REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
LOCHSA RIVER BULL TROUT

DISTRIBUTION AND LIFE HISTORY CHARACTERISTICS OF BULL IN THE LOCHSA RIVER BASIN

Annual Report
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ABSTRACT

Forty three bull trout *(Salvelinus confluentus)* were captured using hook and line sampling in the Lochsa River, 2005. Total length of all bull trout collected ranged from 281 mm to 586 mm (mean 444.6 mm) and weight ranged from 150 g to 1,950 g (mean 921.0 g). Radio transmitters were implanted in 37 bull trout, and 86% were documented migrating into spawning tributaries. The highest number (38%) of radio-tagged fish entered Fishing Creek. Collectively, Colt Killed Creek and Storm Creek, a tributary to Colt Killed Creek contained 33% of tagged bull trout. The mean upstream migration distance observed by all tagged fish was 55.1 km. Upon spawning 47% of radio-tagged fish were detected returning to the Lochsa River mainstem, compared to 76% and 69% in 2004 and 2003. Low post-spawn survival estimates in 2005 may be due to limited radio tracking during this time, or highly variable survival rates as observed in the North Fork Clearwater River. Post spawn radio-tagged bull trout were found in the lower Lochsa River, Middle Fork Clearwater River and Selway River during the winter. Two fish were located in the Selway River throughout the winter. This is the first time bull trout tagged in the Lochsa River were documented moving into the Selway River.

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INTRODUCTION

In 1998 bull trout *Salvelinus confluentus* were listed in the Columbia River drainage as threatened under the Endangered Species Act. Reasons for their decline include: habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, angler harvest, entrainment, and competition from non-native species.

In 2002, the draft recovery plan described processes to reduce threats to the long-term survival and reverse the decline of the species (U.S. Fish and Wildlife Service 2002, Chapter 1). The Columbia River drainage was broken into 22 recovery units, areas where bull trout share genetic characteristics as well as management jurisdictions. Recovery units contain one or more core areas (areas that contain local populations of bull trout and are partially isolated but have some degree of gene flow among them). Local populations are defined as groups of bull trout that spawn in various tributaries but are generally characterized by small amounts of genetic diversity within a tributary but high levels of genetic divergence between tributaries (Leary et al. 1993). Local populations are considered to be the smallest group of bull trout known to represent an interacting reproductive unit (U.S. Fish and Wildlife Service 2002, Chapter 1).

The draft recovery plan lists 7 core areas and 45 local populations in the Clearwater River drainage (U.S. Fish and Wildlife Service 2002, Chapter 16). In addition to the local populations, 27 potential local populations were identified. Potential local populations are areas known or suspected to be unoccupied, but have the potential to provide spawning and rearing habitat for bull trout and support a local population in the future. Furthermore, the draft recovery plan considers 18 of the 27 potential populations as essential to recovery because they are considered to be central to recovery objectives. According to the recovery plan, in order for bull trout in a core area to be considered at diminished risk of extinction, recovery plan criteria requires each of its core areas to contain at least 1,000 adult spawners, and a minimum of 10 local populations (U.S. Fish and Wildlife Service 2002, Chapter 1).

The Lochsa River Drainage is one of the seven core areas in the Clearwater River Recovery Unit. The recovery plan identifies 16 known local populations in the Lochsa core area. The local populations include: Fishing, Legendary Bear, Fox, Shotgun, Crooked Fork, Boulder, Haskell, Rock, Brushy Fork, Spruce, Twin, Colt Killed, Beaver, and Storm creeks. The recovery plan also categorizes nine potential populations essential to recovery in the Lochsa core area: Post Office, Weir, Indian Grave, Lake, Boulder, Old Man, Hungery, Fish, and Split creeks. The recovery criteria for the Lochsa River Drainage is 16 local and 9 potential populations, with 5,000 total adults, and a trend of stable to increasing for 15 years (U.S. Fish and Wildlife Service 2002, Chapter 16).

To date, little information is known about adult bull trout numbers or trends in abundance in the Lochsa River Drainage except for redd counts conducted by the Clearwater National Forest (Pat Murphy, Personal Communication, USDA Forest Service, Clearwater National Forest). Additionally little is known about the distribution or abundance of bull trout in streams listed as “potential essential” local populations.

The goals of this project were to document bull trout distribution, migration patterns, and identify previously unknown spawning locations.

STUDY AREA

The Clearwater River (CWR) is a sixth order stream in north-central Idaho. The CWR extends from its confluence with the Snake River, at Lewiston, Idaho, east to its confluence with the South Fork Clearwater River (South Fork) at Kooskia, Idaho (Figure 1). Major tributaries to the CWR include the North Fork Clearwater River (North Fork) (rkm 64.8), the South Fork (rkm 119.5) and the Middle Fork Clearwater River (Middle Fork) (rkm 119.5). In this document, river kilometers are calculated from 0.0 rkm at the Snake and CWR river confluence. The North Fork extends east 3.1 km to the base of Dworshak Dam. Dworshak Dam was constructed in 1971 without fish passage facilities, and is a permanent upstream migration barrier. Upstream of Dworshak Dam is Dworshak Reservoir and the remainder of the North Fork. Dworshak Reservoir and the North Fork is a fifth order stream with a total drainage area of 739,982 ha. The Middle Fork extends from the mouth of the South Fork near Kooskia, Idaho (rkm 119.5), east to the confluence of the Lochsa and Selway rivers (rkm 156.2) at Lowell, Idaho. The Lochsa River is a fifth order stream with a total drainage area of 306,254 ha (Figure 1).

The Lochsa River extends east to the Bitterroot Mountains on the Idaho-Montana Border. The majority of the land in the watershed is under public ownership and more than 60% of the drainage is designated as wilderness or roadless. The primary private landowner in the drainage is Plum Creek Timber Company. Major tributaries include: Brushy Fork, Colt Killed, Crooked Fork, Walton, Shotgun, Fishing, Legendary Bear, Post Office, Warm Springs, Lake, Split, Stanley, Boulder, Old Man, Fish, Deadman, and Pete King creeks (Figure 1).

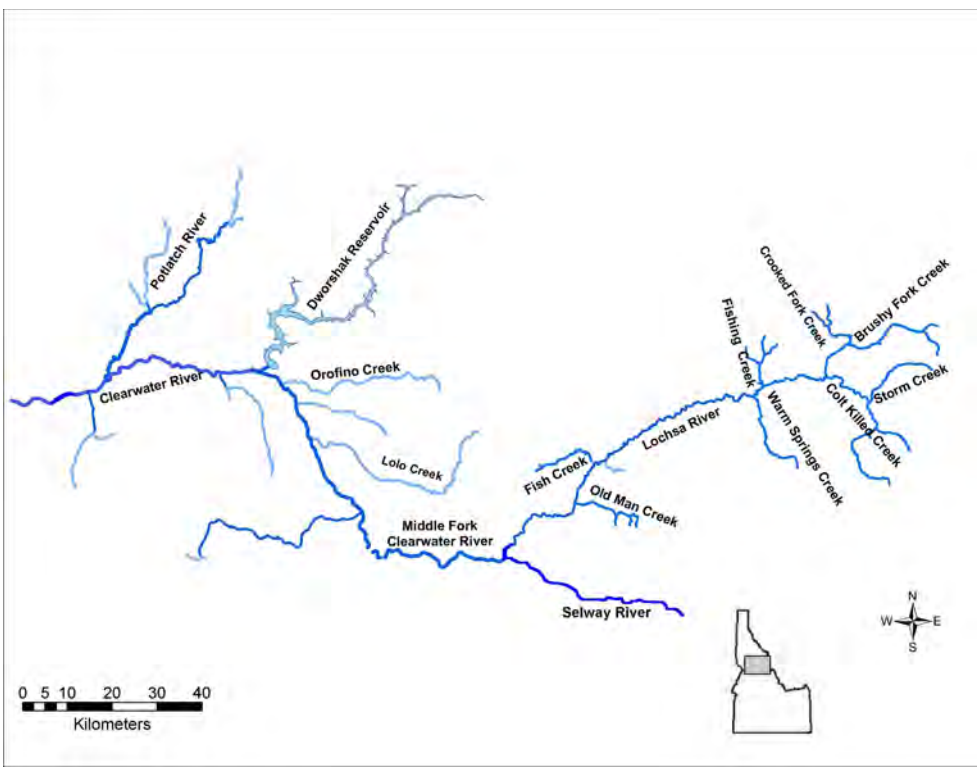

Figure 1. Overview map of the Clearwater and Lochsa River drainages including major tributaries.

OBJECTIVES

1. Obtain basic biological and life history information on bull trout in the Lochsa, Middle Fork Clearwater (Middle Fork), and Clearwater rivers (CWR).

2. Determine migration patterns of bull trout within the Lochsa, Middle Fork, and CWR rivers.

METHODS

Tagging

Bull trout were captured with hook-and-line in the Lochsa River between 3 June 2005 and 20 June 2005. Sampling was conducted in the Lochsa between rkm 170.2 and rkm 248.5 (Figure 2). To maximize catch, radio-tagged bull trout from 2004 that were emitting signals were used to help determine sampling areas. Individual bull trout were anesthetized, and all fish were scanned for Passive Integrated Transponder (PIT) tags. If a fish was PIT-tagged the identification number was recorded, total and fork lengths and weight were measured. Then the fish was recovered in fresh water for 15 minutes prior to being released. If a fish was not previously PIT tagged the following procedure was completed. A 134 kHz PIT tag was inserted in the opercula muscle using a 14-guage hypodermic needle. Fish were weighed and total and fork lengths were measured. Each fish's adipose was clipped for genetic sampling and for future identification. The leading pelvic fin ray was collected from each fish to determine age.

Bull trout weighing greater than 390 g were candidates for surgical radio transmitter implantation. The surgical procedure is an adaptation of the shielded-needle technique as described by Schill et al. (1994). All individuals were allowed to recover in fresh water for a minimum of 15 minutes prior to release.

We utilized MCFT-3EM (MICRO) radio transmitters (Lotek Engineering). MICRO radio transmitters are 11 mm x 49 mm, weigh 8.9 g in air, 4.3 g in water, and have a life expectancy of at least 399 days. We used transmitters in the frequency 149.340 MHz, 148.440 MHz, 148.620 MHz and 149.460 MHz. Each transmitter had a code associated with it ranging from 048 to 184. We will use a frequency-code combination to identify individual fish throughout this document. For example: a fish tagged with a transmitter in the 149.340 MHz frequency with a code of 105 will be shown as 149.34.105.

Fish with radio transmitters implanted were also subject to maturity and sex determination. An otoscope was used to visually determine gender and maturity. An otoscope was inserted into the incision created for transmitter implantation. Once inserted into the body cavity, mature reproductive organs, if present, were readily observed. If no reproductive organs were observed, the otoscope was moved down the body wall dorsally and anteriorly toward the head, following the kidney. Immature reproductive organs were generally found lying along the body wall posterior to the liver. If no reproductive organs were observed, it was recorded as unknown. A female was determined to be mature if eggs greater than one mm diameter were observed and immature if eggs less than one mm diameter were observed. A male was

identified as mature if large gonads were observed and immature if gonads were small and undeveloped.

Tracking and Distribution

The Department conducted tracking during 2005 through April 2006. Automobiles and fixed-wing aircraft were utilized to monitor fish in the Lochsa, Middle Fork Clearwater, and Selway rivers. Tracking was conducted at least once per month, except during November and December when tracking was not performed.

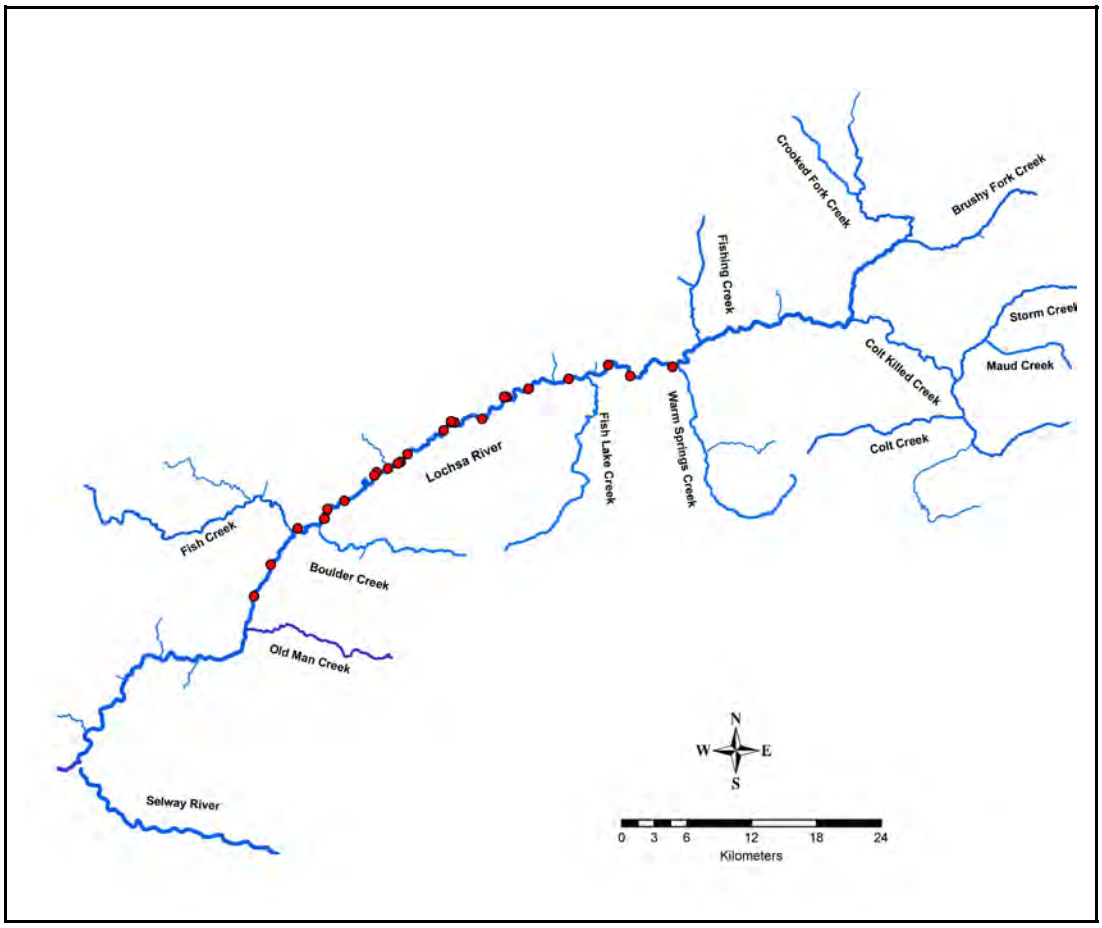

Figure 2. Bull trout capture locations in the Lochsa River, 2005.

RESULTS

Tagging

From 3 June to 20 June 2005, 43 bull trout were collected on the Lochsa River (Table 1). Total length of all bull trout collected ranged from 281 mm to 586 mm (mean 444.6 mm) (Figure 3, Table 1) and weight ranged from 150 g to 1,950 g (mean 921.0 g) (Figure 4). Radio transmitters were implanted in 37 bull trout. Six fish were not radio-tagged; five were too small and one was injured during collection. It is believed that one fish died due to the tagging procedure, this fish was not included in migration or spawning analysis.

Life History Information

Length-Weight Relationship

The length-weight relationship for bull trout captured in the Lochsa River was described by the equation: log weight (g) = 3.2523 log total length (mm) – 5.6929 (Figure 5). For 2004 Schiff et al. (2005) obtained a value of log weight (g) = 3.1355 log total length (mm) -5.3657. In 2003 Schiff and Schriever (2003) obtained a value of log weight (g) = 3.1195 log total length – 5.3164. These values are not significantly different at the 95% confidence interval.

Sex Ratio and Maturity

Maturity was determined in 35 of the 43 fish collected in the Lochsa River, 94% (33/35) were mature and 6% (2/35) were immature. Mean total length of immature fish was 312 mm (range 281 - 343 mm). Sex was determined in 34 fish with 30 males and 4 females, resulting in a ratio of 7.5 males per female.

Migration and Spawning Periods

In the summer of 2005, 65 radio-tagged bull trout were detected migrating upstream from their tagging location. The migration time period was defined from 1 April – 30 June 2005. During the migration period all 37 fish tagged in 2005 were detected and an additional 28 bull trout that were radio-tagged in 2004 were detected (Figure 6). All fish during this time were located in the mainstem Lochsa River. The majority of fish were located between rkm 194.9 and rkm 236.2 in the Lochsa River (Figure 6).

The spawning period was delineated from 15 August – 30 September 2005. During the spawning time 39 individual fish were detected, 36 tagged in 2005 and 3 tagged in 2004. Few fish tagged during 2004 were detected because of radio tag batteries expiring. Detections were located in the following tributaries to the Lochsa River; Brushy Fork Creek 2 (5%), Colt Killed Creek 6 (15%), Crooked Fork Creek 4 (10%), Fishing Creek 15 (38%), Storm Creek 7 (18%),

and Lochsa mainstem 5 (13%) (Figure 7, Table 2). Five fish distributed in the mainstem Lochsa were located at the mouth of potential spawning tributaries. They were at the mouth of Indian Graves Creek, Bear Mountain Creek, Eagle Creek, Skookum Creek and Papoose Creek (Figure 7).

Fish 149.34.090 was tagged 20 June 2005 at rkm 224.7 and was next detected 13 July 2005 at rkm 234.3 in the mainstem Lochsa River. This location represents the farthest upstream this fish was found. During August and September the fish moved 13.5 km downstream, staying in the mainstem Lochsa River. It is not known whether this fish spawned during July, moved downstream to spawn in August or September, or did not spawn during 2005.

Table 1. Bull trout total length and weight statistics for all fish captured in the Lochsa River during 2005.

	Total Length	Total Weight
Mean	442.8	908.6
Median	435.0	760.0
Mode	357.0	575.0
Standard Deviation	77.7	479.6
Sample Variance	6,029.7	230,037.3
Minimum	281.0	150.0
Maximum	586.0	1950.0
Number Captured	43	43

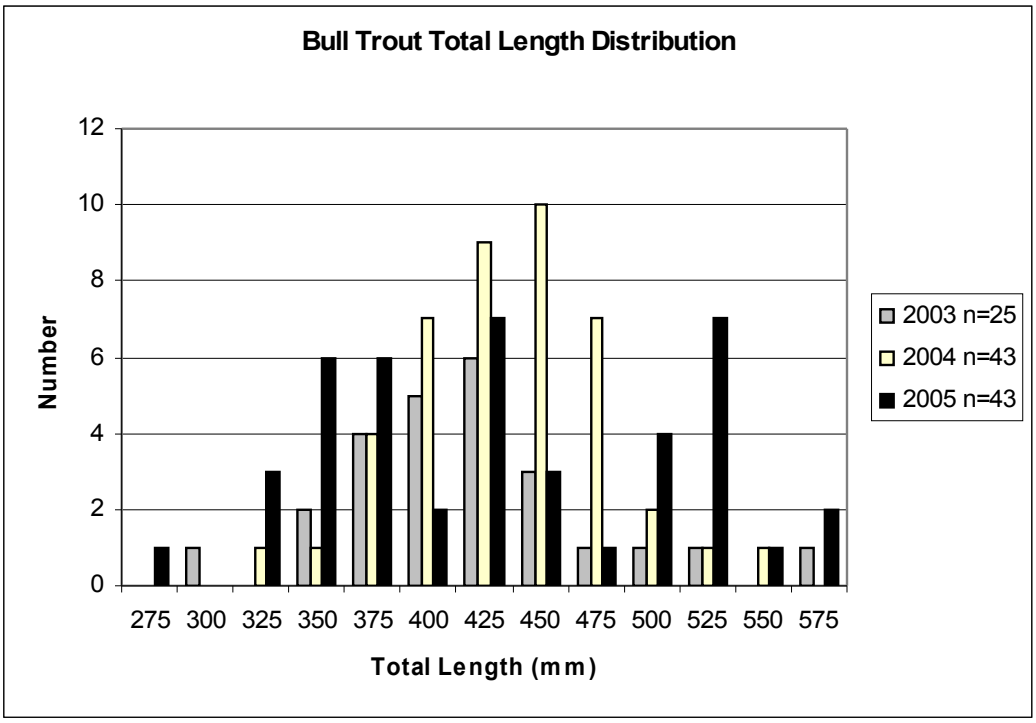

Figure 3. Bull trout total length distribution for fish captured in the Lochsa River, 2003, 2004, and 2005.

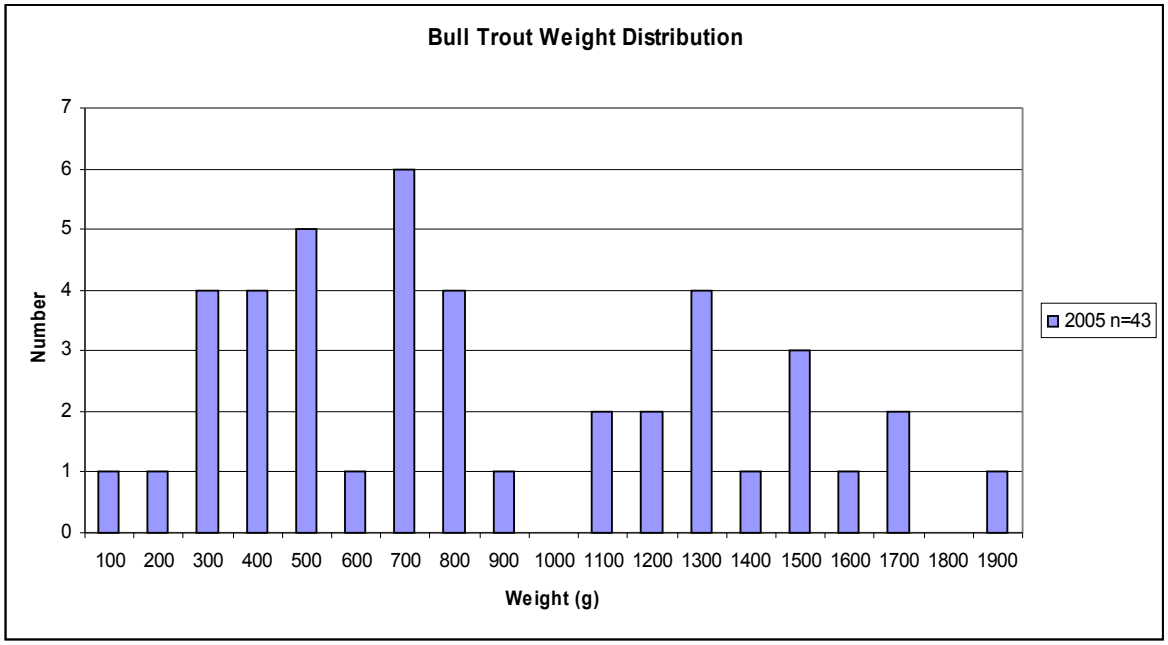

Figure 4. Bull trout weight range distribution for fish captured in the Lochsa River, 2005.

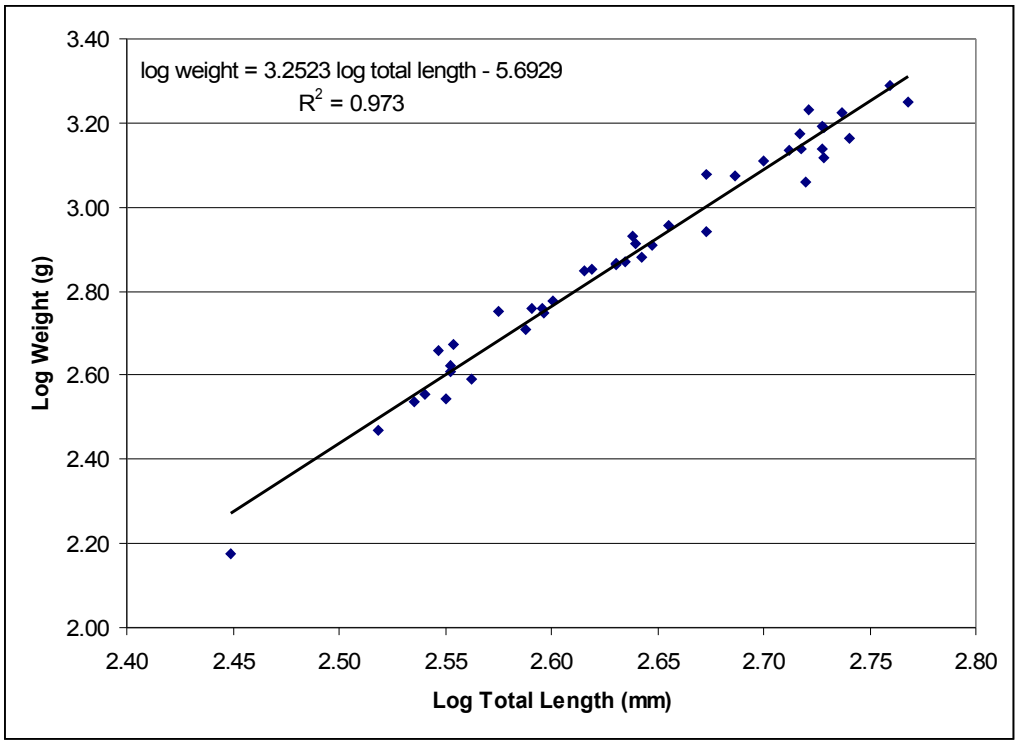

Figure 5. Log length-weight for bull trout captured in the Lochsa River drainage, 2005.

Radio-tagged bull trout in the Lochsa River migrated extensive upstream distances between tagging locations and the spawning period (Table 1, Appendix A). Bull trout were observed migrating a mean upstream distance of 55.1 km (9.6 km – 101.4 km). Between the migration period and spawning period bull trout began to enter tributaries to the Lochsa River. The area was tracked on 13 July 2005, 31 fish were found in tributaries and 16 remained in the mainstem Lochsa River. The farthest upstream distance bull trout (except 149.34.090) were located was on 11 August 2005 or 19 September 2005. Tracking was not conducted between the dates of August 11th and September 19th. Spawning was thought to occur sometime within this period because of the fish's location near the head of the watershed.

Spawning Mortalities

Forty seven percent (17/36) of fish radio-tagged in 2005 were detected returning to the Lochsa River post-spawn. The remaining 19 fish either shed their transmitters, or succumbed to mortality. Due to radio-tag batteries running out three fish tagged in 2004 that were tracked to spawning locations, were not included in post-spawn mortality analysis. Fish survival/tag retention separated by spawning tributary was as follows: Brushy Fork Creek 0% (0/2), Colt Killed Creek 80% (4/5), Crooked Fork Creek 25% (1/4), Fishing Creek 50% (7/14), Lochsa mainstem 75% (3/4), and Storm Creek 29% (2/7) (Table 3).

Post-spawning Period

The post-spawn period in this study was defined as during October 2005. Tracking was conducted only once during this period. Tracking of the Lochsa River was not conducted during November or December. Fifteen radio-tagged bull trout were detected at least once, and all fish were found in the mainstem Lochsa River. Fish were distributed from rkm 194.9 (above Fish Creek) to rkm 248 (below Warm Springs Creek (Figure 8)).

Overwintering Period

The overwintering period was from 1 January – 31 March 2006. Tracking was conducted once per month, from an automobile. During this period radio-tagged fish were distributed from rkm 150.8 to rkm 253.2 (5 km below the confluence with the Selway River to Fishing Creek). Thirty-five percent (6/17), of radio-tagged fish were found in the Middle Fork just below the confluence of the Selway River during the winter. Two fish were located up the Selway River, one fish 1.2 km above the confluence from the Middle Fork and the other 9 km upstream of the confluence (Figure 9). All bull trout were located in either a 5th or 6th order stream during this time.

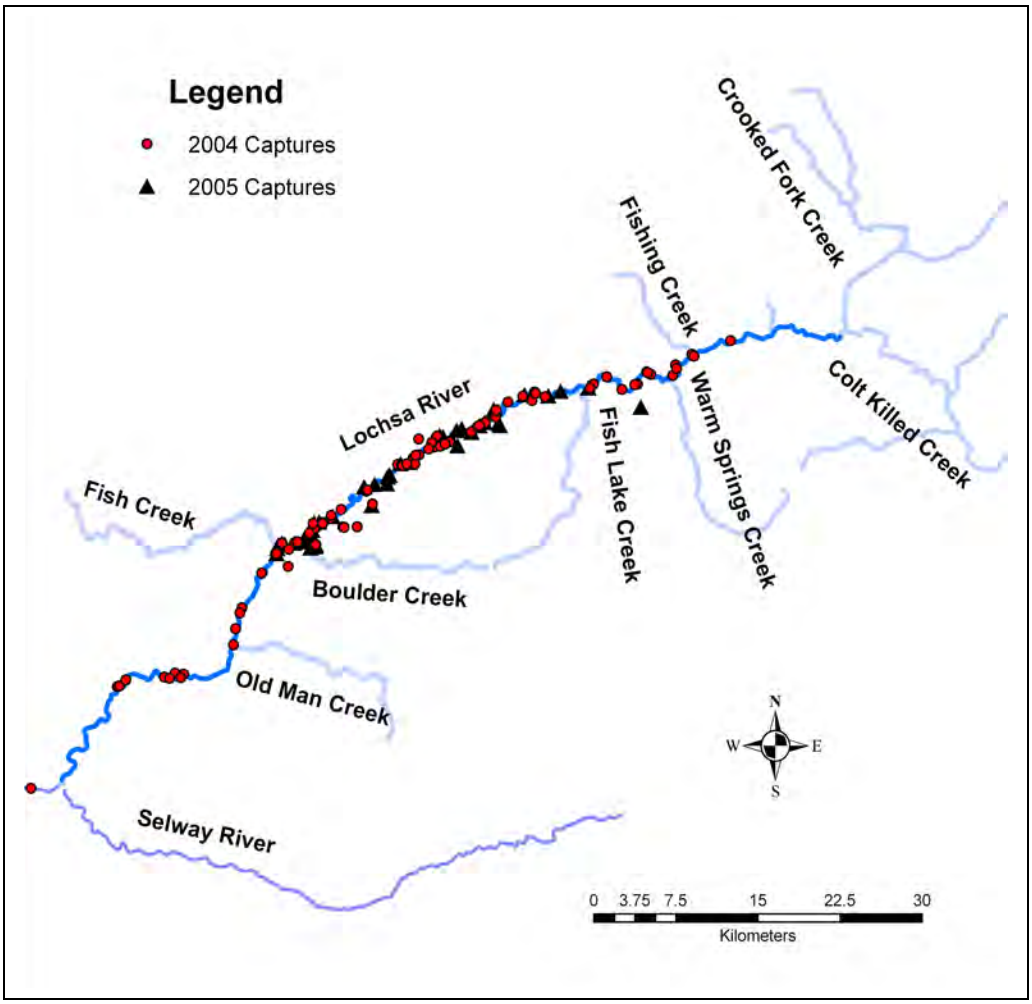

Figure 6. Radio-tagged bull trout distribution during the migration period, 1 April – 30 June 2005. An individual fish is displayed more than once if detected multiple times during the period.

Table 2. Migration distances (km) grouped by watershed for bull trout in the Lochsa River drainage, 2005. Fish suspected to be tagging mortalities or shed tags were not included in analysis.

	Brushy Fork Creek	Colt Killed Creek	Crooked Fork Creek	Fishing Creek	Lochsa, Mainstem	Storm Creek	All
Mean	61.9	64.2	76.9	44.0	27.0	76.7	55.1
Standard Error	12.6	9.3	7.4	4.1	5.8	6.3	3.7
Median	61.9	68.3	74.9	48.8	24.8	74.4	51.2
Standard Deviation	17.7	22.8	14.7	14.9	12.9	16.5	23.2
Sample Variance	315.0	518.9	216.5	221.2	166.6	273.5	539.1
Minimum	49.3	30.7	64.3	11.7	9.6	57.1	9.6
Maximum	74.4	89.0	93.4	69.4	45.1	101.4	101.4

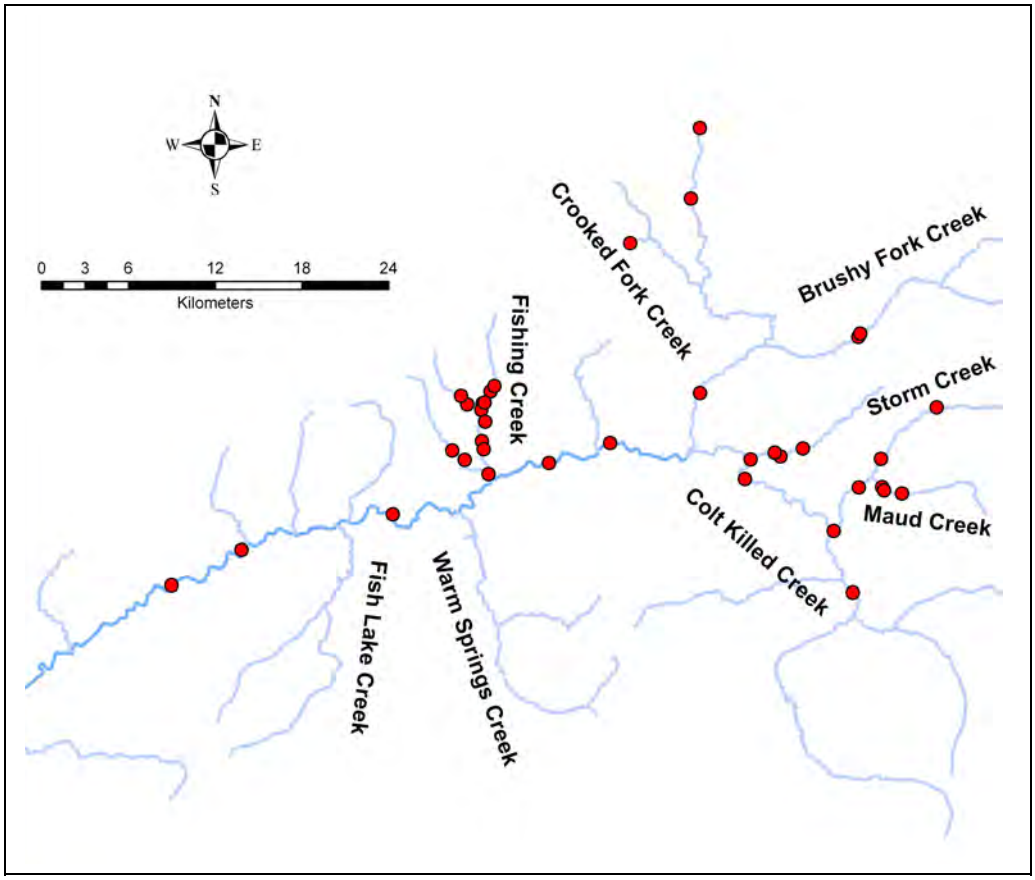

Figure 7. Radio-tagged bull trout distribution during the spawn time period, 15 July – 30 September 2005. For simplification purposes each fish is displayed once during this time frame.

Table 3. Radio tagged bull trout survival in the Lochsa River drainage, separated by spawning tributary in 2003, 2004, and 2005.

Drainage	Number of Fish (2005)	Number of Suspected Shed Transmitters or Fish Mortalities (2005)	Percent Survival of Radio-Tagged Fish (2005)	Percentage of Total Radio-Tagged Fish (2004)	Percent Survival of Radio-Tagged Fish (2003)
Brushy Fork Creek	2	2	0%	50%	50%
Colt Killed Creek	5	1	80%	82%	80%
Crooked Fork Creek	4	3	25%	50%	NA
Fishing Creek	14	7	50%	88%	0%
Lochsa, Mainstem	4	3	75%	NA	NA
Storm Creek	7	5	29%	67%	25%
Warm Springs Creek	NA	NA	NA	NA	100%
Total Survival	**36**		**47%**	**76%**	**69%**

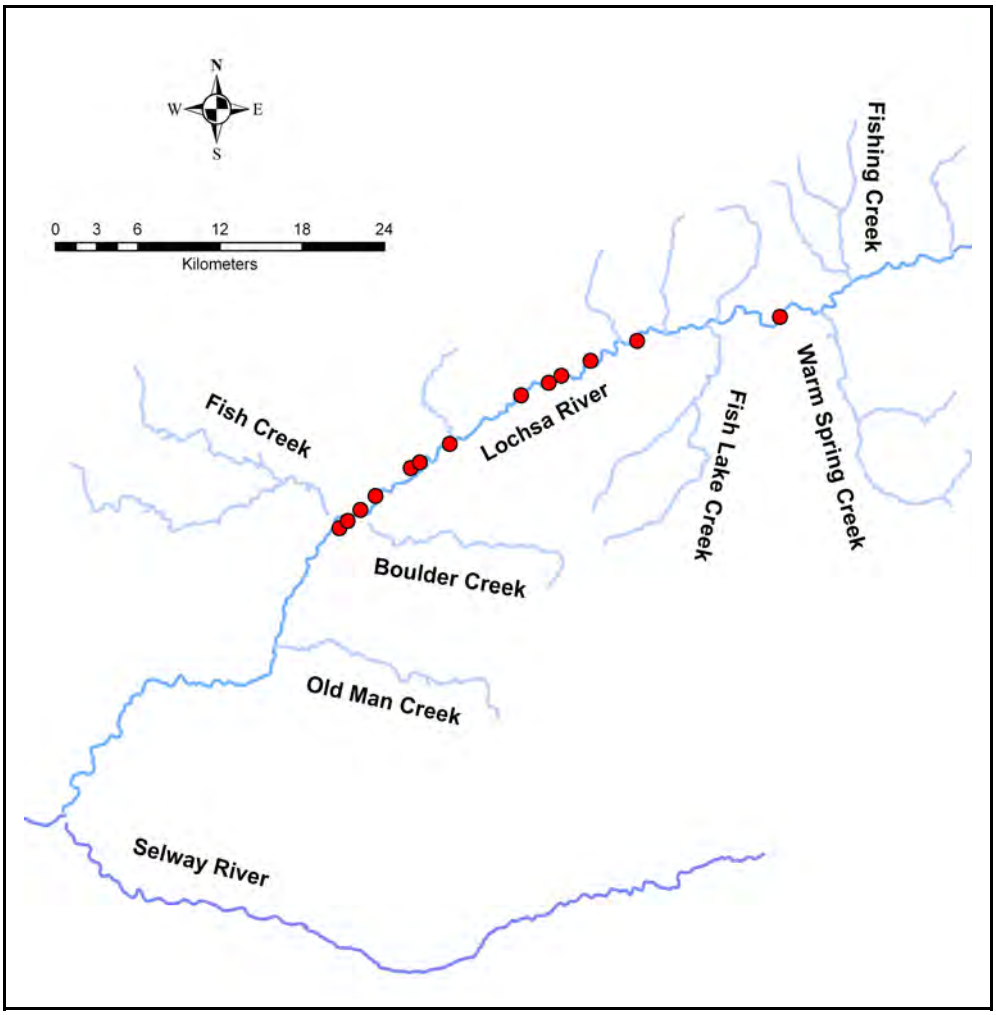

Figure 8. Radio-tagged bull trout distribution during the post-spawn period, 18 October 2005.

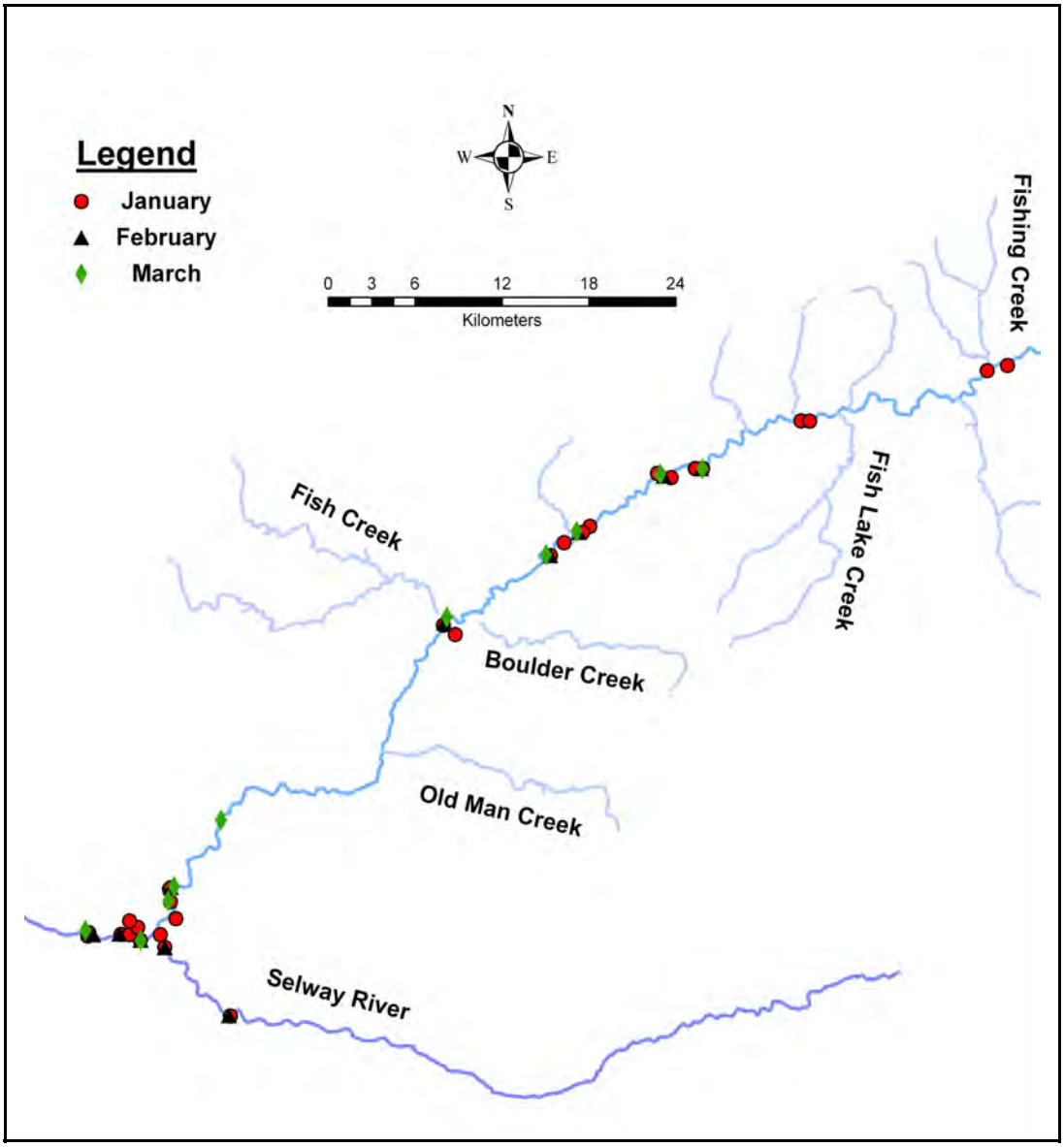

Figure 9. Radio-tagged bull trout distribution during the overwintering period, 1 January- 31 March 2006.

DISCUSSION

Tagging

There was not a significant difference in the mean size of bull trout captured in the Lochsa River from 2003 to 2005. In 2003 the dominant size range of fish was 400 – 449 mm total length (44%). In 2004 the majority, 40%, of fish captured were in the 450 – 499 mm total length size. During 2005 the majority, 28%, of captured fish were in the 350 – 399 mm total length range. The dominant size range of captured bull trout for these three years varies between each year, but size classes tend to be spread out for every year.

Life History Characteristics

Sex Ratio

Sex ratios observed in 2003 were 1.25 males per female and 1.28 males per female in 2004 (Schiff et al. 2005). During 2005 the sex ratio was 7.5 males per female. There was a significant difference ($p<0.05$) in the sex ratio observed in 2005 compared to 2003 and 2004. The dates of capture between years were similar for all years and did not appear to have an effect on sex ratio. Significant differences were not detected in mean total length of males or females between years. Also, post spawn mortality estimates of radio-tagged fish in 2004, separated by sex, was 56% (5/9) for females and 44% (4/9) for males. Reasons for differences in sex ratio between 2005 and previous years is not clear.

Migration

The majority, 38%, of radio-tagged fish in 2005 entered the Fishing Creek drainage. In 2003 and 2004 approximately 20% of fish were observed in Fishing Creek. Fishing Creek is a relatively small drainage, 6,957 ha. Bull trout redds and spawners have been consistently observed here, since 1994 the average is 35 redds. Fishing Creek drainage appears to be a stronghold for bull trout spawning in the Lochsa River.

Two other key areas for bull trout appear to be Colt Killed Creek and Storm Creek. In 2003 and 2004 these two drainages accounted for 56% and 45% of radio-tagged spawner locations, respectively. During 2005 these drainages accounted for 33% of known spawner locations. Storm Creek had the second highest percentage of radio tagged fish in 2003 and 2005, and the third highest in 2004. Colt Killed Creek had the second highest percentage in 2004, and third in 2003 and 2005. Radio-tagged bull trout were consistently documented in these two tributaries for all three years.

One consideration to take into effect is similarity of tagging locations. Tagging for every year was conducted in the same general area, and often the same pool. The majority of bull trout were tagged between Boulder Creek and Fish Lake Creek. Bull trout are found throughout the mainstem Lochsa River during the spring, and the location of individual fish prior to

migration may effect where bull trout are likely to spawn. Fishing Creek, Colt Killed Creek, and Storm Creek are clearly important tributaries; but other drainages may also be critical although not documented because of similar tagging locations every year.

Overwintering migration patterns were similar for all years. Upon spawning the majority of fish moved downstream in the system and remained in one area through April. 2005 was the first year bull trout were documented moving up the Selway River at any time of the year.

Bull trout moved considerable distances between tagging and spawning. During the three year study the farthest upstream migration distance from a tagging location was 124.1 km in 2004. The mean migration distance for radio-tagged fish in 2003 was 68.6 km, 73.3 km in 2004, and 55.1 km in 2005. There was a significant difference ($p < 0.05$) in mean migration distance between 2005 and 2004. Significant differences were not detected between other years. High water flows during the 2004 spawning period may have allowed or required bull trout to migrate farther distances compared to other years. In 2004 the mean August stream flow for the Lochsa River, 1.4 km above the confluence of the Selway River, was 21.4 m^3/s; in 2003 it was 13.5 m^3/s, and 12.5 m^3/s during 2005. September 2004 mean stream flow was 35.8 m^3/s; in 2003 and 2005 mean stream flow was 10.5 m^3/s and 9.9 m^3/s, respectively.

Spawning Mortality

Estimated post-spawn survival was 47% in 2005. In 2004 post-spawn survival estimates were 76%, and 69% in 2003 (Schiff et al. 2005). Low survival estimates may be due to tracking only once in October and not searching again until January, decreasing the probability of finding returning tagged fish. Bull trout could have dispersed during this time and were not detected by automobile tracking. Survival rates could also be highly variable such as the bull trout population in the North Fork, Schiff et al. (2005) reported estimated survival rates varying from 31% to 82% in the North Fork from 2001 – 2003. Continued investigation and additional years of data is needed to understand yearly trends in adult bull trout survival, for the Lochsa River.

RECOMMENDATIONS

1. Colt Killed, Storm, and Fishing creeks contain a large population of fluvial bull trout spawning areas. Efforts should be made to protect riparian corridors and stream habitat in these areas. Managing for bull trout should be a top priority for these drainages.

2. Maintain the connectivity of tributaries to the Lochsa River to support potential bull trout spawning habitat.

ACKNOWLEDGEMENTS

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APPENDIX

Appendix A, Table 1. Radio-tagged bull trout distribution by spawning watershed, tagging and furthest upstream location, and total migration distance, in the Lochsa River drainage, 2005.

Frequency Code	Tagging Date	Spawning Watershed	Tagging Location (rkm)	Furthest Upstream (rkm)	Migration Distance From Tagging Location (km)	Furthest Upstream Detection Date
149.34.088	6/19/2005	Brushy Fork Creek	239	288.3	49.3	8/11/2005
149.34.056	6/11/2005	Brushy Fork Creek	218.2	292.6	74.4	9/19/2005
149.34.064	6/11/2005	Colt Killed Creek	229.8	277.3	47.5	9/19/2005
149.34.066	6/7/2005	Colt Killed Creek	187.3	276.3	89	8/11/2005
*149.46.182	6/11/2004	Colt Killed Creek	247.2	277.9	30.7	8/11/2005
149.34.062	6/10/2005	Colt Killed Creek	217.3	274.6	57.3	8/11/2005
149.34.063	6/10/2005	Colt Killed Creek	197	276.3	79.3	8/11/2005
149.34.072	6/5/2005	Colt Killed Creek	198.3	279.9	81.6	8/11/2005
148.44.048	6/8/2005	Crooked Fork Creek	210.1	295.2	85.1	8/11/2005
149.34.055	6/12/2005	Crooked Fork Creek	209.4	274	64.6	8/11/2005
149.34.082	6/5/2005	Crooked Fork Creek	211.1	304.5	93.4	8/11/2005
149.34.083	6/17/2005	Crooked Fork Creek	234.4	298.7	64.3	8/11/2005
149.34.054	6/6/2005	Fishing Creek	221.5	253	31.5	8/11/2005
149.34.057	6/7/2005	Fishing Creek	190.4	259.8	69.4	8/11/2005
149.34.059	6/17/2005	Fishing Creek	248.3	260	11.7	8/11/2005
149.34.073	6/5/2005	Fishing Creek	211.2	260.6	49.4	8/11/2005
149.34.074	6/3/2005	Fishing Creek	198.6	253.1	54.5	8/11/2005
149.34.076	6/5/2005	Fishing Creek	210.4	260.4	50	8/11/2005
149.34.077	6/3/2005	Fishing Creek	202.2	259	56.8	8/11/2005
149.34.079	6/4/2005	Fishing Creek	211.1	260.3	49.2	8/11/2005
149.34.080	6/5/2005	Fishing Creek	211.1	256	44.9	9/19/2005
149.34.081	6/8/2005	Fishing Creek	210.1	256.3	46.2	9/19/2005
149.34.087	6/19/2005	Fishing Creek	242.2	258.3	16.1	8/11/2005
149.34.097	6/15/2005	Fishing Creek	212.2	252.5	40.3	8/11/2005
149.34.105	6/19/2005	Fishing Creek	216.2	256.6	40.4	9/19/2005
*149.46.178	5/17/2004	Fishing Creek	203.8	255	51.2	8/11/2005
149.46.184	6/15/2005	Fishing Creek	210.1	258.9	48.8	9/19/2005
148.62.140	6/9/2005	Lochsa, mainstem	217.6	262.7	45.1	8/11/2005
149.34.060	6/9/2005	Lochsa, mainstem	226.1	257.8	31.7	8/11/2005
149.34.069	6/18/2005	Lochsa, mainstem	217.3	241.3	24	9/19/2005
149.34.090	6/20/2005	Lochsa, mainstem	224.7	234.3	9.6	7/13/2005
*149.46.169	4/3/2004	Lochsa, mainstem	203.8	228.6	24.8	8/11/2005

Appendix A, Table 1, Continued.

Frequency Code	Tagging Date	Spawning Watershed	Tagging Location (rkm)	Furthest Upstream (rkm)	Migration Distance from Tagging Location (km)	Furthest Upstream Detection Date
148.44.056	6/9/2005	Storm Creek	226.1	291.4	65.3	8/11/2005
149.34.065	6/9/2005	Storm Creek	199.9	294.2	94.3	9/19/2005
149.34.071	6/17/2005	Storm Creek	234.4	291.5	57.1	8/11/2005
149.34.067	6/18/2005	Storm Creek	234.4	297.6	63.2	8/11/2005
149.34.068	6/4/2005	Storm Creek	194.9	296.3	101.4	9/19/2005
149.34.075	6/5/2005	Storm Creek	210.4	291.5	81.1	8/11/2005
149.34.078	6/5/2005	Storm Creek	210.4	284.8	74.4	8/11/2005
149.34.061	6/6/2005	Tagging Mortality	225.5	234.2	8.7	8/11/2005

* Indicates bull trout tagged in 2004.

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