introductions of nonnative brown trout and rainbow trout. Although some of these factors relate to human activities, the natural potential for Yellowstone cutthroat trout in this HUC is marginal.

Currently, fish community composition varies along this portion of the Yellowstone River, and this variation reflects its transition from a cold-water fishery towards a warm-water fishery. Cold-water species including mountain whitefish, brown trout, and rainbow trout occur throughout this portion of the Yellowstone River, but become rarer near Billings (MFISH database). Warm-water species such as channel catfish, goldeye, flathead chub, and river carpsucker begin to comprise a portion of the fish assemblage in the downstream portions of the Yellowstone River (MFISH database).

Given the natural limitations for Yellowstone cutthroat trout in the Upper Yellowstone – Lake Subbasin, this area is a low priority for implementation of specific conservation actions. Projects that promote recovery of fluvial Yellowstone cutthroat trout upstream of this HUC may increase the representation of Yellowstone cutthroat trout in this part of its range. A greater abundance of Yellowstone cutthroat trout upstream may result in fluvial fish moving into these lower reaches, especially during seasons when water temperatures are favorable for this sensitive species.

6.5 Stillwater River of the Yellowstone Subbasin (HUC 10070005)

The Stillwater River (Figure 6-36) begins in the Beartooth Mountains near Cooke City and flows north and east approximately 70 miles before entering the Yellowstone River in the town of Columbus. Several major tributaries feed the Stillwater River. The West Fork Stillwater River flows about 25 miles and joins the Stillwater near the town of Nye. East Rosebud and West Rosebud creeks measure about 40 miles each and form Rosebud Creek, which flows a short distance before joining the Stillwater River near the town of Absarokee.

Land uses are typical of the region. The forested higher elevations support timber harvest, livestock grazing, and recreation. Agriculture is the primary land use in the valley portions of the watershed, and includes livestock production and irrigated crops. Water demands for irrigation result in periodic dewatering in portions of the Stillwater River and two of its tributaries (Table 6-56).

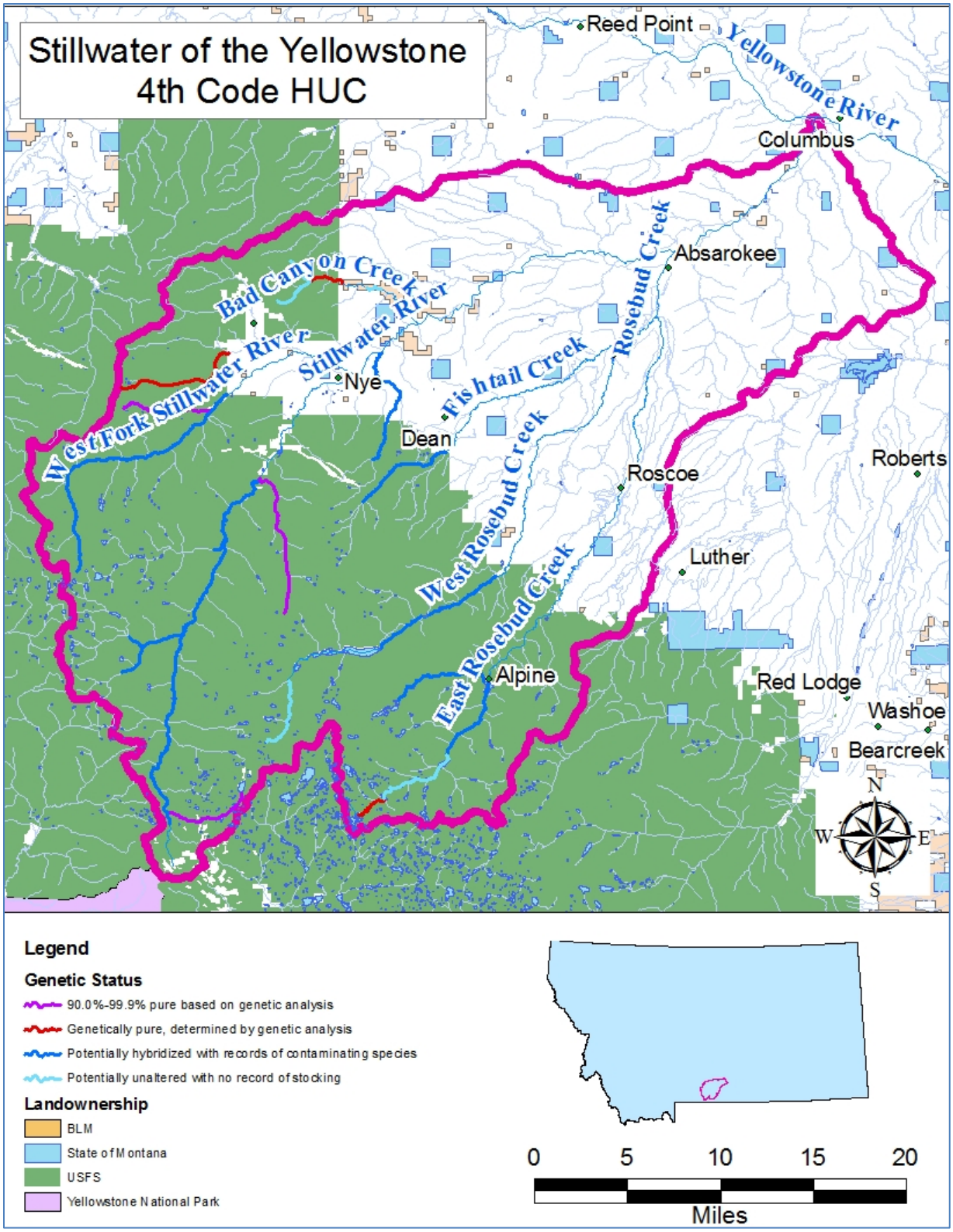

Figure 6-36: Stillwater of the Yellowstone River Subbasin (10070005).

Table 6-56: Dewatered streams in the Stillwater River watershed (MFISH database).

Stream	*Tributary To*	*Begin Mile*	*End Mile*	*Dewater*
Bad Canyon Creek	Stillwater River	0	1	Periodic Dewatering
Fishtail Creek	West Rosebud Creek	0	2	Periodic Dewatering
Stillwater River	Yellowstone River	12	24	Periodic Dewatering

Historically, the Stillwater drainage supported a healthy population of Yellowstone cutthroat trout through most of its length. Today, Yellowstone cutthroat trout are only present in small remnant populations in tributaries to the Stillwater and in headwater lakes that were previously fishless. Brook trout, brown trout, and rainbow trout rate as common to abundant through much of the main stem (Table 6-57). Given the connectivity with the Yellowstone River, the majority of the Stillwater drainage has little to no potential for restoration of secure Yellowstone cutthroat trout populations. Several tributaries have features that make them suitable candidates for reestablishment or protection of core populations of Yellowstone cutthroat trout. Genetic analyses in the Stillwater River watershed indicate the populations present are core or conservation populations (Table 6-58).

Table 6-57: Distribution and abundance of trout species in the Stillwater River (MFISH database).

Begin Mile	*End Mile*	*Species*	*Abundance*	*Use Type*	*Data Rating*
30	40	Brook trout	Rare	Year-round resident	EFMSO
40	42	Brook trout	Common	Year-round resident	EFMSO
44	70	Brook trout	Common	Year-round resident	EFMSO
0	26	Brown trout	Abundant	Primarily rearing and migration	EFMSO
26	36	Brown trout	Abundant	Both resident and fluvial/adfluvial populations	EFMSO
36	40	Brown trout	Common	Both resident and fluvial/adfluvial populations	EFMSO
40	42	Brown trout	Rare	Both resident and fluvial/adfluvial populations	EFMSO
0	20	Rainbow trout	Abundant	Primarily rearing and migration	EFMSO
20	44	Rainbow trout	Common	Both resident and fluvial/adfluvial populations	EFMSO
44	60	Rainbow trout	Rare	Year-round resident	EFSSO
11	13	Yellowstone cutthroat trout	Not Applicable	Unknown	EFSSO
44	67	Yellowstone cutthroat trout	Abundant	Unknown	NSPJ

Table 6-58: Summary of genetic analyses for streams and lakes in the Stillwater River watershed (MFISH database).

Body of Water	*Sample. No.*	*Sample Size*	*Target Species*	*Percent of Genes*	*Count*	*Collection Date*
Bad Canyon Creek	525	4	YCT	100	0	8/28/1991
East Rosebud Creek	3556	13	YCT	0	13	7/25/2007
Goose Creek	950	11	YCT	97.7	0	7/20/1994
Goose Creek	950	11	RBT	2.3	0	7/20/1994
Goose Creek	702	4	YCT	100	0	9/01/1992
Goose Lake	2840	50	YCT	100	0	7/22/2003
Iron Creek	816	15	YCT	93	0	8/19/1993
Iron Creek	816	15	RBT	7	0	8/19/1993
Picket Pin Creek	1027	6	YCT	100	0	9/21/1994
Woodbine Creek	3554	30	YCT	99.7	0	7/27/2007
Woodbine Creek	3554	30	WCT	0.2	0	7/27/2007
Woodbine Creek	3554	30	RBT	0.1	0	7/27/2007

Numerous mountain lakes in the Stillwater River drainage support populations of Yellowstone cutthroat trout, and 22 are likely to be nonhybridized. These lakes are: Sundown, Jordan, Martes, Jay, Chrome, Wood, Wilderness, Cataract, Wrong, Courthouse, Beauty, Anvil, Goose, Little Goose, Huckleberry, Mutt, Jeff, Lake of the Woods, Aufwuch, Mouse, Pentad, and Favonius. Most notably, the population in Goose Lake is the current brood source for the Yellowstone cutthroat trout hatchery program in Montana. Reportedly, a prospector living at the lake transported these fish from the Clarks Fork of the Yellowstone River around 1906. Huckleberry, Mutt, and Jeff lakes have been the subject of conservation actions to remove brook trout and establish a population of Yellowstone cutthroat trout. This project began in 2007 and was completed in 2009.

6.5.1 Goose Creek

The 6-mile long Goose Creek (Figure 6-37) is a tributary to the Stillwater near its headwaters, just north of Cooke City. Goose and Little Goose lakes harbor self-sustaining populations of Yellowstone cutthroat trout. Below a small cascade, brook trout were present throughout Goose Creek, the result of historic brook trout stocking in Huckleberry Lake. From 2007 through 2009, a piscicide project resulted in the successful removal of brook trout from Huckleberry, Mutt and Jeff lakes, as well as about five miles of Goose Creek. Yellowstone cutthroat trout are being reintroduced to the lakes and creek, and the goal of creating a self-sustaining Yellowstone cutthroat trout population throughout 3 lakes and 5-6 miles of creek will be accomplished soon.

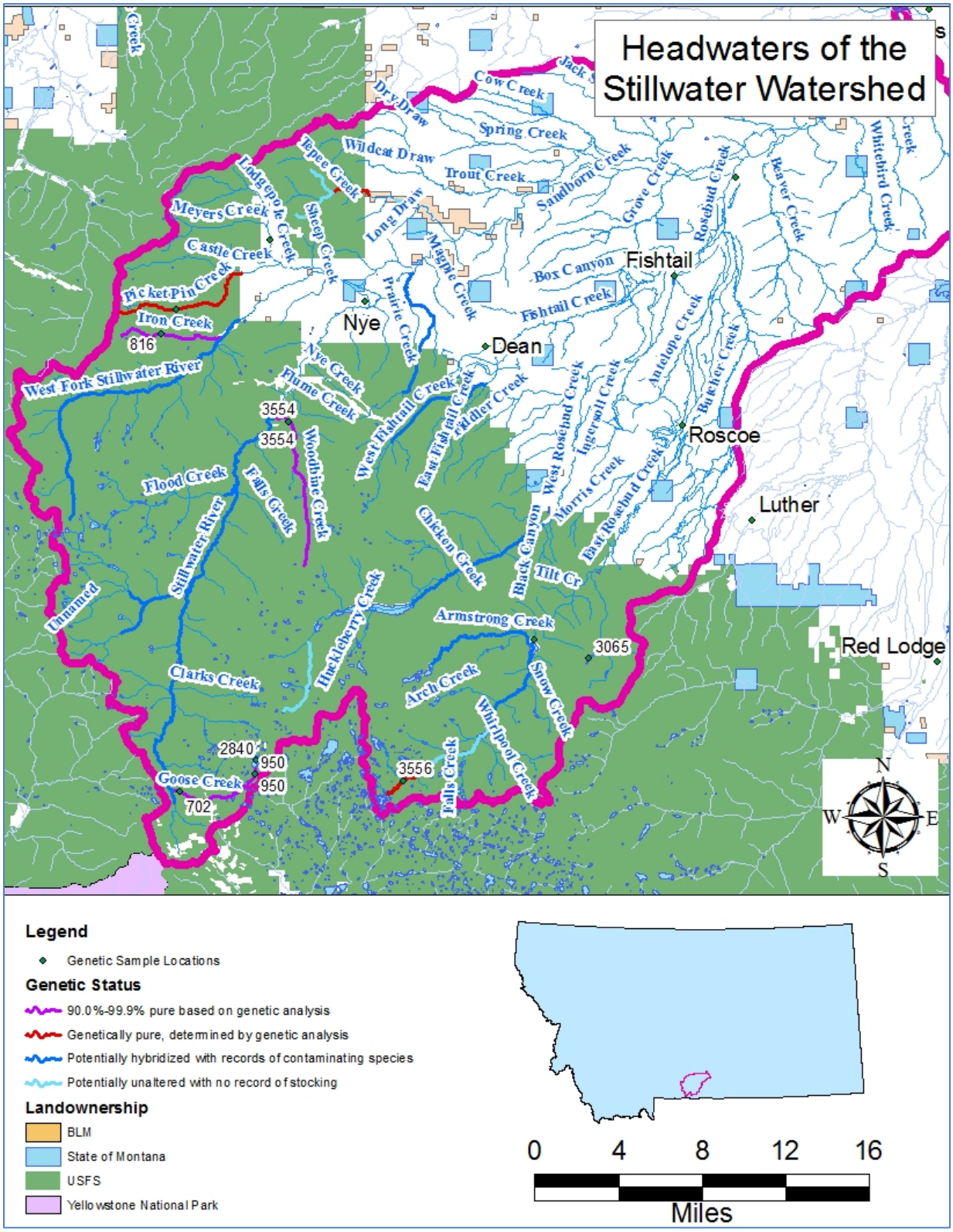

Figure 6-37: Upper Stillwater River watershed.

6.5.2 Woodbine Creek

Woodbine Creek (Figure 6-37), a tributary of the Stillwater River, enters the Stillwater near the boundary of the Absaroka-Beartooth Wilderness. Woodbine Creek supports a population of slightly introgressed Yellowstone cutthroat trout (Table 6-58). A waterfall near its mouth has likely been the feature that has allowed persistence of Yellowstone cutthroat trout in this part of the watershed. As a core population with less than 1% hybridization, protecting this population is a conservation priority. Additional investigation of abundance and distribution will guide development of a specific conservation approach.

6.5.3 Little Rocky Creek

Little Rocky Creek (Figure 6-37) flows about 10 miles from the Benbow Mine area down to the Stillwater River just southwest of Beehive. Despite its length, the creek is relatively small and steep, and fish densities are low. Rainbow and brown trout are present in the lower reaches of the creek, and brook trout and Yellowstone cutthroat trout are present upstream of the GNF boundary. A nonhybridized population of Yellowstone cutthroat trout may be present in Little Rocky Creek, but too few fish have been captured to obtain a reliable genetic sample. Access to most of the creek is difficult. Chrome Lake, near the headwaters of Little Rocky, was historically stocked with brook trout, and now contains stocked populations of Yellowstone cutthroat trout and Arctic grayling. Some potential exists to build a barrier to upstream fish passage in lower Little Rocky Creek, perhaps at the Forest Service road crossing, or further downstream at the Highway 419 crossing, and remove brook, brown, and rainbow trout from above the barrier. The suitability of the available habitat to support Yellowstone cutthroat trout is unknown, and should be the subject of future survey work.

6.5.4 Bad Canyon Creek

Bad Canyon (Figure 6-37) is a 10-mile long creek that flows through National Forest, BLM and private lands before joining the Stillwater River. Near its confluence with the Stillwater River, Bad Canyon has low flow for most of the year. Brown trout dominate the lower six miles of creek, where water is in sufficient supply. About 6 miles upstream from the mouth, a Yellowstone cutthroat trout population that is thriving throughout four miles of creek, and a barrier prevents invasion of brown trout into this area.

The current fish distribution is a result of a past Yellowstone cutthroat trout restoration project that involved the improvement of a fish barrier to ensure its effectiveness, and treatment of the creek above the barrier with a piscicide. The piscicide treatment occurred in 2002. Yellowstone cutthroat trout salvaged before piscicide application were returned to the stream after detoxification. Surveys in 2005 and 2008 revealed a healthy Yellowstone cutthroat trout population in the creek above the barrier. Below the barrier, brown trout continue to be present in high densities. Expanding the Yellowstone cutthroat trout population downstream is a potential conservation action. Achieving expansion would require the construction of a fish passage barrier on BLM land and another piscicide project. The relatively complex landownership along

Bad Canyon Creek means collaboration among agencies and private landowners would be necessary for implementation of conservation actions.

6.5.5 Trout Creek

Trout Creek (Figure 6-37) enters the Stillwater River several miles downstream from Bad Canyon Creek, and bears similarities to Bad Canyon Creek in terms of size and nature of the habitat. The fish population in Trout Creek is a mix of brown and brook trout, with brown trout more common in the lower reaches and brook trout more common near the headwaters. Livestock grazing practices are compatible with fisheries, as the stream retains high quality habitat and abundant fish. Near the headwaters of Trout Creek, a waterfall keeps fish from moving further upstream. Some suitable fish habitat exists above the barrier, and may support a small Yellowstone cutthroat trout population if introduced. Further downstream, building a fish passage barrier, and reclaiming the stream to reestablish Yellowstone cutthroat trout population, may be feasible. These actions would require significant cooperation and support from the private landowners on Trout Creek.

6.5.6 West Fork Stillwater River

The West Fork Stillwater River drainage (Figure 6-37) supports a diverse fishery, including rainbow, brown, brook, golden and cutthroat trout, as well as Arctic grayling. The abundance of nonnative fishes, combined with connectivity with the main stem Stillwater River, means little potential exists for Yellowstone cutthroat trout restoration in this stream. Moreover, much of the drainage is within the Absaroka-Beartooth Wilderness, which limits options for use of motorized equipment to implement fish conservation actions in this sizeable watershed.

Potential conservation actions for the West Fork Stillwater include basic inventories: of species distribution, presence of fish passage barriers, and the potential for available habitat to support Yellowstone cutthroat trout. Nonetheless, its steep gradient, difficult accessibility, and wilderness designation may preclude Yellowstone cutthroat trout introduction. Four lakes, (Jasper, Little Jasper, North Picket Pin and South Picket Pin) and two creeks (Iron Creek and Picket Pin Creek) support nonhybridized Yellowstone cutthroat trout populations in the West Fork drainage. Additionally, Castle, Meyers and Lodgepole creeks should be evaluated for potential Yellowstone cutthroat trout restoration projects.

6.5.7 Iron Creek

Upstream of the confluence West Fork of the Stillwater, t5.5 mile long Iron Creek (Figure 6-37contains a self-sustaining population of nonhybridized Yellowstone cutthroat trout. No other fish species are present here, potentially due to a fish passage barrier located somewhere near the mouth of the creek. The origin of this Yellowstone cutthroat trout population is likely a result of stocking events in 1943 and 1971. Because the creek is steep throughout much of its length, the spatial extent of the Yellowstone cutthroat trout population is probably limited. Investigation of the density and distribution of Yellowstone cutthroat trout would be useful in determining the status and security of this population.

6.5.8 Picket Pin Creek

Picket Pin (Figure 6-37) is a headwater tributary in the West Stillwater Creek drainage. Plants of Yellowstone cutthroat trout into the North and South Picket Pin lakes began in 1969. Sampling in 1994, 2004 and 2008 confirmed that a self-sustaining population of Yellowstone cutthroat trout exists in the creek on the Custer National Forest (CNF), upstream from an apparent natural barrier to fish passage that precludes brown and rainbow trout invasion (J.R. Wood, FWP, personal communication). The effectiveness of this barrier is uncertain, but no nonnative fish species have been found above it in recent years. Future sampling should confirm whether the barrier is functioning to keep invasive fish species out of the creek and obtain information about the distribution and density of the Yellowstone cutthroat trout population in Picket Pin Creek.

6.5.9 Castle, Meyers and Lodgepole Creeks

These three streams (Figure 6-37are tributaries to Limestone Creek, which is a tributary of the West Fork Stillwater River. All three flow through private and CNF land and may have some potential to support Yellowstone cutthroat trout populations. Data needs include determination of the current upstream extent of fish distribution and identification of barriers, if present. These streams have an unknown potential for restoring a Yellowstone cutthroat trout population, but possible actions include stocking into fishless waters, constructing fish passage barriers, and reclaiming Yellowstone cutthroat trout populations. As landownership is a mixture of public and private, collaboration with private landowners would be essential to Yellowstone cutthroat trout restoration in these drainages.

6.5.10 East Rosebud Creek

East Rosebud Creek (Figure 6-37) originates high in the Beartooth Mountains where it forms the drainage for 76 mountain lakes, 30 of which contain fish populations. Such a wide variety of nonnative trout species and hybrid trout occur in these lakes that Yellowstone cutthroat trout restoration is not feasible throughout most of the drainage. Some nonhybridized Yellowstone cutthroat trout are present in the creek near its headwaters, but the stream gradient is steep, and the creek only flows a short distance between lakes.

The creek flows into East Rosebud Lake at the wilderness boundary and flows mostly through private land until it joins the West Rosebud to form Rosebud Creek near the town of Absarokee. Brown trout dominate the fish population in this reach of East Rosebud Creek, although rainbow trout are also present. Significant water withdrawal and interbasin transfer of water through irrigation ditches, combined with naturally poor habitat conditions, would make Yellowstone cutthroat trout restoration infeasible in the few tributaries to East Rosebud Creek (Morris Creek, Antelope Creek, Butcher creeks).

6.5.11 West Rosebud Creek

Similar to East Rosebud, West Rosebud Creek (Figure 6-37) originates high in the Beartooth Mountains and drains 84 mountain lakes, the majority of which are naturally fishless. Twelve lakes in the drainage currently contain populations of Yellowstone cutthroat trout, five of which are self-sustaining. These are Frenco, Princess, Beckwourth, Arrapooash and Ram lakes.

Potential to stock Yellowstone cutthroat trout in stream and lake habitat exists in the headwaters of West Rosebud Creek; however, because this part of the watershed is within designated wilderness, stocking Yellowstone cutthroat trout in fishless waters has been a priority. Downstream of the wilderness boundary, the West Rosebud Creek, brown trout are the most numerous fish, although rainbow trout and brook trout are also present. The presence of these species results in little potential for Yellowstone cutthroat trout restoration in the main stem of the creek. Only two major tributaries, Fishtail Creek and Fiddler Creek, enter the West Rosebud in this reach.

6.5.12 Fiddler Creek

Fiddler Creek (Figure 6-37) is a 7.5-mile long stream that originates on the north face of the Beartooth Mountains and enters West Rosebud Creek south of the town of Fishtail. Numerous small tributaries contribute to Fiddler Creek, the two largest being the Middle Fork and the East Fork. Brook trout dominate the fish population throughout these streams. Brown trout are present, but are confined to the lower reaches. Though small, the fish habitat throughout much of Fiddler Creek is complex, with beaver dams contributing to the diversity of habitats.
Early attempts to establish populations of Yellowstone cutthroat trout and rainbow trout in Fiddler Creek were unsuccessful. These plants occurred from 1928 to 1934. Although anglers have reported catching Yellowstone cutthroat trout in the headwaters of the East Fork Fiddler Creek, extensive sampling yielded only brook trout (J.R. Wood, FWP, personal communication).

Although Fiddler Creek has some potential for establishment of a Yellowstone cutthroat trout population, several factors present significant challenges. Notably, brook trout are abundant throughout the creek, and the presence of numerous beaver dams would complicate reclamation efforts, as achieving total removal is difficult in complex habitat. Removal of rainbow trout from Crater Lake would also be required, although this would be considerably easier than treating the stream.

6.5.13 Fishtail Creek

Fishtail Creek (Figure 6-37) begins at the junction of East and West Fishtail creeks and flows about 14 miles before joining West Rosebud Creek in the town of Fishtail. Brown trout are the most common salmonid in Fishtail Creek. Rainbow trout are also present throughout the creek's length, and some brook trout are present in the upper reaches. Most of the creek provides good trout habitat, some of which has been degraded by significant sediment loading and agricultural-related runoff. The potential for Yellowstone cutthroat trout restoration in Fishtail Creek, while minimal, is dependent upon restoration potential in its tributaries, East and West Fishtail creeks.

6.5.14 East Fishtail Creek

East Fishtail Creek joins West Fishtail Creek to form Fishtail Creek just downstream of the CNF boundary (Figure 6-37). The creek flows approximately 6 miles through steep terrain, primarily on national forest. No lakes are present in the creek's headwaters. Brown trout, brook trout, and rainbow trout are likely present in the creek, but fish survey data are not available. Access to the

creek by a trail has become difficult due to recent blow-down events and lack of trail maintenance. Future survey work will be necessary to determine the spatial distribution of fish in East Fishtail Creek, and to determine the potential for securing an existing population or restoring Yellowstone cutthroat trout to these waters. Depending on findings of baseline investigations, possible actions may include barrier construction and removal of nonnative fishes.

6.5.15 West Fishtail Creek

West Fishtail Creek flows (Figure 6-37) approximately 10 steep stream miles along the Beartooth Mountain face before joining East Fishtail Creek just below the forest boundary. No survey data are available for West Fishtail Creek, but species potentially present include brown trout, rainbow trout, and Yellowstone cutthroat trout (MFISH database). Beginning in the early 1980s, golden trout have been stocked into a series of lakes at the headwaters of West Fishtail Creek, and some of these lakes support self-sustaining populations of golden trout. The presence of golden trout makes the possibility for Yellowstone cutthroat trout restoration in West Fishtail Creek unlikely to be successful over the long term. Golden trout have potential to move downstream and interbreed with Yellowstone cutthroat trout. Data requirements for this drainage include determination of species composition and distribution, and determination of the potential for downstream movement of golden trout from lakes. Without this information, drainage-wide Yellowstone cutthroat trout restoration potential remains unknown.

6.5.16 Island Lake Project

In the lower reaches of West Fishtail Creek, about a mile upstream from the forest boundary, two irrigation ditches take water from the creek and run it into adjacent drainages. The lowermost ditch runs for approximately 1 mile, entering and exiting several small lakes before providing irrigation water for the 4-K Guest Ranch. Of these bodies of water, Island Lake, located on CNF land is the largest at approximately 4.5 surface acres. Water exits Twin Lakes through a small headgate, runs through a flume for several hundred yards, drops into Island Lake, exits through another headgate and drops almost vertically before reaching irrigated pasture land. Water level fluctuates substantially in the lake, dropping approximately 6-8 vertical feet from full elevation when irrigation season ends.

Because of the irrigation-caused flow fluctuations and the limited amount of spawning habitat available, brown and brook trout that drop into the lake from the ditch cannot spawn successfully. This limitation has resulted in a small group of medium to large sized fish, primarily brown trout, which grow well but are unable to reproduce. The water-level regime appears to be ideal for a spring-summer spawning fish like Yellowstone cutthroat trout, whose spawning and egg incubation period would take place while the lake is full, unlike fall-spawned brown and brook trout eggs that dry up when the lake level drops.

Beginning in 2009, FWP, the 4-K Ranch, and the CNF implemented a spawning habitat improvement and Yellowstone cutthroat trout introduction project in Island Lake. The spawning

habitat component involved placement of spawning gravels in the lake outlet. In summer 2009, approximately 1,000 2-inch long Yellowstone cutthroat trout and 100 14-inch-long Yellowstone cutthroat trout were stocked into the lake. Stocking will occur for several years with the objective of establishing a self-sustaining Yellowstone cutthroat trout population. Survival, growth and spawning/reproduction of these fish will continue to be monitored in the future.

6.6 Clarks Fork of the Yellowstone Subbasin (HUC 10070006)

The Clarks Fork of the Yellowstone River Subbasin (Figure 6-38) begins in the high mountain lakes of the Absaroka-Beartooth Wilderness Area near Cooke City, Montana. The Clarks Fork drainage has more mountain lakes (424) than any other drainage in the Beartooth Mountains, and these lakes support a wide variety of trout species, including brook trout, rainbow trout, Yellowstone cutthroat trout, golden trout, lake trout and various hybrid trout. Although this large variety offers significant angling opportunity, it makes Yellowstone cutthroat trout restoration a difficult, if not impossible task in much of the drainage. No significant headwater areas in the Clarks Fork drainage present great Yellowstone cutthroat trout restoration opportunity due to large numbers of nonnative trout that would have to be removed in headwater lakes and streams. Fisher Creek, near Cooke City, has adequate water and no headwater lakes, but does not support fish due to heavy metal contamination. Restoration work here may improve water quality, but it is more likely that background metal levels would be too high to support fish even with remediation of mining-related sources.