APPENDIX AD4

Draft Species Report
Bull Trout (*Salvelinus confluentus*)
in the
Walla Walla Subbasin[1]

1. GENERAL INFORMATION

1.1 CLASSIFICATION AND DISTRIBUTION

1.1.1 Classification

Bull Trout (*Salvelinus confluentus*) are members of the salmon and char family Salmonidae and are native to waters of western North America (U.S. Fish and Wildlife Service) (USFWS) (USFWS Critical Habitat Designation-50 CFR Part 17). There are both anadromous (Dolly Varden) and non-anadromous (Bull Trout) populations from Washington north, but the bull trout populations in California, Nevada, Montana, Oregon, and Idaho are non-anadromous, resident forms, found in freshwater (Scott and Crossman 1973). All S. confluentus in the Columbia River are believed to be non-anadromous bull trout as compared to the anadromous forms, commonly called Dolly Varden, found further north.

1.1.2 Distribution

Bull trout are found in rivers and lakes from northern California (McCloud River and Shasta Lake) to northwestern Alaska and to Japan and Korea (McAfree 1966). In North America, they range inland to Alberta, Montana, Idaho, and northern Nevada (Delacy and Norton 1943; LaRivers 1962). Anadromous Dolly Varden are common in fresh and salt water environments from northern Washington north.

1.2 GENERAL LIFE HISTORY STRATEGIES

Bull trout have a number of life-history strategies, and a particular life-history strategy may dominate under stable conditions, but another life-history strategy may be favored with changing environment (Gross 1991; Northcote 1992; Sibly 1991). It is possible to have four (4) or more ages in any spawning population and as many as 12 to 16 age combinations in any spawning year (Shepard et al. 1984).

Resident bull trout complete their entire life cycle in the tributary streams where they spawn and rear. Some bull trout are migratory but not anadromous. They spawn in tributary streams where juvenile fish rear from 1 to 4 years before migrating to either a larger river (fluvial) or lake (adfluvial) where they

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[1] This draft species report was incorporated into the Walla Walla Subbasin Plan as part of an Addendum Document in November 2004. During public comment on the Addendum Document, a number of comments were received addressing the completeness and accuracy of information in this draft species report. These comments were in addition to information intended to be added to the draft species report during the Fall 2004 subbasin planning revision process and could not be fully addressed. These comments are listed as an attachment to the draft species report and will need to be addressed in another process such as the current Habitat Conservation Process (HCP) development process or a future subbasin planning revision process.

spend their adult life. They usually return to the tributary stream to spawn (Fraley and Shepard 1989). Migratory forms occur in areas where conditions allow for movement from upper watershed spawning streams to larger downstream waters that contain greater foraging opportunities (Dunham and Rieman 1999). It has been suggested that resident and migratory forms may be found together, and that either form could produce resident or migratory offspring (Rieman and McIntyre 1993).

1.2.1 Spawning

Sexual spawning characteristics in bull trout develops slowly (Scott and Crossman 1973), and sexual maturity is not reached for 4 to 9 years (Williams and Mullan 1992; Pratt 1991). Males often mature a year earlier than females (Scott and Crossman 1973).

Spawning populations usually migrate to the spawning areas in August and September (Scott and Crossman 1973). Bull trout have a strong homing tendency, and in some areas, bull trout migrate great distances to their natal spawning grounds (Carl et al. 1959).

Males are aggressive toward other male bull trout during spawning. Females excavate the redds. Prespawning courtship involves males and females pressing their bodies together and quivering (Needham and Vaughan 1952).

Bull trout spawn in declining water temperatures from August to November depending upon the area (Bajkov 1927; Block 1955; Delacy and Morton 1943).

Spawning areas often are near springs in cold streams (Allan 1980; Ratliff 1992; Shepard et al. 1984). Spawning occurs at temperatures of 41 to 48 ºF, and usually takes place in daytime hours (Scott and Crossman 1973).

1.2.2 Egg Incubation

Egg numbers in females are high depending upon the size of the female. The number of eggs per female can range from 1,300 to 8,000. Eggs hatch in March and April depending upon water temperature, and fry emerge from the gravel in April to mid-May (Blackett 1968). Bull trout eggs require approximately 662 to 824 temperature units to hatch (Weaver and White 1984; Gould 1987; Pratt 1992). A temperature unit is 1 degree Fahrenheit above 32ºF for 24 hours. Hatching is completed after 100 to 145 days (Pratt 1992). Sac fry require at least 65 to 90 days after hatching to absorb their yolk sacs (Pratt 1992). Fry may live in the gravel for up to three weeks before they emerge (McPhail and Murray 1979; Pratt 1992).

1.2.3 Juvenile Growth

Growth of juvenile bull trout is fairly fast in early years, but slows over time. Juvenile bull trout are approximately 2 to 2.8 inches at age-1, 4 to 5 inches at age-2, and 6 to 7 inches at age-3 (Pratt 1992; Ratliff et al. 1996). Bull trout eat larval and adult aquatic insects, fish, snails, leeches, amphibians, mice, salmon egg, and other bull trout, depending on availability (Delacy and Morton 1943; Jeppson 1963; Pratt 1992; Roos 1959; Wales 1939). The young may spend several months to several years in streams before they move downstream into a lake or larger river (Scott and Crossman 1973).

The size of bull trout is variable depending on life-history strategy. Resident bull trout tend to be small, averaging 200 millimeters (mm) [8 inches (in)] in length and rarely exceeding 305 mm (12 in). Adults that migrate to larger downstream rivers average about 405 mm (l6 in), and often exceed 610 mm (24 in) (Goetz 1989). Maximum sizes of bull trout are reached in large lakes and reservoirs where adults grow over 685 mm (27 in) in length and 10 kilograms (kg) [22 pounds (lbs)] in weight (McPhail and Baxter 1996).

Under good conditions, bull trout regularly live to age-10, and under exceptional circumstances, reach ages in excess of 20 years (Fraley and Shepard 1989, McPhail and Baxter 1996).

Bull trout are opportunistic feeders, with food habits that primarily are a function of size and life history. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro-zooplankton, and small fish (Donald and Alger 1993, McPhail and Baxter 1996). Adult migratory bull trout feed almost exclusively on other fish (Rieman and McIntyre 1993).

1.2.4 Migration

Juvenile bull trout may migrate from natal areas during spring, summer, or fall (Pratt 1992). Most of the migration occurs at night (Ratliff et al. 1996)

1.3 HABITAT REQUIREMENTS

Bull trout have specific habitat requirements (Rieman and McIntyre 1993), and they are sensitive to habitat change (Rothschild and DiNardo 1987). The key habitat requirement is cold water, and bull trout prefer cool lakes and pool areas of streams (McAfree 1966). The habitat of young is the gravelly spawning stream (Fraley and Shepard 1989; Oliver 1979; Pratt 1984). As they mature, bull trout move about over the length of natal streams (Pratt 1984). Juveniles live close to in-channel wood or undercut banks (Goetz 1991; Pratt 1984, 1992). Young-of-the-year use side channels, stream margins, and areas of low water velocity. Older fish use pools (Hoelscher and Bjornn 1989; Pratt 1984).

The stability of the channel will influence survival of young bull trout (Goetz 1989; Weaver 1985, Elwood and Water 1969; Seegrist and Gard 1972; Wickett 1958). For example, an increase in fine sediments in the gravel reduce survival (Leathe and Enk 1985; McPhail and Murray 1979; Shepard et al. 1984; Weaver and Fraley 1991). Winter cover also is important (Chapman 1966; Cunjak and Power 1986).

Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, spawning and rearing substrate conditions, and migratory corridors (Fraley and Shepard 1989, Goetz 1989, Watson and Hillman 1997). These environmental variables may contribute to the stability, growth, or decline of the population (Stacey and Taper 1992, Rieman and Dunham 2000). The size of the population may be important for its persistence (Soule 1987), as larger populations are less vulnerable to stochastic environmental events (Rieman and McIntyre 1993).

Bull trout require a narrow range of cold temperature conditions to rear and reproduce (Buchanan and Gregory 1997). Temperatures in excess of about 60 ºF (15.5 ºC) limit bull trout distribution (Allan 1980; Brown, 1992; Fraley and Shepard 1989; Goetz 1991; Oliver 1979; Pratt 1985; Ratliff 1992; Shepard et al. 1984; Rieman and McIntyre 1993). Buchanan and Gregory (1997) provide information outlining temperature requirements for each bull trout life history state (Table 1).

Table 1 Bull Trout Life History Temperature Regimes

Bull Trout Life History	Optimal Temperature
Adult Migration	50 ºF (10 ºC)– 54 ºF (12 ºC)
Egg Incubation	34 ºF (1.1 ºC) – 43 ºF (6.1 ºC)
Fry Growth	39 ºF (4 ºC) – 40 ºF (4.4 ºC)
Juvenile Growth	39 ºF (4 ºC)– 50 ºF (10 ºC)
Adult Habitat	< 54 ºF (12 ºC)

Source: Buchanan and Gregory 1997.

Dambacher and Jones (1997) found that there were seven variables that determined the presence of juvenile bull trout. The variables were (1) high levels of shade, (2) high levels of undercut banks, (3) the presence and quantity of large woody debris pieces, (4) high levels of gravel in riffles, (5) low levels of fine sediment in riffles, and (6) low levels of bank erosion. However, juvenile bull trout are present when some of these variables are short in supply or missing.

2. BULL TROUT DISTRIBUTION IN THE WALLA WALLA SUBBASIN

Bull trout are common in upper reaches of the Walla Walla Subbasin (Contor and Sexton 2003), but there is a question as to whether bull trout were ever common in lower reaches of the Walla Walla and Touchet rivers. Water temperature influences bull trout presence more than any other factor in the Walla Walla Subbasin (Rieman and McIntyre 1993), and water temperatures may have always been too warm for bull trout during summer months in the lower Walla Walla and Touchet rivers. As a result, lower sections of the Walla Walla and Touchet rivers were not classified as critical habitat for bull trout (see Section 6).

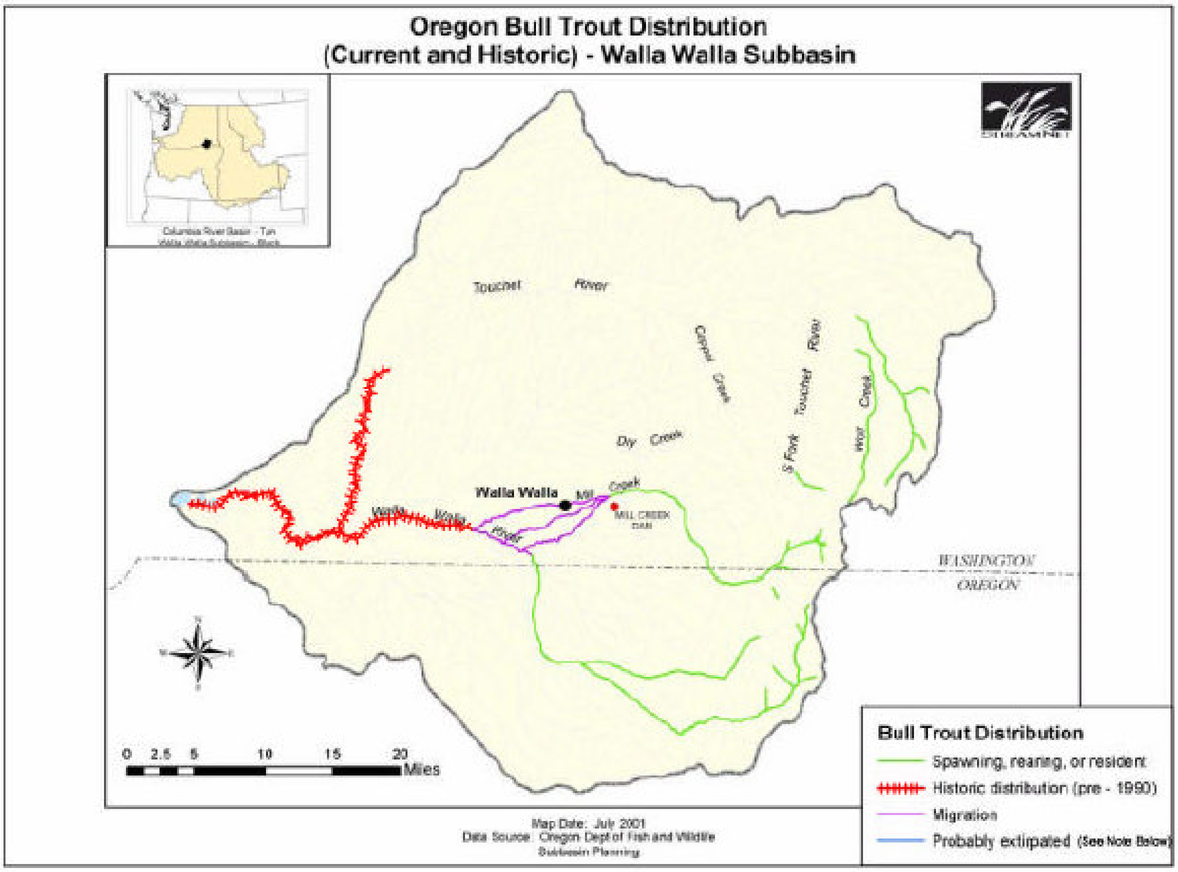
There are three core populations of bull trout in the Walla Walla Subbasin: the Touchet River, Mill Creek, and upper Walla Walla River populations (Mahoney 2003). Bull trout exhibit fluvial and resident life-history strategies in each of the three core areas (Rieman and McIntyre 1993).

Resident populations of bull trout are common in the North Fork and Wolf Fork and upper South Fork and in Spangler, Lewis, Robinson, and Burnt creeks of the Touchet River (Mendel et al. 2003). Fluvial bull trout are common downstream to the Waitsburg area (RM 44).

Spawning and juvenile rearing occur primarily above the City of Walla Walla's water intake dam in Mill Creek. Some subadults and adults remain above the intake throughout the year. Most winter between the Bennington Lake diversion dam and the intake. A relatively small number of adults, as well as juveniles and subadults, migrate below Bennington Lake.

Resident and fluvial bull trout inhabit the Walla Walla River above Milton-Freewater (RM 47) and in the South and North forks (EES-Parametrix 2003). Bull trout may have occurred in Cottonwood Creek, Little Meadows Canyon, Big Meadows Canyon, Couse Creek, and other smaller tributaries, but their presence in these streams has not been confirmed (Buchanan et al. 1997). Fluvial bull trout presently inhabit the Walla Walla River downstream to McDonald Bridge RM 29 in winter months (Glen Mendel, personal communication, July 15, 2003 In: EES 2004). Historically, fluvial populations are believed, but not confirmed, to have occurred throughout the Walla Walla Subbasin to the mouth of the Walla Walla River (USFWS Draft Recovery Plan, Chapter 10, 2002).

Figures 1 and 2 depict historic and present distribution of bull trout in the Oregon and Washington portions of the Walla Walla Subbasin.

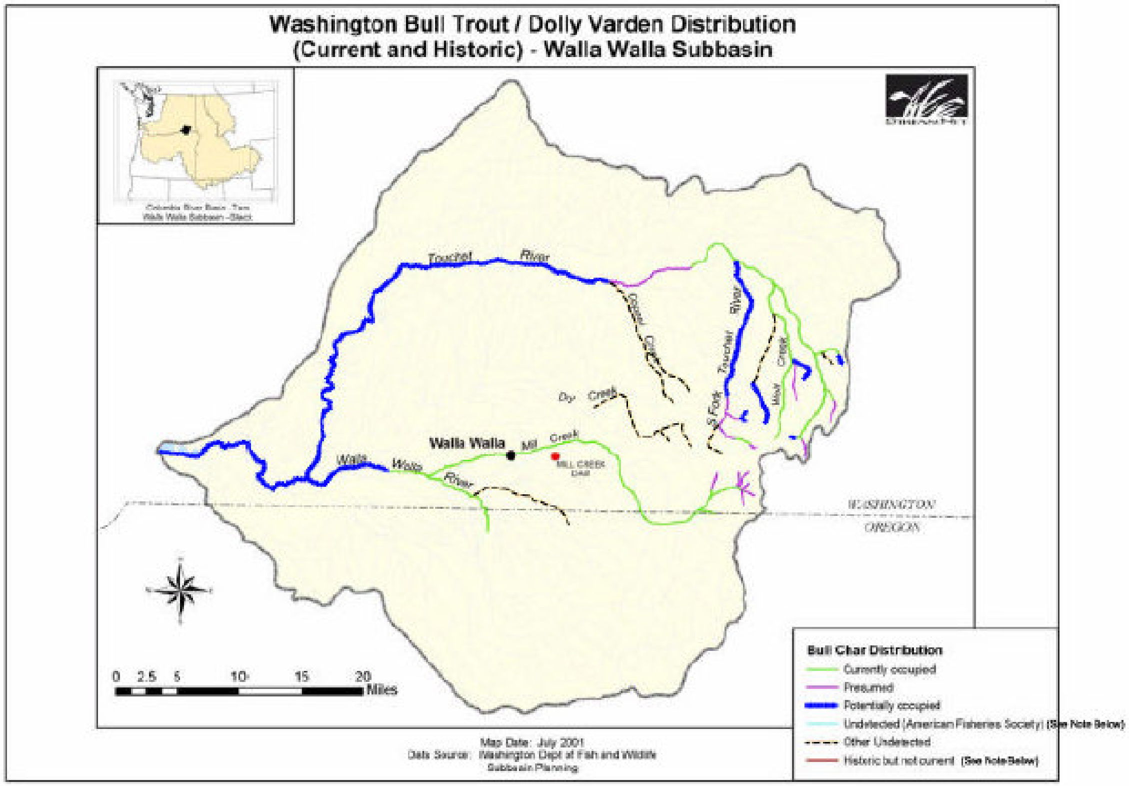


Source: StreamNet 2001

Note: No stream reaches shown for this distribution category.

Note that Figures 4 and 5 were compiled by StreamNet and Table 3 was compiled from other sources. Any information that is not uniform between these figures and table are attributable to these authors

Figure 1 Bull Trout Distribution, Walla Walla Subbasin, Oregon



Source: StreamNet 2001

Note: No stream reaches shown for these distribution categories.

Note that Figures 4 and 5 were compiled by StreamNet and Table 3 was compiled from other sources. Any information that is not uniform between these figures and table are attributable to these authors.

Figure 2 Bull Trout Distribution, Walla Walla Subbasin, Washington

Table 2 shows distribution by life stage of bull trout in the Walla Walla Subbasin (EES-Parametrix 2003).

Although bull trout typically spawn and rear in the upper mainstem reaches or in higher-order tributaries such as the North or South Fork Walla Walla River, Wolf Creek, upper Mill Creek or North Fork Touchet, bull trout rearing and migration also occurs in mid-reaches of the Walla Walla River, Yellowhawk Creek and Mill Creek in areas affected by the GFID operations. High water temperatures, fluctuating flows, and sediments may limit, but not eliminate, bull trout populations in the GFID area (EES 2004).

Table 2 Bull Trout Distribution, By Life Stage, Walla Walla Subbasin

Tributary Reach Description	Tributary Subreach Description	Life Stage Description	Timing of Use	Comments
Walla Walla River	Stateline down to mouth of Mill Creek	Adult, subadult rearing	Winter, Spring	(Personal communication, Glen Mendel, November 3, 2004)
Walla Walla River	From Mill Creek to the Touchet River	Adult, subadult rearing	Winter, Spring	(Personal communication, Glen Mendel, November 3, 2004)
Walla Walla River	From the Touchet River to the mouth of the Walla Walla River	Possible adult, subadult rearing	Winter, Spring	Not verified (Personal communication, Glen Mendel, November 3, 2004)
Walla Walla River	From Cemetery Bridge downstream to the state line	Adult, subadult rearing	Winter, Spring	Data from2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Walla Walla River	From the forks downstream to Cemetery Bridge in Milton-Freewater	Adult, subadult rearing	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Dry Creek (WA)	From the confluence to SR 125	None	None	(Personal communication, Glen Mendel, November 3, 2004)
Dry Creek (WA)	Upstream of SR 125 to Headwaters	None	None	(Personal communication, Glen Mendel, November 3, 2004)
South Fork Walla Walla River	Harris park downstream to the forks of the North and South Fork Walla Walla	Adult, subadult rearing, and staging by adult fluvial fish	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
South Fork Walla Walla River	Forest Service boundary downstream to Harris Park	Habitat for all bull trout life history stages	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
South Fork Walla Walla River	Headwaters and tributaries to Forest Service boundary	Habitat for all bull trout life history stages	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
North Fork Walla Walla River	Forest Service boundary downstream to confluence with the South Fork	Overwintering adults and possible use by juveniles/subadult fish. Possible spawning, but needs to be investigated.	Winter, Spring	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins

Tributary Reach Description	Tributary Subreach Description	Life Stage Description	Timing of Use	Comments
North Fork Walla Walla River	Headwaters downstream to the Forest Service boundary	Habitat for all bull trout life history stages	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Mill Creek	Walla Walla River to lower end of flood control channel at Gose Street	Adult, subadult rearing	Winter, Spring	Limited data indicating periodic use (Personal communication, Glen Mendel, November 3, 2004)
Mill Creek	Yellowhawk Creek mouth to confluence with Mill Creek	Possible adult, subadult rearing	Winter, Spring	Not verified
Mill Creek	Bennington Diversion downstream to Gose Street	Adult, subadult rearing	Winter, Spring	Data from Ben Tice, Corps of Engineers, 2004
Mill Creek	Intake Dam downstream to Bennington Diversion	Adult, subadult rearing	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Mill Creek	Headwaters and tributaries to the City of Walla Walla intake dam	Year round habitat for all bull trout life history stages	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Touchet River	Confluence with Walla Walla River upstream to Waitsburg	Possible adult, subadult rearing	Winter, Spring	Not verified
Touchet River	Waitsburg to confluence of North and South Forks	Adult, subadult rearing	Winter, Spring	(Personal communication Glen, Mendel, November 3, 2004)
Patit Creek	From confluence with Touchet River upstream	None	None	(Personal communication, Glen Mendel, November 3, 2004)
Whiskey Creek	From confluence with Touchet River upstream	None	None	(Personal communication, Glen Mendel, November 3, 2004)
Coppei Creek	From confluence with Touchet River upstream	None	None	(Personal communication, Glen Mendel, November 3, 2004)
North Fork Touchet River	From confluence upstream to Spangler Creek	Adult, subadult rearing	Year-round	(Personal communication, Glen Mendel, November 3, 2004)
North Fork Touchet River	Upstream of Spangler Creek including Spangler Creek	Year round habitat for all bull trout life history stages	Year-round	(Personal communication, Glen Mendel, November 3, 2004)
Lewis Creek	Lewis Creek from mouth upstream	Year round habitat for all bull trout life history stages	Year-round	(Personal communication, Glen Mendel, November 3, 2004)

Tributary Reach Description	Tributary Subreach Description	Life Stage Description	Timing of Use	Comments
Jim Creek	Jim Creek from mouth upstream	None	None	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
South Fork Touchet River	From mouth to headwaters	Adult, subadult rearing	Winter, Spring	(Personal communication, Glen Mendel, November 3, 2004)
Burnt Fork South Fork Touchet River	From mouth upstream	Year round habitat for all bull trout life history stages	Year-round	Data from2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Wolf Fork Touchet River	From mouth upstream to Whitney Creek	Adult, subadult rearing	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Wolf Fork Touchet River	Whitney Creek to headwaters of Wolf Fork Touchet River	Year round habitat for all bull trout life history stages	Year-round	Data from 2004 draft USFWS Recovery Plan for Bull Trout - Umatilla/Walla Walla Basins
Whitney Creek	Mouth to headwaters	None	None	Not verified
Coates Creek	Mouth to headwaters	None	None	Not verified
Robinson Creek	Mouth to headwaters	Subadult rearing	Year-round	Limited data

3. LISTING UNDER PROVISIONS OF STATE ACTION AND THE FEDERAL ENDANGERED SPECIES ACT

3.1 STATE ACTIONS

Oregon and Washington use different classification systems to assess status of bull trout populations. In 1996, bull trout in the Oregon portion of the Walla Walla Subbasin were classified as “high risk” of extirpation in the North Fork, at “low risk” in the South Fork, and “of special concern” in Mill Creek (Buchanan et al. 1997). Washington Department of Fish and Wildlife considers the status of bull trout in Mill Creek as “healthy” and “unknown” in the Touchet River (WDFW 1997).

3.2 FEDERAL ACTIONS

The U.S. Fish and Wildlife Service (USFWS) issued a final rule listing the Columbia River population of bull trout as a “threatened” species June 10, 1998 (63FR31647). At the time of Federal listing, the USFWS (2002) used criteria in Rieman et al. (1993) to classify all bull trout subpopulations in the Walla Walla as “depressed” (63 FR 31647). Three subpopulations were identified by the USFWS in the Walla Walla River subbasin (63 Fr 31647) (USFWS 2002).

4. LOCAL POPULATIONS/RECOVERY UNITS AND THEIR DISTRIBUTION

Seven local populations of bull trout are distributed in the upper reaches of the three core areas in the Umatilla-Walla Walla Recovery Unit in Washington and Oregon. Two of the core areas, the Walla Walla and Touchet, are in the Walla Walla Subbasin. These populations provide the base for recovery units.

There are differences in actual and desired bull trout distribution patterns in the Walla Walla Subbasin. Presently, fluvial populations of bull trout are present but not common to McDonald Bridge in the mainstem Walla Walla River (Glen Mendel, personal communication, July 15, 2003) during winter months. It is common to observe bull trout downstream to Waitsburg (RM 44) in the Touchet River, to the Bennington Lake Diversion (RM 11.5) in Mill Creek and to Burlingame Diversion Dam (RM 37.4) in the Walla Walla River.

The USFWS (2002) reports that it is desirable to have bull trout distribution to the mouth of the Walla Walla River. Based on physical conditions, including stream flows and water temperatures in the main-stem Walla Walla, bull trout could be distributed, at the present time, to the mouth of the Walla Walla River during winter months. Water temperatures are favorable and diversions are not affecting flows at that time of year. The USFWS (2002) suggests that habitat conditions in the Walla Walla limit bull trout distribution as well as related abundance and genetic health in the Walla Walla River (USFWS 2002). Rather than suggest that habitat conditions in the Walla Walla limit bull trout distribution, abundance, and genetic health, it could be suggested that habitat conditions in the Columbia River or harvests have extirpated fluvial populations of bull trout that historically were distributed, if in fact they were present, in the lower Walla Walla Subbasin to the Columbia River.

The USFWS (2002) acknowledge that additional bull trout life history information is needed to establish bull trout abundance, growth rate and productivity, spatial structure, and diversity in the Walla Walla recovery unit.

5. BULL TROUT RECOVERY GOAL AND CRITERIA

The goal of the draft bull trout recovery plan is to ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be delisted. To achieve this goal, the following objectives have been identified for bull trout in the Umatilla-Walla Walla Rivers Recovery Unit (USFWS 2004b):

- Maintain the current distribution of bull trout within the core areas and re-establish bull trout in previously occupied habitats.
- Maintain stable or increasing trends in abundance of bull trout in the recovery unit.
- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.
- Conserve genetic diversity and provide opportunity for genetic exchange.

Draft recovery criteria have been established for each recovery unit to assess whether recovery actions result in the recovery of bull trout in the unit. The criteria include quantitative measures of bull trout distribution and population characteristics in each core area within the recovery unit. Draft recovery criteria for the Umatilla-Walla Walla Recovery Unit are as follows (USFWS 2004b):

- Bull trout are distributed among seven or more local populations, including the following:
  - Umatilla River Core Area
    - North Fork Meacham Creek local population
    - Upper Umatilla River local population
  - Walla Walla River Core Area
    - Upper Mill Creek local population
    - Upper Walla Walla River local population
  - Touchet River Core Area
    - South Fork Touchet River local population
    - Wolf Fork Touchet River local population
    - North Fork Touchet River local population
- Achieve and maintain bull trout numbers within the following annual abundance ranges in each core area:
  - Umatilla River Core Area 500 to 1,000 spawning adults
  - Walla Walla River Core Area 1,500 to 3,000 spawning adults
  - Touchet River Core Area 500 to 1,000 spawning adults

  These abundance criteria are based on the professional judgment of the recovery unit team, with consideration given to current habitat conditions and potential conditions after threats have been addressed.
- Bull trout populations in each core area exhibit a stable or increasing trend in abundance for at least two generations (i.e., 10-14 years) at or above the abundance levels identified in criterion #2 The intent of this criterion is to increase bull trout populations in those core areas presently below their recovered abundance levels, and to maintain stable bull trout populations in core areas that have reached recovery levels. Achievement of this criteria will be based on a minimum of at least 10 years of monitoring data.
- The fluvial component of each local population is maintained and specific barriers to bull trout movement are sufficiently addressed to: (1) allow fluvial fish to effectively move between

spawning and wintering areas, and (2) ensure that fish movement can occur, at least seasonally, between local populations within each core area in the recovery unit. Establish the conditions necessary for up- and down-stream fish passage to ensure the persistence of fluvial life stages and genetic interchange between local populations within each core area. In the Walla Walla Core Area this means providing suitable habitat conditions on the Walla Walla River from Nursery Bridge downstream to the Mill Creek confluence, ensuring the ladders and slots at Nursery Bridge and Burlingame Diversion Dam will successfully pass bull trout, and screening diversions that impact bull trout. On Mill Creek, there must be effective up- and down-stream passage at the Bennington Diversion Dam, and either Yellowhawk Creek or lower Mill Creek must be restored to provide a functional, two-way movement corridor between Mill Creek and the Walla Walla River. In the Touchet Core Area, barriers to be addressed include improving passage at the Dayton Steelhead Acclimation Pond intake diversion, and screening diversions that impact bull trout.

6. CRITICAL HABITAT DESIGNATION FOR BULL TROUT IN THE WALLA WALLA SUBBASIN

Approximately 351.6 km (218.5 mi) of stream have been proposed as critical habitat to support the three bull trout populations in the Walla Walla Subbasin. Landownership associated with the critical habitat designation is approximately 28 percent Federal, 69 percent private, and 3 percent State. Stream segments composing proposed critical habitat are (USFWS 2002):

1. The Walla Walla River from its confluence with Mill Creek upstream 27.3 km (17.0 mi) to the confluence with the North and South Forks of the Walla Walla.
2. The North Fork Walla Walla River from its confluence with the South Fork upstream 29. 7 km (18.4 mi) to its headwaters.
3. The South Fork Walla Walla River from its confluence with the North Fork upstream 42.7 km (26.5 mi) to its headwaters.
4. Skiphorton Creek extending 2.6 km (1.6 mi).
5. Reser Creek extending 3.6 km (2.2 mi).
6. Husky Spring Creek extending 2.2 km (1.4 mi).
7. Unnamed tributary entering the South Fork at rkm 117.9 (RM 73.2) extending 1.8 km (1.1 mi).
8. Mill Creek from its confluence with the Walla Walla River upstream 54.7 km (32.0 mi) to its headwaters.
9. Yellowhawk Creek downstream from its division with Mill Creek 13.6 km (8.4 mi).
10. Garrison Creek downstream from its division with Mill Creek 15.4 km (9.6 mi).
11. Low Creek from it confluence with Mill Creek upstream 3.2 km (2.0 mi).
12. Paradise Creek from its confluence with Mill Creek upstream for a distance of 2.2 km (1.4 mi).
13. North Fork Mill Creek from its confluence with Mill Creek upstream 0.8 km (0.5 mi).
14. Deadman Creek from its confluence with North Fork Mill Creek upstream for a distance of 0.5 km (0.3 mi).
15. Burnt Fork Creek from its confluence with North Fork Mill Creek upstream for a distance of 1.6 km (1.0 mi).
16. Green Fork Creek from its confluence with North Fork Mill Creek upstream for a distance of 0.8 km (0.5 mi).
17. Bull Creek from its confluence with North Fork Mill Creek upstream for a distance of 0.7 km (0.4 mi).

18. North Fork Touchet River from its confluence with the South Fork upstream 31.7 km (19.7 mi) to its headwaters.

19. Wolf Fork Touchet River from its confluence with the North Fork Touchet River upstream 25.3 km (15.7 mi).

20. Robinson Creek extending upstream 17.3 km (10.7 mi).

21. Lewis Creek from its confluence with the North Fork Touchet River upstream 7.9 km (4.9 mi).

22. Spangler Creek from its confluence with the North Fork Touchet River upstream 6.6 km (4.1 mi).

23. South Fork Touchet River from its confluence with the North Fork upstream 24.6 km (15.3 mi) to its headwaters.

24. Griffin Fork from its confluence with the South Fork Touchet River upstream 6.2 km (3.9 mi) and including 3.2 km (2.0 mi) of an unnamed tributary the enters Griffin from the north.

25. Burnt Fork from its confluence with the South Fork Touchet River upstream 4.3 km (2.7 mi).

7. ECONOMIC IMPACT ASSOCIATED WITH CRITICAL HABITAT DESIGNATION

The USFWS published a draft economic analysis describing costs associated with the designation of critical habitat for bull trout (USFWS 2004). It is estimated that total annual costs associated with the bull trout recovery in the Umatilla-Walla Walla Unit will be between $103,000 and $213,000. Of this, $57,000 is associated with administration costs, $25,000 to $63,000 is associated with timber harvest costs, and $26,000 is associated with agricultural irrigation diversion costs.

Costs associated with preparation of Habitat Conservation Plans (HCPs) are not described in the economic analysis (USFWS 2004). However, there is a connection between the costs to create HCPs and costs associated with the designation of critical habitat for bull trout.

8. LIFE HISTORY CHARACTERISTICS OF BULL TROUT IN THE WALLA WALLA SUBBASIN

8.1 LIFE HISTORY STRATEGIES

Bull trout exhibit resident and fluvial life-history forms in the Walla Walla Subbasin (Rieman and McIntyre 1993). Resident bull trout complete their entire life cycle in upper reaches of the watershed where they spawn and rear. They do not travel far from their natal stream where they are dependent on freshwater environments which are usually clean, cold, and relatively pristine streams. The percentage of resident and fluvial bull trout in the Walla Walla is unknown, but ongoing radio telemetry (Mahoney 2003) and a population study (Budy et al. 2003, 2004) should provide that information (T. Bailey, personal communication, April 2004).

Considerable bull trout life history strategy information has been collected but not summarized in the Walla Walla Subbasin. Budy et al. (2004) state that analyses of populations of bull trout in the South Fork of the Walla Walla River are based on limited data collection and should be considered with caution. Budy et al. (2004) suggest a large population of bull trout exists in the South Fork of the Walla Walla River. Based on two sampling seasons, the size of this population appears to be increasing somewhat (Budy et al. 2004).

8.1.1 Spawning

Bull trout tend to spawn in about the same areas and at about the same time of year. Extensive bull trout spawning surveys have been conducted in Mill Creek (Hemmingsen et al. 2002, 2000, 1998; Hemmingsen and Buchanan 1996; Sankovich et al. 2003; Hemminsen et al. 1999), and bull trout spawning surveys have been conducted in other areas of the Walla Walla Subbasin. These surveys are used to depict population trends in the Walla Walla Subbasin. Mill Creek is located between the Touchet and Walla Walla rivers in the same general type of habitat. The headwaters of each stream are located in the Blue Mountain, and each stream flows in a west, north or northwest direction. Spawning ground information collected in Mill Creek is used to represent spawning life history strategies in the Walla Walla Subbasin. Figure 3 depicts general locations, tributaries, and reaches where surveys are conducted in Mill Creek.

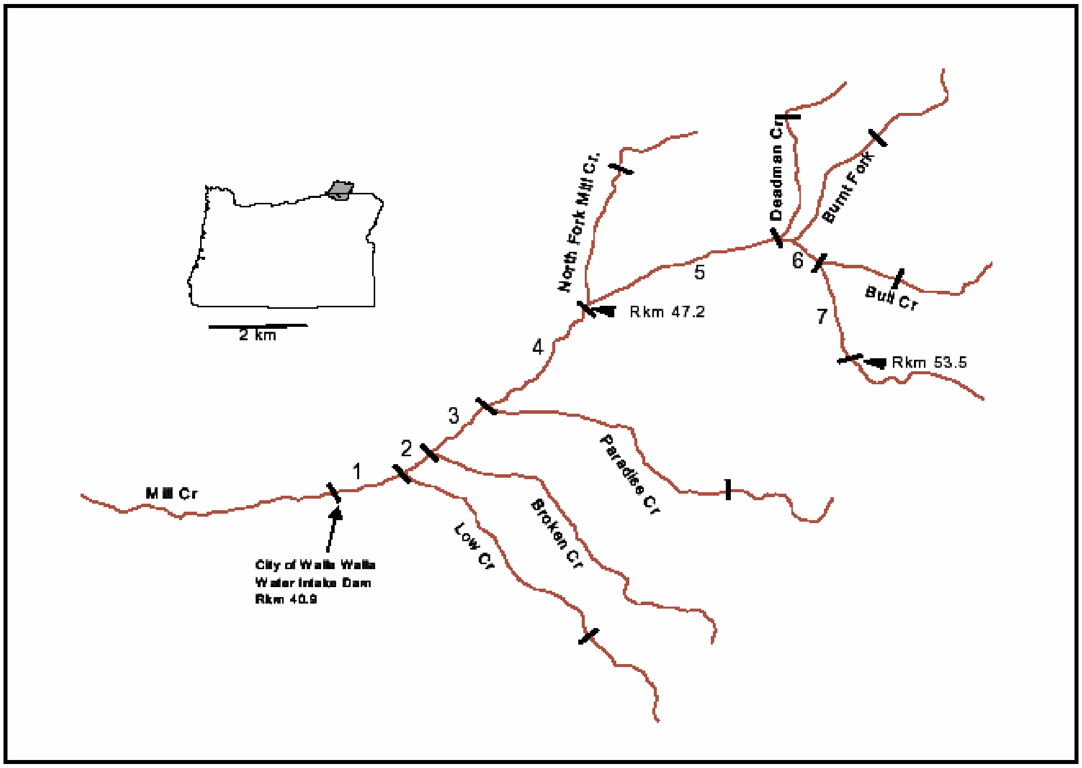


Figure 3 Map of Mill Creek Showing Stream Location, Tributaries, and Units Where Spawning Ground Counts are Conducted and Redds are Counted

In 2001, 220 bull trout redds were observed in Mill Creek. Of these, 163 (74 percent) were in Mill Creek and 57 were in tributaries. Tributaries contained 27 to 43 percent of the total redds counted during the period 1996-2000. Low Creek, where resident bull trout spawn, contained 18 redds per km and the most redds observed in all tributaries (Hemmingsen et al. 2002). The densities of redds ranged from 5 to 27 per kilometer (Hemmingsen et al. 2002). Figure 4 depicts trends in bull trout redds observed in Mill Creek, 1994 – 2002 and Figure 5 depicts number, density and time of redd counts in each reach.

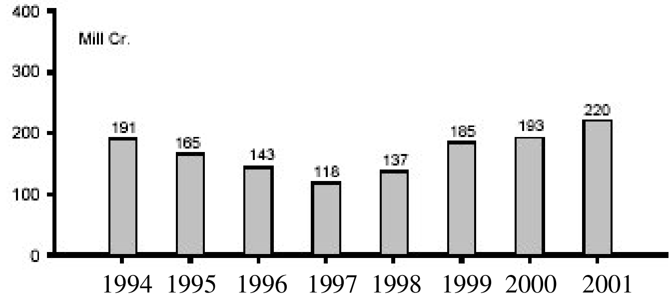


Figure 4 Numbers of Bull Trout Redds Observed in Mill Creek

Source: Hemmingsen et al. 2001.

Figure 5 shows spawning ground surveys on Mill Creek and tributaries in 2001. The first graph shows number of redds counted while the second graph shows density of bull trout redds in each reach, and the final graph shows proportion of the total number observed during each survey.

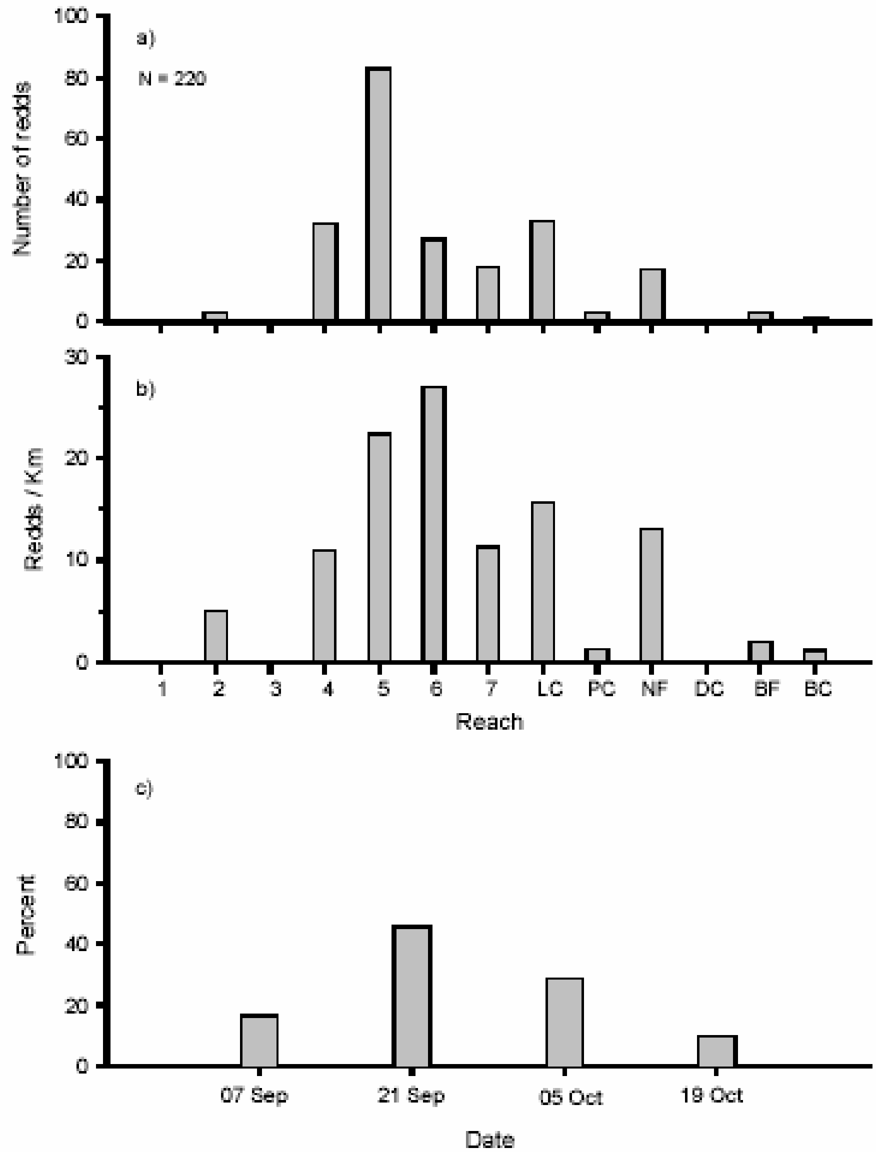


Figure 5 Spawning Ground Surveys on Mill Creek and Tributaries, 2001

LC = Low Creek, PC = Paradise Creek, NF = North Fork Mill Creek, DC = Deadman Creek, BF = Burnt Fork, and BC = Bull Creek.

Reach five in Mill Creek contained the greatest proportion of redds (range is 31 to 38 percent with a coefficient variation (cv) of 9 percent among all reaches. Although redds in Low Creek tend to be smaller and possibly more difficult to observe than those in reach five, proportions of redds in Low Creek also had relatively low variation (cv +20 percent). Together, reach five of the South Fork and Low Creek produced 48 to 57 percent (mean = 52.1 percent) of redds observed annually in the watershed from 1996 through 2001 (Table 3) (Hemmingsen et al. 2002).

Table 3 Proportion of Bull Trout Redds Observed Each Year in Various Survey Reaches of Mill Creek and Tributaries, and the Estimated Variation Among Years

Survey Reach	1996	1997	1998	1999	2000	2001	Mean	SD	CV
Mill Creek									
1	0.7	0.0	0.0	0.0	0.0	0.0	0.1	0.3	245
2	0.0	0.0	0.7	0.0	0.0	1.4	0.3	0.6	165
3	0.0	4.2	2.2	2.2	1.0	0.0	1.6	1.6	102
4	16.9	11.9	10.9	20.5	6.7	14.5	13.6	4.8	36
5	37.3	30.5	32.8	31.4	36.3	37.7	34.3	3.2	9
6	7.7	12.7	10.2	7.0	5.2	12.3	9.2	3.0	33
7	2.1	13.6	12.4	7.6	7.8	8.2	8.6	4.1	47
Low Creek	12.7	16.9	19.7	22.2	20.2	15.0	18.3	3.7	20
Paradise Creek	7.7	1.7	0.7	3.2	2.6	1.4	3.2	2.7	85
NF Mill Creek	4.2	2.5	4.4	3.2	8.8	7.7	4.6	2.5	53
Deadman Creek	2.1	0.8	2.9	0.0	3.6	0.0	1.9	1.5	78
Burnt Creek	8.5	3.4	1.5	2.2	7.3	1.4	4.5	3.1	69
Bull Creek	0.0	1.7	1.5	0.5	0.5	0.5	0.8	0.7	84

Source: Hemmingsen et al. 2002.

Redd surveys in the South Fork of the Walla Walla River have demonstrated spawning activity by bull trout between 1994 and 2003. The number of redds identified over the period show a general increasing trend, although sample locations varied somewhat. Table 4 provides data for the 1994-2003 period.

Table 4 Redd Survey Data, South Fork Walla Walla River, 1994 – 2003

Reach	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Harris Park – Bear Creek	0				0	0	2	0	0	2
Bear Creek-Burnt Cabin	16 (to Skiph. Creek)	1 (to Table Creek)	3 (to Table Creek)		1 (to Table Creek)	5 (to Table Creek	5 (to Table Creek)	10 (to Table Creek)	5 (to Table Creek)	5
Burnt Cabin-Table										10
Table-Skiphorton Creek		18	6	7	18	50	12	27	35	62
Skiphorton Creek	23	20	14	31	19	28	26	28	52	42
Skiphorton Creek-Midpt.	32 (to Reser Creek)	35 (to Reser Creek)	58 (to Reser Creek)	67 (to Reser Creek)	125 (to Reser Creek)	215 (to Reser Creek)	225 (to Reser Creek)	311 (to Reser Creek)	151 (to Reser Creek)	50
Midpt. to Reser										75

Reach	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Reser Creek-2nd Trib.	69 (to top)	27	84	51	98	89	67	72	47	61
Reser Creek	3	7	10	9	6	18	17	2	18	19
2nd Trib.-Top		3 (to Reser Cab Trib.)	9 (to Reser Cab Trib.)	14 (to Reser Cab)	9 (to Reser Cab)	26 (to Reser Cab)	12 (to Reser Cab)	33	22	36
2nd Trib. on East				1	0					
Total	**143**	**111**	**184**	**180**	**276**	**431**	**366**	**483**	**330**	**362**

Source: ODFW, 2003.

The North Fork of the Walla Walla River was also surveyed for redds in 2003. No redds were observed during the four sampling efforts for that year.

8.1.2 Characteristics of Bull Trout Redds

The visibility and physical characteristics of bull trout redds vary among streams, but bull trout redds in Mill Creek are very visible. After two weeks in Mill Creek, nearly 50 percent of the redds counted looked newly made and after six weeks nearly 33 percent of the redds looked newly made.

Physical characteristics of each redd likely influence their visibility. The substrate where bull trout spawn in the Mill Creek drainage is quite large; especially in the mainstem. Substrate used for spawning is smaller in Low Creek (Hemmingsen et al. 1998). Figure 6 shows mean size of substrate and the percentage of small particles where bull trout spawn in Mill Creek, 1997 and 1998.

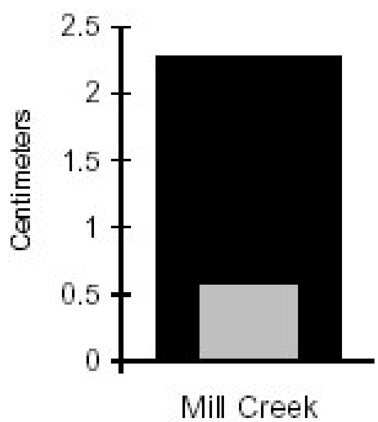


Figure 6 Mean Size of Substrate and the Percentage of Small Particles in Bull Trout Redds, Mill Creek, 1997 – 1998

Source: Hemmingsen et al. 1998.

Bull trout redds, other than Low Creek, are quite large in Mill Creek (Figure 7). Size of redds compares to size of fish that were observed spawning or holding near the redd, i.e larger fish create larger redds. Bull trout spawners 300 mm (12 in.) or larger have larger redds. Nearly 80 percent of spawners in Mill Creek, with the exception of Low Creek, are larger than 300 mm.

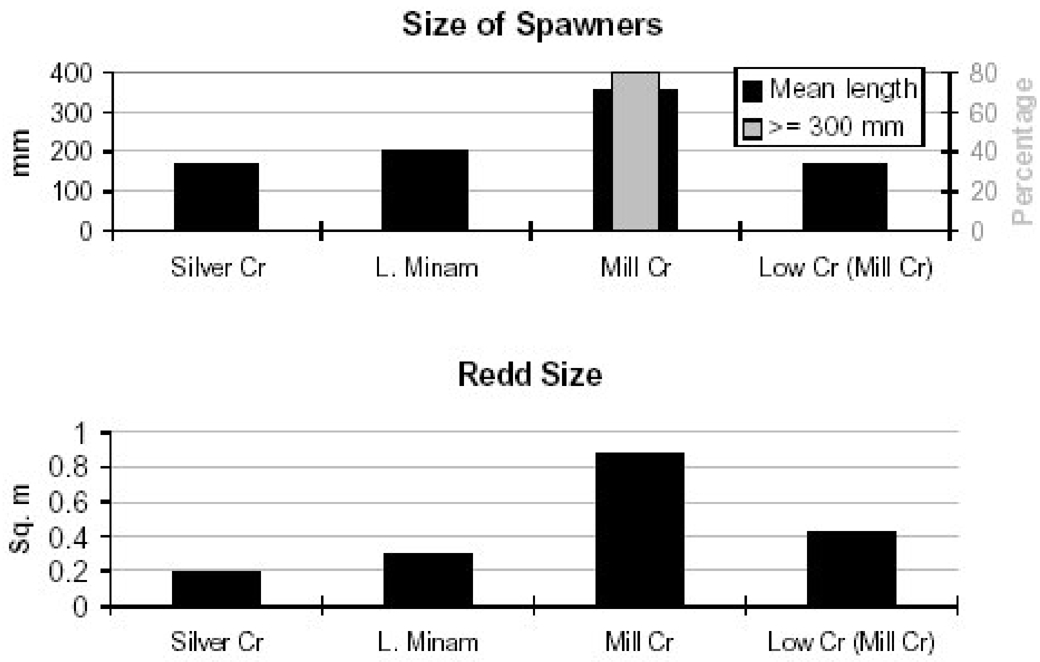


Figure 7 Mean Size of Redds and Bull Trout Observed in Mill and Low Creeks Compared to Silver Creek and Little Minam, 1997 and 1998

8.1.3 Fecundity

Budy et al. (2003) counted eggs in a small sample of female bull trout. Size of bull trout sampled ranged from 205 to 564 mm (8 to 22 in.). Average number of eggs-per-female was 1,661. The number of eggs-per-female was related to the total length of the female. Figure 8 depicts number of eggs compared to the total length of females.

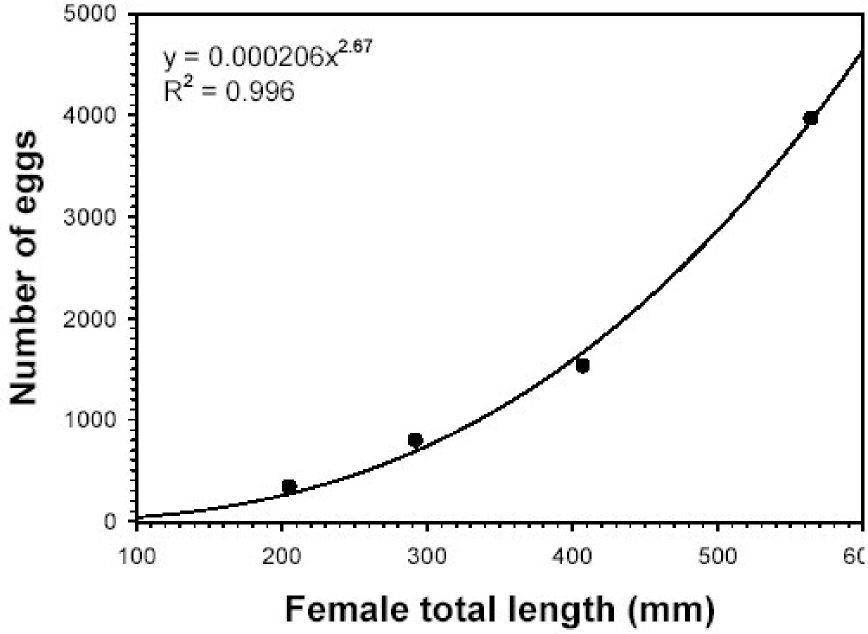


Figure 8 Fecundity of Female Bull trout Captured in the South Fork Walla Walla River, 2002

Source: Budy et al. 2003.

8.1.4 Egg Survival and Incubation

Survival of eggs and sac fry during incubation has not been determined in the Walla Walla Subbasin.

Egg incubation progresses according to water temperature. Egg incubation may take 100 to 145 days depending upon water temperature. Sac fry and fry remain in the substrate for 50 or more days prior to emergence, and fry emerge may occur in April through May.

Nine temperature data loggers were deployed December 12 at five sites in Mill Creek in 2000 (Figure 9). During the time of egg incubation, the 7-day average minimum temperatures at all sites remained at or below 5ºC through February 15. The 7-day average minimum temperature at RKM 21 was consistently coler that other sites and fluctuated between 1.7ºC and 3.7ºC from December 19, 2000 to March 7, 2001. Stream temperatures slowly began to increase in mid-March (Hemmingsen et al. 2002).

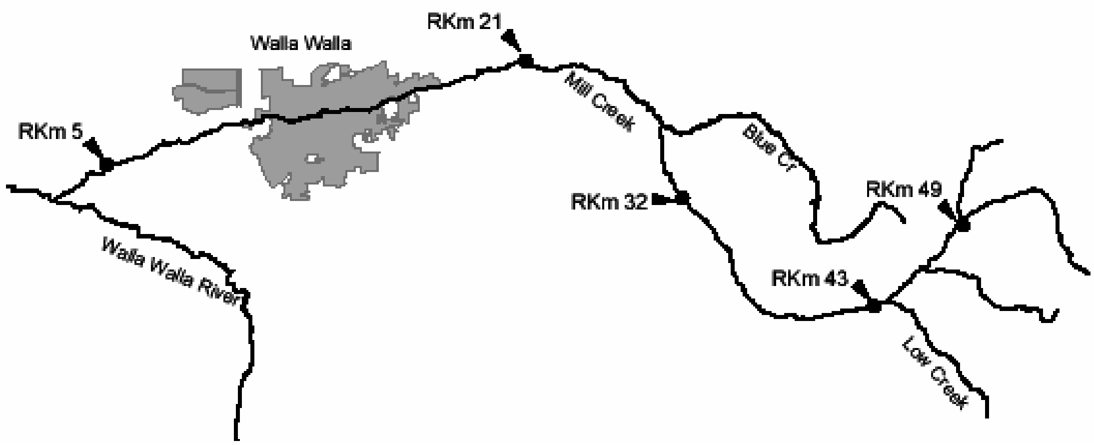


Figure 9 Locations of temperature data loggers in Mill Creek in 2001

8.1.5 Juvenile Growth

Bull trout growth studies have not been conducted in the Walla Walla Subbasin. Figure 10 depicts size of bull trout caught, but growth patterns have not been determined. Fluvial bull trout tend to grow larger because they seek out food in the larger waters. But, resident and fluvial forms may be found together in headwater streams, and either form can have offspring that exhibit either life history pattern (EES 2004). It is common for resident and fluvial forms of bull trout to reside over-winter in portions of the Walla Walla Subbasin (T. Bailey, personal communication, April, 2004).

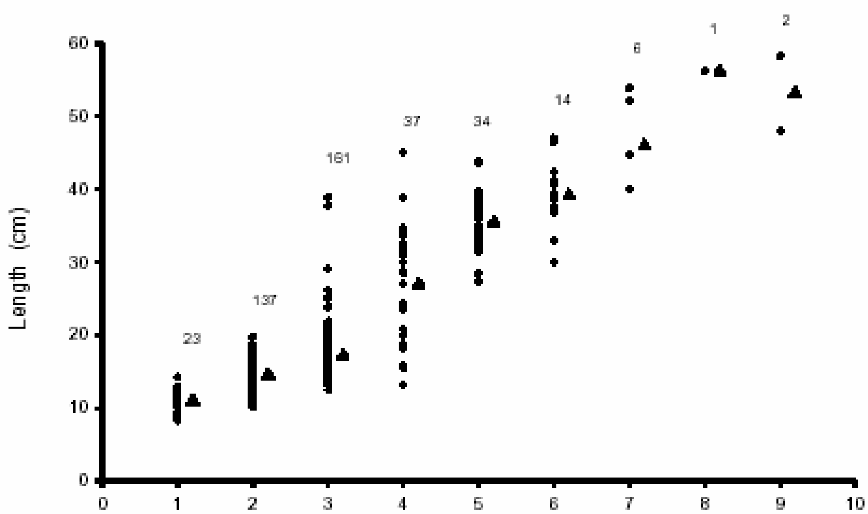


Figure 10 Fork Length by Age of Bull Trout, Mill Creek, 1998

Age was estimated using scale samples. Mean length at age is represented by triangles.

Source: Hemmingsen et al. 1998.

Figure 11 provides fork length by age of bull trout collected at different sites in the Walla Walla Subbasin, 1993 – 2000 (data from Internet).

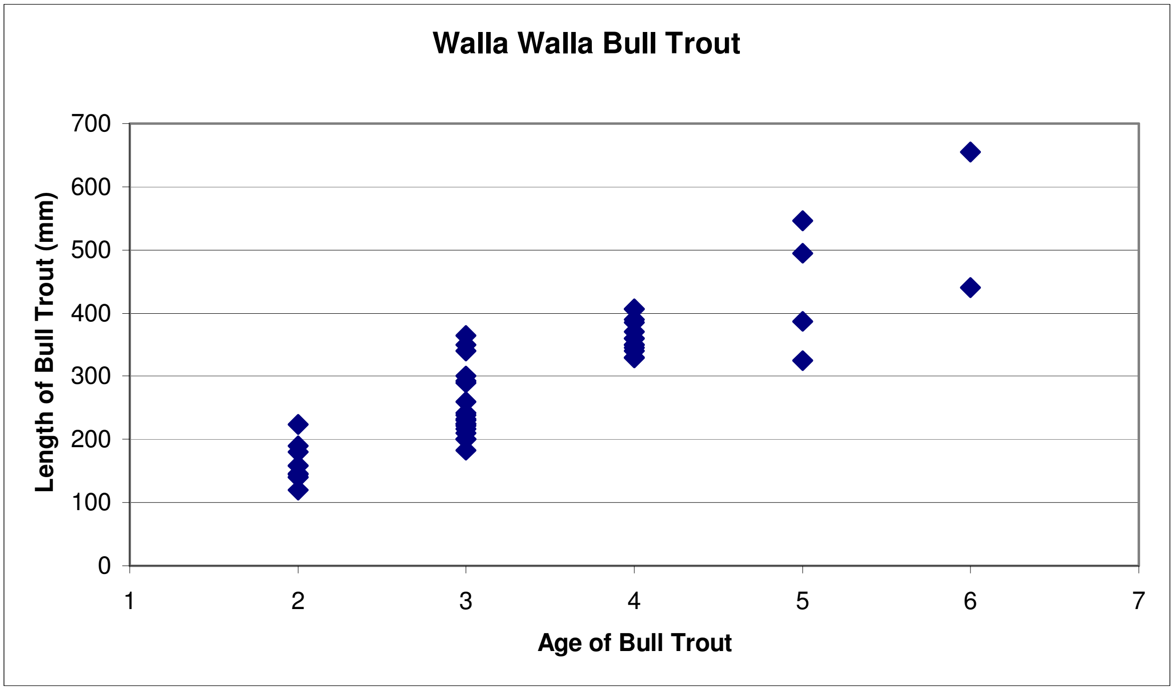


Figure 11 Fork Length by Age of Bull Trout at Select Locations, Walla Walla Subbasin, 1993 – 2000

8.1.6 Size and Movement of Bull Trout in the Walla Walla Subbasin

Mill Creek Traps

Hemmingsen et al. (2001) describes bull trout trapping in Mill Creek. Upstream migrant bull trout are trapped from June through mid-October as they exited an existing fish ladder at the City of Walla Walla water intake (Rkm 40.9) (RM 25.4). Downstream migrant bull trout were trapped nearly all year in a rotary screw trap at Rkm 42 (RM 26.1) (Hemmingsen et al. 2001, 2002). Bull trout were anesthetized, measured, weighed and scales were collected from a sub-sample. Some bull trout over 150 mm (6 in.) were tagged with passive integrated transponder (PIT) tags and some were marked with fin clips. Efficiency of the screw trap was determined monthly from the number of recaptured, fin-marked or PIT-tagged bull trout (Hemmingsen, et al. 2002).

Bull trout were divided into two groups; those captured for the first time and those recaptured one or more times in either trap. The trap at the City Intake collected 157 bull trout of which 157 were measured with lengths ranging from 212 to 710 mm (8.4 to 28 in.). Only four bull trout were less than 300 mm (11.8 in.), and two were less than 250 mm (9.8 in.) (Figure 12).

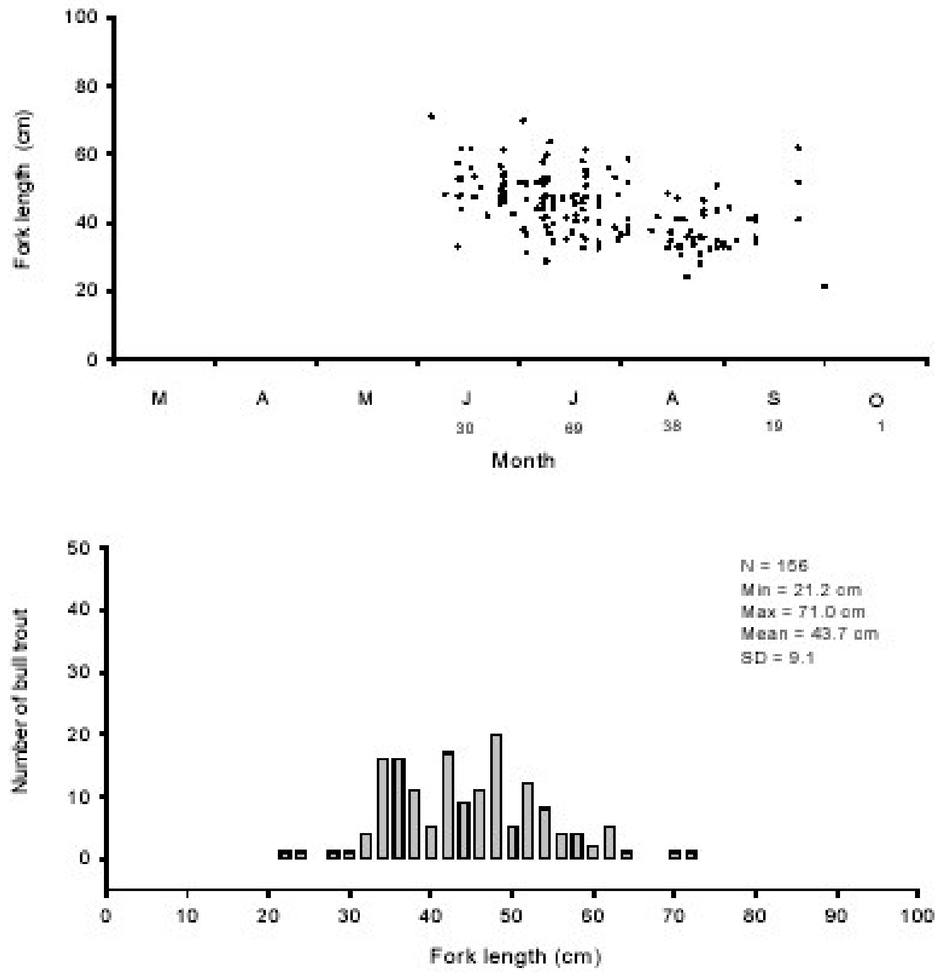


Figure 12 Numbers and Lengths of Bull Trout Captured in the Upstream Migrant Trap in Mill Creek, 2001

Sixty-three percent of the upstream migrant bull trout were captured by August 1 (Table 5), and the larger bull trout tended to appear earlier than the smaller bull trout (Figure 13) (Hemmingsen et al. 2002).

Table 5 Lengths of bull trout captured in the upstream migrant trap in Mill Creek, 2001

		FL (mm)		
Month	**N**	**Min**	**Max**	**X**
June	29	330	710	512
July	69	287	697	447
August	38	239	584	385
September	19	326	617	398
October	1	--	--	212

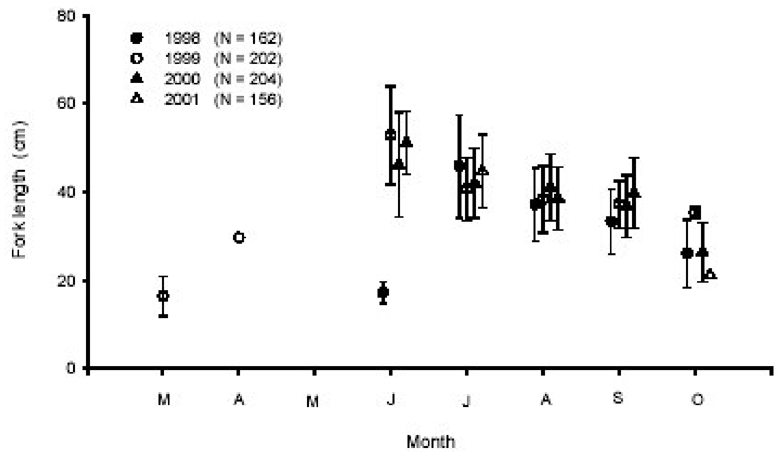


Figure 13 Monthly Mean Fork Lengths of Bull Trout Captured in the Upstream Migrant Trap During Four Years, Mill Creek

Source: Hemmingsen et al. 2002

The rotary screw trap in Mill Creek captured 215 bull trout ranging in lengths from 36 to 607 mm (1.4 to 24 in.) (Hemmingsen et al. 2002). Similar sized bull trout were captured in previous years (Hemmingsen et al. 2002) (Figure 14).

Eighty-five percent of the bull trout captured by the screw trap from September 2001 through March 2002 were less than 300 mm (12 in.) in length, with 29 percent captured in March. The length distributions were similar each month (Figure 14). Together, these data indicate movement of juvenile bull trout year-round in Mill Creek, and this emigration occurs at a specific size. Fifteen percent of the bull trout captured by screw trap were 300 mm (12 in.) or larger. All but two were captured during September and October and none were captured after December (Hemmingsen et al. 2002).

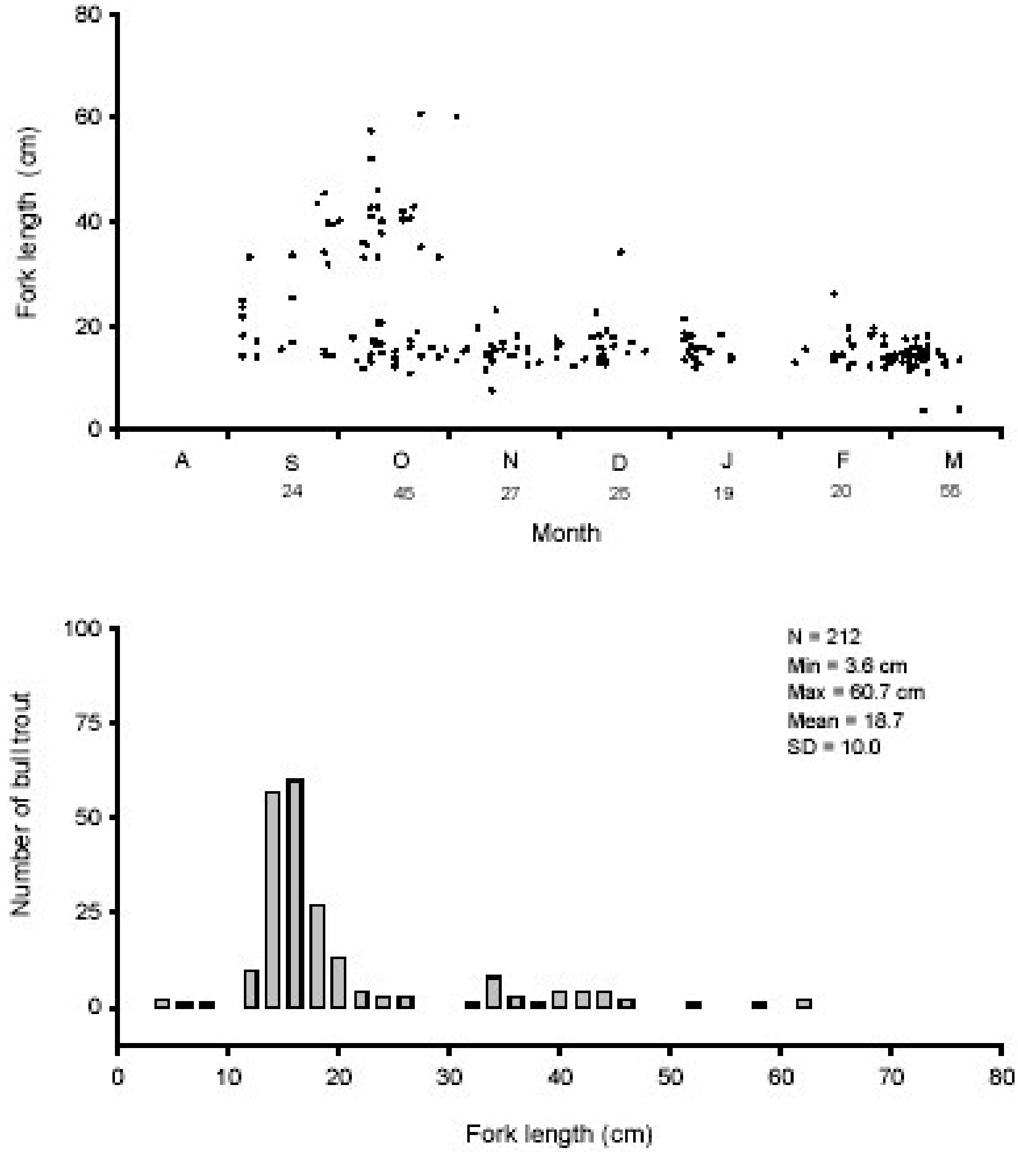


Figure 14 Numbers and Lengths of Bull Trout Captured in a Screw Trap in 2001
Monthly totals are shown under corresponding months.
Source: Hemmingsen et al. 2002

South Fork Walla Walla Surveys

Budy et al. (2003) conducted length-weight relationships on 299 bull trout in the South Fork Walla Walla in 2002. Figure 15 shows the calculated information based on all measured bull trout. The smallest bull trout captured was 32 mm (1.3 in.) and weight 0.3 grams. The largest bull trout caught was 617 mm (24.3 in.) and weighed 1.8 kg. The greatest numbers of bull trout were in the 100 mm (4 in) to 200 mm (8 in) size range (Figure 16).

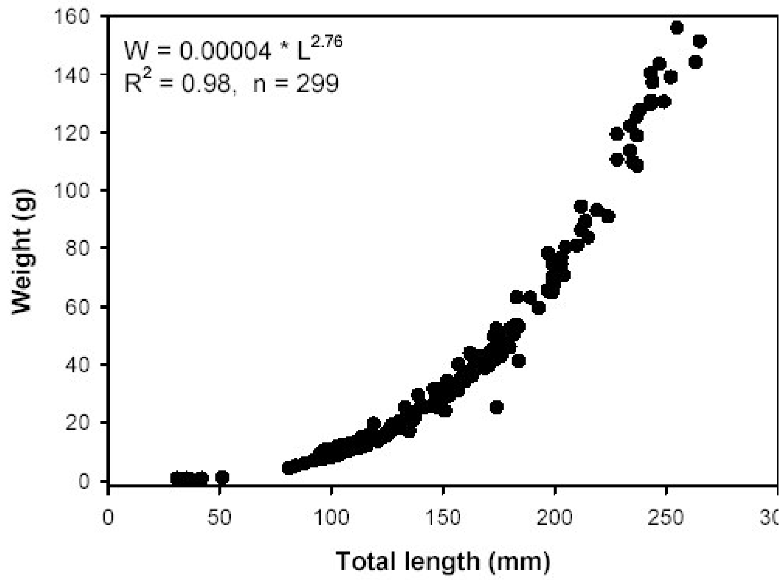


Figure 15 Length-Weight Relationship for Bull Trout Captured in the South Fork Walla Walla River, 2000

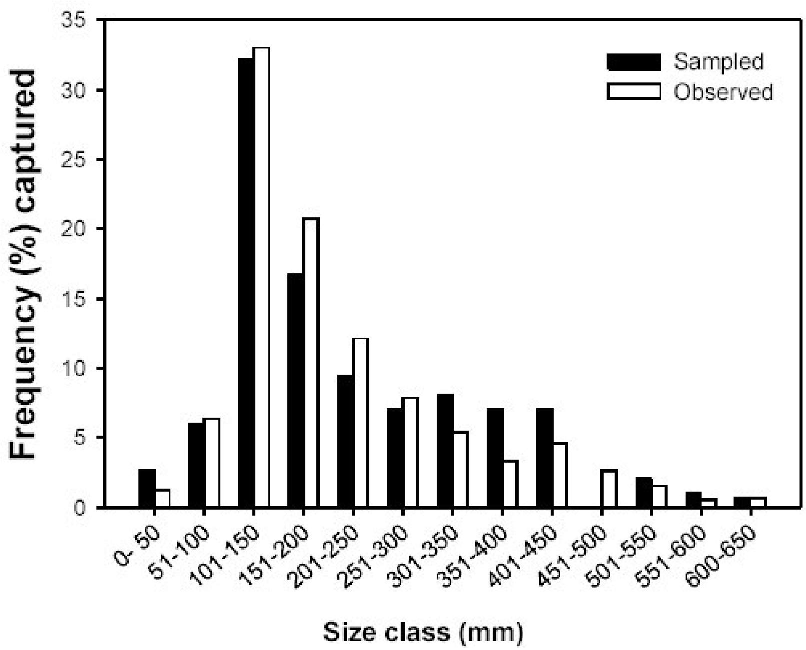


Figure 16 Length Frequency Distribution of Bull Trout in the South Fork Walla Walla River, 2002

Mill Creek Telemetry

Eleven radio-tagged bull trout, tagged in 1998 and 1999, were tracked in 2001 (Hemmingsen et al. 2002). Table 6 depicts their movements. There were many more than 11 bull trout tagged between 1997 and 1999. See all of Hemmingsen's annual reports for those years.

Table 6 Movement of Radio-Tagged Bull Trout, Mill Creek, 2001

MHz	L (mm)[1]	LU	TU	LD	TD	Last Found
Tagged in 1998						
150.073	605	37.4[2]	04 Jan	--	--	27 Jun
150.105	535	29.8[2]	04 Jan	--	--	15 May
150.123	520	24.8[2]	04 Jan	--	--	27 Jun
150.134	545	40.6	04 Jan	20.5	11 Apr	27 June
105.192	630	19.2	04 Jan	18.6	15 May	27 June
150.343	510	38.6[2]	14 Jun	--	--	27 Jun
150.713	555	20.3	04 Jan	18.7	15 May	27 Jun
Tagged in 1999						
151.273	360	38.9[2]	04 Jan	--	--	08 May
151.312	315	40.6[2]	04 Jan	--	--	27 June
151.343	358	37.0[2]	04 Jan	--	--	27 Jun
151.681	395	40.6	04 Jan	35.4	05 Apr	05 Apr

LU = maximum known upstream location (Rkm) in 2001.
TU = earliest date of maximum upstream location.
LD = maximum downstream location (Rkm) 2001.
TD = earliest date of maximum downstream location.
[1] Length when implanted with radio transmitters.
[2] Always located here.

Walla Walla River Telemetry

From 2001 through 2004, the Oregon Department of Fish and Wildlife (ODFW) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) (Mahoney 2003, 2004) placed radio tags in 91 bull trout in the Walla Walla River. Although this work is ongoing, there have been some results to date. Eight bull trout over-wintered between Joe West Bridge and the State line, and no bull trout moved below the Washington-Oregon state line. These fish were tagged in the same area. There was no evidence in this study to indicate that bull trout are found in the lower Walla Walla below the State line (Mahoney 2003). Twenty-three radio-tagged bull trout over-wintered in the vicinity they were observed in November 2003 (Mahoney 2004).

On average, downstream migrant bull trout took 21 days to move from Burnt Cabin Creek to below Harris Park, 102 days to pass below the Little Walla Walla River and 178 days to depart below Nursery Bridge Dam. There was little movement by radio-tagged bull trout in winter, but when movement did occur, it was associated with high flows. There is some evidence that bull trout also moved downstream to feed (Mahoney 2003).

Of the 91 radio-tagged bull trout between 2001 and 2003, 73 (78 percent) survived and were tracked in the South Fork Walla Walla River. Pre-spawn tag loss was quite high during the first year of the study, at

45 percent, but declined to 12 percent and 14 percent respectively, in the following two years (see Table 7). Snorkeling observations on the tagged fish indicated that the high tag loss in the first year may have been related to post-operative infection due to poor water quality and surgical techniques. Bull trout movement was generally low, except during fluvial migration, which generally occurred between June and November (see Figure 17). Bull trout in the study primarily overwintered between the South Fork Walla Walla River, the North Fork Walla Walla River, and the upper Walla Walla River. Spawning in the South Fork Walla Walla River took place between late August and early November, with the primary spawning area above Burnt Cabin Creek (Schwartz et al, 2004).

Table 7 Prespawning Mortality and Tag Loss, Number of Fish that Moved to the Spawning Area, Post Spawn Mortality, and Downstream Fate of Bull Trout

	Migration Year					
	2001 (n=20)		2002 (n=25)		2003 (n=64)	
	Number	Percent	Number	Percent	Number	Percent
Prespawning mortality and tag loss	9	45	3	12	9	14.1
Battery failure (pre-spawn)					2	3.1
In rearing area during spawning season					10	15.6
Unknown[1]					2	3.1
Moved up to spawning area	11	55	22	88	41	64.1
Post-spawn mortality and tag loss	5	45.5	10	45.5	8	19.5
Moved downstream to over-winter	6	54.5	12	54.5	29	70.7
Battery failure (post-spawn)					4	9.8

[1] Either tag malfunction, fish left study area, or undocumented Harvest.

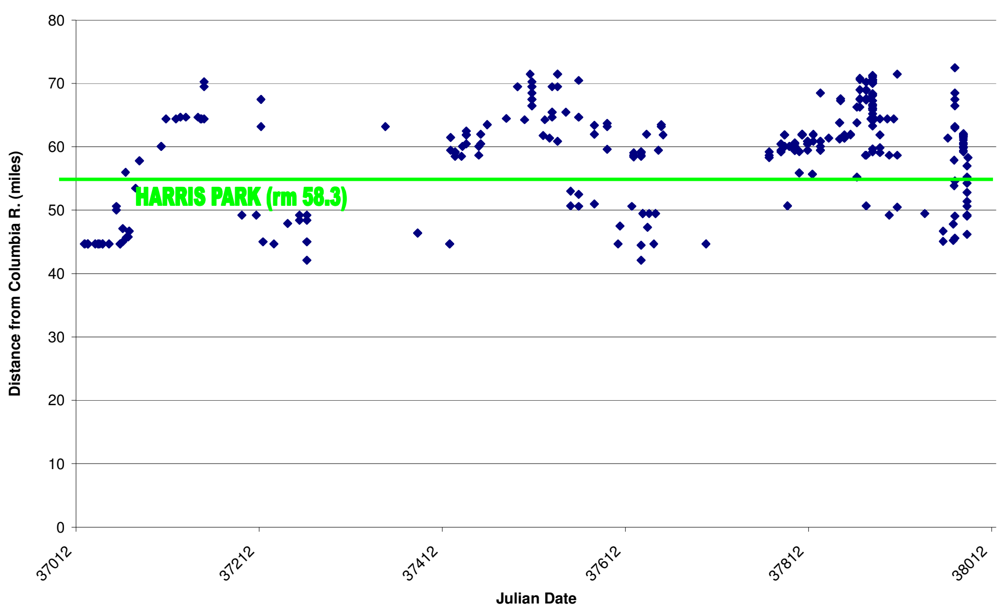


Figure 17 Movement of Radio Tagged Bull Trout on the South Fork Walla Walla River During 2003

9. BULL TROUT ABUNDANCE IN THE WALLA WALLA SUBBASIN

Quantitative population assessment data are extremely limited for bull trout in the Columbia River Basin (Rieman and McIntyre 1993, Buchanan et al. 1997, USFWS 1998) and in the Walla Walla River subbasin. Information on fish population abundance, life-stage specific survival, and limiting factors is required for determining population status and identifying management actions aimed at recovery (Meffe et al. 1997). Bull trout populations can be difficult to evaluate because of the species' nocturnal and elusive behavior (Shepard et al. 1984, Goetz 1991, Bonneau et al. 1995); different life-history strategies, which often coexist together (Fraley and Shepard 1989, Goetz 1991, Rieman and McIntyre 1993); and their potentially diverse habitat requirements (Pratt 1984, Goetz 1991).

The ability to accurately assess bull trout population status, trend, and distribution is central to conservation efforts for the species, however. A coordinated approach to conduct such assessment is needed, but currently, monitoring activities to assess population status, trends and distribution are not part of any overall framework. The Environmental Protection Agency (EPA) has developed the Environmental Monitoring and Assessment Program (EMAP) to evaluate the status of natural resources which control bull trout populations.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) conducted snorkeling and electrofishing to document the presence and abundance of salmonids throughout the Walla Walla Subbasin. The information collected by both techniques were inconsistent. CTUIR notes that it may be impossible to develop a statistically robust and cost effective monitoring program (Contor et al. 2003). Contor et al. (2003) reported bull trout observations, however. They surveyed, using electrofishing and snorkeling gear, 17,511.1 linear meters (19,150 linear yards) and they saw 126 bull trout (Table 8).

Table 8 A Summary of Bull Trout Observations, Walla Walla Subbasin, 2000-2002.

Stream	May	June	July	August	Total
Couse Creek		2			**2**
Griffin Creek				1	**1**
NF Walla Walla				3	**3**
SF Walla Walla	1	6	2	47	**74**
Walla Walla	9		20		**15**
Mill Creek	1	7	8	15	**31**
Total	**11**	**15**	**34**	**66**	**126**

Bull trout presence during CTUIR sampling efforts appeared to be associated with water temperature. Figure 18 depicts the number of bull trout associated with different water temperatures (Contor et al. 2003).

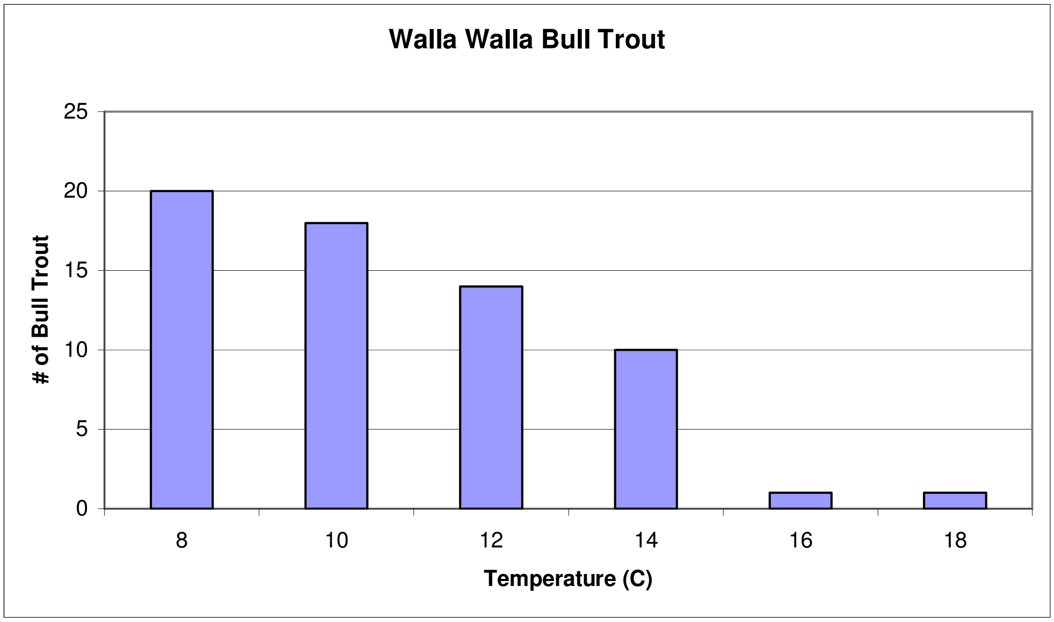


Figure 18 Number of Bull Trout by Water Temperature, Walla Walla Subbasin, 2000 – 2002

Source: Contor et al. 2003

Budy et al. (2003, 2004) suggests that the bull trout population in the South Fork Walla Walla may range from 4,221 to 8,200 fish. Despite the preliminary nature of work conducted by Budy et al. (2003, 2004), numbers of bull trout may be much larger than might be expected based on past redd counts. Redd counts likely may include only larger redds associated with fluvial bull trout whereas the smaller resident bull trout redds may not be counted. Budy et al. (2003) suggest, based on their preliminary studies, that the bull trout population in the South Fork Walla Walla River is stable and is increasing.

10. BULL TROUT AND BROOK TROUT INTERACTIONS

It is important to note that the introduced brook trout pose a threat to native bull trout populations through hybridization (Leary et al. 1993) and competition (Ratliff and Howell 1992). Hybridization between brook and bull trout was documented by Kitano et al. (1994) and Markle (1992).

The diets of bull trout and brook trout are similar, but evidence of resource partitioning and interactive segregation is minimal. Food may be limiting in high, unproductive streams where bull trout and brook trout are present suggesting strong competition among size classes (Hemmingsen et al. 1999).

Unlike many streams in eastern Oregon and Washington, brook trout are not causing an interaction or threat to bull trout populations in the Walla Walla Subbasin.

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COMMENTS RECEIVED ON THE DRAFT BULL TROUT SPECIES REPORT

The following comments were submitted by agencies and public citizens in the Walla Walla Subbasin during the final comment period for the Addendum Document. Although these comments were not able to be addressed in this Addendum Document, they will need to be addressed in another process such as the current Habitat Conservation Plan (HCP) development process or a future subbasin planning revision process.

Washington Department of Fish and Wildlife

- This document has been updated to include the USFWS 2004 Recovery Criteria and that is very helpful as the USFWS 2004 document was unavailable for the May 2004 Subbasin Planning Document. Unfortunately, the Species Report does not include information from the 2004 Recovery Plan (USFWS 2004) for many parts of the life history and habitat needs sections. Additionally, much of the local documentation was ignored in the Species Report (e.g. Martin et al. 1992?, Underwood et al. 1997?, Budy et al. 2004, Mendel et al. 2002, 2003, 2004, etc.). The Critical Habitat Section appears to come from the 2002 effort, but it should be updated to the current review draft for critical habitat (2004).
- Figures 1 and 2 are not completely accurate. It may be possible to include maps from the USFWS 2004 draft document that may be better.
- Resident (and fluvial) populations of bull trout are common in the North Fork and Wolf Fork of the Touchet River and uncommon in other areas of the Touchet drainage listed (pg. AD4-5).
- References to EES or EES Parametrix should be replaced with original references or the USFWS 2004 document.
- Table 2 still needs some slight tweaking, such as putting the stream segments in order from either top to bottom or bottom to top (but be consistent).
- Page AD4-12: A political statement exists near the bottom of the 3rd paragraph. "Rather than suggest…" should be changed to "Another possibility is that instead of suggesting that habitat…" It is speculative, but it is a possibility.
- Page AD4-12, paragraph 2, line 4 should be changed. Bull trout are present between Dayton and Waitsburg in winter and spring but may not be common. A last sentence should be added about their presence below Bennington Dam and reference Tice 2004.
- Page AD4-17, Section 7 appears to not be complete. I believe the draft Recovery Plan showed $65 million for recovery over 25 yrs
- Figure 4 on page AD4-19 is not very useful. It suggests similar surveys and trend analysis. Not all areas were walked each year or the same number of times each year (see Mendel et al. 2004 for a more detailed review of these data)
- Table 3 on page AD4-21 is too much detail for one area without similar detail for other bull trout areas in the Walla Walla Basin.
- Table 8 on page AD4-33 is missing all of WDFW's data that covers many other areas of the Walla Walla Basin (Mendel et al. 1998-2004).
- Page AD4-34: "…numbers of bull trout may be much larger than might be expected based on redd counts." This is not a reasonable statement. No one is using redd counts to estimate the population of bull trout greater than 100mm and inclusion of small juveniles is inappropriate for comparison with redd surveys.

- Page Ad4-35: Note that brook trout do not exist in the Walla Walla Basin.

Ed Chestnut, WWBWC Board Member

- Page AD4-6: See the legends for the figure (which are hard to read on my copy). It looks like it says “Historic distribution (pre-1990).” Shouldn't that be (pre-1890)? I’m virtually certain that bull trout were not present in the lower main stem WW and lower Touchet in 1960, 1970, 1980 (all pre-1990).
- Page AD4-8: The plan states that the WW from the forks downstream to Cemetery Bridge is used for Adult, subadult rearing in the winter and spring (per the USFWS data). I would add that there is occupation of that reach by 16” – 19” adults by mid-October (fall) in most years as evidenced by my own fishing experience over the past 25+ years. However, occurrence of bull trout in this reach is EXTREMELY LOW (if present at all) during the months of June, July and August. It doesn't make any sense to say that bull trout use this reach year round (an assertion which I question).
- Page AD4-17: Are those cost estimates evenly remotely reasonable?
- Page AD4-33: See Table 8. Row totals are incorrect for two rows. The row total for “SF Walla Walla” should be 56, not 74. The row total for “Walla Walla” should be 29, not 15. There is one column total which is incorrect. The “July” column total should be 30, not 34. Finally, the check total (bottom right) should be 122, not 126.