RECLAMATION

Managing Water in the West

Biological Assessment of Potential Effects to Middle Columbia River Bull Trout from the Taneum Canal Company Fish Bypass Repair, Kittitas County, Washington

Yakima Project, Washington

U.S. Department of the Interior
Bureau of Reclamation
Columbia-Cascades Area Office
Yakima, Washington

July 2011

Mission Statements

U. S. DEPARTMENT OF THE INTERIOR

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

BUREAU OF RECLAMATION

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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INTRODUCTION

Taneum Creek is located in Kittitas County south of Thorp, WA, and is a tributary of the Yakima River at River Mile (RM) 166.1 (Figure 1). The Taneum Creek watershed is mostly undeveloped with agricultural crop production, forestry, and recreation as the primary land uses. The lower watershed is predominantly privately owned, while the upper watershed includes both public and private lands. Taneum Creek supported salmon runs until the early 20th Century, when the stream was dammed and diverted for irrigation.

Figure 1. Taneum Creek is a tributary to the Yakima River in central Washington.

Habitat conditions in the upper Taneum Creek watershed are considered to be suitable for salmonid production in general due to factors such as stream size, substrate composition and gradient. In recent years a number of fish passage and instream flow improvements have occurred. These improvements include the removal of the Bruton Dam in 2009, and the installation of a fish passage channel at the Taneum Canal Company (TCC) diversion in 2011, addressing two major fish passage barriers on the creek. The Yakama Nation and Washington Dept. of Fish and Wildlife are stocking the creek with coho salmon in hopes of rebuilding a salmon run, and PIT tagging rainbow/steelhead trout they find in Taneum Creek.

The high flows in mid-May in Taneum Creek scoured out a large portion of the TCC canal embankment. The fish bypass that routes fish safely past the TCC fish screens and back to the river passed through that eroded canal embankment. While the Creek was still high and before the condition of the fish bypass could be assessed, the canal embankment was rebuilt by placing sand, gravel, and rip-rap into the scoured areas directly into the stream. Once the flows started to receded, it became apparent that the bypass outfall was at least partially blocked and natural gravel deposition occurred at the previous location of the fish bypass which reduced the effective

depth of water at the bypass outlet. Also, the concrete encasement at the very end of the fish bypass pipe had shifted. As relatively high flows continued and the fish screens operated by passing floating debris down the fish bypass, any openings that remained at the fish bypass outfall apparently became plugged with the debris passing down the fish bypass, so that now the bypass is effectively plugged and there is no sign of free flowing water coming out of the fish bypass outfall area.

On June 15 Reclamation provided temporary bypass at the TCC screens by cutting a hole in the overflow sluiceway gate and creating a plunge-pool in the sluiceway. While this action provides a temporary passage, the bypass pipe needs to be fixed in order for passage to be permanently provided. Additionally, Reclamation proposes to take steps to protect the bypass outfall and the overflow outfall (which can again be used to provide temporary passage in the future, if needed) from future flood flows.

PROPOSED ACTION

Location

The project site is located on Taneum Creek in Kittitas County, Washington. The legal description for the project site is NW ¼ Section 05, TN 18 North, RE 17 East and the 6th Field Hydrologic Unit Code (HUC) identification is #170300010302, Taneum Creek.

Project Description

In order to repair the TCC fish bypass and to protect it from future flood flows, Reclamation proposes to: a) excavate the existing canal embankment to access the fish bypass pipe; b) replace and rebury the fish bypass pipe; c) place a rock barb just upstream of the pipe to protect it from erosion; and d) rock the revetment face and key in large rocks in the revetment to protect the revetment and overflow channel (currently used for temporary fish passage) from erosion during flood flows.

Work performed for this project will occur between July 15 and September 15, 2010: the period of lowest natural streamflow in Taneum Creek (Figure 2). Reclamation crews will construct the project. Construction will require about 8 working days to complete and will entail the following actions (Figures 3-6):

- Heavy equipment required to complete the project includes a hydraulic excavator and/or backhoe working from the canal bank, and dump truck to deliver rock to the site. The excavator/backhoe will be refueled and staged away from the creek. All other equipment required to complete the project will consist of hand tools (e.g. shovels).
- Very little vegetation, and no mature vegetation, will be disturbed as part of this project. Access and all construction activities will be confined to the right bank, which is currently a highly modified rocked revetment and serves as an access road for the canal. Some immature vegetation around the overflow channel will disturbed or removed when rock is placed to stabilize the eroding bank. This vegetation consists of shrubs and small trees in areas of active erosion (Figure 6). The left bank riparian area is vegetated with large cottonwood trees. This bank will not be impacted by construction activity.
- The excavator/backhoe will place a sandbag cofferdam to isolate the work area. In the vicinity of the bypass, the area that will be isolated by the sandbags is not expected to

have surface flow at the time of construction. In the vicinity of the overflow channel, any surface water is expected to be shallow (approximately 0.5 inch deep), if present at all. If subsurface flow contributes a significant amount of water in areas isolated by the sandbags, this water will be pumped out and discharged in the left bank riparian area to minimize turbidity effects.

- The excavator/backhoe will dig out enough of the revetment to access the undamaged portion of the fish bypass pipe. The damaged portion of the pipe will be cut off using a torch and a new fish bypass pipe will be attached and extended out to approximately the edge of the new canal embankment. Personnel working with hand tools will be in the water assisting with spotting, rigging, and cutting/welding.
- The concrete encasement will be reinstalled at the end of the bypass pipe and the whole bypass pipe will be buried with rip-rap and the same fill material that was excavated to access the pipe.
- Rock will be placed upstream of the repaired bypass pipe to form a rock groin, directing flow away from the pipe and helping to protect the pipe from flood flow. In addition, the rock groin currently located upstream of the bypass will be rearranged.
- New rock will be placed along the revetment, starting from the spot where the new rock ends, and the approximate location of the bypass pipe, and extending upstream past where the overflow pipe enters the stream, ending at the point where the riparian vegetation becomes continuous. Rocks will be keyed into the bank at 2 locations: the upstream point where rock is to be placed and just downstream of where the overflow pipe enters Taneum Creek. The revetment will need to be excavated in order to key in the large rocks into the bank. The rock will be individually placed, and no rock will be end dumped into the stream.

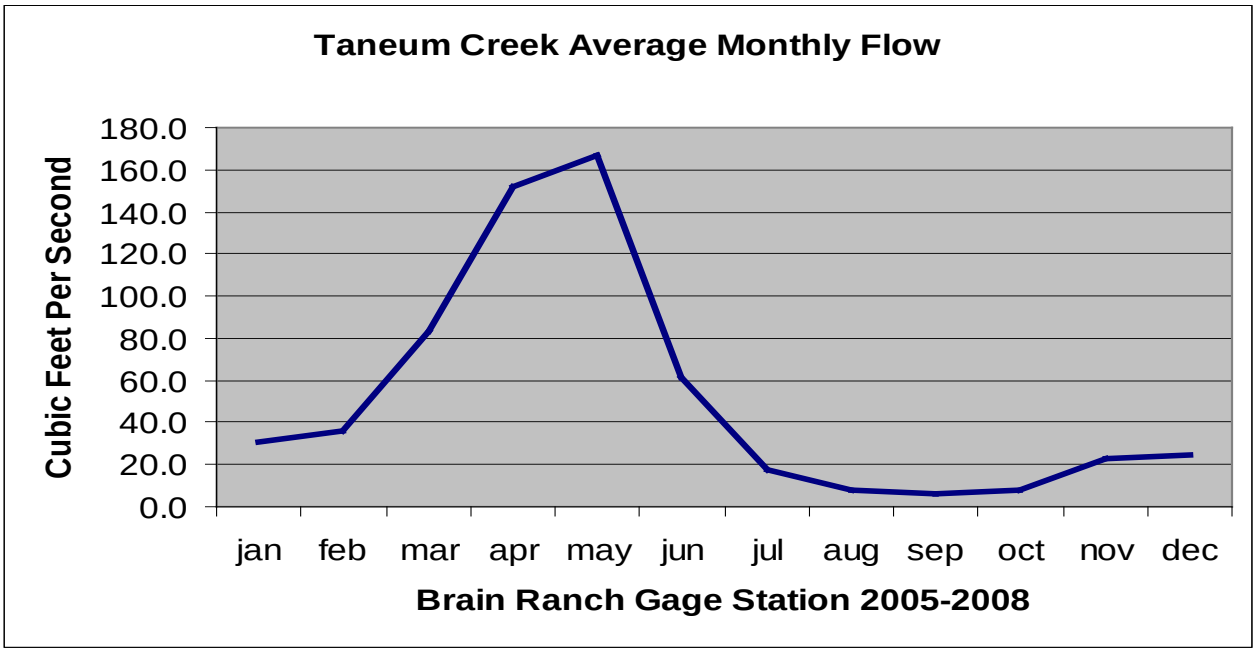

Figure 2. Taneum Creek flow data. Low flows suitable for instream work generally occur from late July through late February.

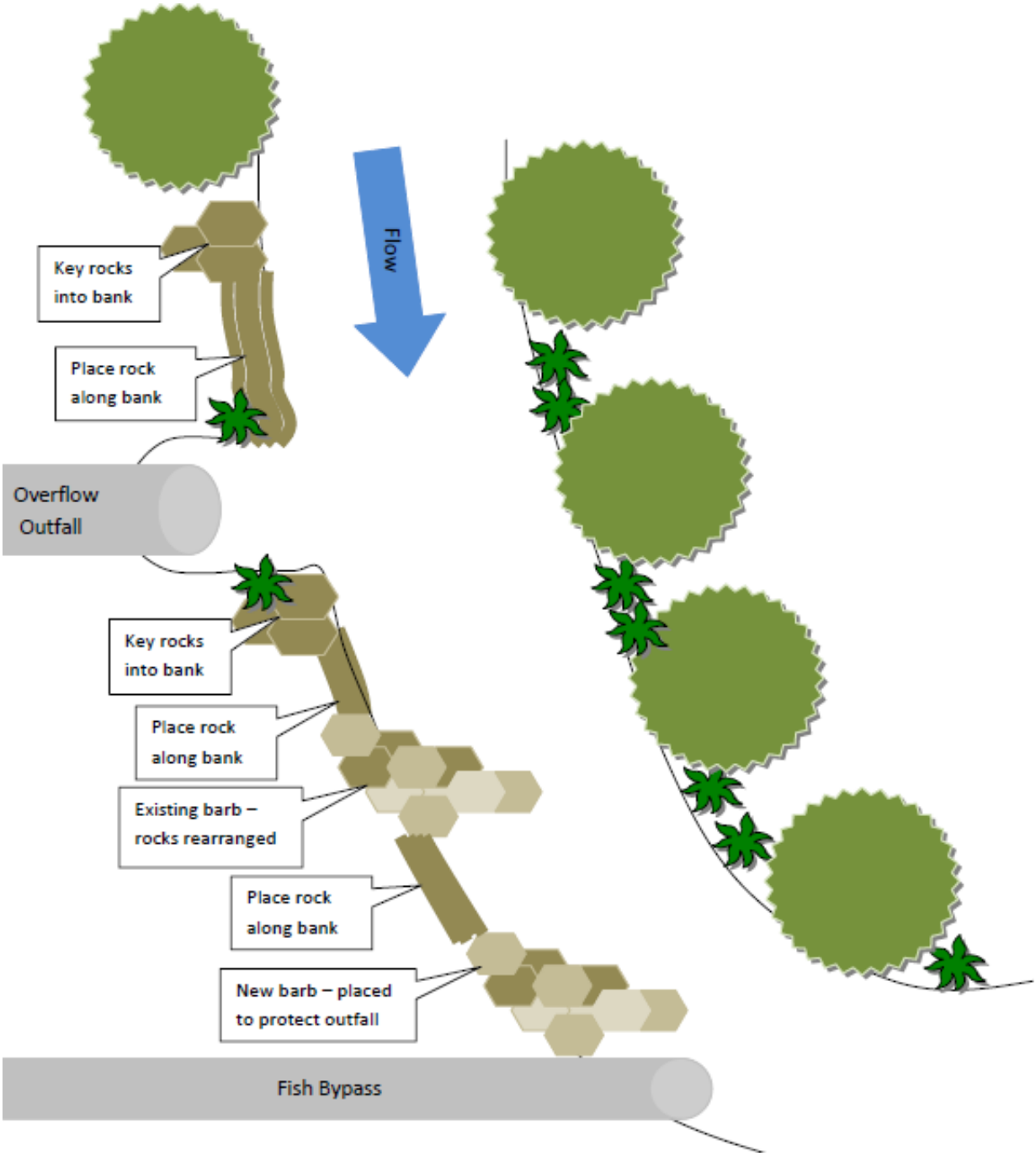

Figure 3: Schematic showing construction elements.

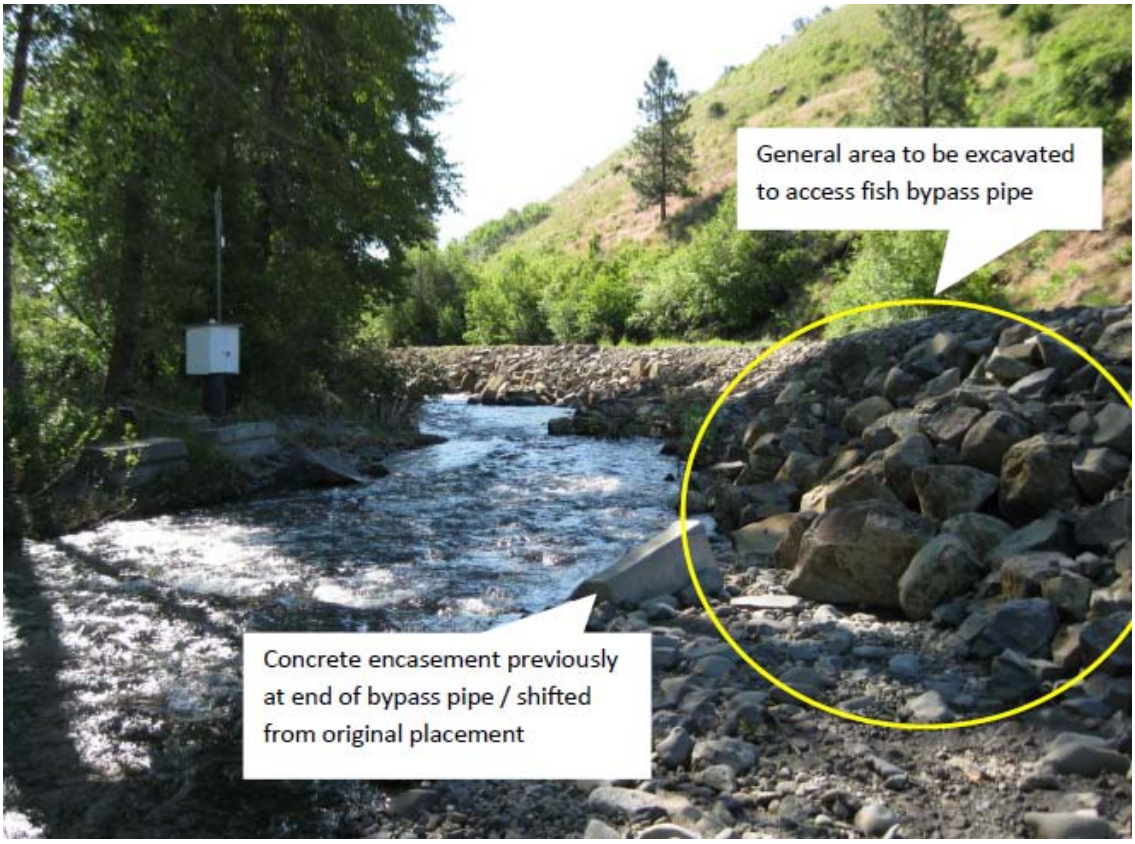

Figure 4. General location of the buried fish bypass pipeline, June 30, 2011. The revetment on the right bank separates Taneum Creek from Taneum Canal. The concrete encasement that was previously at the end of the bypass pipe is the only part of the fish bypass visible.

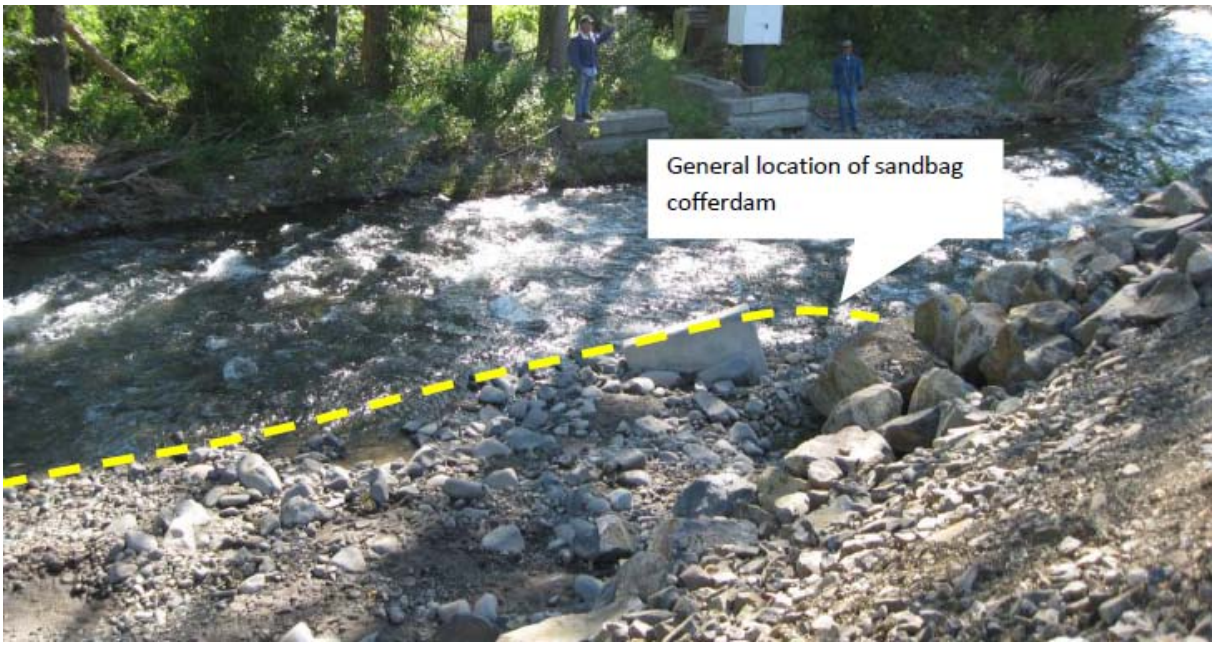

Figure 5. Photograph taken from the top of the revetment looking down on the concrete encasement shown in Figure 2. The general location of the cofferdam is shown.

Figure 6. Bank surrounding the overflow outfall where rock will be placed to protect against further erosion.

In total, approximately 230 cubic yards of new rock will be placed along approximately 75 feet of revetment. Along the toe of the revetment, rock will be placed 2 rocks deep, using 4 foot diameter rock. Rock will be placed up to the top of the revetment, transitioning to 2-3 foot diameter and then 1-2 foot diameter rock as you move up the slope. Turbidity effects from construction are not expected to extend more than 200 feet downstream.

ENVIRONMENTAL BASELINE

Bull Trout (*Salvelinus confluentus*)

The U. S. Fish and Wildlife Service (FWS) listed bull trout in the Columbia River Distinct Population Segment (DPS) as threatened on June 10, 1998 (63 Fed. Reg. 31647; June 10, 1998). The Columbia River DPS includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana. Bull trout populations within the DPS have declined from historic levels and are generally considered to be isolated and remnant. The species is estimated to have occupied about 60% of the Columbia River Basin, and presently occurs in 45% of the estimated historical range (Quigley and Arbelbide 1997). An examination of 386 bull trout populations in the DPS indicated that 33 percent were declining, 15 percent were stable, 3 percent were secure, and 2 percent were increasing (FWS 1997). The status of the remaining 47 percent of the populations was classified as unknown. Because the FWS considers that known, documented trends within a DPS to be representative of the entire DPS, the status of the species was considered to be following an overall declining trend.

The FWS identified 22 recovery units within the Columbia River Distinct Population Segment (FWS 2002). The Yakima River Basin was designated as the Middle Columbia River (MCR) recovery unit. For recovery purposes, the FWS has identified a single core area (Yakima River Basin) within the Middle Columbia Recovery unit encompassing a majority of the basin and its tributaries.

Bull trout have some of the most demanding habitat requirements of any native trout species mainly because they require water that is especially cold and clean. As a result, water temperature is a critical habitat characteristic for bull trout. Bull trout have demonstrated a unique adaptation for spawning, incubating, and rearing in colder water than salmon and steelhead which has allowed this species to survive in habitat areas that may be unsuitable for most other species of fish. Ratliff and Howell (1992) note that in many of the cold streams where bull trout spawn, they are the only fish present. McPhail and Murray (1979) demonstrated that survival of bull trout eggs was 80-95 percent to hatching at temperatures of 2-4ºC and dropped to 0-20 percent at temperatures of 8-10ºC. Buchanan et al. (1997) report observations from throughout Oregon and the published literature, and concluded that, while optimum temperatures for juvenile growth are between 4-10ºC, the optimum for adult bull trout is near 12-15ºC. Temperatures above 15˚C (59˚ F) exceed bull trout physiological preferences and are therefore thought to limit their distribution (Fraley and Shepard 1989).

Bull trout reach sexual maturity after 4 of more years and live up to 10 to 12 years. They typically spawn during September through November, in relatively cold streams that are clean and free of sediment. The incubation period for bull trout is extremely long, and young fry may take up to 225 days to emerge from the gravel (Craig 1997, FWS 1998, 63 Fed. Reg. 31647). Because of this long incubation period, eggs are particularly vulnerable to siltation problems and bed load movement in rivers and streams where spawning occurs. Any activity that causes erosion, increased siltation, removal of stream cover, or changes in water flow or temperature affects the number of bull trout that hatch and their ability to survive to maturity (Knowles and Gumtow 1996).

Bull trout exhibit both migrant and resident life history strategies. After rearing as juveniles for 2-4 years in their natal streams (Meehan and Bjornn 1991), migrant bull trout emigrate to larger rivers or lakes, whereas resident fish complete their entire life cycle within their natal stream. Migrant forms, including both fluvial (downstream migration to larger rivers) and adfluvial (downstream migration to lakes) grow rapidly, often reaching over 20 inches in length and 2 pounds by the time they are 5-6 years old. Migratory bull trout live several years in larger rivers or lakes, where they grow to a much larger size than resident forms before returning to tributaries to spawn. Growth differs little between forms during their first years of life in headwater streams, but diverges as migratory fish move into larger and more productive waters (Rieman and McIntyre 1993).

Historical Status and Distribution

Historically, bull trout were more widely distributed in the Yakima Basin than is currently observed (WDFW 1998). Although historic population numbers are unavailable, it is assumed they were more abundant (WDFW 1998). Available scientific literature suggests that the species probably displayed a mixture of fluvial, adfluvial, and resident life-history forms. Fluvial fish reside in the mainstem rivers, migrating into tributary streams to spawn; adfluvial fish reside in lakes, migrating into tributary streams to spawn. The progeny of both life-history forms

generally rear in their natal streams for one-to-three years before emigrating. The resident life-history form resides in a particular stream for its entire life cycle.

Since bull trout have perhaps the most stringent habitat requirements of any salmonid species (Rieman and McIntyre 1993), spawning and rearing (all life-history forms) was likely to have occurred only in stream reaches at higher elevations in the watershed. However, migratory forms (fluvial and adfluvial) may use much of the river system throughout their life cycle (Bjornn and Mallet 1964). Regional bull trout life history patterns suggest that bull trout may have once moved into the lower Yakima River to over-winter and forage. This migration pattern may still be occurring in the basin, but it has not been observed and is not thought to occur frequently, if at all. For example, in a radio tracking study of bull trout in the Naches basin, none of the bull trout radio tagged moved downstream as far as the mouth of Ahtanum Creek even though passage further downstream was not prevented (Mizell et al. 2009).

Physically, habitat connectivity currently exists between the mainstem Yakima River and the Columbia River. Fluvial bull trout may have historically migrated between the Yakima and Columbia Rivers. Bull trout in the upper Columbia River have been observed to migrate considerable distances between the mainstem and its tributaries. Based on findings of bull trout movement patterns in the Columbia and Snake Rivers in areas proximate to middle and upper Columbia River tributaries, it is reasonable to assume that bull trout once migrated between Columbia River tributaries and the mainstem Columbia River and still do in the case of upper Columbia tributaries such as the Wenatchee and Methow River systems. During a bull trout radio-telemetry tracking study conducted by the Grant County Public Utilities District (Grant PUD 2003: Rocky Reach Project No. 2145), 39 adult bull trout were captured, surgically implanted with transmitters, and released at Wells, Rocky Reach, and Rock Island Dams on the Columbia River during the spring and early summer of 2001. An additional 47 fish were captured and radio-tagged at these facilities during 2002. Some of these fish were subsequently detected in the Wenatchee River, Okanogan River, Entiat River, Mad River (tributary to the Entiat), Methow River, Libby Creek (tributary to the Methow), Twisp River (tributary to the Methow), and Buttermilk Creek (a tributary to the Twisp) (Grant PUD 2003). Based on these findings, it is reasonable to assume that bull trout once migrated between the Yakima River basin and the mainstem Columbia River and perhaps still do, although this is only speculation at this point. Whether or not bull trout migrated as freely between Middle Columbia River tributaries such as the Yakima and the mainstem Columbia River is a matter of speculation at this point.

Distance to a migratory corridor or to a local population within the upper Yakima and Naches basins is a factor in determining the expression of migratory patterns and the potential use of the mainstem Columbia River by Yakima basin bull trout. However, given the lack of bull trout observations in the lower Yakima River, the poor habitat conditions, and the extensive distance between the Columbia River and know local populations, it is not likely that bull trout ever migrated between the Upper Yakima River drainage and the Columbia River.

Present Status and Distribution

Yakima Basin studies indicate that bull trout typically occur in the upper reaches of several tributaries, in small populations that are mostly isolated from each other (Goetz 1994, Wissmar and Craig 1998, WDFW 1998). Studies have indicated that bull trout are most likely to occur, and to be strong in cold, high elevation, low- to mid-order watersheds with low road density (Rieman et al. 1997, Goetz 1994, MacDonald et al. 1996).

In the 1998 final listing rule (63 Fed. Reg. 31647), the FWS identified eight bull trout sub-populations in the Yakima River basin. These sub-populations included: 1) Ahtanum Creek; 2) Naches River; 3) Rimrock Lake; 4) Bumping Lake; 5) North Fork Teanaway River; 6) Cle Elum Lake; 7) Kachess Lake; and 8) Keechelus Lake. At the time of listing, only the Rimrock Lake sub-population was considered stable. The remaining sub-populations were classified as depressed and declining. The population status for the Naches River sub-population was classified as unknown. With the exceptions of Rimrock Lake and the Naches River, the remaining sub-populations were considered to be at risk of extirpation.

The WDFW recognizes nine bull trout stocks in the Yakima River basin (Table 1). Eight of these stocks are consistent with the sub-populations identified by the FWS in the final listing rule; however, they also include one (Yakima River) which was not recognized by the FWS at the time of listing. The FWS, however, now concurs with the presence of nine populations. The status of six of these stocks is classified as critical by WDFW, one is depressed, one is healthy, and one is unknown (Table 1). The status of each of these stocks was largely derived from redd counts which the agency has been conducting on an annual basis since 1984 (Table 2).

Table 1. **Yakima basin bull trout stocks recognized by WDFW (from WDFW 1998). Definitions for status classifications appear below table.**

Stock	Life History Form	Status[2]	Comments
Keechelus Lake	Adfluvial	Critical	Chronically low redd counts
Kachess Lake	Adfluvial	Critical	Chronically low redd counts
Cle Elum/Waptus Lakes	Adfluvial	Unknown	
Bumping Lake	Adfluvial	Depressed	Short-term severe population declines
Rimrock Lake	Adfluvial	Healthy	
N. Fork Teanaway River	Fluvial/Resident	Critical	Chronically low redd counts
Naches River	Fluvial/Resident	Critical	Chronically low redd counts
Yakima River[1]	Fluvial	Critical	Chronically low redd counts
Ahtanum Creek	Resident	Critical	Chronically low redd counts

[1]Stock not recognized by the FWS as a sub-population in final listing rule

[2]Stock Status Ratings (WDFW 1998):

Critical – A stock of fish experiencing production levels that are so low that permanent damage to the stock is likely or has already occurred.

Depressed – A stock of fish whose production is below expected levels based on available habitat and natural variations in survival rates, but above the level where permanent damage to the stock is likely.

Healthy – A stock of fish experiencing production levels consistent with its available habitat and within the natural variations in survival for the stock.

Unknown – There is insufficient information to rate stock status.

Within each stock one or more local populations may exist (WDFW 1998). A local population represents a group of bull trout that spawn within a particular stream or portion of a stream system. Thus, a local population is considered the smallest group of fish that represent an interacting reproductive unit. Gene flow may occur between local populations but is assumed to be infrequent compared to that among individuals within a local population. There are presently thirteen local populations which have been identified in the Yakima River basin (WDFW 1998, FWS 2002). Other local populations may exist that are as yet unrecognized. For example, as recently as 2002, a juvenile bull trout was captured by Yakima Nation fisheries personnel in a tributary to Cowiche Creek (Eric Anderson, WDFW, personal communication 2002) and 13 bull trout were observed in the North Fork Tieton River during a comprehensive snorkel census in 2004.

Table 2. Annual redd counts since 1993 for eight local bull trout populations in the Yakima River basin (Data from WDFW). The average number of redds counted in the index areas along with the standard deviation (SD) is given at the bottom.

Survey Year	**Ahtanum Creek**	**Rattlesnake Creek**	**American River**	**S.Fork Tieton River**	**Indian Creek**	**Deep Creek**	**Box Canyon Creek**	**Gold Creek**
1993	9			38	140	45	4	11
1994	14	4		167	179	12	11	16
1995	6	26		95	201	101	4	13
1996	5	38	25	233	193	46	8	51
1997	7	46	24	177	193	126	10	31
1998	5	53	31	142	212	98	16	36
1999	7	44	30	161	205	107	17	40
2000	11	45	44	144	226	147	10	19
2001	20	57	36	158	117	51	14	15
2002	17	69	27	141	100	120	15	31
2003	12	54	30	190	101	57	8	9
2004	8	32	40	180	50	97	19	20
2005	6	15	35	205	91	73	8	7
2006	7	40	55	189	106	95	8	8
2007	8	13	31	152	58	130	2	6
2008	1	37	22	266	130	145	8	40
2009	3	36	29	259	200	178	21	29
Avg.	**8.6**	**38.1**	**32.8**	**170.0**	**147.0**	**95.8**	**10.8**	**22.5**
SD.	**4.9**	**17.2**	**8.8**	**55.4**	**57.3**	**43.8**	**5.4**	**13.8**

At the time of listing, the FWS found no evidence that a sub-population of bull trout remained in the mainstem Yakima River (FWS 1998). The WDFW, however, did recognize a mainstem Yakima stock (WDFW 1998). Until recently the justification for such recognition was weak. Old catch records and anecdotal accounts indicated the species was present in the mainstem historically but bull trout had rarely been encountered in the recent past and no spawning activity had been observed. Through 1998, after eight years of intensive electro-fishing surveys, only four bull trout were captured in the mainstem upper Yakima River. Three of these fish were

caught near Cle Elum and one near Ellensburg. (These surveys were conducted as part of the Yakima Species Interaction Study, a cooperative effort between the WDFW and Yakama Nation under the umbrella of the Yakima-Klickitat Fisheries Project.). Other bull trout sightings included an adult bull trout illegally caught in 1996 by an angler in Easton Lake (a 95 hectare [238-acre] impoundment formed above the Easton Diversion Dam) about 18.4 km (11.5 miles) below Keechelus Dam and an adult fish captured by WDFW biologists in 1997 near Benton City, Washington (about 45 km [28 miles] above the mouth of the Yakima River).

Very little information exists about bull trout usage of the lower Yakima River. Currently, it is acknowledged that habitat conditions are not suitable year-round to support general bull trout life-history requirements in the lower section of the river below the Ahtanum Creek confluence. Very few bull trout have ever been reported in the lower mainstem Yakima River or its tributaries and return flow drains and wasteways. The only reported bull trout observation in the lower Yakima River was the adult caught bear Benton City by WDFW biologist in 1997 (WDFW 1998). No bull trout have ever been sampled in the Chandler juvenile counting facility near Prosser that has been operated by the Yakama Nation since 1992 (Johnston, M., pers. comm., 2009). When operating, this facility continuously samples the river and is used to count outmigrant salmon and steelhead in the winter and spring. Given the fact that habitat conditions are generally not suitable for bull trout in the lower river, particularly high water temperatures during the summer, it is not surprising that few fish have been observed in the lower sections of the mainstem Yakima River.

Bull trout spawning activity has also been recently observed in the upper Yakima River. In mid-September 2000, during a redd survey of the reach between Keechelus Dam and the Easton Diversion Dam, USFWS and WDFW biologists found two bull trout redds and four live adults (500-600 mm or 20 to 24 inches); another redd was found the following year as well as an extremely large dead adult (>750 mm or >30 inches). Intensive monitoring efforts in the fall of 2002 and 2003 did not locate any redds in this area. Incomplete surveys in 2004, 2005, 2007 and 2008 also failed to document any bull trout spawning activity in the mainstem upper Yakima River. In 2006, USFWS observed several large adfluvial bull trout in the Upper Yakima River in the areas above Cabin Creek. It is suspected that bull trout redds continue to be constructed in areas with spring Chinook spawning in the upper mainstem in the Easton to Keechelus reach between the Cabin Creek wetlands and the outlet of Keechelus Dam. However, the presence of bull trout redds cannot be confirmed due to their similarity in appearance to spring Chinook redds that are constructed at the same time. Finally, a large gravid female was captured and radio-tagged at the base of Kachess Dam in 2005. Most of the fish that have been observed in the upper Yakima River are likely fish that have been entrained over dams and cannot return to upstream spawning areas and now spawn, or attempt to spawn, in the upper Yakima mainstem.

It is not clear what life history forms are present in the mainstem Yakima River. It is reasonable to assume that fluvial bull trout are present since they exist in the Naches sub-basin. It is also reasonable to assume that the adfluvial life history form is present in Lake Easton. While more monitoring is needed, it is clear that at least adult and sub-adult bull trout do inhabit and utilize the mainstem Yakima River at low density levels.

The mainstem Naches River, as well as some of its major tributaries are known to be occupied by a fluvial bull trout population. These fish reside in the Naches River for a portion of their life history before migrating to upstream habitat areas for spawning in tributary streams. Post spawning adults, as well as some sub-adult fish, migrate back to the mainstem Naches River where they occupy suitable holding habitat during the winter and spring months. As a result of

this fluvial life history strategy, bull trout can be highly migratory during certain periods of the year.

The main migration period for fluvial adult bull trout in the Naches River occurs between May and October, with peak upstream movement occurring in July and peak downstream movement occurring in September to October (Mike Mizell, WDFW, personal communication 2006). The early part of this time period is coincident with both water temperature and day length (solar periodicity) increases and with the early onset and preparation for spawning by adult fish. The later part of this active migration period relates to the downstream movement of post-spawn adults as they return to winter and spring holding habitats in the mainstem of the Naches River. Sub-adult bull trout are also known to have increased migration activity during this late-spring to early summer period, however this behavior is not related to spawning. Adult bull trout that have been radio-tagged as part of the WDFW bull trout telemetry study in the Yakima Basin have been tracked throughout the Naches River mainstem during the active migration period. However, the majority of radio-tagged bull trout have remained near the city of Naches and have only occasionally migrated down as far as the city of Yakima. A few fish have migrated into the Yakima River where they have held in suitable habitat for a short time (a few days to weeks) before migrating back to the mainstem Naches River. Prior to the onset of spawning adult bull trout in the mainstem Naches migrate upstream to spawning areas in several tributaries of the upper Naches basin.

During the winter and spring periods (roughly, November through May) adult and sub-adult bull trout hold or overwinter in the mainstem Naches River. The winter and spring is characterized by a period of relative inactivity by bull trout. Overwintering adults and sub-adults tend to congregate in highly-selective pool habitats that may be utilized year after year by the same fish (Mike Mizell, WDFW, personal communication 2006). Preferred pool overwintering habitats that are used by radio-tagged bull trout occur in the mainstem Naches River from the Wapatox Diversion Dam (RM 17) to the town of Cliffdell (RM 36) (Mike Mizell, WDFW, personal communication 2006).

Taneum Creek Bull Trout Populations and Habitat Conditions

Taneum Creek historically supported anadromous runs of spring Chinook salmon (*O. tshawytscha*), coho salmon (*O. kisutch*), and steelhead trout. Bryant and Parkhurst (1950) report that the stream supported good runs of coho and spring Chinook prior to the construction of Taneum Ditch in 1910. Current use of Taneum Creek by coho salmon is largely unknown, however this species is likely to occur in the lower section of the creek especially since reintroduction efforts have been and continue to occur in the upper Yakima River by the Yakama Nation. This creek also continues to support small runs of spring Chinook (formerly to Burton Dam, which was removed in 2009) and steelhead trout spawning and rearing into both forks.

In addition to anadromous salmon and steelhead, Taneum Creek also currently supports resident populations of cutthroat trout (*O. clarki*), rainbow trout (*O. mykiss*), brook trout (*S. fontinalis*), and various species of shiners, dace and sculpin (WDFW 1993). Taneum Creek may have historically supported a resident or fluvial population of bull trout, however, this species has not been observed in the drainage since 1989 (Teske 1994).

According to the USFWS (2002) and the WDFW (1998b) a local population of fluvial bull trout exists in the Yakima River and is composed of fish that inhabit the mainstem Yakima River below the upper reservoir dams (i.e. Keechelus, Kachess, Cle Elum Dams). Although the

genetic characteristics of the stock have not been determined, bull trout in the mainstem of the Yakima River are considered distinct from other Yakima subbasin stocks based on physical, geographical, and thermal isolating factors (WDFW 1998). There are only a few historical references that indicate the presence of bull trout in Yakima River tributaries (NPPC 2001). The population status for the Yakima River bull trout stock is currently designated as "unknown" by the USFWS and as "critical" by the WDFW based on lack of population information and low redd counts (USFWS 2002, WDFW 1998).

The status of bull trout is currently uncertain in Taneum Creek. In August 1989, a Yakama Nation survey crew conducting fish population inventories on North and South Fork Taneum Creeks collected a single fish identified as a dolly varden, currently referred to as bull trout in eastern Washington (Teske 1994). In August of 1993, Plum Creek Timber Company conducted a bull trout presence/absence survey on North and South Fork Taneum Creeks. However, no bull trout were identified during this effort (Teske 1994).

The USFWS has not identified a local population of bull trout in the Taneum Creek drainage in the Middle Columbia Bull Trout Recovery Unit of the Draft Recovery Plan for Bull Trout (USFWS 2002). However, because definitive data on bull trout presence/absence is not available in several Yakima River tributaries, including Taneum Creek, the Middle Columbia Bull Trout Recovery Unit Team recommended further studies be conducted in the Yakima Core Area to better define the current distribution of resident bull trout in the recovery unit. The Middle Columbia Bull Trout Recovery Unit Team has also identified Taneum Creek as a tributary with potential for expanding the range of bull trout within the Middle Columbia recovery area due to its existing habitat characteristics and location in the Yakima River Basin (USFWS 2002).

Knowledge of resident and anadromous salmonid and non-game fish population densities and stability within the Taneum watershed is very limited. Few presence/absence or population density surveys have been conducted to document fish communities in the drainage to date. However, information from the studies that have been conducted on Taneum Creek indicate that fish populations are relatively diverse and abundant compared to other upper Yakima River west bank tributaries. Salmonid population densities in Taneum Creek were the highest of ten upper Yakima tributaries that were evaluated by Pearsons et al. (1993).

Channel conditions are generally rated as fair in the Taneum Creek watershed (Teske 1994, USFS 1996). Instream cover, in the form of large woody debris and boulders, is abundant on the NF and SF, except where LWD was cleaned out of the channel as part of past logging activities. The moderately steep gradient in the lower reaches tends to limit pool frequency, resulting in the habitat being relatively more suitable for steelhead than coho (CBSP 1990). Substrate in the moderately steep lower reaches is composed primarily of large and small cobbles. However, patches of good gravel are numerous and are more than adequate to satisfy steelhead, spring Chinook and coho salmon spawning needs (Haring 2001, CBSP 1990).

The lower eight miles of the mainstem Taneum Creek (downstream from the Wenatchee National Forest boundary) are identified as core summer salmonid habitat for its aquatic life designated use. Tributaries to Taneum Creek from its mouth to the Wenatchee National Forest boundary are designated as salmonid spawning, rearing, and migration habitat. Taneum Creek, SF Taneum Creek, and Lookout Creek (a tributary to Taneum Creek) are on the Clean Water Act 303(d) impaired water quality list for water temperature, and the lower reaches of the mainstem are listed for non-compliance with instream flows. Maximum summertime water temperatures in the lower sections of Taneum Creek can occasionally approach 70ºF (NPPC 2001), but these

episodes are brief, diurnal fluctuations are large, and excessive temperature is not believed to be a serious problem. Water temperature is likely exacerbated by low instream flows (Haring 2001).

The major constraints on salmonid production in Taneum Creek include very low summer and fall flows in the lower section of the creek (downstream of the major diversions), and adult fish passage barriers during low flow periods (Haring 2001). The natural flow of Taneum Creek is fully appropriated for irrigation. As a result, the lower portion of the creek is heavily diverted, with 4 irrigation diversions in the lower 3.5 miles. Low flows in the lower 2.4 miles of Taneum Creek in the late summer preclude anadromous salmon access to good spawning habitat upstream (CBSP 1990, WDFW 1998). Fishways and screens were installed on all Taneum Creek diversions by 1990, and the passage through the Taneum Ditch ladder is difficult at low flows (when natural flows are low and Kittitas Reclamation District (KRD) is not supplementing 20 cfs to the creek). In 2009 the Bruton Dam was removed, addressing a previous major fish passage barrier on the creek

Instream flow is considered to be the most significant irrigation related problem in Taneum Creek. Stream flow problems are especially critical during the late summer and fall period for salmon species (spring Chinook and coho) and during the winter period for steelhead. Flows are needed for upstream migrants and to ensure adequate spawning and rearing habitat. Flow also influences water quality. Fluctuations in flow can have detrimental effects by stranding fish and dewatering redds or displacing fish to less suitable habitats. Water quality problems affecting upper Yakima River fish populations include sedimentation caused by increased silt loads and elevated water temperatures.

In 1994, an agreement was reached involving the Bureau of Reclamation, the Kittitas Reclamation District, WDFW, and the Yakama Nation, transferring up to 20 cfs, when available (typically available in the spring, not available in the summer through late August, and available in September), from the Yakima River through the KRD canal to enhance instream flow in the lower reaches of Taneum Creek (KCCD 1999, BOR 2000). Consequently, the ability for adult salmonids to access the watershed upstream of RM 1.6, and the ability of juvenile salmonids and smolts produced in the upper watershed to safely migrate out of Taneum Creek has only recently been accommodated. Even with these modifications, adult summer steelhead will be able to pass upstream in most years, but adult spring Chinook and coho passage is significantly impaired (Haring 2001).

Bull Trout Critical Habitat

The USFWS first issued proposed critical habitat rules for several mainstem and tributary reaches of the Yakima River Basin in November 2002 (FR 67 71235). In October, 2004 USFWS designated bull trout critical habitat for over 1,748 miles of stream habitat and 61,235 acres of lakes and marshes within the Klamath and Columbia River basins (FR 69 59995). For the Middle Columbia River basin (Critical Habitat Unit 20), critical habitat designations were listed for 269 stream miles; all within the Yakima River basin. Habitat areas designated in the Yakima River Basin in the 2004 critical habitat rule include mainstem river reaches downstream of Keechelus, Kachess, Cle Elum, and Tieton Dams; the mainstem Naches River down to its confluence with the Yakima River; and the mainstem Yakima River downstream to the Ahtanum Creek confluence near the city of Yakima.

In 2005, USFWS reopened the comment period for critical habitat for the Klamath River and Columbia River bull trout populations. In September, 2005 USFWS issued a revised final designation for bull trout critical habitat and reduced the amount of critical habitat designated in the Middle Columbia River Basin to 188 stream miles (70 FR 56212). In response to a law suit, the USFWS voluntarily remanded the 2005 final rule, and on October 18, 2010, issued the final rile for the revised critical habitat designation for bull trout in the coterminous United States (75 FR 36897). In the 2010 listing, the Yakima River was identified as a critical habitat unit, and 557.3 stream miles and 15,530.9 acres of lakes and reservoirs were designated as critical habitat. Taneum Creek, plus its 2 forks (North and South Fork Taneum Creeks) are designated critical habitat.

The final critical habitat designation in 2010 lists a total of nine primary constituent elements (PCEs) that are designed to identify essential habitat functions for bull trout conservation (75 FR 36897). PCEs include, but are not limited to: space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; and habitats that are protected from disturbance (75 FR 36897). The nine PCEs listed in the final rule include: 1) water quality maintained by springs, seeps, groundwater sources, and hyporheic flows, 2) migration habitat between spawning, rearing, overwintering, and freshwater and marine forging habitats, 3) an abundant food base, 4) channel and shoreline complexity, 5) appropriate water temperatures and thermal refugia, 6) suitable substrate in spawning and rearing areas, 7) a natural river flow regime, 8) sufficient water quality to support reproduction, growth, and survival, and 9) low levels of nonnative predatory, interbreeding, or competing species.

Adult and sub-adult bull trout are known to occupy the mainstem Yakima and Naches Rivers, as well as several tributary systems both upstream and downstream of Yakima Project storage dams during various times of the year. These life history stages use these rivers and tributaries, as well as the Cle Elum, Bumping, and Tieton River drainages, as foraging, migration, and overwintering (FMO) habitat (FR 69 59995). The recent critical habitat revision also identifies Taneum Creek as likely to provide FMO habitat for a potential local population (75 FR 36897). Furthermore, because adult and sub-adult bull trout can migrate freely throughout much of the mainstem Yakima and Naches Basins, these life history stages are expected to occur within designated critical habitat segments listed in the final rule (FR 69 59995) that have suitable stream temperatures and habitat conditions.

EFFECTS DETERMINATION

Effects to Bull Trout

Even though additional surveys, particularly more recent surveys, are needed to confirm bull trout absence from the project area, current understanding of Yakima Basin bull trout distribution and habitat requirements suggests a low probability that any bull trout life stage will occupy the project area during construction. The latest recorded observation of bull trout in Taneum Creek was in 1989, and bull trout are only known to inhabit and utilize the mainstem Yakima River at low densities. Proposed project timing corresponds to the summer base flow period between mid-July to mid-September, 2010. Not only will adult bull trout spawning and egg incubation (if it occurs at all in the Taneum drainage) have been completed by the construction period, but warm water temperatures and low streamflow will not be conducive to bull trout stream occupancy.

Several precautions will be taken during construction to minimize impacts to aquatic resources, which will also be protective to bull trout if they do occur in the project area or utilize Taneum Creek post-construction. The most significant step to avoid impacts to aquatic resources is to completely isolate the project area from Taneum Creek. In the vicinity of the fish bypass, where significant excavation will be required to dig out the damaged pipe, the area enclosed by sandbags will be dry at the time of construction. In the vicinity of the overflow channel, there may be surface flow immediately adjacent to the bank where rock is to be placed. This water, if present at all, is expected to be very shallow (0.5 – 1 inch deep) and does not constitute the main flow along that stretch of river. In addition to isolating the work area, potential impacts will further be avoided by ensuring that all necessary work is conducted from the right stream bank and that heavy machinery will not need to enter the stream. Finally, rocks will be placed by the excavator, rather than end-dumped along the revetment. Given the low probability of bull trout occurrence and measures to taken to isolate the work area and the fact that heavy machinery will not enter the stream channel, mechanical injury to bull trout is discountable.

Isolating the work area will also help to avoid sedimentation effects downstream of the project as rocks and gravel material are removed by construction equipment. In addition to placing a sandbag coffer-dam, any water in the work area (anticipated to be contributed by subsurface flow) will be pumped out and deposited in the riparian area of the left streambank. While the placement and removal of the sandbags will mobilize some fine sediment, given both the scale of the impact and the low flows at the time of construction, any elevation in suspended sediment is expected to be modest and limited to a distance of less than 200 feet downstream of the project area. Since sediment will primarily be mobilized during the installation and removal of the sandbags, increases in suspended sediment levels will be of only a short duration. Finally, construction activities will not increase long-term sediment loading to the creek. The construction area is currently a highly modified rock revetment with little to no vegetation. Rock armoring that is removed to unearth the bypass pipe will be replaced. Any new rock placed will be an extension of current rock armoring. Due to these measures to minimize sediment inputs to the stream, and the low probability of bull trout occurrence, impacts from potential elevated sediment levels associated with construction are discountable.

As previously mentioned, the revetment that composes the right bank of Taneum Creek along this stream reach, and separates the creek from Taneum Canal, is highly modified and currently characterized by a large amount of armoring. Additional rock placed to protect the fish bypass outfall and overflow outfall is located in an area that is already simplified and lacking developed riparian habitat. New rock placed around and keyed into the bank by the overflow outfall will only impact a small amount of immature vegetation, and is strategically placed to both provide the needed protection to the outfall while also avoiding the more heavily vegetated area located just upstream of the project area.

Given current understanding of bull trout occurrence in Taneum Creek and general habitat requirements, there is only a low probability that bull trout will occupy the project area. Additionally, impacts from excavating the revetment, repairing the pipe, and placing new rock will be minimized by isolating the work area, conducting necessary work from the revetment, and individually placing rock rather than end-dumping it. Furthermore, neither instream nor riparian habitat will be fundamentally changed by this project. Any potential effects are considered to be very low intensity, localized, and short-term. Further, a permanent bypass will be restored by this project. This bypass is particularly crucial because during the summer irrigation months, nearly the entire flow of Taneum Creek is diverted for irrigation. Because of

these factors **Reclamation has determined that the project may affect, but is not likely to adversely affect bull trout in Taneum Creek.**

Effects to Bull Trout Critical Habitat

The effects of this fish passage improvement project will not alter the hydrologic condition in Taneum Creek, but may temporarily affect water quality and instream habitat conditions during construction. A very small amount of disturbed, immature vegetation will be removed when rock is placed along the revetment bank. As a result, this project may affect the water temperature, substrate quality, and food base bull trout PCEs. However, impacts will be of very low intensity and are not thought to lead to an appreciable reduction in the amount of overall habitat quantity or quality. Critical habitat PCEs supporting migratory corridors may be temporarily affected while construction activities occur. However, when construction activities stop, migratory conditions will be restored, as is the function of the bypass. **Reclamation therefore concludes that the proposed project may affect, but is not likely to adversely affect proposed bull trout critical habitat in Taneum Creek.**

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