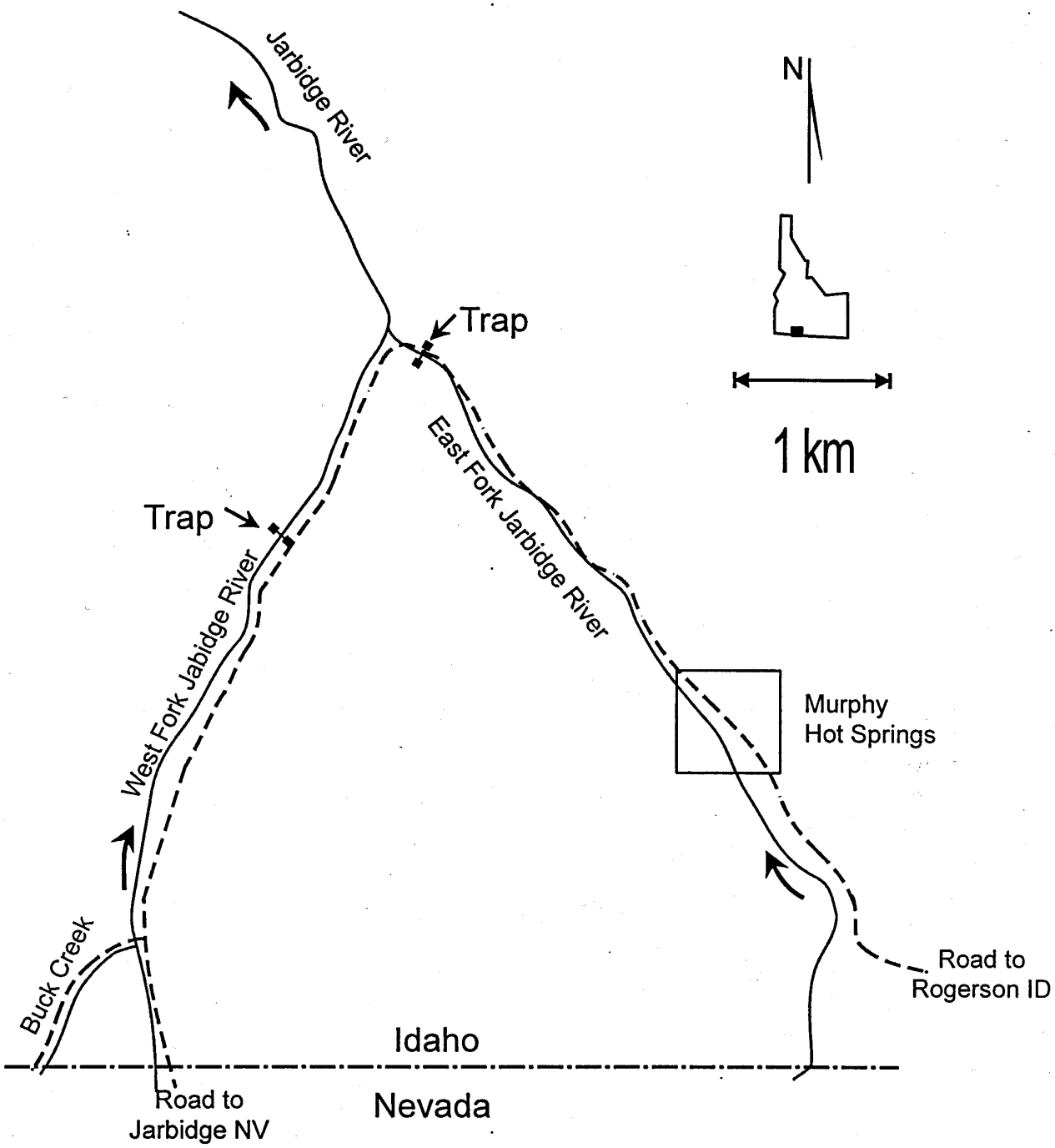


Figure 1. Location of downstream fish migrant traps on East and West Forks of the Jarbidge River, 1997.

taken. Weights were taken on subsamples of trout and mountain whitefish *Prosopium williamsoni*. Fish were released immediately downstream of the weir. Additional sampling specifically for bull trout was conducted on October 16, 1998 with backpack electrofishing gear in several pools between the trap locations and the Idaho/Nevada state line in both the East Fork and West Fork.

Bull trout sampled were tagged with internal passive integrated transponders (PIT tags) and a small portion of the caudal fin was taken for future DNA analysis.

Daily means, maximum and minimum water temperatures were determined from HOBO thermographs placed at each trap site.

RESULTS AND DISCUSSION

The fish weir was installed in the East Fork on August 26 and removed on October 17, 1997. The West Fork weir was installed on August 27 and removed on October 17. Only one bull trout was sampled in either trap during the study period. This fish was captured on August 28 in the West Fork. This bull trout was 141 mm in length and weighed 13 g. A PIT tag (7F7F4D3972) was placed in the fish and it was released downstream of the weir. Additional stream sampling between the weirs and the state line on October 16, 1998 did not find any bull trout.

The limited success of capturing bull trout in the traps may be due to a variety of factors with low population numbers being the most likely reason. Other reasons could include the timing of when traps were in operation and seasonal barriers to movement upstream. Warm water temperatures (15+ C) in the Jarbidge River during summer suggest that bull trout would remain in the headwater areas until fall, however the only bull trout observed was just after the traps were installed in late August. Several beaver dams were observed in both streams upstream of the traps. These ponds provide deeper water which could provide cover and habitat for bull trout along with the dams being possible barriers to movement until flows increase in the fall. However, snorkeling in some of the ponds in the West Fork in October did not observe any bull trout (Gary Johnson, NDOW, pers. comm.).

Other species sampled in the trap boxes included rainbow/redband trout, mountain whitefish, bridgelip sucker *Catostomus columbianus*, shorthead sculpin *Cottus confusus*, redside shiner *Richardsonius balteatus*, longnose dace *Rhinichthys cataractae* and speckled dace *R. osculus*. Other possible species present near the trap sites include mountain sucker *C. platyrhynchus* and leopard dace *R. falcatus*. Due to size and field identification, all dace were combined together for analysis, also there may have been mountain sucker included in the bridgelip sucker summary.

Except for the one bull trout and three shorthead sculpin trapped in the West Fork, fewer fish of other species were sampled in the West Fork than in the East Fork (Table 1). Over four times as many rainbow trout, three times as many bridgelip sucker and eight times as many dace were captured in the East Fork as the West Fork. The most likely reason for the differences is the reduced amount of disturbances (roaded and mining) in and along the East Fork as compared to the West Fork.

Length frequencies of subsamples of all fish trapped except bull trout and

Table 1. Total numbers of fish trapped and total length frequencies (mm) and average weights (g) of some fish sampled in the traps on the East Fork and West Fork Jarbidge River, 1997. One bull trout and three sculpin also sampled are not included in the table.

Length Range (mm)	Rainbow/redband trout								Mountain whitefish							
	East Fork				West Fork				East Fork				West Fork			
	Length		Weight		Length		Weight		Length		Weight		Length		Weight	
	No.	%	No.	Avg.	No.	%	No.	Avg.	No.	%	No.	Avg.	No.	%	No.	Avg.
0-9																
10-19																
20-29																
30-39																
40-49	3	1.4			5	10.4										
50-59	13	6.2			6	12.5										
60-69	9	4.3			4	8.3										
70-79	7	3.3														
80-89	6	2.8	3	7												
90-99																
100-109																
110-119	1	0.5			3	6.3	1	11								
120-129	14	6.6	7	12	4	8.3	3	14								
130-139	18	8.5	13	15	4	8.3	3	14	1	0.5						
140-149	15	7.1	12	20	3	6.3	3	25								
150-159	24	11.4	17	26	4	8.3	4	22								
160-169	12	5.7	10	31	1	2.1	1	21								
170-179	12	5.7	10	43	1	2.1	1	30	2	1.0	1	50				
180-189	11	5.2	9	53									2	1.6	1	39
190-199	14	6.6	12	53	3	6.3	2	51	3	1.6	3	76				
200-209	2	0.9	2	63	2	4.2	1	70	7	3.6	5	89	6	4.8	3	73
210-219	4	1.9	4	74					2	1.0	2	93	6	4.8	2	83
220-229	12	5.7	10	84	1	2.1	1	105	3	1.6	2	95	4	3.2	2	79
230-239	6	2.8	5	92					2	1.0	1	140	6	4.8	5	114
240-249	7	3.3	7	103					2	1.0	1	152	4	3.2	3	153
250-259	6	2.8	6	132	1	2.1	1	130	7	3.6	6	165	2	1.6	1	120
260-269	4	1.9	4	100	2	4.2	2	118	4	2.1	3	167	7	5.6	3	203
270-279	1	0.5			2	4.2	2	158	4	2.1	1	220	3	2.4	2	185
280-289	1	0.5	1	130					3	1.6	1	235	3	2.4		
290-299	3	1.4	2	185					1	0.5	1	250	4	3.2	2	285
300-309	1	0.5	1	215					4	2.1	3	303	5	4.0	2	305
310-319	1	0.5	1	250	1	2.1	1	200	3	1.6	2	322	4	3.2		
320-329	1	0.5	1	210					1	0.5	1	380	2	1.6	1	310
330-339					1	2.1	1	200								
340-349																
Total trapped:	211				48				192				124			
No. measured:	208				48				49				58			
Avg. length:	159				139				245				253			

Table 1. Continued.

Length Range (mm)	Bridgelip sucker East Fork Length No.	%	Bridgelip sucker West Fork Length No.	%	Dace sp. East Fork Length No.	%	Dace sp. West Fork Length No.	%	Redside shiner East Fork Length No.	%	Redside shiner West Fork Length No.	%
0-9												
10-19					1	1.5			1	12.5		
20-29												
30-39												
40-49												
50-59					1	1.5						
60-69					7	10.8					1	33.3
70-79					19	29.2	3	6.0			1	33.3
80-89					17	26.2	11	22.0	2	25.0	1	33.3
90-99	1	1.3			6	9.2	13	26.0	1	12.5		
100-109					4	6.2	7	14.0	1	12.5		
110-119					9	13.8	13	26.0	2	25.0		
120-129	4	5.3			1	1.5	2	4.0	1	12.5		
130-139	9	11.8	3	10.0								
140-149	15	19.7	3	10.0			1	2.0				
150-159	10	13.2	2	6.7								
160-169	9	11.8	2	6.7								
170-179	9	11.8	7	23.3								
180-189	2	2.6	5	16.7								
190-199	10	13.2	5	16.7								
200-209	4	5.3	2	6.7								
210-219	1	1.3	1	3.3								
220-229	1	1.3										
230-239	1	1.3										
240-249												
250-259												
260-269												
270-279												
280-289												
290-299												
300-309												
310-319												
320-329												
330-339												
340-349												
Total trapped:	109		30		1002		125		9		3	
No. measured:	76		30		65		50		8		3	
Avg. length:	161		172		84		98		90		77	

shorthead sculpin are shown in Table 1. The largest rainbow trout sampled (West Fork trap) was a hatchery trout moving downstream from Nevada. Most of the time the trap tenders did not differentiate hatchery and wild trout, however from the length frequency sample in the West Fork, the number of hatchery trout sampled would be low.

Three shorthead sculpin were captured in the West Fork box on October 17. Nine redside shiner were captured in the East Fork sporadically throughout the sampling period and three in the West Fork in early September. Rainbow trout and mountain whitefish in the East Fork showed a response to lowering water temperature or shorter day lengths with numbers trapped increasing from mid September to mid October (Figure 2 and 3). Dace either moved earlier or it is possible that local populations near the trap were captured and moved downstream during the early sampling in both the East and West forks (Figure 4). No obvious pattern was detectable for bridgelip sucker (Figure 5).

Daily mean water temperatures averaged one degree (°C) higher in the East Fork than in the West Fork (Table 2.) The warmer temperatures may have been due to the warm spring inflows at Murphy Hot Springs, three kilometers upriver.

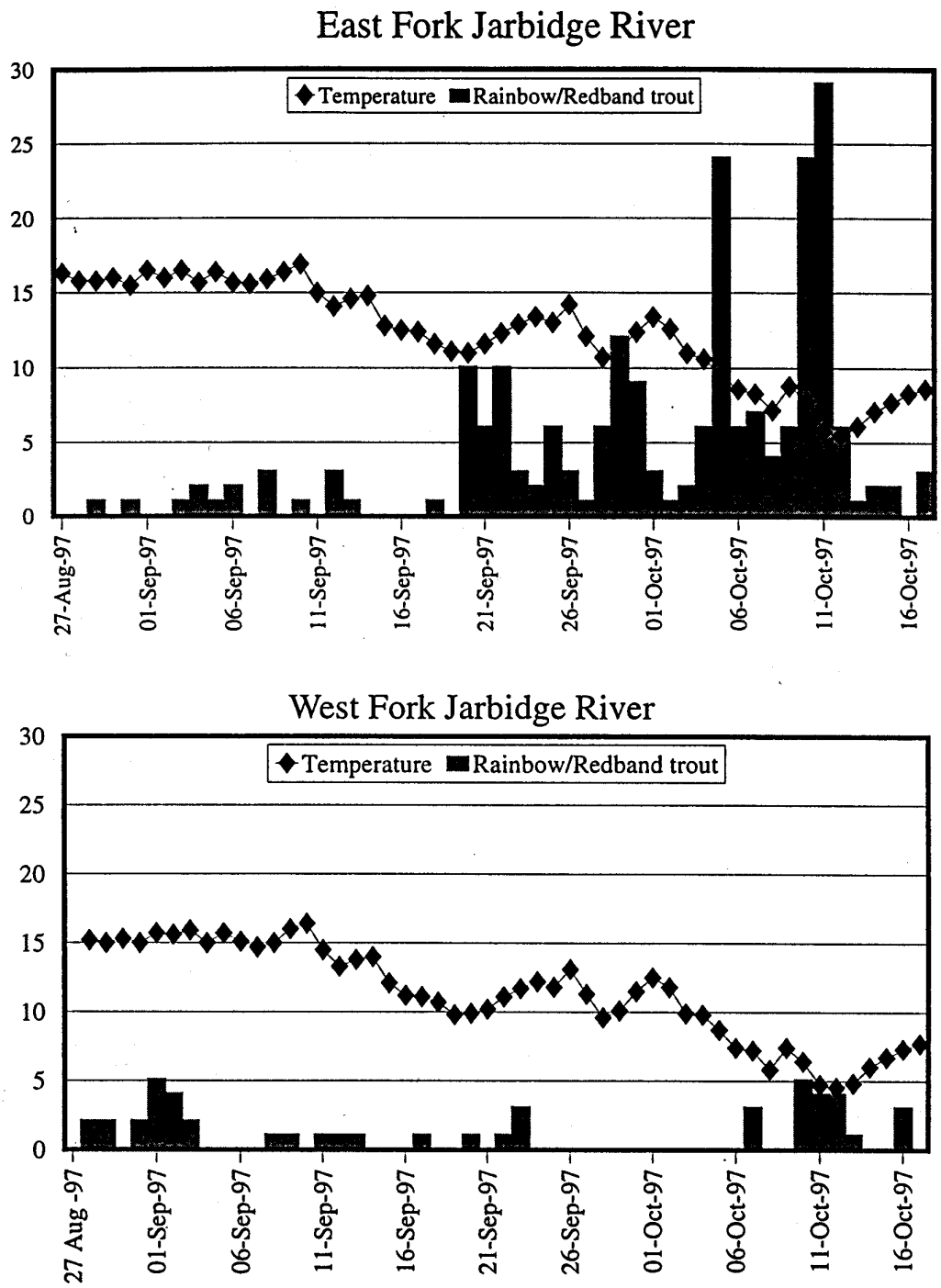


Figure 2. Number of rainbow/redband trout and daily mean water temperature (C) sampled at traps on the East Fork and West Fork, Jarbidge River.

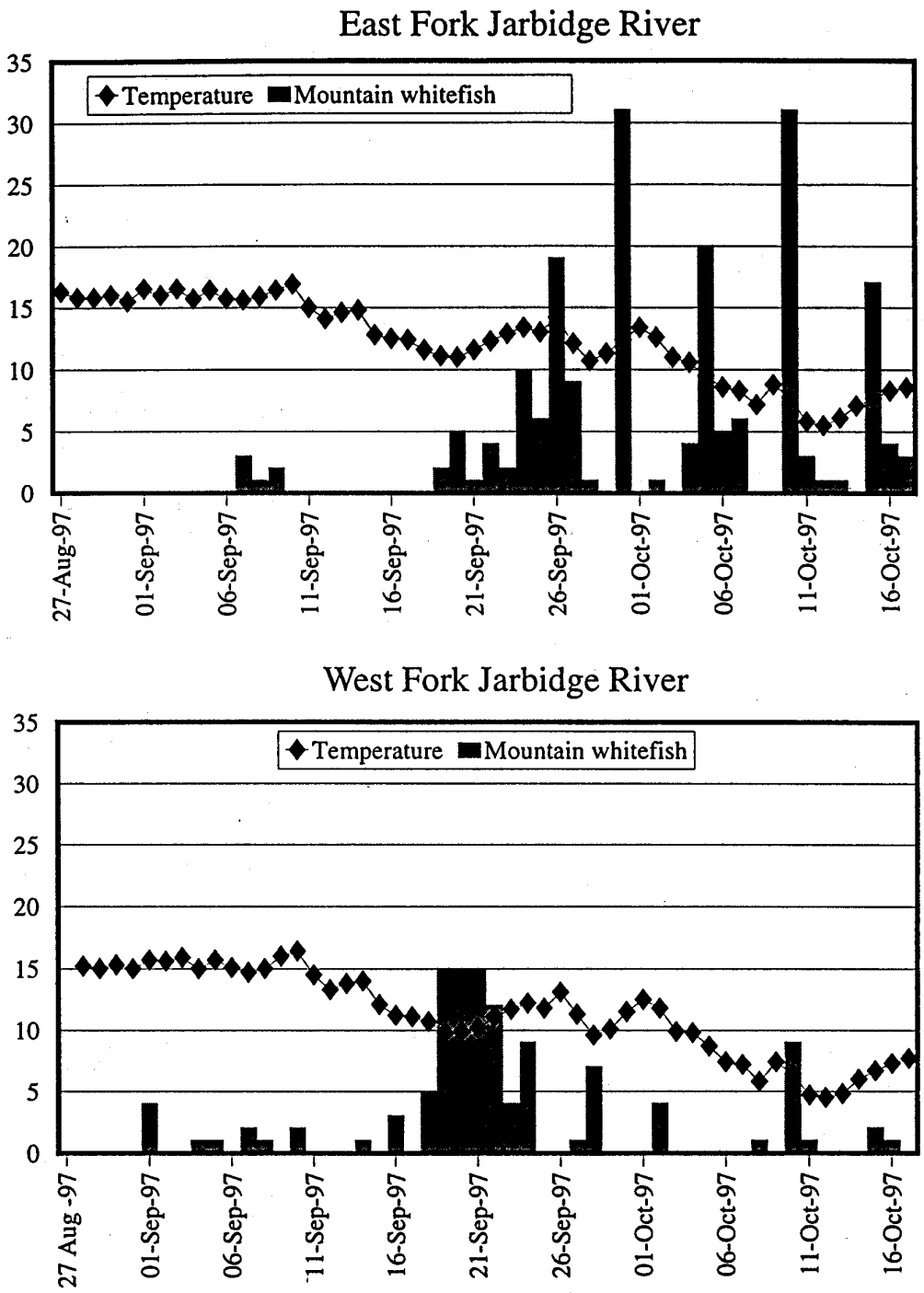


Figure 3. Number of mountain whitefish and daily mean water temperature (C) sampled at traps on the East Fork and West Fork, Jarbidge River.

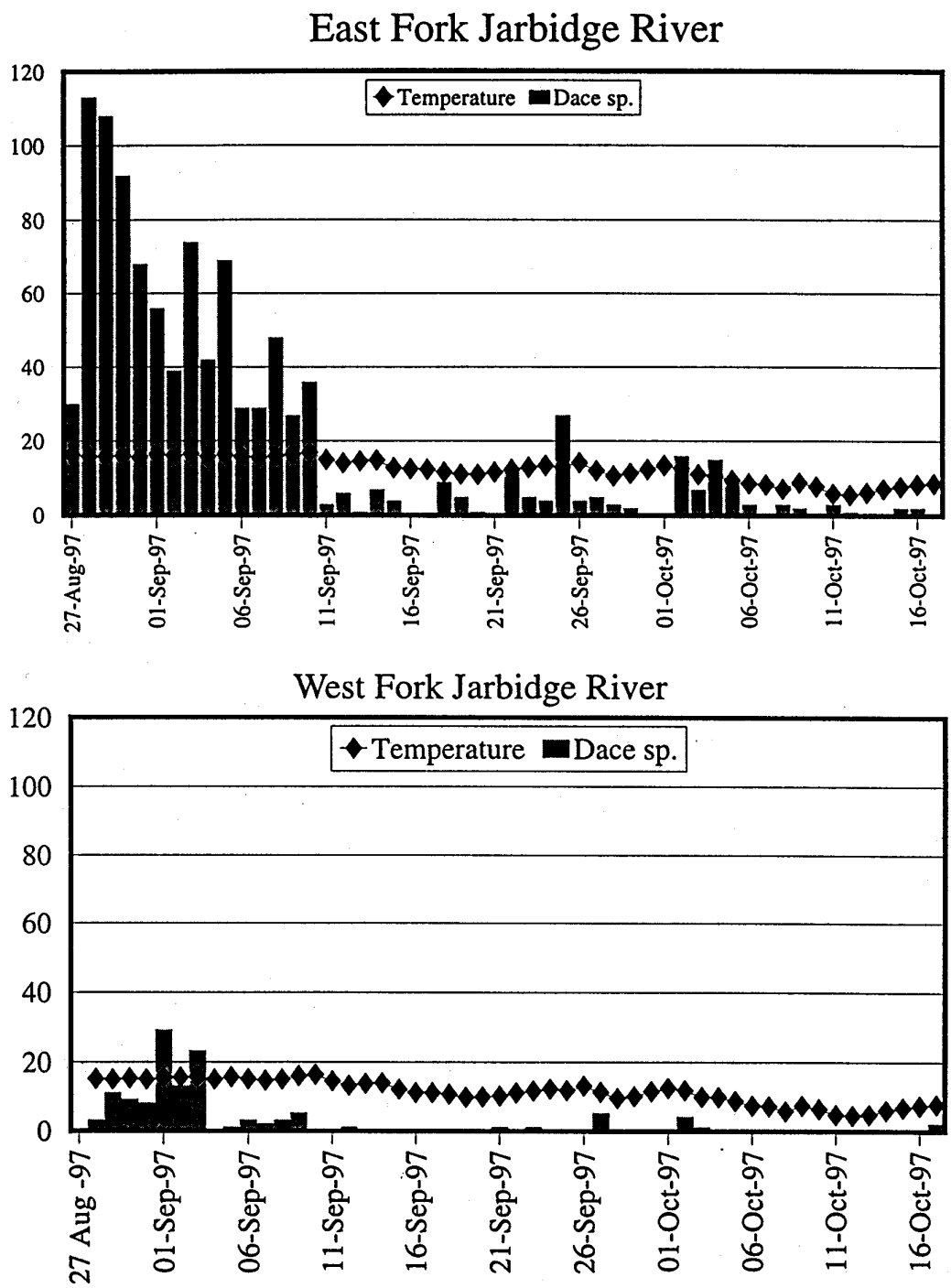


Figure 4. Number of dace sp. and daily mean water temperature (C) sampled at traps on the East Fork and West Fork, Jarbidge River.

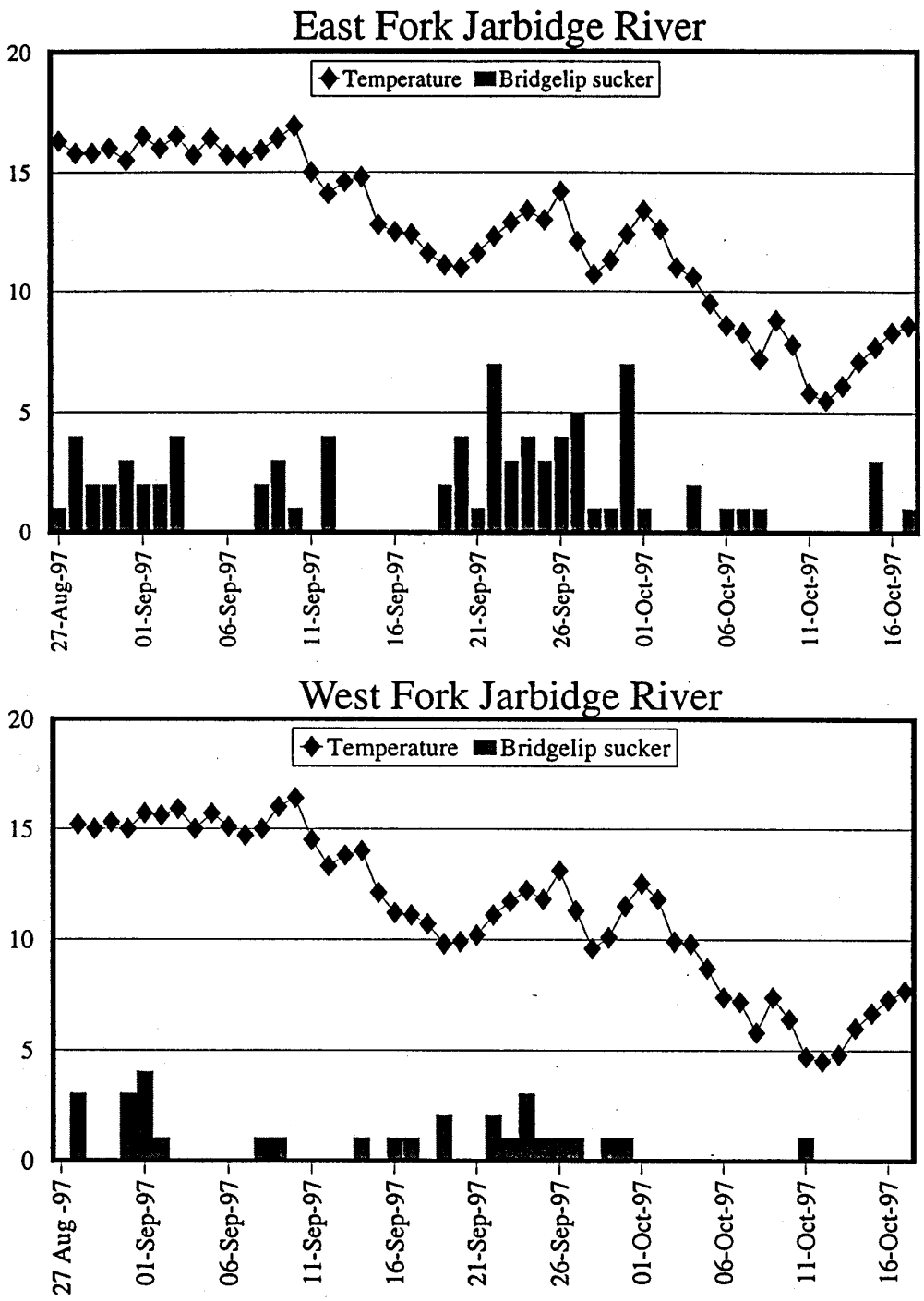


Figure 5. Number of bridgelip suckers and daily mean water temperature (C) sampled at traps on the East Fork and West Fork, Jarbidge River.

Table 2. Daily temperature summaries (°C) for temperatures taken with continuously recording thermographs on the East Fork and West Forks Jarbidge River at the fish trapping sites from August 27 through December 2, 1997.

	East Fork Jarbidge River				West Fork Jarbidge River			
Date	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature
8/27/97	16.3	2.99	21.1	12.2				
8/28/97	15.8	3.06	20.6	11.7	15.2	2.50	19.6	11.7
8/29/97	15.8	3.06	20.3	11.7	15.0	2.41	19.3	11.9
8/30/97	16.0	3.24	20.8	11.7	15.3	2.61	19.8	11.9
8/31/97	15.5	2.16	18.8	12.5	15.0	1.60	17.7	12.8
9/1/97	16.5	2.68	20.5	13.3	15.7	1.92	19.0	13.6
9/2/97	16.0	1.17	17.9	14.7	15.6	0.83	17.2	14.8
9/3/97	16.5	1.80	19.5	14.2	15.9	1.39	18.2	14.2
9/4/97	15.7	2.13	19.1	12.7	15.0	1.56	17.5	12.7
9/5/97	16.4	2.15	19.6	13.8	15.7	1.79	18.7	13.6
9/6/97	15.7	1.67	17.9	13.3	15.1	1.30	17.2	13.3
9/7/97	15.6	2.80	19.6	11.7	14.7	1.84	17.5	12.2
9/8/97	15.9	2.60	19.5	12.2	15.0	1.80	17.4	12.4
9/9/97	16.4	2.75	20.5	12.7	16.0	2.24	20.0	13.1
9/10/97	16.9	1.44	19.1	14.8	16.4	1.25	18.5	14.7
9/11/97	15.0	0.79	16.4	13.9	14.5	0.64	15.6	13.3
9/12/97	14.1	2.54	17.9	10.6	13.3	1.87	16.3	10.6
9/13/97	14.6	2.72	18.7	10.9	13.8	2.18	17.5	10.9
9/14/97	14.8	2.35	18.5	11.6	14.0	1.90	17.4	11.4
9/15/97	12.8	1.40	15.3	10.8	12.1	1.26	14.7	10.6
9/16/97	12.5	2.27	16.1	9.4	11.2	1.91	14.8	8.8
9/17/97	12.4	2.82	16.9	8.6	11.1	2.11	14.7	8.1
9/18/97	11.6	0.93	13.0	10.3	10.7	0.58	11.7	9.7
9/19/97	11.1	2.44	14.7	8.0	9.8	1.94	13.3	7.2
9/20/97	11.0	0.86	12.2	9.7	9.9	0.56	10.8	9.1
9/21/97	11.6	2.32	15.0	8.5	10.2	1.92	13.6	7.8
9/22/97	12.3	2.63	16.3	8.8	11.1	2.18	15.0	8.3
9/23/97	12.9	2.60	16.7	9.2	11.7	2.14	15.5	8.9
9/24/97	13.4	2.63	17.2	9.7	12.2	2.06	15.8	9.4
9/25/97	13.0	1.28	14.7	10.9	11.8	0.90	13.0	10.3
9/26/97	14.2	1.80	17.0	11.9	13.1	1.77	16.3	11.1
9/27/97	12.1	1.58	14.5	9.4	11.3	1.41	13.8	9.1
9/28/97	10.7	2.44	14.2	7.2	9.6	2.01	13.1	6.9
9/29/97	11.3	2.78	15.3	7.5	10.1	2.32	14.1	7.2
9/30/97	12.4	2.86	16.6	8.6	11.5	2.35	15.6	8.9
10/1/97	13.4	2.31	16.9	10.3	12.5	1.97	16.1	10.3
10/2/97	12.6	0.73	13.9	11.7	11.8	0.62	12.7	10.3
10/3/97	11.0	2.12	14.1	7.8	9.9	1.86	13.3	7.4
10/4/97	10.6	2.01	13.6	8.0	9.8	1.83	13.0	7.8
10/5/97	9.5	1.64	12.0	6.9	8.7	1.46	11.4	6.8
10/6/97	8.6	2.22	11.7	5.5	7.4	1.57	9.9	5.2

Table 2. Continued.

Date	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature
10/7/97	8.3	0.66	9.2	6.9	7.2	0.54	7.8	5.8
10/8/97	7.2	2.14	10.3	4.4	5.8	1.77	8.8	3.5
10/9/97	8.8	1.42	10.9	7.1	7.4	1.19	9.6	6.2
10/10/97	7.8	1.20	9.6	5.8	6.4	0.91	7.7	4.7
10/11/97	5.8	0.46	6.8	5.1	4.7	0.67	6.2	3.6
10/12/97	5.5	1.24	7.4	3.8	4.5	1.07	6.3	3.0
10/13/97	6.1	2.27	9.2	3.3	4.8	1.88	8.1	2.7
10/14/97	7.1	2.30	10.3	4.1	6.0	1.82	9.2	3.6
10/15/97	7.7	2.36	10.9	4.6	6.7	1.85	10.0	4.4
10/16/97	8.3	2.29	11.4	5.2	7.3	1.82	10.6	5.1
10/17/97	8.6	2.19	11.7	5.7	7.7	1.77	10.9	5.5
10/18/97	8.2	1.95	10.9	5.5	7.5	1.45	10.3	5.7
10/19/97	7.8	2.09	10.8	4.9	6.8	1.68	9.7	4.6
10/20/97	7.9	1.43	9.9	5.8	6.9	1.31	9.4	5.2
10/21/97	6.9	1.83	9.4	4.1	6.0	1.54	8.9	4.0
Average 8/28-10/21	11.9				11.0			
10/22/97	No Data - Thermograph Serviced							
10/23/97	No Data - Thermograph Failure				5.5	0.43	6.3	4.6
10/24/97					3.5	0.69	4.7	2.4
10/25/97					2.0	1.40	4.6	0.3
10/26/97					2.5	1.80	5.5	0.5
10/27/97					3.4	1.53	6.2	1.7
10/28/97					3.3	1.23	4.9	1.7
10/29/97					4.7	0.87	5.8	3.6
10/30/97					6.3	1.09	8.1	5.1
10/31/97					6.7	0.43	7.5	5.7
11/01/97					4.6	1.05	6.5	3.2
11/02/97					3.7	1.39	6.2	1.9
11/03/97					4.4	1.31	6.5	3.0
11/04/97					5.4	1.22	7.5	4.0
11/05/97					5.8	1.32	8.1	4.3
11/06/97					5.3	1.40	7.8	3.5
11/07/97					5.5	1.08	7.5	4.6
11/08/97					4.8	0.69	6.0	4.0
11/09/97					3.9	0.92	5.5	2.4
11/10/97					2.2	0.90	3.6	0.8
11/11/97					3.1	0.47	3.8	2.5
11/12/97					3.3	0.59	4.4	2.9
11/13/97					2.0	1.05	3.8	0.5
11/14/97					1.2	1.08	3.2	0.0
11/15/97					0.6	0.81	2.4	0.0
11/16/97					1.0	1.02	2.9	0.0
11/17/97					1.4	0.73	2.7	0.5
11/18/97					1.2	0.95	2.7	0.0

Table 2. Continued.

Date	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature	Daily mean temperature	Standard deviation	Daily max. temperature	Daily min. temperature
11/19/97					2.6	0.71	3.6	1.7
11/20/97					2.2	0.54	2.9	1.3
11/21/97					1.6	0.44	2.4	0.8
11/22/97					0.0	0.08	0.3	0.0
11/23/97					1.3	1.39	3.8	0.0
11/24/97					1.7	1.12	3.8	0.5
11/25/97					2.5	0.60	3.6	1.9
11/26/97					3.4	1.63	5.5	1.4
11/27/97					3.6	0.50	4.4	2.5
11/28/97					1.8	0.86	3.5	0.6
11/29/97					1.3	0.96	3.0	0.1
11/30/97					1.8	0.92	3.3	0.6
12/01/97					1.6	0.50	2.2	0.8
12/02/97					0.6	0.54	1.6	0.0

LITERATURE CITED

Johnson, G. L. 1990. Bull trout species management plan. State of Nevada, department of Wildlife, Statewide Fisheries Program, Federal Aid Project No. F-20-26, Job No. 207.4.

Zoellick, B.W., R. Armstrong, and J. Klott. 1996. Status of the migratory bull trout population in the Jarbidge River drainage. Idaho Bureau of Land Management Technical Bulletin No. 96-5. 21 pp.