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STANDING STOCKS OF FISHES IN SECTIONS OF LITTLE LAST CHANCE CREEK, PLUMAS COUNTY, 1996

by

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INTRODUCTION

The Department of Water Resources (DWR) initiated an instream flow program in 1976 to identify streams that would benefit from flow enhancement and to assess instream values. The Northern District of the DWR selected Little Last Chance Creek below Frenchman Reservoir (Figure 1) as one of the streams to study under this program.

Department of Fish and Game (DFG) biologists studied trout populations in Little Last Chance Creek in 1976, 1981, 1986, 1988, 1991, 1992, 1993, 1994, and 1995. Brown trout (Salmo trutta) was the only game fish caught every year. Sacramento suckers (Catostomus occidentalis) were also caught every year (Brown 1976, Bumpass et al. 1989, Brown 1991, Brown 1992a, Brown 1992b, Brown 1993, Brown 1994, Brown 1995, Brown 1996). This report documents the results of sampling conducted in 1996.

The purpose of this study is to evaluate the effects of the operation of Frenchman Reservoir on populations of trout in Little Last Chance Creek through the periodic sampling of fish at established stations in that creek. These data may also be used to measure the recovery of trout in Little Last Chance Creek following the rotenone treatment that the DFG conducted in 1991 to kill northern pike (Esox lucius) in Frenchman Reservoir (Brown 1992).

Results of this report and previous reports on Little Last Chance Creek will be discussed in a summary report that will evaluate the current operation of Frenchman

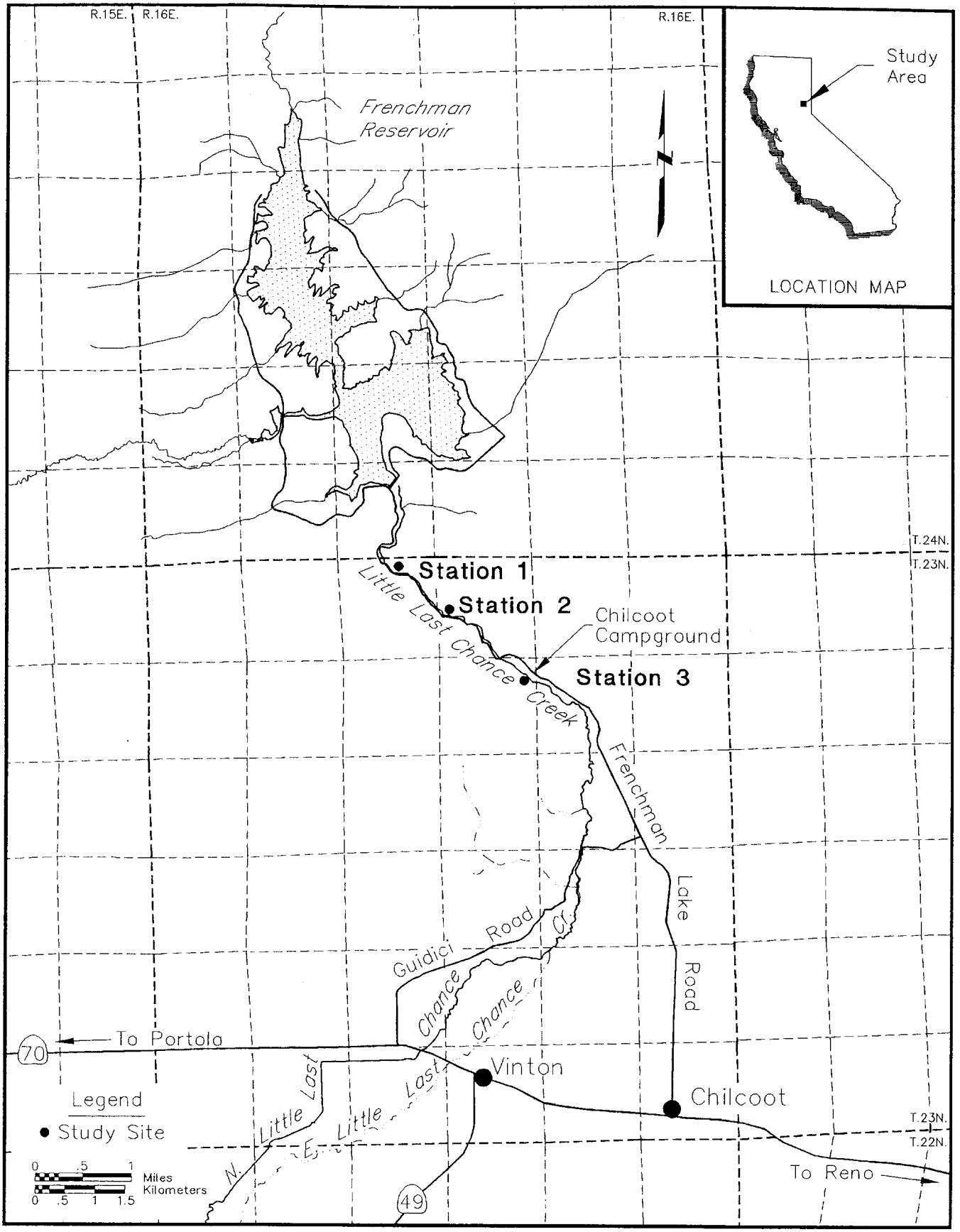

Figure 1. Stations Sampled to Estimate Standing Stocks of Fish in Little Last Chance Creek, Plumas County, 1996.

Reservoir and make recommendations regarding its future operations

METHODS

Naturally Produced Trout

Standing stocks of fishes were estimated at three stations in Little Last Chance Creek in Plumas County in October, 1996. Stations were intentionally selected to be near stations sampled in previous DFG studies (Appendix 1). Markers had previously been placed in trees along the stream to identify station boundaries. Stations varied in length from 46.6 to 47.9 m. The length and average width of each station was measured. Fish were captured with a battery-powered backpack electroshocker in stream sections blocked by seines. Captured fish were removed from the net-enclosed section on each pass. Standing stock estimates of naturally produced trout were developed using the two-count method of Seber and LeCren (1967) or the multiple-pass method of Leslie and Davis (1939) with limits of confidence computed using a formula proposed by DeLury (1951). Trout of hatchery origin were not included in standing stock estimates.

The weight of each naturally produced trout was determined by displacement. Fork length (FL) of each fish was measured to the nearest millimeter. Scale samples were taken for naturally produced trout.

The distribution of fish caught is listed according to location. Standing stocks of brown trout and rainbow trout were calculated by station.

Hatchery Trout

Trout planted in the creek that were of hatchery origin were not weighed. They were counted and measured (FL). They were not included as part of the standing stock calculation.

RESULTS

Rainbow trout (Oncorhynchus mykiss) and brown trout were caught in each station. Sacramento suckers were caught in station 3 and Lahontan redsides (Richardsonius egregius) were caught in station 2 (Table 1).

TABLE 1. Fishes caught in selected sections of Little Last Chance Creek, Plumas County, 1996.

	Station Number		
	1	2	3
Distance below Frenchman Reservoir (km)	1.6	3.2	4.4
Rainbow trout	X	X	X
Brown trout	X	X	X
Lahontan redside		X	
Sacramento sucker			X

Naturally produced brown trout ranged in size from 85 to 134 mm (Figure 2). Brown trout biomass averaged 2.4 g/m^2 at three stations. Fourteen brown trout large enough for anglers to catch and keep ($\geq$127 mm FL) were caught (Table 2).

TABLE 2. Estimate of naturally produced brown trout standing crop in Little Last Chance Creek, Plumas County, 1996.

Distance below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m^2)	Estimate of Catchable Trout ($\geq$127 mm FL)	Biomass of Catchable Trout (g/m^2)
1.6	40	32-58	1.8		
3.2	7	7-9	0.7	5	0.6
4.4	70	46-117	4.8	9	0.9

Rainbow trout ranged in size from 54 to 134 mm (Figure 3). Rainbow trout biomass averaged 0.9 g/m^2 at three stations. One rainbow trout large enough for anglers to catch and keep ($\geq$127 mm FL) was caught (Table 3).

TABLE 3. Estimate of rainbow trout standing crop in Little Last Chance Creek, Plumas County, 1996.

Distance below Frenchman Dam (km)	Population Estimate	95% Confidence Interval	Biomass (g/m^2)	Estimate of Catchable Trout ($\geq$127 mm FL)	Biomass of Catchable Trout (g/m^2)
1.6	24	24-25	0.6		
3.2	49	41-64	1.1	1	0.1
4.4	36	30-50	1.0		

The relationship between fork length (FL) and weight (W) of brown trout is:

$$\text{Log}_{10} W = -4.9 + 3.0 \text{ Log}_{10} FL$$

$$r^2 = 0.96$$

N = 84 (Figure 2 and Appendix 2)

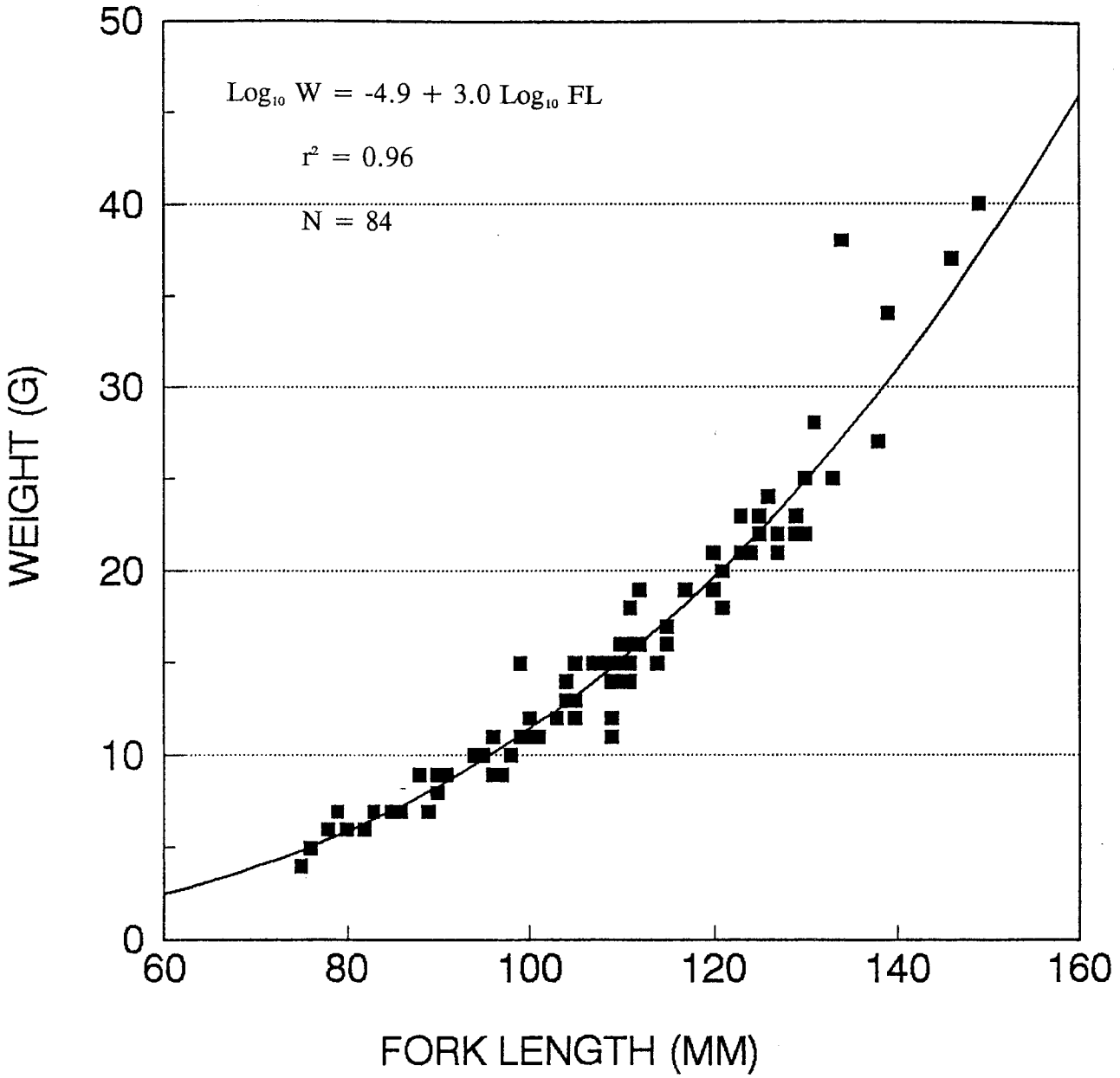

FIGURE 2. The relationship between length and weight of brown trout caught in sections of Little Last Chance Creek, Plumas County, 1996.

The relationship between fork length (FL) and weight (W) of rainbow trout is:

$\text{Log}_{10}\ W = -5.0 + 3.0\ \text{Log}_{10}\ FL$

$r^2 = 0.96$

N = 93 (Figure 3 and Appendix 3)

Coefficient of Condition

The average coefficient of condition for 85 brown trout was 1.1468 (Table 4) and 1.1055 for 93 rainbow trout (Table 5). Age 0+ brown trout had slightly higher coefficients of condition than rainbow trout of the same age group.

Table 4. Condition of brown trout in Little Last Chance Creek, Plumas County, 1996.

Age Group	Number of Fish	Coefficient of Condition	95% Confidence Interval
0+	43	1.1509	0.9075-1.3942
1+	42	1.1426	0.9305-1.3547
Combined	85	1.1468	0.9182-1.3754

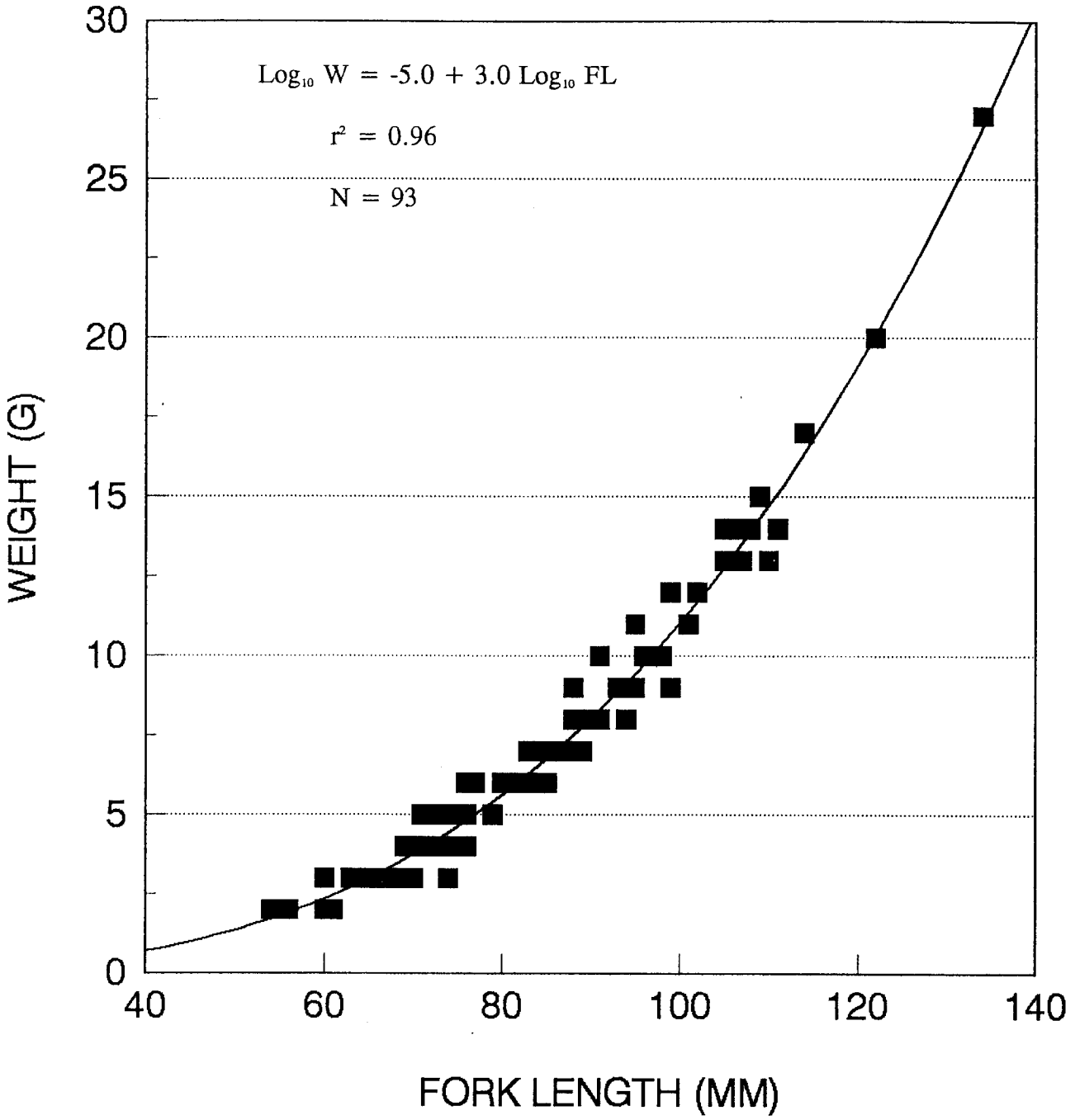

FIGURE 3. The relationship between length and weight of rainbow trout caught in sections of Little Last Chance Creek, Plumas County, 1996.

Table 5. Condition of rainbow trout in Little Last Chance Creek, Plumas County, 1996.

Age Group	Number of Fish	Coefficient of Condition	95% Confidence Interval
0+	85	1.1064	0.8605-1.3523
1+	8	1.0955	0.9802-1.2108
Combined	93	1.1055	0.8679-1.3430

DISCUSSION

Thirty brown trout of hatchery origin were caught. They were caught at each station. The trout ranged in size from 220 to 364 mm FL and averaged 278 mm FL. Ten brown trout over 295 mm FL appeared ready to spawn. These trout are holdovers from plants the DFG made over the last three years.

Fifteen rainbow trout of hatchery origin were caught. Some may have migrated downstream from Frenchman Reservoir. They were caught at each station. These trout ranged in size from 180 to 309 mm FL and averaged 224 mm FL. (Brown 1995).

Brown trout population estimates before treatment averaged 10 trout while after treament averaged 9.8 trout. Biomass averaged 3.3 g/m^2 before treatment and 0.7 g/m^2 after treatment. Rainbow trout population estimates averaged 41 trout before treatment and 6.5 trout after. Biomass averaged 7.1 g/m^2 before treatment and 0.2 g/m^2 after (Table 6).

Table 6. Average standing crop and biomass for naturally produced brown and rainbow trout in Little Last Chance Creek, 1976-1996.

	Brown Trout		Rainbow Trout	
Year	Population Estimate	Biomass g/m^2	Population Estimate	Biomass g/m^2
Before treatment				
1976	1	1.2	8	13.9
1981	6	2.7	17	4.0
1986	10	3.7	96	3.8
1988	21	5.5	43	6.5
After treatment				
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	20	1.5	2	0.001
1996	39	2.4	36	0.9

Many of the trout we caught this year were planted by the DFG in spring and summer 1993, 1994, 1995, and 1996. The DFG planted fingerling and catchable brown trout and rainbow trout in 1993, fingerling brown trout in 1994, and catchable brown trout in 1995 and 1996 (Ron DeCoto, Fishery Biologist, DFG, personal communication). The small trout (85-134 mm) we caught this year were the offspring of hatchery trout that spawned in October 1994 and 1995. The larger trout (180-364 mm) survived from plants over the last few years.

Fish populations are slowly recovering from the DFG treatment of Frenchman Reservoir, Little Last Chance Creek, and parts of the Feather River that were treated with

rotenone to kill northern pike in 1991. The DFG killed northern pike in this watershed to prevent them from migrating downstream into the Sacramento River. The DFG feels that pike could become established in the Sacramento River and become significant predators on juvenile salmonids (Brown 1992).

We caught 10 large trout (296-364 mm FL) that were nearly ripe. They probably spawned in October or November. We have observed that spawning gravel is concentrated above station 1 (Figure 1). That is where we expect most trout to spawn. Spawning was successful last year because we observed age 0+ trout in all stations. They distributed themselves downstream through the spring and summer in search of food and space.

While our periodic sampling of trout in Little Last Chance Creek has allowed us to observe the prolonged effects of rotenone on trout populations and their recovery, the main purpose of our study has not changed. We still plan to evaluate the effects of the operation of Frenchman Reservoir on trout populations in Little Last Chance Creek.

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APPENDIX 1

PERMANENT FISH POPULATION STATIONS FOR
LITTLE LAST CHANCE CREEK, PLUMAS COUNTY
OCTOBER 1996.

Station 1 - Located 1.6 km below Frenchman Dam just downstream from the first bridge at elevation of 1659 m MSL in NW 1/4 of NE 1/4, Section 4, T23N, R16E. This station begins in a riffle beneath the bridge carrying Frenchman Lake Road, then enters a pool with a deeply undercut room-sized boulder on the right bank. The remainder of the station is a short riffle and a shallow pool/run. About 55 percent of the station is pool and 45 percent riffle. Substrate is boulder, rubble, and sand. The station is 47.9 m long with a surface area of 244.3 m^2 at a flow of 0.4 cms.

Station 2 - Located 3.2 km below Frenchman Dam adjacent to the upper end of a large turnout at an elevation of 1610 m MSL in NW 1/4 of SW 1/4, Section 3, T23N, R16E. This station begins in a large plunge pool followed by two shallow pool/run areas and two short riffles. About 45 percent of the station is pool and 55 percent riffle. Substrate is boulder, rubble, and sand. The station is 47.6 m long with a surface area of 271.3 m^2 at a flow of 0.4 cms.

Station 3 - Located 4.4 km below Frenchman Dam adjacent to the cutoff road in the center of Chilcoot Campground at an elevation of 1561 m MSL in NE 1/4 of NE 1/4, Section 10, T23N, R16E. This station begins in a steep rapid followed by a long pool with undercut right bank, then a short riffle, a short pool, and finally, another steep riffle. The station is 40 percent pool and 60 percent riffle. Substrate is boulders, rubble, and sand. The station is 46.6 m long with a surface area of 256.3 m^2 at a flow of 0.4 cms.

APPENDIX 2

LENGTH AND WEIGHT OF BROWN TROUT
CAUGHT IN LITTLE LAST CHANCE, 1996

Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)
75	4	94	10	103	12	110	15
76	5	95	10	103	12	110	14
78	6	95	10	104	13	110	16
80	6	96	9	104	14	110	14
82	6	96	11	105	13	111	15
83	7	96	11	105	12	111	18
85	7	97	9	105	15	111	14
86	7	98	10	107	15	111	16
88	9	99	15	108	15	112	19
89	7	99	11	109	12	112	16
90	9	100	12	109	15	114	15
90	9	100	12	109	11	115	17
90	8	100	11	109	14	115	16
91	9	101	11	109	15	117	19

APPENDIX 2

LENGTH AND WEIGHT OF BROWN TROUT
CAUGHT IN LITTLE LAST CHANCE, 1996
(Continued)

Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)
120	19	125	22	130	25
120	21	125	23	131	28
120	19	125	23	133	25
120	19	126	24	134	38
121	18	127	22	138	27
121	20	127	22	139	34
123	21	127	21	146	37
123	23	129	23	149	40
123	23	129	22		
124	21	130	22		

APPENDIX 3

LENGTH AND WEIGHT OF RAINBOW TROUT
CAUGHT IN LITTLE LAST CHANCE, 1996

Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)
54	2	66	3	74	4	80	6
56	2	67	3	75	5	80	6
60	2	68	3	75	5	81	6
60	3	69	4	75	4	81	6
61	2	69	3	76	5	82	6
63	3	69	4	76	6	82	6
64	3	70	3	76	6	82	6
65	3	70	4	76	5	83	7
65	3	71	4	76	4	83	6
65	3	71	5	76	5	84	6
66	3	72	4	77	6	84	6
66	3	73	5	79	5	84	7
66	3	74	5	79	5	84	6
66	3	74	3	79	5	84	6

APPENDIX 3

LENGTH AND WEIGHT OF RAINBOW
TROUT CAUGHT IN LITTLE LAST CHANCE, 1996
(Continued)

Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)	Fork Length (mm)	Weight (g)
85	7	91	10	105	14
85	7	93	9	105	13
85	7	94	8	106	14
85	6	94	8	107	13
87	7	95	11	108	14
88	9	95	9	109	15
88	8	95	11	110	13
89	7	96	10	111	14
89	8	98	10	114	17
89	7	99	12	122	20
90	8	99	9	134	27
90	8	101	11		
91	8	102	12		