U.S. Fish and Wildlife Service

Upper Columbia Recovery Unit Bull Trout Telemetry Project: 2005 Progress Report for the Methow River Core Area

U.S. Fish and Wildlife Service
Mid-Columbia River Fishery Resource Office
7501 Icicle Road
Leavenworth, WA 98826

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Upper Columbia Bull Trout Project
FONS # 2001-002

January 25, 2007

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The correct citation for this report is:

Nelson, M.C. and R.D. Nelle. 2007. Upper Columbia Recovery Unit Bull Trout Telemetry Project: 2005 Progress Report for the Methow Core Area. January 25, 2007. U.S. Fish and Wildlife Service, Leavenworth, WA.

UPPER COLUMBIA RECOVERY UNIT
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2005 PROGRESS REPORT
FOR THE METHOW RIVER CORE AREA

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Abstract. - During 2005, the Mid-Columbia River Fishery Resource Office radio-tracked adult fluvial bull trout in the Methow River system. The bull trout were tagged at mid-Columbia River hydroelectric dams by the Douglas and Chelan County Public Utility Districts. Six bull trout were located during mobile telemetry surveys, and one radio tag was recovered. Tagged bull trout migrated to several tributaries, including Twisp River, Wolf Creek, West Fork Methow River and Lost River, which all contain known spawning grounds of bull trout. Upstream migration distances were 68.9 to 88 miles (110.0 to 141. 6 km) for Wells Dam bull trout and 108.3 miles (174.3 km) for the Rocky Reach bull trout. This study documents the first known migrations of adult fluvial bull trout from the Columbia River to Wolf Creek, West Fork Methow River, and Lost River in the Methow River Core Area.

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Introduction

In 2005, as part of their respective Bull Trout Monitoring and Evaluation Programs, the Douglas and Chelan County Public Utility Districts (DPUD and CPUD) implemented bull trout telemetry projects to monitor adult upstream and downstream passage at their Mid-Columbia River dams. Because the focus of these monitoring programs is to evaluate effects of the hydroelectric dams, minimal tracking was to occur when the tagged bull trout entered tributaries and left the influence of the project areas (CPUD 2005). Therefore, the Mid-Columbia River Fishery Resource Office (MCRFRO) cooperated with the PUDs and their contractors to radio track these tagged bull trout in the tributaries of the Upper Columbia Bull Trout Recovery Unit. This cooperative effort will maximize limited resources and increase our knowledge of the movements, spawning migrations, and over-wintering locations of fluvial bull trout. In addition, the initial tracking effort in 2005 will be used as a pilot study to assist in the design and planning of a proposed bull trout radio-telemetry study by MCRFRO.

This progress report details the results of the initial telemetry effort by MCRFRO in the Methow River watershed in late summer and autumn of 2005.

Study Area

The Upper Columbia Recovery Unit contains the mainstem Columbia River from the Yakima River upstream to Chief Joseph Dam and includes the Wenatchee, Entiat, Chelan, Methow, and Okanogan basins (USFWS 2002). The Wenatchee, Entiat, and Methow Rivers have been identified as core areas in the recovery unit (Figure 1).

The Methow River, tributary to the Columbia River at river mile (rm) 524 (river kilometer (rkm) 843.3), drains an area of approximately 1,890 mi^2 (4,895 km^2). The Methow River sub-basin has seven primary sub-watersheds: the Upper Methow River, Lost River, Early Winters Creek, Chewuch River, Middle Methow River, Twisp River, and Lower Methow River (Figure 2). The tributaries listed on Figure 2 are areas of assumed historic or current distribution of bull trout in the Methow sub-basin (NPCC 2004).

Mean stream discharge is 1,592 ft^3/s; base flow is 264 ft^3/s and flood stage can be as high as 46,700 ft^3/s (Mullan et al. 1992). The lowest stream flows occur in mid-winter (December to February) and early autumn (September) when stream flow is primarily the result of groundwater discharge. Several reaches dewater and flow subsurface at base flows, including the mainstem Methow near the town of Mazama, Goat Creek at the mouth, and Twisp River at Poplar Flats Campground.

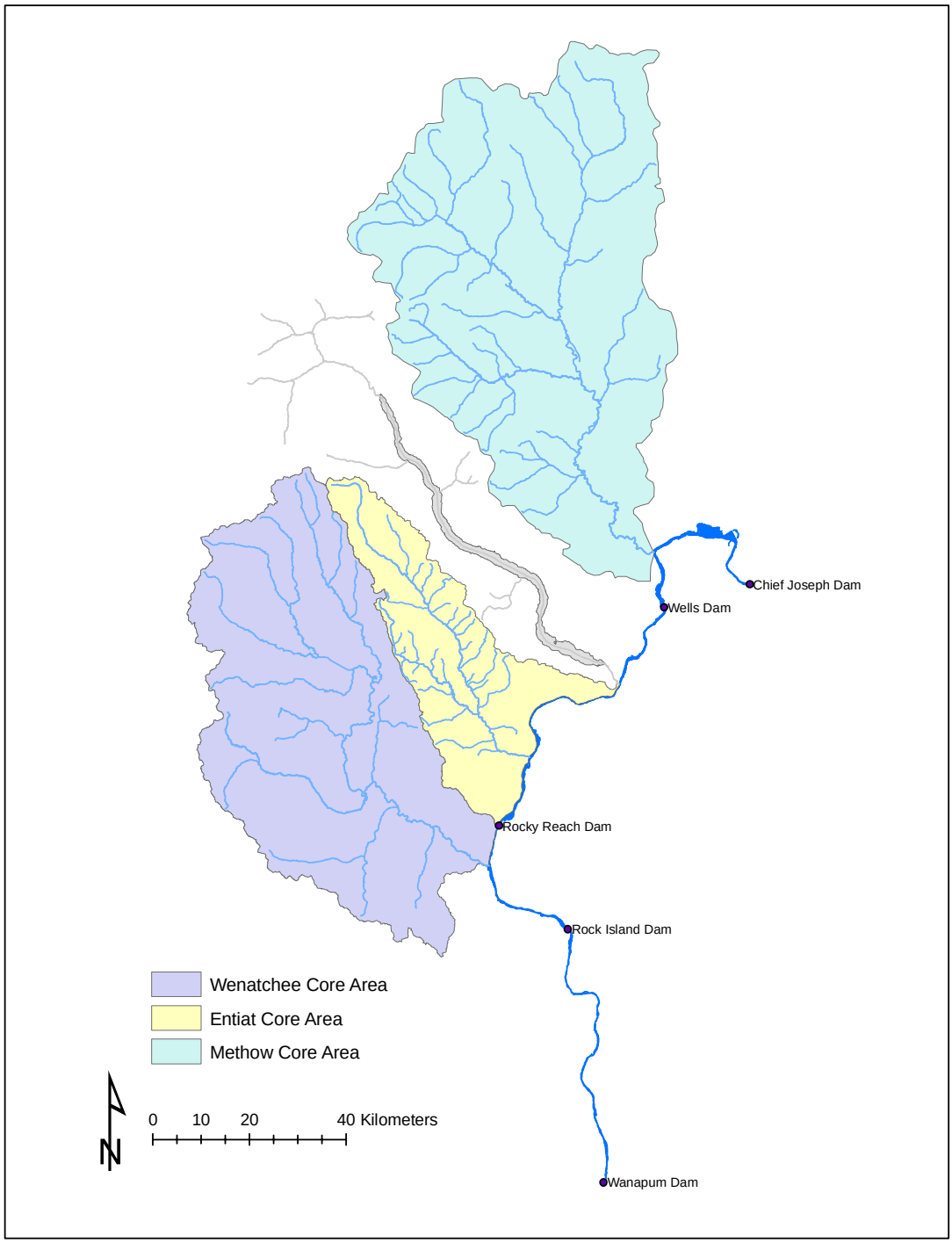

Figure 1. Map of the Mid-Columbia River and the 3 core areas of the Upper Columbia Bull Trout Recovery Unit.

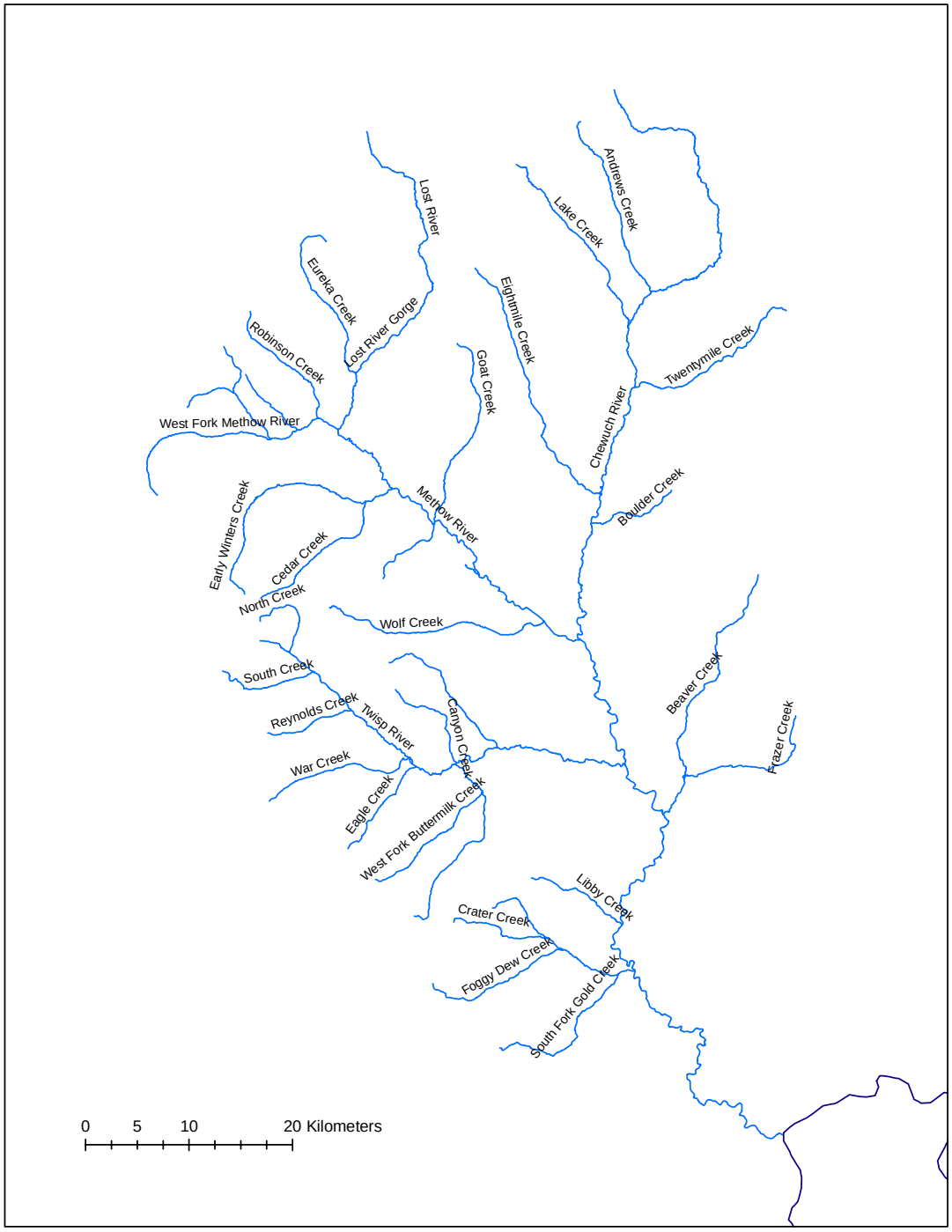

Figure 2. Map of the Methow River Core Area of the Upper Columbia Bull Trout Recovery Unit.

Methods

Adult fluvial bull trout were radio-tagged at Wells Dam by DPUD (LGL 2006) and at Rocky Reach Dam and Rock Island Dam by CPUD (CPUD 2006a). The radio tags used at Wells Dam were manufactured by Grant Engineering and transmitted on frequency 148.320 MHz (channel 201). Tags used at Rocky Reach and Rock Island Dams were Lotek model MCFT-3A transmitters and transmitted on frequency 148.580 MHz (channel 214). Fixed telemetry sites were set up and maintained by the PUDs at the dams and tributary entrances. After the tagged bull trout entered the Methow River, MCRFRO used a Lotek SRX400 telemetry receiver and mobile telemetry techniques to locate the fish. The large size of the watershed precluded a single survey of the entire core area so different areas were covered during each survey session. Surveys were conducted on foot and by mountain bike with whip and hand held yagi antennae, by truck with hitch mounted dual yagi 4-element antennae (Figure 3), and by airplane with wing mounted dual yagi antennae. Locations were recorded with a Garmin GPSmap76 unit or placed by hand on 7.5 minute USGS topographic maps. GPS waypoints were downloaded into MapTech Terrain navigator and the marker files were exported into Desktop GIS ArcView v9.0 for creation of maps.

Figure 3. Hitch mounted antennas and bike rack setup for mobile tracking.

Results

Tagging

Six adult fluvial bull trout were radio-tagged at Wells Dam by DPUD in 2005 (LGL 2005). Thirty-one bull trout were radio-tagged by CPUD at Rocky Reach Dam and 9 at Rock Island Dam in 2005 (BioAnalysts 2006a). Five of the DPUD bull trout (codes 2, 4, 6, 8, and 10) were detected by the fixed receiver site at the mouth of the Methow River (LGL 2005). Code 12 was not detected at any of the fixed receiver sites maintained by DPUD. Two CPUD bull trout (codes 3 and 31) were detected at the mouth of the Methow River (BioAnalysts 2006a). Lengths of the bull trout that used the Methow Core Area ranged from 430-680 mm; weights ranged from 840-2910 g (Table 1).

Table 1. Tagging location, tag channel and code, tagging date, length, and weight of Columbia River bull trout that migrated to the Methow Core Area in 2005.

Agency	Site	Channel	Code	Tagging date	Length (mm)	Weight (g)
DPUD	Wells	1	2	26-May-05	530	--
DPUD	Wells	1	4	2-Jun-05	560	2200
DPUD	Wells	1	6	3-Jun-05	680	2910
DPUD	Wells	1	8	7-Jun-05	430	840
DPUD	Wells	1	10	7-Jun-05	510	1490
DPUD	Wells	1	12	28-Jun-05	--	--
CPUD	Rock Island	14	3	30-May-05	450	1244
CPUD	Rocky Reach	14	31	31-May-05	520	1586

Data: BioAnalysts (2006b)

Radio-telemetry

MCRFRO radio-tracked the tagged bull trout in the Methow River Core Area during 6 sessions in the late summer and autumn of 2005. Each session covered different sections of the watershed and 6 tagged bull trout were located (Table 2). Five bull trout (codes 2, 4, 6, 10, and 12) were DPUD study fish and 1 bull trout (code 31) was a CPUD study fish. Bull trout DPUD code 8 and CPUD code 3 were not located.

Table 2. Date, method, rivers surveyed, and bull trout codes located during radio-telemetry surveys conducted by MCRFRO in the Methow River Core Area in 2005.

Session	Dates	Obs	Method	Rivers Surveyed[1]	Codes
1	8/31-9/1	MN,BG	Truck, Foot	M,T,B,C,Wl,E,WFl,Lol	2,4,6,12
2	9/12-13	MN,DC	Truck, Bike, Foot	M,G,W,WF,Lol	2,31
3	9/27	BKR	Flight	M,C,La,WF,Lo,W	2,10,31
4	9/27-28	MN,DC	Truck, Foot	M,G,T,B,Gld	4,6,12
5	10/12-13	MN,DC	Truck, Foot	M,G,T,B,WFl,Lol	2,10,6,12
6	11/16	MN,DC	Truck, Foot	M,T,WFl,Lol	none

Note 1: *B- Buttermilk Cr., C- Chewuch R., E- Early Winters Cr., G- Goat Cr., Gld- Gold Cr., La- Lake Cr., Lo- Lost R., Lol- lower Lost R., M-entire mainstem Methow R., T- Twisp R., W- Wolf Cr, Wl- lower Wolf Cr., WF- West Fork Methow R, WFl- lower West Fork Methow R.*

Tagged bull trout were located in 4 tributaries of the Methow River: Twisp River, West Fork Methow River, Wolf Creek, and Lost River (Figures 4, 5, 6, 7). No tagged fish were located in the mainstem Methow River.

Twisp River-Three tagged bull trout were located in Twisp River. On August 31, during truck tracking from the Twisp River Road, codes 4, 6, and 12 were located between rm 18.5 (rkm 29.8) and rm 20.2 (rkm 32.5) (Figure 4). On September 28, during truck tracking, bull trout code 4 was located at rm 12.5 (rkm 20.1), downstream of Buttermilk Creek, and we walked in and recorded exact positions for code 6 at rm 20.2 (rkm 32.5) and code 12 at rm 20.8 (rkm 33.5) (Figure 6). Code 6 was holding in a large pool along with at least one untagged fluvial bull trout and code 12 was in a small pool in the vicinity of at least 3 bull trout redds on the spawning grounds downstream of Reynolds Creek. On October 13, codes 6 and 12 were located from the truck downstream of Buttermilk Creek, between rm 12.1 (rkm 19.5) and rm 12.5 (rkm 20.1) (Figure 7). Code 4 was not found and had presumably exited the Twisp River. On November 16, no codes were found in the Twisp, and codes 6 and 12 had also presumably exited the river.

West Fork Methow River-One tagged bull trout was located in West Fork Methow River. On September 1, Code 2 was located from the truck at the end of spur 60 of FR 5400. We walked trail 480 and determined code 2 was upstream of Rattlesnake Creek (Figure 4), but did not attempt an exact position or visual of the fish. On September 13, we tracked from mountain bikes on trail 480 to Leap Creek, and code 2 was in the same general area (Figure 5). During the flight survey on September 27, code 2 was located in the same area (Figure 6). On October 13, we recovered the tag in the same vicinity (Figure 7). No carcass or body parts were discovered. The tag was covered with algae and apparently had been lying on the bottom for a period of time, but we do not known if the bull trout shed the tag or died. The recovery site was more than a mile (2 km) downstream of Trout Creek, the lower start of the USFS bull trout spawning ground survey index reach.

Wolf Creek-One tagged bull trout was located in Wolf Creek. On September 13, we walked the Wolf Creek Trail and found CPUD code 31 downstream of North Fork Wolf Creek (Figure 5). On September 19, it was located in the same area during a spawning ground survey (Judy Delavergne, USFWS, pers. comm.). Code 31 was still in the area during the flight on September 27 (Figure 6), the last telemetry survey of this section of Wolf Creek.

Lost River-One tagged bull trout was located in Lost River. On September 27, code 10 was located during the flight survey in the Lost River Gorge, downstream of Monument Creek (Figure 6). On October 13, code 10 was located 50m downstream of the County Road 9140 bridge (Figure 7). We snorkeled and took pictures of code 10 (see cover photo); it appeared healthy and was with 3 untagged adult fluvial bull trout and a school of 25 mountain whitefish. An additional 4 untagged adult fluvial bull trout and another school of 25 mountain whitefish were observed 50m upstream in a pool under the bridge. We did not locate the signal of code 10 on the November 16 survey. We drove FR 5400 and then walked the lower Lost River and the Methow River to the dry reach, approximately 2 miles (3.2 km) downstream, but we did not pick up the signal.

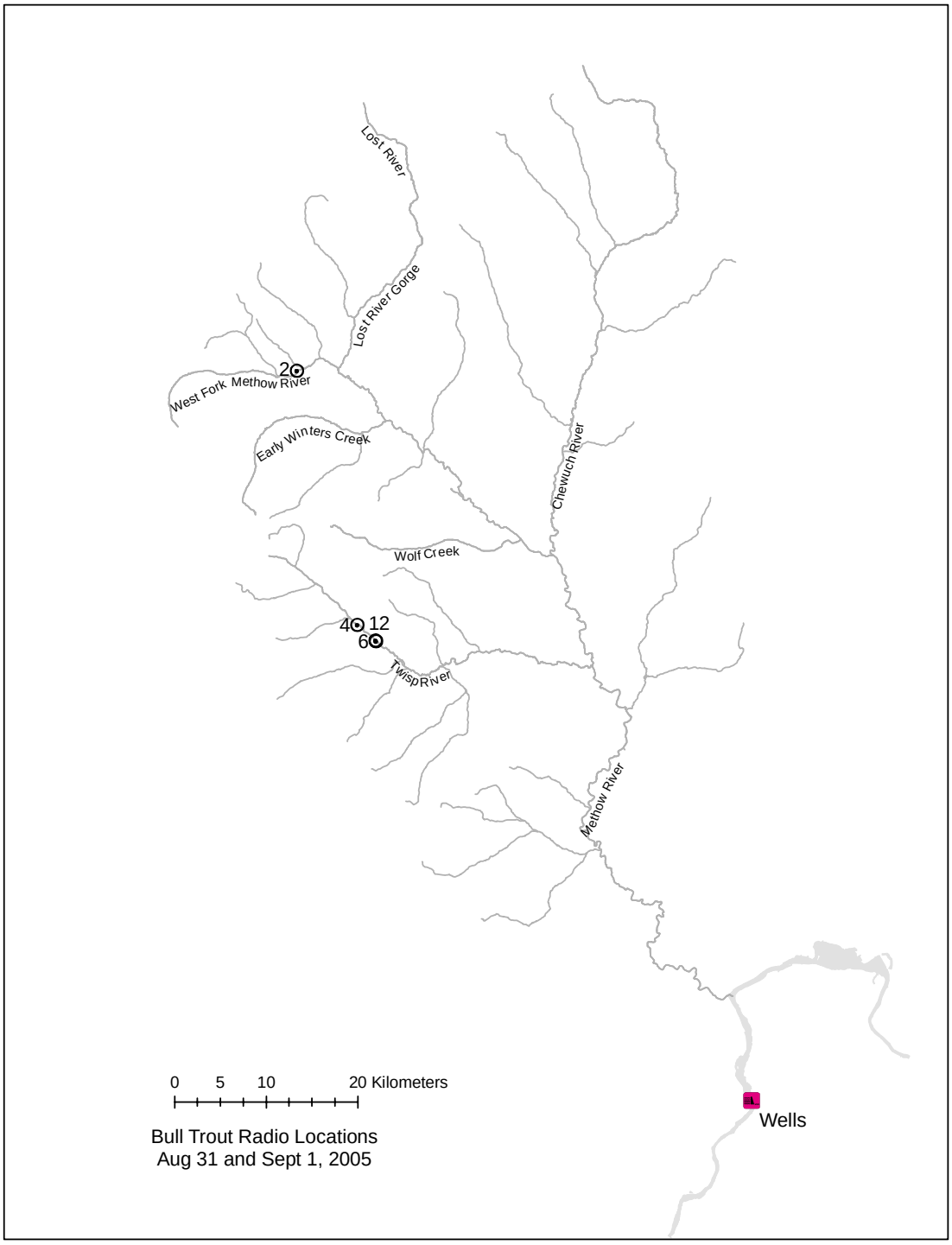

Figure 4. Bull trout locations from radio-telemetry surveys on August 31 and September 1, 2005. See Table 2 for areas surveyed on these dates.

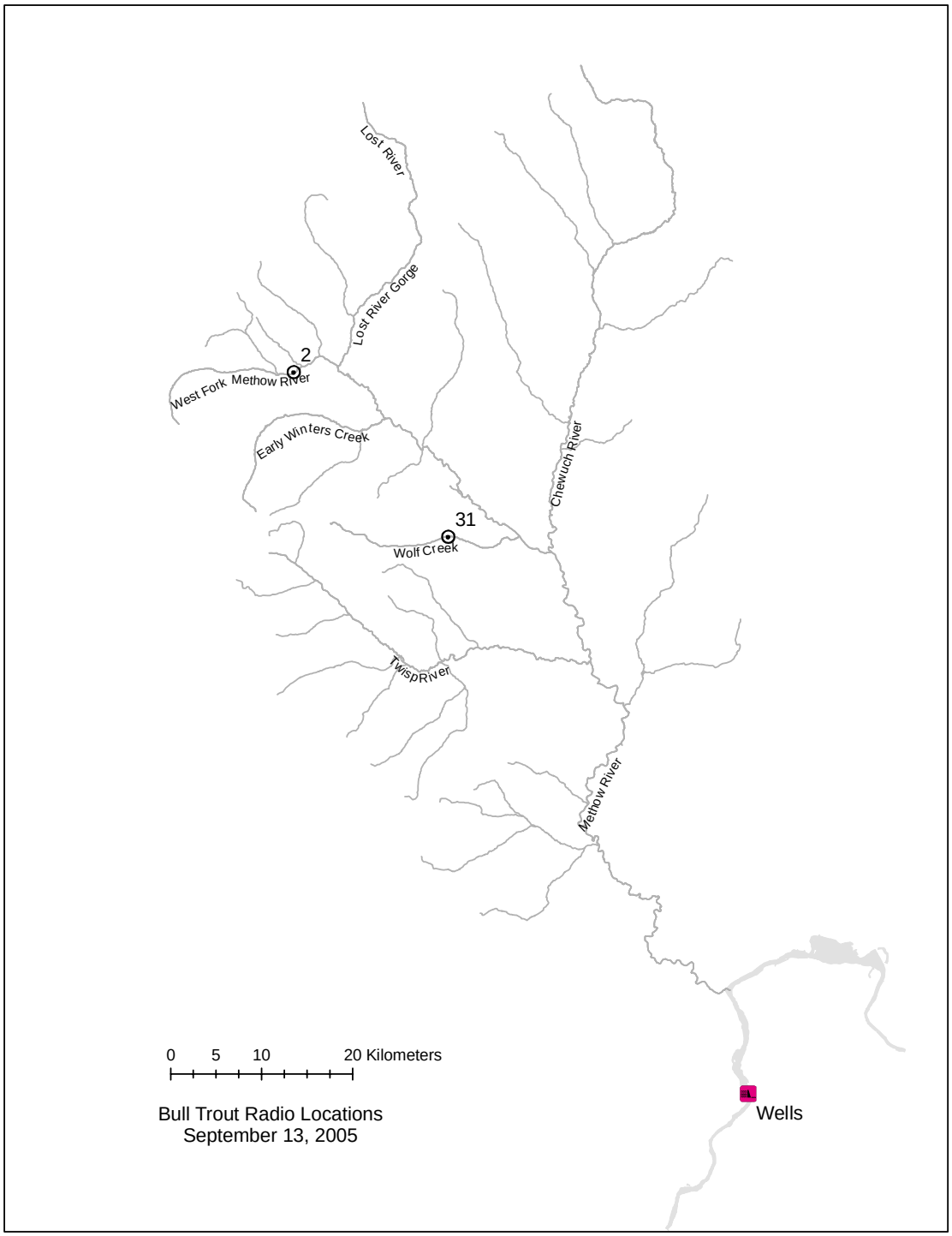

Figure 5. Bull trout locations from radio-telemetry surveys on September 13, 2005. See Table 2 for areas surveyed on this date.

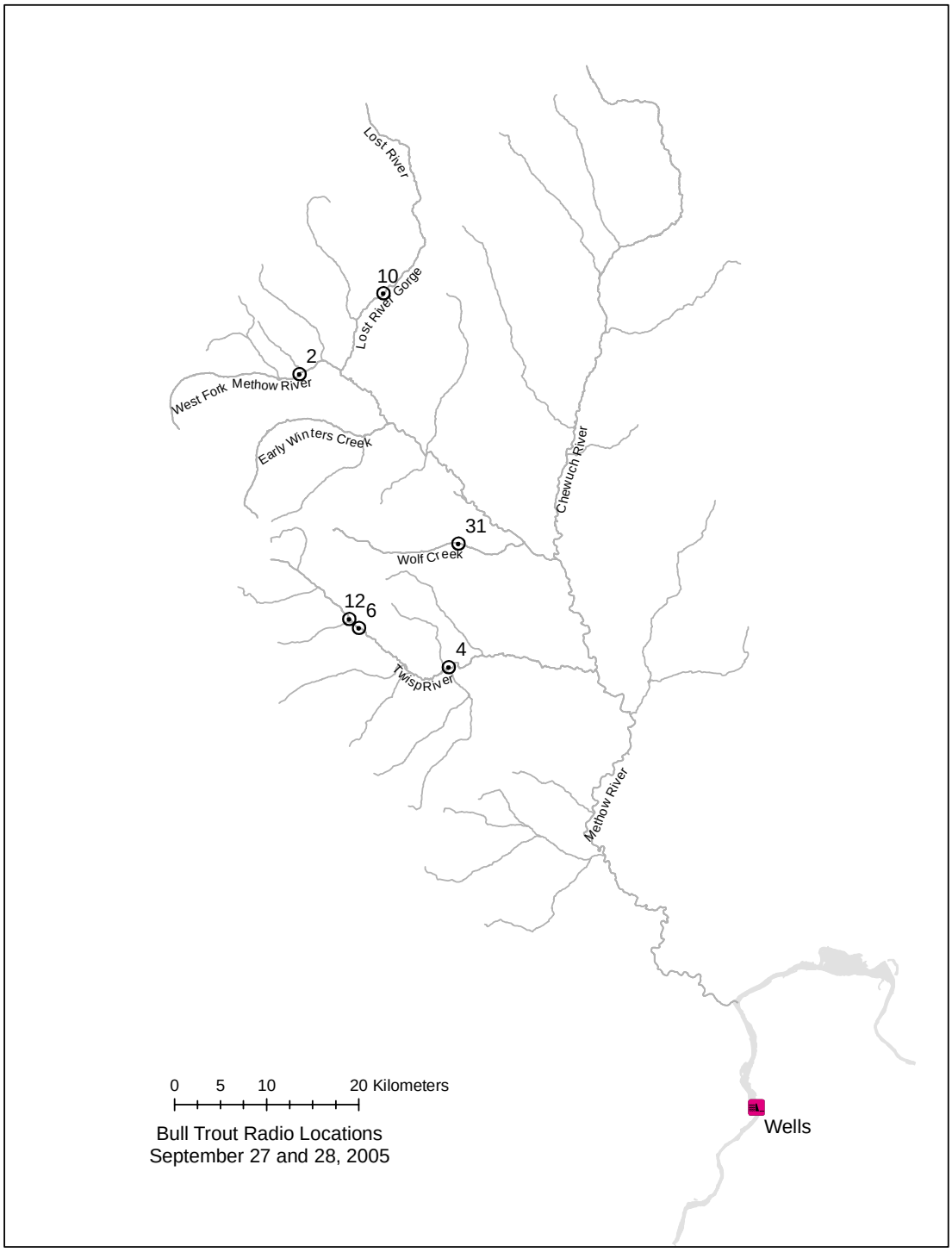

Figure 6. Bull trout locations from radio-telemetry surveys on September 27 and 28, 2005. See Table 2 for areas surveyed on these dates.

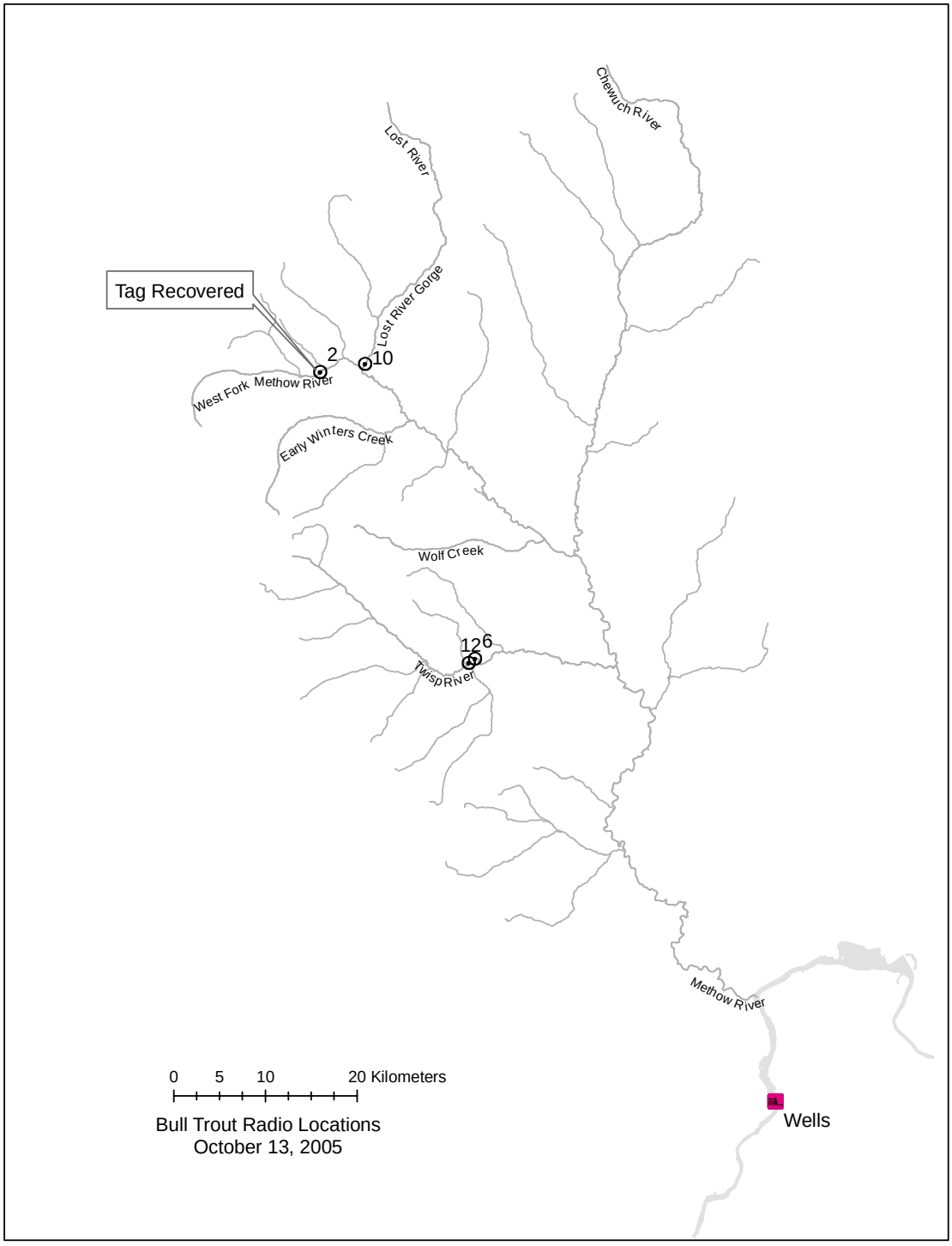

Figure 7. Bull trout locations from radio-telemetry surveys on October 13, 2005. See Table 2 for areas surveyed on this date.

Dry Reaches

During surveys, we documented 3 dry reaches in the Methow River system (Figure 8). The Twisp River was dry at Poplar Flats campground at rm 21.9 (rkm 35.2), and had been since at least mid-August, according to the campground host. The Methow River was dry in the vicinity of Mazama, and eventually the river went dry from Weeman Bridge to river mile 71 (rkm 114.3). Goat Creek was dry from the mouth to the bridge on County Road 1163. Thus, the upper Twisp River and the upper Methow River tributaries of West Fork Methow, Lost River, Early Winter Creek, and Goat Creek were isolated from the mainstem Methow by dry reaches in late summer and fall of 2005.

Migration distances

The upstream migration distances for 5 bull trout tagged at Wells Dam ranged from 68.9 to 88 miles (110.0 to 141. 6 km) (Table 3), with an average distance of 76.2 miles (122 km). The one CPUD bull trout we located migrated 108.3 miles (174.3 km) from Rocky Reach Dam to Wolf Creek (Table 3).

Table 3. Radio-tagged bull trout migration distances from tagging location in Columbia River to furthest upstream location in tributary of Methow River during 2005.

Code	Tagged at:	Tributary migrated to	Distance migrated upstream
2	Wells	West Fork Methow River	85.5 mi (137.6 km)
4	Wells	Twisp River	68.9 mi (110.9 km)
6	Wells	Twisp River	68.9 mi (110.9 km)
10	Wells	Lost River	88 mi (141.6 km)
12	Wells	Twisp River	69.5 mi (111.8 km)
31	Rocky Reach	Wolf Creek	108.3 mi (174.3 km)

Discussion

Fluvial bull trout tagged during previous radio-telemetry studies in the Columbia River migrated to the mainstem Methow River or the Twisp River (BioAnalysts 2004, Nelson 2004). This study documents the first known migrations of bull trout from the Columbia River into the upper tributaries of the Methow River. This study also confirms that Columbia River bull trout visit some of the known spawning reaches in those tributaries, as indicated by the presence of the tagged bull trout on the Wolf Creek spawning grounds. The code 2 tag we recovered in the West Fork Methow River was located just 2 km downstream of the spawning ground index reach, in an area where pre-spawning fluvial bull trout have been observed congregating in pools (Dave Hopkins, USFS, pers. comm.).

The code 2 tag was apparently on the bottom for some time before we recovered it, and we do not know if the bull trout died or shed the tag. Because a large amount of effort is needed to recover carcasses and tags we suggest that future telemetry studies use radio

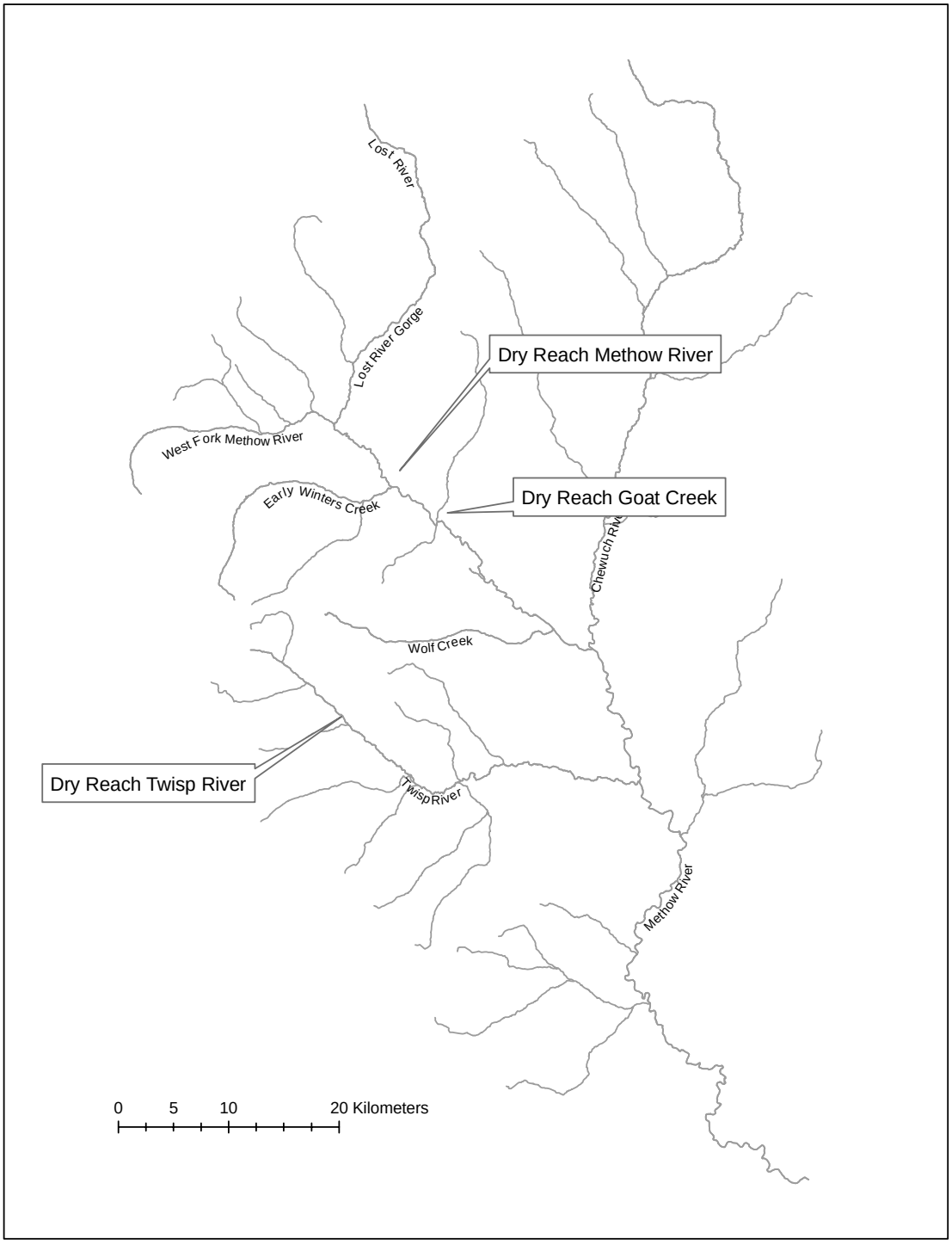

Figure 8. Dry river reaches observed during radio-telemetry surveys in the Methow River system in 2005.

transmitters with motion switches to indicate cessation of movement and increase the likelihood that a carcass and clues to mortality are discovered. Expulsion of tags has been documented in other studies by snorkel observations of an expulsion wound on a bull trout near the vicinity of a shed tag (Mendel et al. 2003) and a motion switch could increase the probability of this type of confirmation.

Dry reaches are a common and natural occurrence in the Methow watershed and several of the known spawning grounds are upstream of these reaches. The response and survival of post-spawning adult bull trout to these isolations should be monitored in order to determine their impact on recovery numbers of bull trout (Nelson 2004).

Acknowledgements

We appreciate the support of Bao Le of Douglas PUD and Steven Hemstrom of Chelan PUD; this first year of study would not have been possible without the tagging and monitoring programs of the utilities. Information on tagged bull trout movements into the Methow River was provided by Bryan Nass of LGL, Ltd, and additional information was provided by John Stevenson and Denny Snyder of BioAnalysts, Inc. Field assistance was provided by USFWS Fish Technicians David Conlin and Brett Gaddis. The aerial survey was conducted by USFWS Fish Biologist Barbara Kelly-Ringel.

On the cover: photograph of adult fluvial bull trout tag code 10 with a school of mountain whitefish in the lower Lost River. USFWS photograph by David Conlin.

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January 2007