

Progress Report

Green River Watershed Native Non-Game Fish Species Research: Phase II

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Submitted to:

Bureau of Reclamation

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INTRODUCTION

Conservation efforts to protect and restore native fish species of the Colorado River basin are underway (Utah Division of Wildlife Resource 2004a and 2004b). Flannelmouth sucker (*Catostomus latipinnus*), bluehead sucker (*Catostomus discobolus*), and roundtail chub (*Gila robusta*), hereafter target species, are three species native to the Colorado River basin that have been targeted by these efforts.

Weitzel (2002) reports that these three species were historically abundant in the Green River watershed of southwestern Wyoming. However, populations have declined in Wyoming (Weitzel 2002) and in other areas throughout the Colorado River drainage (Bezzarides and Bestgen 2002). The Wyoming Natural Diversity Database assigns bluehead sucker (BHS) the global ranking of G4 suggesting this species to be abundant and globally secure, although it may be quite rare in portions of its range and should therefore be an object of long-term concern (Keinath et al. 2003). Flannelmouth sucker (FMS) have been assigned the global ranking of G3/G4, which suggests its existence is uncertain. It is uncommon but appears to be locally secure. Roundtail chub (RTC) have been assigned the ranking of G3, which suggests its existence to be quite rare throughout its range or locally abundant and highly restricted. Additionally, the Wyoming Game and Fish Department classifies these three species as NSS1 species, meaning that they are rare and their habitat is declining or vulnerable.

Baxter and Simon (1970) and Wheeler (1997) represent the only drainage-wide fish surveys conducted in the Green River watershed of southwest Wyoming. The recent surveys conducted by Wheeler (1997) show that from 1965 to 1995 the three species declined in the Wyoming portion of the Green River drainage at three spatial scales (site, stream, and sub-drainage). In 1995, Wheeler documented BHS in the Hams Fork drainage, and RTC in the Hams Fork, Blacks Fork and Little Snake River drainages. In 1995, FMS were documented throughout the Green River drainage downstream of Fontenelle Reservoir and in the Little Snake River drainage (Wheeler 1997). In addition to these drainage-wide survey efforts, the Bitter Creek sub-drainage was surveyed in 1993 (Carter and Hubert 1995) and the Big Sandy River sub-drainage was surveyed in the 1960's and 1970's (Miller 1978). Bluehead sucker and RTC were not documented in the 1993 Bitter Creek survey, but FMS were documented from a site near the Bitter Creek-Green River confluence (Carter and Hubert 1995).

Miller (1978) reported BHS and RTC at one site each during Big Sandy River surveys and BHS were also collected at one site on Little Sandy Creek. FMS were documented throughout the Big Sandy River and Little Sandy Creek downstream of the National Forest Service boundary.

Bluehead sucker, FMS, and RTC face a number of threats to their continued survival in the Green River drainage of Wyoming. The most direct threats include habitat fragmentation caused by dams and water development projects, competition with and predation by introduced species, and hybridization with select introduced species. Recent work in the Yampa River drainage in Colorado (Douglas and Douglas 2003) documents FMS and BHS hybridization with introduced white sucker (*Catostomus commersoni*). These findings raise the possibility that introgressive hybridization may be occurring among white sucker (WHS), FMS, and BHS.

Introgressive hybridization is defined as “the infiltration of genes of one species by the intermediacy of hybrids into another species, resulting in the genetic modification of the latter” (Hanson 1962). In this case, the introduced white sucker could act as a “bridge” allowing gene flow between FMS and BHS that is extremely rare otherwise. In addition, Baxter and Stone (1995) indicated that hybridization may occur between RTC and introduced Utah chub and leatherside chub (see Appendix A for common, scientific and abbreviated names of all fish species encountered in 2005). Because of these potential threats, additional information is needed to further assess the population status and guide future management decisions for these species.

This project consists of two distinct phases. Phase 1, completed in 2002, focused on compiling existing information on BHS, FMS, and RTC, assessing land ownership within the drainage, testing various gear and sampling strategies, documenting fish passage barriers, and collecting preliminary genetic samples from FMS, BHS, WHS, and their hybrids. Refer to Keith et al. (2003) for more information on Phase 1. Phase II of the project involves non-game fish sampling in the Green River drainage in Wyoming. Efforts in 2005 mark the third year of Phase II surveys. One more year will be necessary to complete Phase II surveys drainage-wide.

In the first year of Phase II sampling (2003), efforts focused on the eastern portion of the Green River watershed downstream of Fontenelle Dam (Gill et al. 2004). A total of 60 reaches were sampled among seven sub-drainages. Twenty-three fish species were captured in the study area, of which seven are native to the Green River drainage: FMS, BHS, Colorado River

cutthroat trout (CRC), mottled sculpin (MSC), mountain sucker (MTS), mountain whitefish (MWF), and speckled dace (SPD).

Of the three target species, FMS, BHS, and their respective hybrids with WHS (FMS x WHS=FXW and BHS x WHS=BXW) were identified during the 2003 field season. Bluehead sucker were captured in nine of the 60 reaches sampled, and FMS were captured in 16 of the 60 sampled reaches. Bluehead sucker hybrids (BXW) were captured in three of the 60 reaches, and FXW were captured in 11 of the 60 reaches. No RTC were captured during the 2003 field season. Refer to Gill et al. (2004) for more information on the 2003 field season.

The 2004 field season focused on the west side tributaries of the Green River downstream of Fontenelle Dam (Gill et al. 2005). A total of 100 reaches were sampled in six sub-drainages in 2004. Twenty-one fish species were captured, of which eight are native to the Green River watershed: BHS, FMS, RTC, CRC, MSC, MTS, MWF, and SPD. All three target species were captured in 2004; BHS were captured in two of the 100 reaches, FMS were captured in 34 reaches, and RTC were captured in 17 reaches. Bluehead sucker hybrids (BXW) were captured in five reaches and FXW in 21 reaches. More information on the 2004 field season can be found in Gill et al. (2005). This report summarizes the results of the third field season of Phase II, which was conducted in 2005. Efforts were concentrated in the Green River drainage upstream of Fontenelle Dam.

OBJECTIVES

The objectives outlined for completion during Phase II, 2005 were to:

1. Determine the distribution and abundance of BHS, FMS, and RTC.
2. Document the length frequency of BHS, FMS and RTC at each sampling location to determine the different life stages of each species.
3. Document the native and non-native species composition.
4. Attempt to determine the degree of hybridization that is occurring within FMS, BHS, and possibly RTC populations.

SITE DESCRIPTION

The Green River is the largest tributary to the Colorado River. Its headwaters originate in the Wind River mountain range of Wyoming. As it flows towards its confluence with the Colorado River in southeastern Utah, the Green River and its tributaries drain an area of approximately 45,000mi² in Wyoming, Colorado, and Utah. This project focuses on that portion of the Green River in southwestern Wyoming, which drains an area of nearly 17,100 mi² and encompasses parts of Carbon, Fremont, Lincoln, Sublette, Sweetwater, and Uinta counties (Figure1).

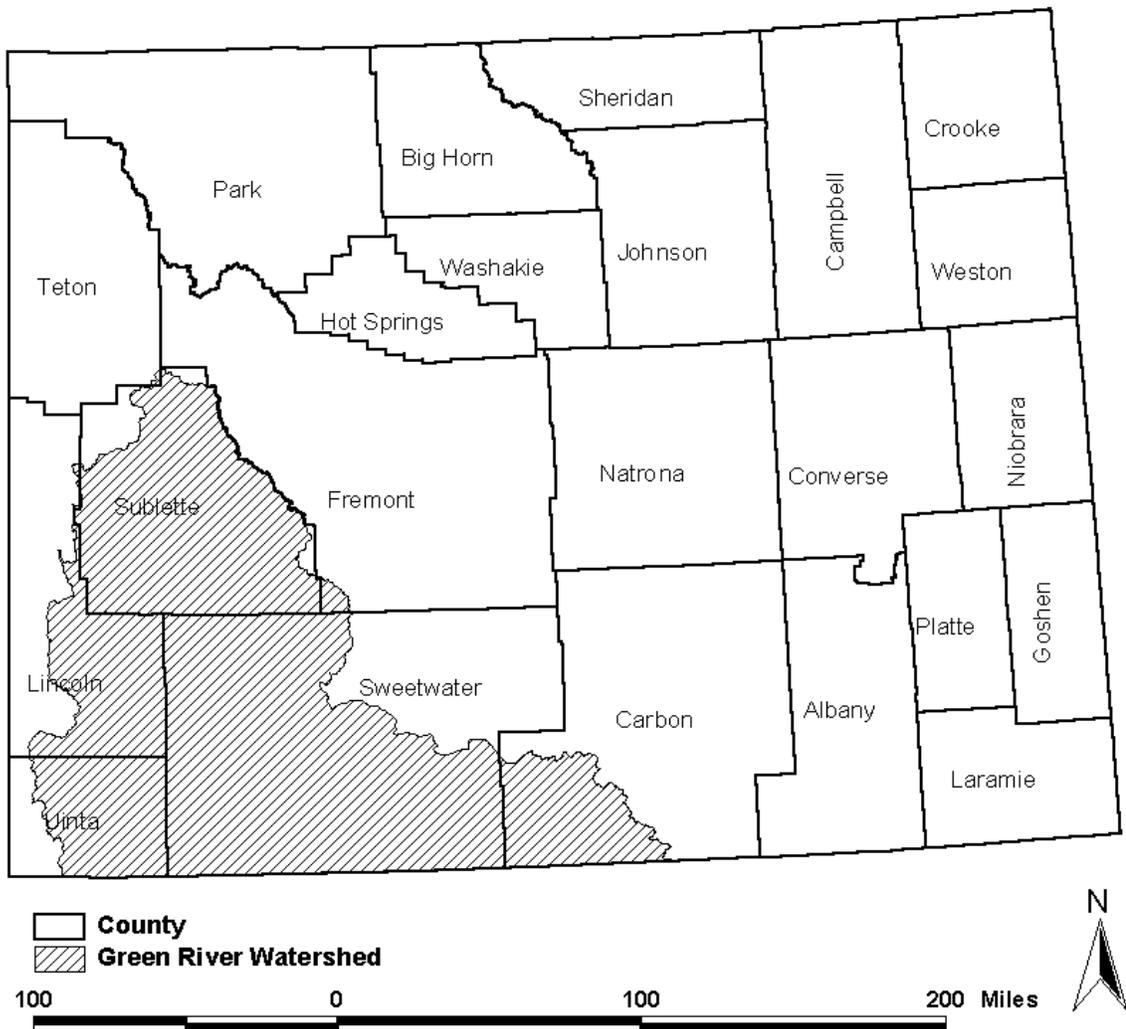


Figure 1. Study area for native non-game fish surveys; the Green River watershed of southwest Wyoming.

Land ownership within the watershed is 72% public and 28% private. The Bureau of Land Management (BLM) manages the majority (75%) of the public land, followed by the U.S. Forest Service (USFS, 15.8%), the State of Wyoming (State, 5.5%), the Bureau of Reclamation (BOR, 2.9%), and the U.S. Fish and Wildlife Service (FWS, 0.8%).

Phase II efforts in 2005 focused on the Green River watershed upstream of Fontenelle Dam (Figure 2). Sub-drainages targeted for sampling were based on Level 5 Hydrologic Unit Code (HUC) classification. For the purposes of this report, Level 5 HUCs will be hereafter referred to as “sub-drainages”. A complete list of sub-drainages within the 2005 target area can be found in Appendix D.

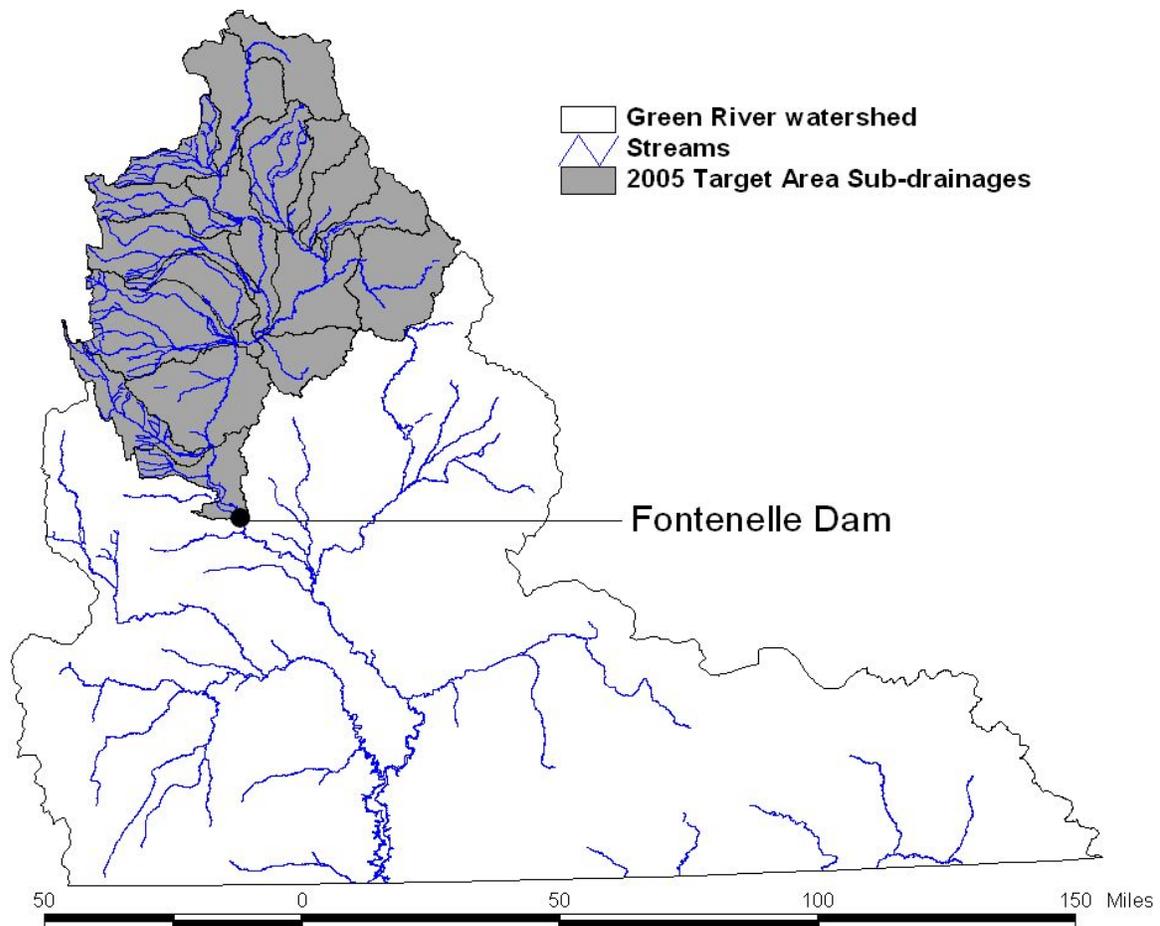


Figure 2. Proposed target area for Phase II sampling in summer 2005. Sub-drainages based on Level 5 HUC classification.

Methods

Sampling reaches were systematically selected throughout the study area and were spaced at approximately 5-mile intervals on most streams. Occasionally it was not possible to adhere to the 5-mile criterion due to lack of water or access problems. Sampling typically progressed upstream until trout and sculpin dominated the fish community. Unless otherwise noted, reaches were 656 ft long. Occasionally reaches were lengthened or shorted to end at habitat transitions or to accommodate local conditions (i.e., large beaver ponds, dense willow growth, or limited available water). Prior to sampling, block nets were placed at the upstream and downstream reach boundaries to prevent fish from moving in or out of the area. At times, natural barriers (such as beaver dams) served as our upstream block nets.

Reaches were sampled with a variety of gears, including backpack, shore-based, and barge (a cataraft barge equipped with three roaming electrodes) electrofishing gear. Dipnets, bag seines, or a combination of electrofishing gear and a bag seine were also used. Conductivities in most 2005 reaches allowed the use of backpack electrofishing units. Generally speaking, conductivities above $1,000\mu\text{s}/\text{cm}$ and below $200\mu\text{s}/\text{cm}$ necessitated the use of a variable voltage pulsator integrated with shore-based or barge electrofishing equipment. One or two backpack units were used in most reaches. A single unit was used in streams <15 ft wide, and two units were used in streams >15 ft wide. Shore-based and barge electrofishing systems were used in reaches with high or low conductivities and in places where stream size and depth made sampling with backpack electrofishing units or shore-based gear impossible. If electrofishing efficiency was poor due to high turbidity or extreme conductivity an additional electrofishing pass or seine haul was conducted over all or a portion of the reach. Residual pools were sampled with a combination of backpack electrofishing units, bag seines, and dipnets. In addition, a small private pond north of Daniel, WY was sampled with a trap net.

All fish collected were sorted by species and counted. Individual weights (g) and lengths (TL, in) were recorded for all target species, hybrids, and game fish. When a large number of WHS were collected, a sub-sample of 30 individuals representing the range of sizes was weighed and measured individually. A count and batch weight was recorded for all WHS. Counts, length ranges, and batch weights were recorded for all non-target, non-game fish collected.

Tissue samples were collected from most BHS, FMS, and hybrids (Appendix B). These samples will be used to evaluate genetic purity and verify phenotypic identification. Samples

consist of a thumbnail-sized piece of the right pelvic fin and are preserved in 95% ethanol. If a fish was too small to provide a sufficient fin sample, the entire fish was sacrificed and preserved. In addition, a close-up digital photograph was taken of the entire fish. On suckers, an additional photograph was taken of the sub-terminal mouth.

Voucher specimens were collected from each stream sampled in 2005. Two specimens from each non-target species were collected. Specimens collected were generally capture or handling-related mortalities. These mortalities were infrequent; if no mortalities were available, specimens were euthanized in a high dose of MS-222. Specimens were then preserved in 10% buffered formalin and labeled for temporary storage. Specimens will be sent to the Museum of Southwestern Biology, University of New Mexico, Albuquerque, for final curation. Tissue samples and photos from target species will also be vouchered after genetic analyses are complete.

Results

Nine of 18 target sub-drainages upstream of Fontenelle Dam were sampled in 2005 (Figure 3). Additional sampling and follow-up work was conducted in five sub-drainages downstream of the 2005 target area (Figure 3). The nine remaining sub-drainages are mainly located on the east side of the drainage upstream of Fontenelle Reservoir. These sub-drainages contain approximately 35 potential sites that will be visited in 2006.

A total of 106 reaches across 14 sub-drainages were visited in 2005 (Figure 3). Of these 106 reaches, 30 were not sampled due to lack of water, insufficient flows, high gradient, or heavy flows. Fish and habitat information was collected at a total of 76 reaches in 2005. Reaches visited but not sampled were noted on the corresponding maps for individual sub-drainages (e.g. Figure 12).

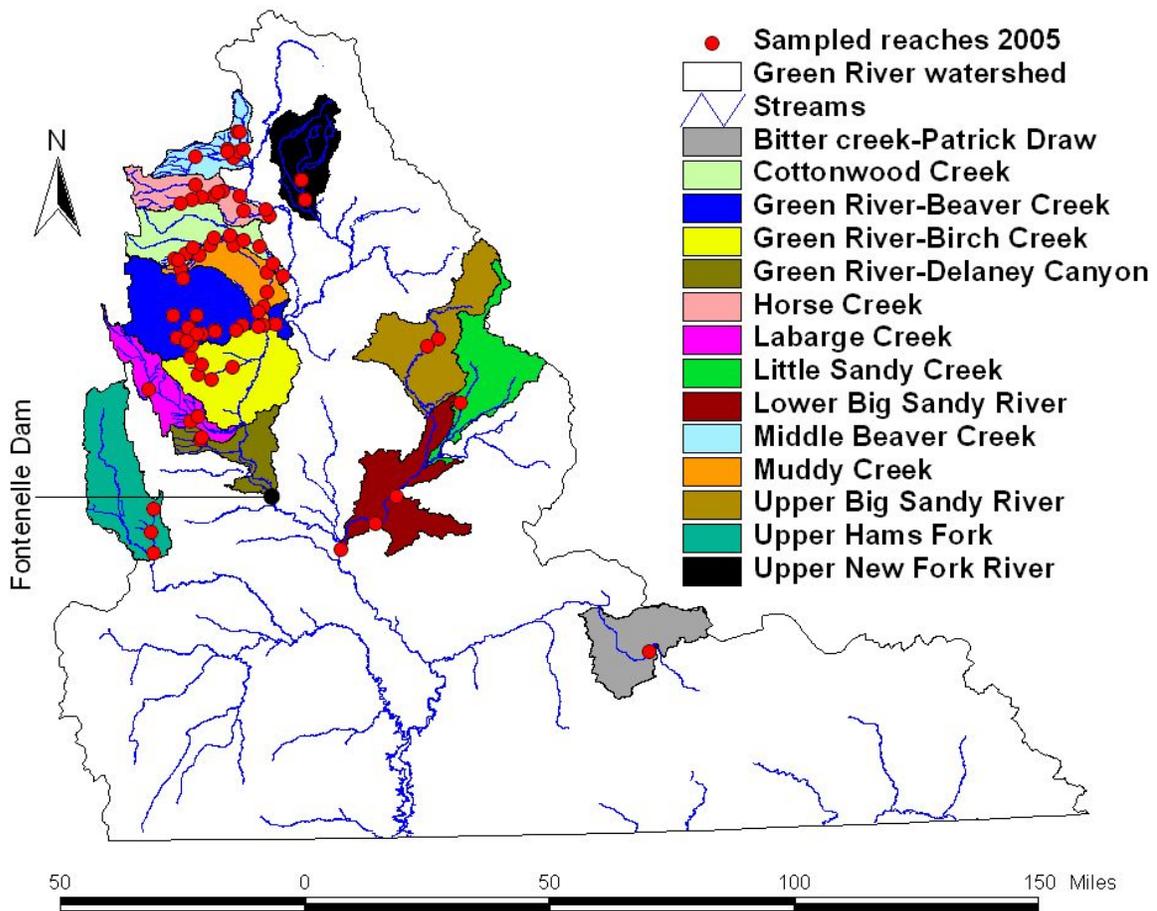


Figure 3. Locations of sub-drainages and reaches sampled in summer 2005.

Nineteen fish species were identified during the 2005 field season (Appendix A), of which only seven were native to the Green River watershed: BHS, FMS, Colorado River cutthroat trout, mottled sculpin, mountain sucker, mountain whitefish, and speckled dace. Two of the three target species (FMS and BHS) were identified. Bluehead sucker were noted in one of the 76 reaches (Figure 4). Flannelmouth sucker were noted in nine of the 76 reaches (Figure 5). Hybridization between BHS and WHS was noted in two of the 76 reaches (Figure 4), while hybridization between FMS and WHS was noted in seven of the 76 reaches (Figure 5). Upstream of Fontenelle Dam, FMS were noted in the Cottonwood Creek and Muddy Creek sub-drainages, FXW were noted in two sub-drainages (Cottonwood and Horse Creeks). Bluehead sucker were not encountered upstream of Fontenelle Dam, but BXW were found in the Muddy

Creek sub-drainage east of Big Piney, WY. No RTC were collected during the 2005 field season.

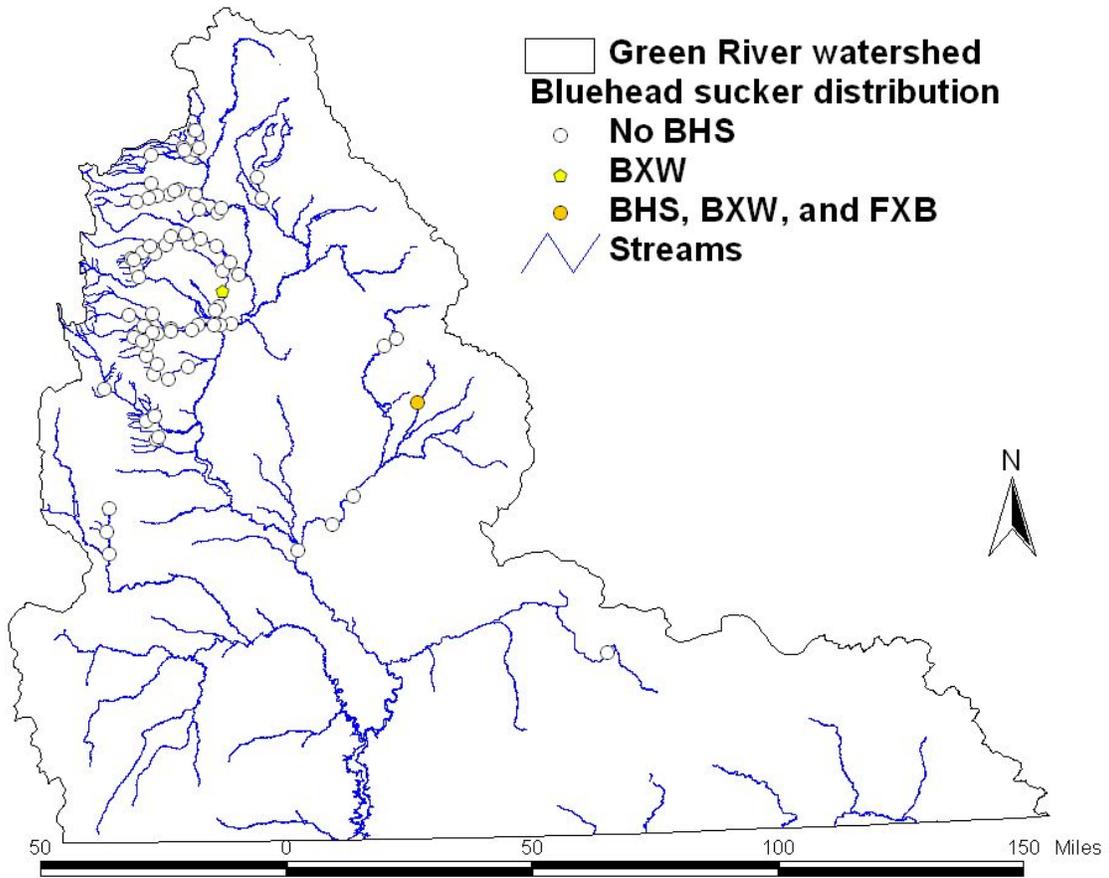


Figure 4. Locations of reaches where BHS and hybrids were identified during 2005 sampling.

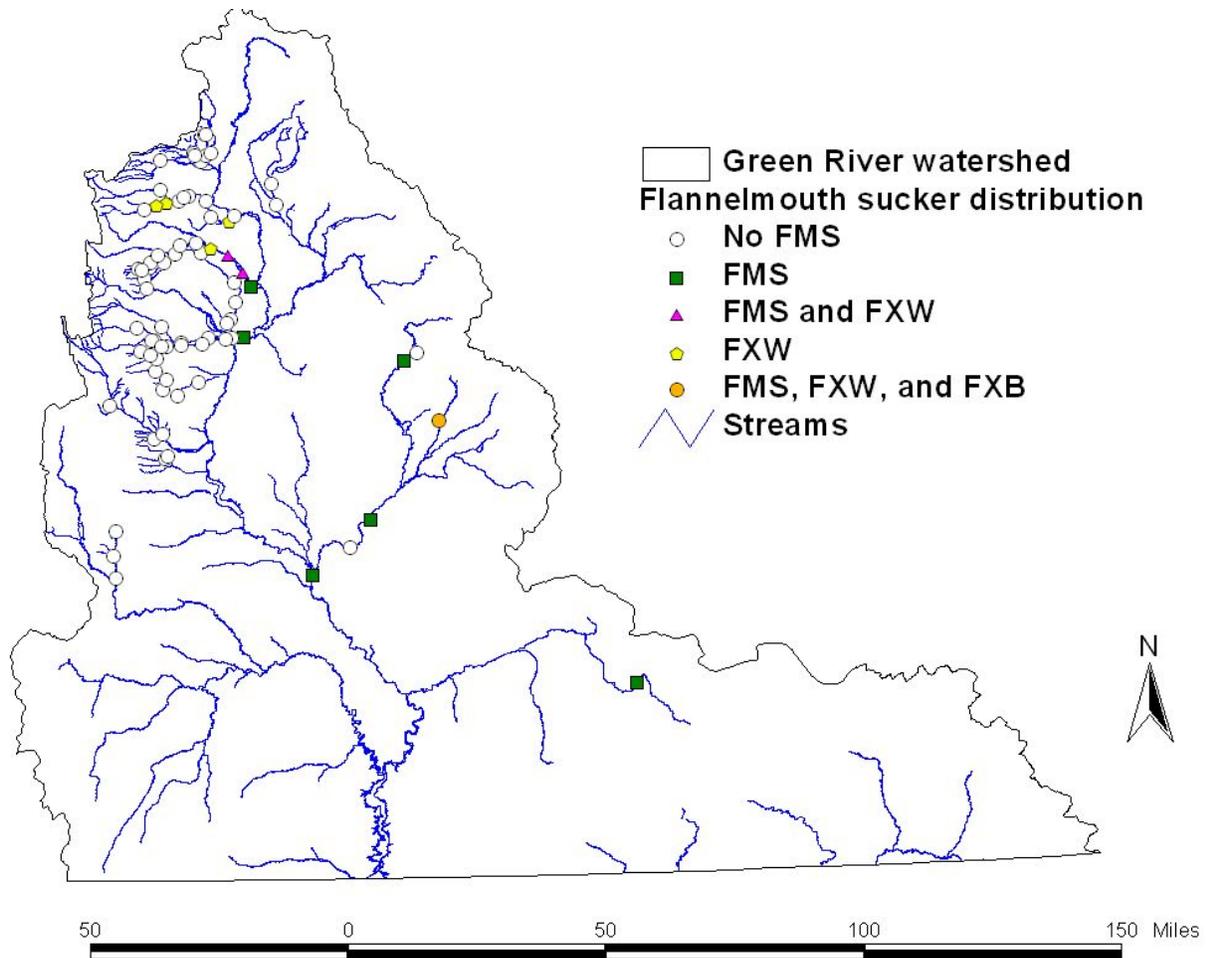


Figure 5. Locations of reaches where FMS and hybrids were identified during 2005 sampling.

Bitter Creek-Patrick Draw Sub-drainage

The Bitter Creek-Patrick Draw Level 5 HUC is 284mi² in the upper portion of the Bitter Creek watershed between the towns of Point of Rocks and Bitter Creek (Figure 6). Bitter Creek was previously sampled in 2003 and 2004 and harbors the only known population of FMS in Wyoming that is not sympatric with WHS (Gill et al. 2004, 2005). While WHS and other non-native species are found downstream of the town of Point of Rocks, a culvert underneath Country Road 48 appears to be blocking upstream movement of WHS and other fish.

Bitter Creek

In 2005, Bitter Creek was sampled within the Bitter Creek-Patrick Draw sub-drainage to fill a gap in sampling coverage, to verify reports of localized stream de-watering, and to train technicians to identify pure FMS. Bitter Creek was dry from near Point of Rocks to just downstream of the town of Bitter Creek.

One reach was sampled just upstream of the de-watered segment in June 2005 (Figure 6 and Appendix C). The mean wetted width of the reach was 5.9 ft and the maximum depth encountered was 1.3 ft. Due to time constraints, the length of the reach was shortened to 141 ft. Three species were collected (FMS, SPD, and MTS) and all are native to the drainage (Appendix E). The 56 FMS collected ranged in length from 3.0-7.0 in TL (Figure 7). Right pelvic fin clips were taken from five FMS for genetic analyses.

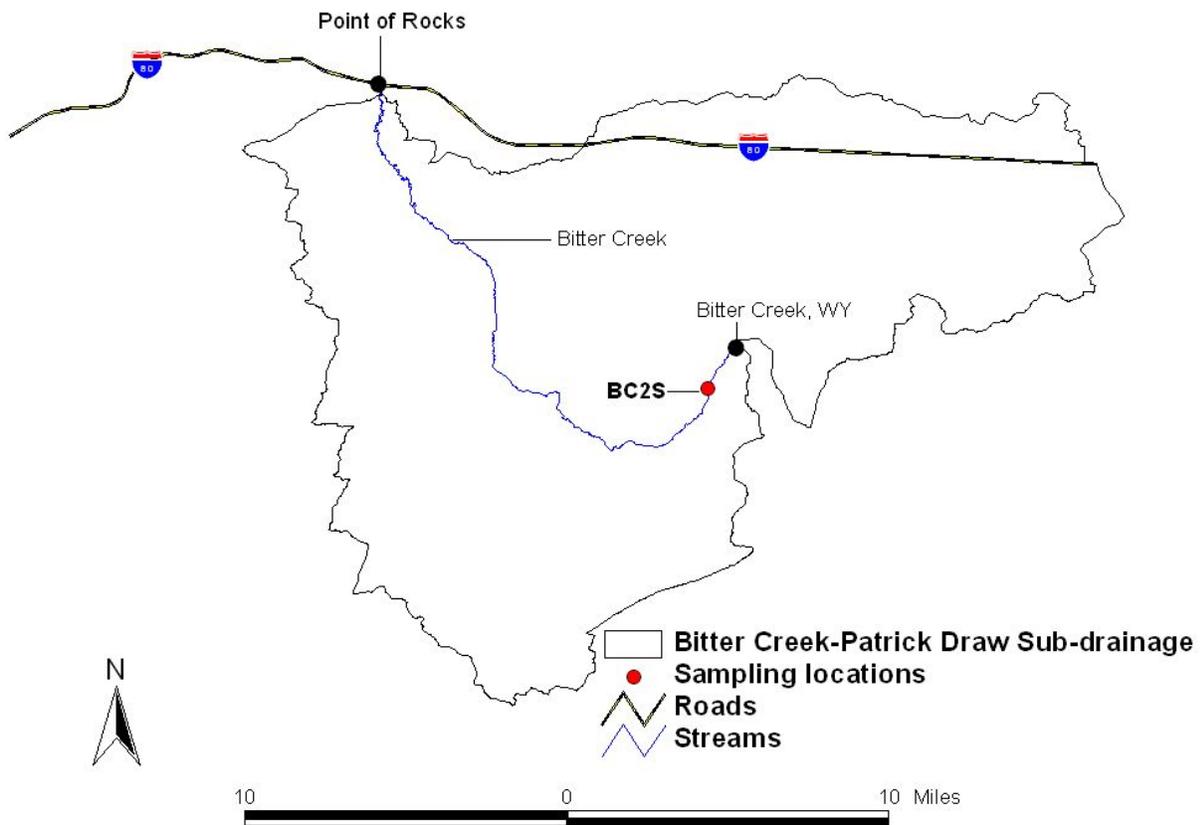


Figure 6. Location of reach sampled in Bitter Creek in 2005.

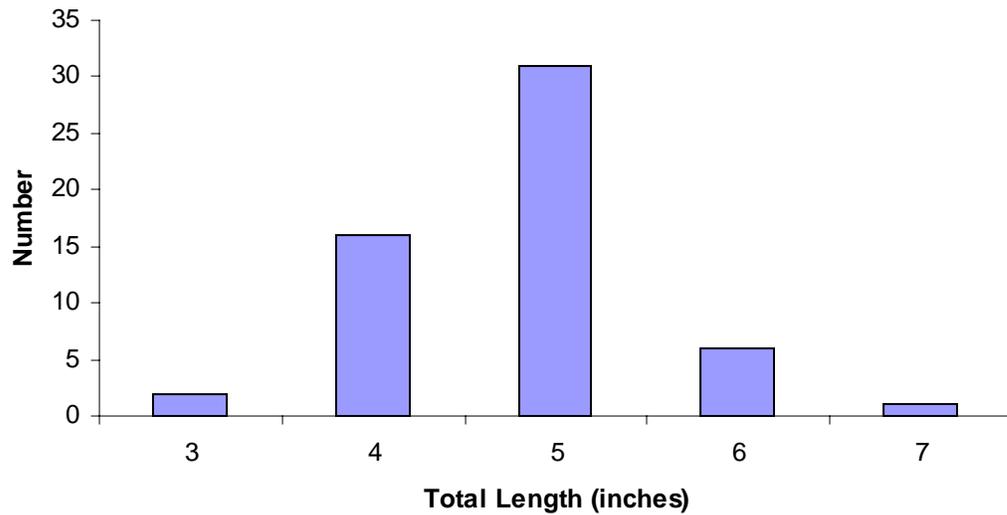


Figure 7. Length-frequency of FMS identified from reach BC2S in 2005 (n=56).

Cottonwood Creek Sub-drainage

The Cottonwood Creek sub-drainage is 238-mi² in the northwestern portion of the Green River watershed (Figure 3). Ten reaches were sampled in the sub-drainage (Figure 8 and Appendix C). Nine fish species, including four native species (FMS, MSC, MTS, and SPD), were identified in the Cottonwood Creek sub-drainage in 2005 (Appendix F). Flannelmouth sucker were the only target species identified, and were collected from three reaches in main stem Cottonwood Creek. In addition, hybridization between FMS and WHS was noted in three reaches on mainstem Cottonwood Creek. As was the case in most stream reaches, WHS dominated the sucker community in mainstem Cottonwood Creek (Figure 9). No target species or hybrids were collected from other reaches sampled in the sub-drainage.

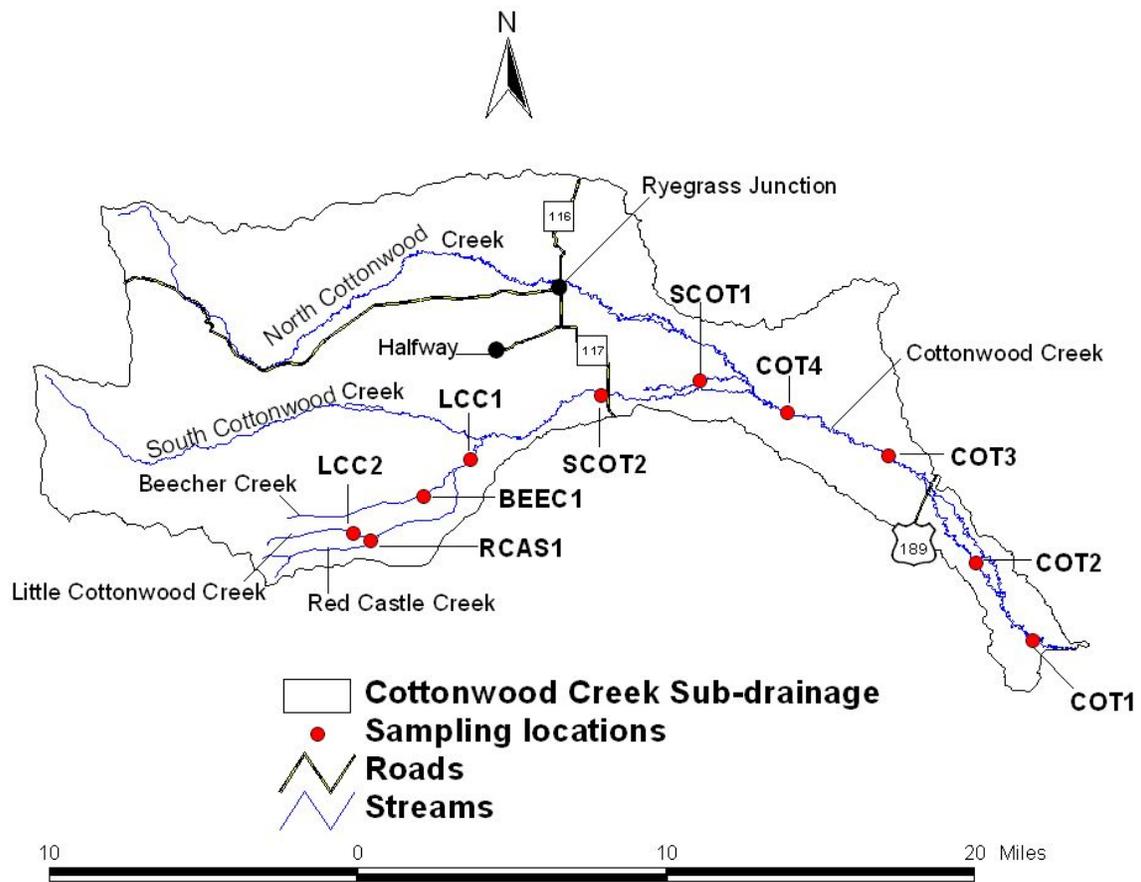


Figure 8. Locations of reaches sampled in the Cottonwood Creek sub-drainage in 2005.

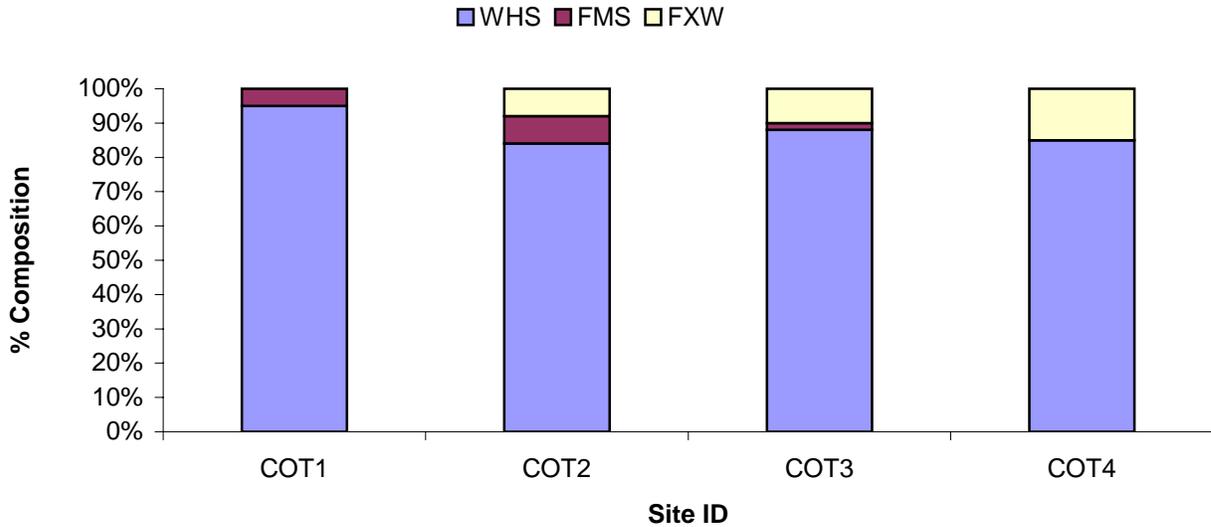


Figure 9. Relative abundance of WHS, FMS, and FXW collected from the Cottonwood Creek sub-drainage between reaches COT1 and COT2 in 2005 (n=125).

Cottonwood Creek

Cottonwood Creek flows into the Green River between the towns of Marbleton, WY and Daniel, WY. Four reaches were sampled on main stem Cottonwood Creek during July 2005 (Figure 8 and Appendix C). The mean wetted width of the reaches sampled on Cottonwood Creek was 24.0 ft, and the maximum depth encountered was 4.7 ft. Reach COT3 was lengthened to 689 ft to end at a habitat transition. Eight fish species were identified, of which four are native (FMS, MSC, MTS, and SPD) to the stream (Appendix F). Four FMS were identified in main stem Cottonwood Creek (reaches COT1, COT2, and COT3), and hybridization between FMS and WHS was noted in 23 individuals (reaches COT2, COT3, and COT4). The four FMS ranged in length from 4.9 to 10.4 in and the FXW ranged from 2.7 to 20.6 in (Figure 10). Right pelvic fin clips were taken from all FMS and FXW for genetic analyses.

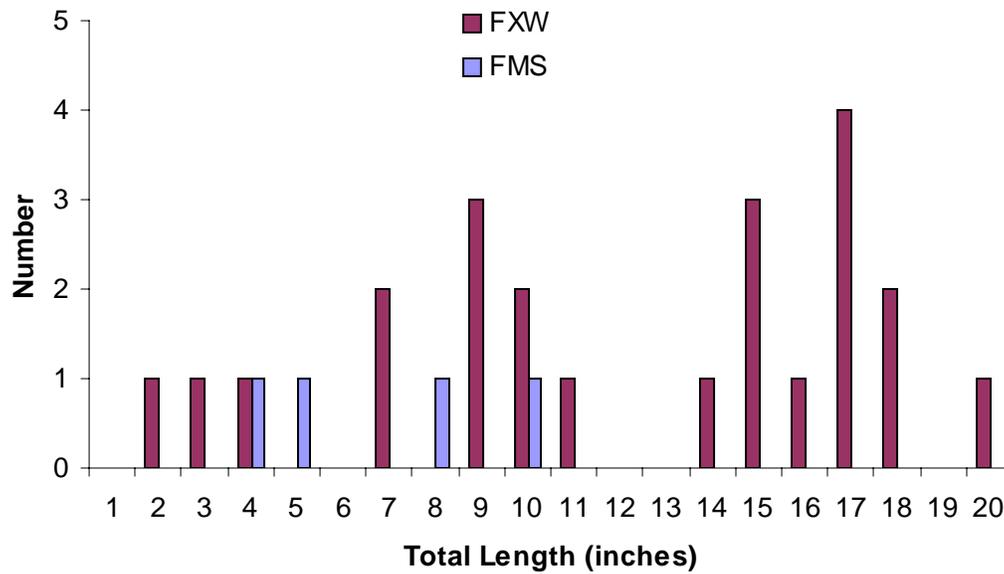


Figure 10. Length-frequency of FMS and FXW collected from the Cottonwood Creek sub-drainage between reaches COT1 and COT4 in 2005 (n= 27).

South Cottonwood Creek

South Cottonwood Creek flows into North Cottonwood Creek between Ryegrass Junction and U.S. Highway 189 to form Cottonwood Creek (Figure 8). Two reaches were sampled on South Cottonwood Creek in July 2005 (Figure 9 and Appendix C). Reach SCOT1 was lengthened to 673 ft to end at a habitat transition. The mean wetted width of the reaches on South Cottonwood Creek was 18.9 ft and the maximum depth encountered was 4.6ft. Seven fish species were identified in South Cottonwood Creek, of which three are native (MTS, SPD, and MSC) to the stream (Appendix F). No target species or hybrids were identified from South Cottonwood Creek.

North Cottonwood Creek

North Cottonwood Creek was not sampled in 2005 due to time constraints. Three sites on North Cottonwood Creek will be sampled during the 2006 field season.

Little Cottonwood Creek

Little Cottonwood Creek flows into South Cottonwood Creek south of Halfway, WY (Figure 8). Two reaches were sampled on Little Cottonwood Creek in June and July 2005

(Figure 8 and Appendix C). The mean wetted width of the reaches on Little Cottonwood Creek was 12.0 ft and the maximum depth was 2.0 ft.

Four fish species were identified, of which two are native (MTS and SPD) to the stream (Appendix F). No target species or hybrids were identified from Little Cottonwood Creek.

Beecher Creek

Beecher Creek is a small (mean wetted width 3.6 ft) and relatively deep (max depth 3.6ft) tributary to Little Cottonwood Creek located south of Halfway, WY (Figure 8). One reach was sampled in June 2005 (Figure 8 and Appendix C). No fish were present at the time of sampling.

Red Castle Creek

Red Castle Creek flows into Little Cottonwood Creek southwest of Halfway, WY (Figure 8). One reach was sampled in July 2005 (Figure 9 and Appendix C). The mean wetted width of the reach was 7.6 ft and the maximum depth encountered was 2.5 ft. No fish were present at the time of sampling.

Green River-Beaver Creek Sub-drainage

The Green River-Beaver Creek sub-drainage is 415mi² in the northwestern portion of the Green River drainage (Figure 3). Three streams in this sub-drainage (South Piney, Middle Piney, and North Piney Creeks) are tributaries to the Green River east of Big Piney, WY (Figure 11). A total of sixteen reaches were sampled within the sub-drainage drainage in 2005 (Figure 11 and Appendix C). Twelve fish species were identified in 2005, of which five are native (SPD, MWF, MTS, MSC, and CRC) to the drainage (Appendix G). No target species or hybrids were identified from the sixteen sampling reaches in the Green River-Beaver Creek sub-drainage in 2005.

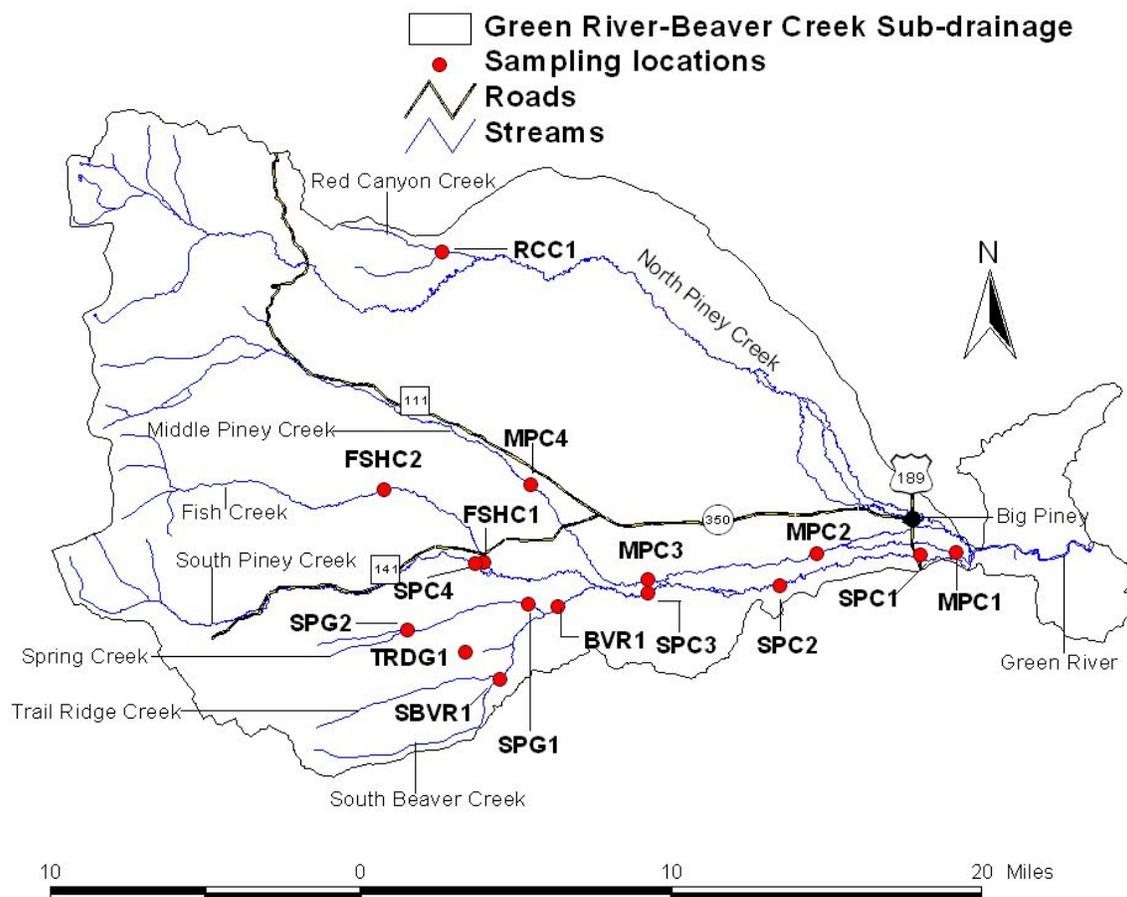


Figure 11. Locations of reaches sampled in the Green River-Beaver Creek sub-drainage in 2005.

Middle Piney Creek

Middle Piney Creek flows into the Green River east of Big Pine, WY (Figure 11). Middle Piney Creek had ample flow at the time of sampling, although area landowners noted that the stream had gone dry downstream of U.S. Highway 189 the previous 4 years. Four reaches were sampled on Middle Piney Creek in June and July 2005 (Figure 11 and Appendix C). The mean wetted width of the reaches sampled on Middle Piney Creek was 16.6 ft and the maximum depth encountered was 4.3 ft. Three of the eight fish species identified from Middle Piney Creek are native (MSC, SPD, and MTS) to the stream (Appendix G).

South Piney Creek

South Piney Creek flows into the Green River east of Big Piney, WY (Figure 11). Four reaches were sampled on South Piney Creek in 2005 (Figure 11 and Appendix C). The mean wetted width of the four reaches was 23.0 ft and maximum depth was 4.9 ft. Ten fish species were identified from South Piney Creek in 2005, of which four are native (SPD, MWF, MSC, and MTS) to the stream (Appendix G).

North Piney Creek

North Piney Creek was not sampled in 2005 due to time constraints. Five sites on North Piney Creek will be sampled during the 2006 field season.

Fish Creek

Fish Creek flows into South Piney Creek south of Sublette County Road 141 (Figure 11). Two reaches were sampled on Fish Creek in August and September 2005 (Figure 11 and Appendix C). The mean wetted width of the reaches on Fish Creek was 13.9 ft and the maximum depth was 4.3 ft. Six fish species were identified from Fish Creek, of which three are native (MTS, MSC, and CRC) to the stream (Appendix G).

Beaver Creek

Beaver Creek is a stream located in the southwestern portion of the Green River-Beaver Creek sub-drainage. Beaver Creek flows into South Piney Creek south of Sublette County Road 141 (Figure 12). One reach was sampled on Beaver Creek in July 2005 (Figure 11 and Appendix C). The mean wetted width of the reach was 8.5 ft and the maximum depth encountered was 3.1 ft. Five fish species were identified from Beaver Creek, of which three are native (MTS, MSC, and SPD) to the stream (Appendix G).

South Beaver Creek

South Beaver Creek flows into Beaver Creek approximately two miles northwest of Cretaceous Mountain. One reach was sampled on South Beaver Creek in July 2005 (Figure 11 and Appendix C). The mean wetted width of the reach was 5.9 ft and the maximum depth

encountered was 3.0 ft. Three fish species were identified from South Beaver Creek (Appendix G). All three species (MTS, MSC, and CRC) are native to the stream.

Trail Ridge Creek

Trail Ridge Creek flows into Beaver Creek north of South Beaver Creek (Figure 11). One reach was sampled on Trail Ridge Creek in July 2006 (Figure 11 and Appendix C). The mean wetted width of the reach was 11.8 ft and the maximum depth encountered was 2.3 ft. One fish species (MTS) was identified from Trail Ridge Creek (Appendix G). MTS are native to the stream.

Spring Creek

Spring Creek flows into Beaver Creek north of Trail Ridge Creek (Figure 11). Two reaches were sampled on Spring Creek in July 2005 (Figure 11 and Appendix C). The mean wetted width of the two reaches was 6.2 ft and the maximum depth encountered was 1.5 ft. One reach (SPG1) was shortened to 578 ft due to exceptionally dense willow growth. One fish species (MTS) was identified from Spring Creek. (Appendix G). MTS are native to the stream.

Red Canyon Creek

Red Canyon Creek joins North Piney Creek in the extreme northern portion of the Green River-Beaver Creek sub-drainage (Figure 11). One reach was sampled at the confluence of Whiskey Creek and Red Canyon Creek in June 2005 (Figure 1 and Appendix C). The mean wetted width of the reach was 4.9 ft and the maximum depth was 1.6 ft. No fish were present at the time of sampling.

Green River-Birch Creek Sub-drainage

The Green River-Birch Creek sub-drainage is 365mi² in the northwestern portion of the Green River watershed (Figure 3). Eleven potential sampling reaches were visited in June 2005. Of these, six were not sampled because the reaches were either dry or had insufficient flows to support fish. (Figure 12 and Appendix H). Three fish species (MTS, MSC, and CRC) were identified in the Green River-Birch Creek Level 5 HUC in 2005 (Appendix H). All three species

are native to the stream. No non-native species, no target species, or hybrids were identified from the Green River-Birch Creek sub-drainage in 2005.

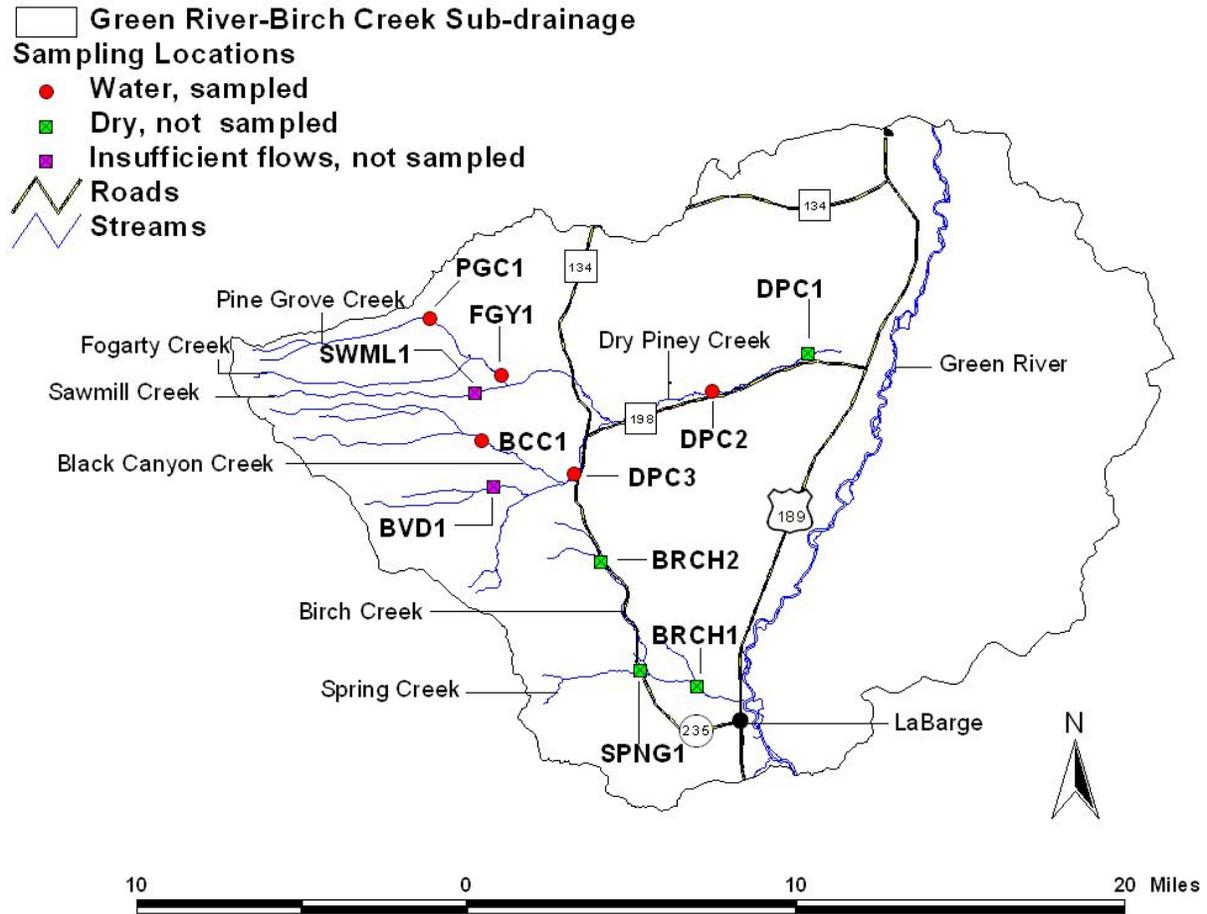


Figure 12. Locations of reaches visited in the Green River-Birch Creek sub-drainage in 2005.

Dry Piney Creek

Dry Piney Creek is an ephemeral tributary to the Green River northwest of LaBarge, WY (Figure 12). According to maps and area landowners, Dry Piney Creek rarely flows past U.S. Highway 189. Sufficient flow for sampling existed upstream of reach DPC1 (Figure 12), although area landowners informed us that water had not flowed in Dry Piney Creek or other local streams the previous 4 years. Three potential sampling reaches were visited in June 2005, of which one was dry (Figure 12 and Appendix C). The mean wetted width of the two reaches sampled was 7.3 ft and the maximum depth was 4.6 ft. One reach (DPC3) was lengthened to

695 ft to end at a habitat transition. No fish were present in Dry Piney Creek at the time of sampling.

Fogarty Creek

Fogarty Creek flows into Dry Piney Creek east of Sublette County Road 134 (Figure 12). One reach was sampled in June 2005 (Figure 12 and Appendix C). The mean wetted width of the reach was 6.6 ft and the maximum depth was 2.6 ft. Two fish species (MTS and MSC) were identified from Fogarty Creek (Appendix H).

Pine Grove Creek

Pine Grove Creek flows into Fogarty Creek west of Sublette County Road 134 (Figure 12). One reach was sampled on Pine Grove Creek in June 2005 (Figure 12 and Appendix C). The mean wetted width of the reach was 5.3 ft and the maximum depth was 1.5 ft. One fish species (CRC) was identified from Pine Grove Creek (Appendix H).

Black Canyon Creek

Black Canyon Creek flows into Dry Piney Creek west of Sublette Country Road 134 (Figure 12). One reach was sampled on Black Canyon Creek in June 2005 (Figure 12 and Appendix C). The mean wetted width of the reach was 3.3 ft and the maximum depth was 1.3 ft. One fish species (MTS) was identified from Black Canyon Creek (Appendix H).

Birch Creek

Birch Creek flows into the Green River north of LaBarge, WY. Three potential sampling reaches were visited in June 2005 (Figure 12 and Appendix C), but all were dry.

Beaver Dam Creek

Beaver Dam Creek is a tributary to Dry Piney Creek west of Sublette County Road 134. One potential sampling reach was visited in June 2005 (Figure 12 and Appendix C). Beaver Dam Creek had insufficient flow for sampling and is unlikely to support fish.

Sawmill Creek

Sawmill Creek flows into Fogarty Creek west of Sublette County Road 134. One potential sampling reach was visited in June 2005 (Figure 12 and Appendix C). Sawmill Creek had insufficient flows for sampling and is unlikely to support fish.

Spring Creek

Spring Creek flows into Birch Creek north of State Highway 235. One potential sampling reach was visited in June 2005 (Figure 12 and Appendix C). Spring Creek was dry at the time of sampling.

Green River-Delaney Canyon Sub-drainage

The Green River-Delaney Canyon sub-drainage is 171mi² in the western portion of the Green River watershed (Figure 3). Seven potential sampling reaches were visited in June 2005 (Figure 13 and Appendix C). Five reaches were not sampled due to the stream being dry, having insufficient flows to support fish, or flows too heavy for sampling (Figure 13). One non-native fish species (RSS) was identified from one reach in the Green River-Delaney Creek sub-drainage in 2005 (Appendix I). No target species or hybrids were collected from the Green River-Delaney Canyon sub-drainage in 2005.

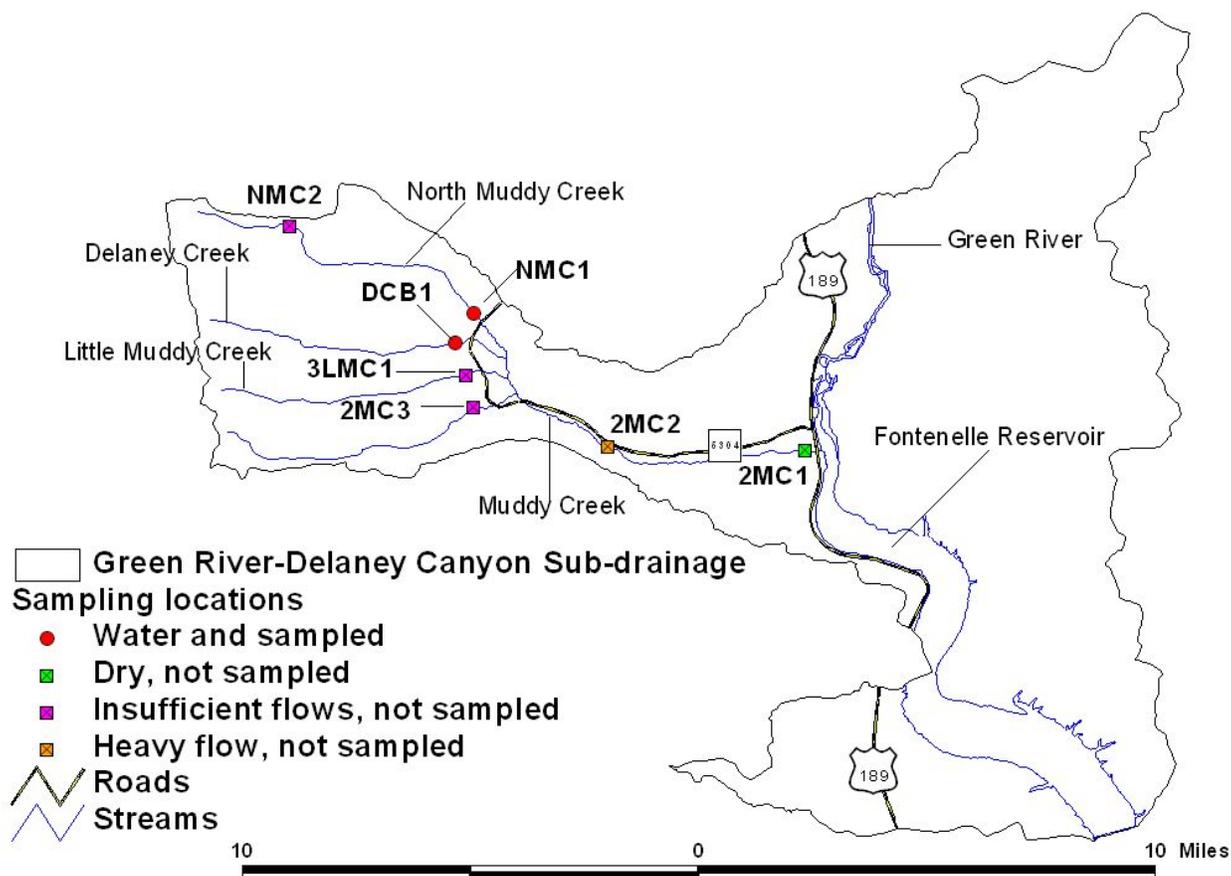


Figure 13. Locations of reaches visited in the Green River-Delaney Canyon sub-drainage in 2005.

Muddy Creek

Muddy Creek is the largest stream in the Green River-Delaney Canyon sub-drainage and flows into the Green River at the upper end of Fontenelle Reservoir (Figure 13). Muddy Creek is heavily influenced by the Anderson-Howard Canal, which joins North Muddy Creek just downstream of reach NMC1 (Figure 13). This canal diverts water from the LaBarge Creek drainage into North Muddy Creek, and the large volume of diverted water made sampling downstream of reach NMC1 on North Muddy Creek and Muddy Creek impossible. Surprisingly, Muddy Creek was dry just west of U.S. Highway 189. Upstream of its confluence with North Muddy Creek, Muddy Creek exhibited insufficient flows for sampling and is unlikely to support fish (Figure 13). For these reasons, no reaches were sampled on Muddy Creek (Appendix C). Follow-up work in the Muddy Creek sub-drainage in 2006 will consist of

sampling a minimum of one reach in Muddy Creek mainstem late in the field season when irrigation flows have subsided.

North Muddy Creek

North Muddy Creek flows into Muddy Creek just north of BLM Road 5304 approximately 10 mi west of U.S. Highway 189. Two potential sampling reaches were visited on North Muddy Creek in June 2005 (Figure 13 and Appendix C). One reach was sampled and the other reach had insufficient flow for sampling and is unlikely to support fish. The mean wetted width of the sampled reach was 4.3 ft and the maximum depth encountered was 1.2 ft. One non-native fish species (RSS) was identified from North Muddy Creek (Appendix I).

Delaney Creek

Delaney Creek flows into North Muddy Creek east of BLM Road 5304 (Figure 13). One reach was sampled on Delaney Creek in June 2005 (Figure 13 and Appendix C). The mean wetted width of the reach was 2.6 ft and the maximum depth encountered was 1.0 ft. No fish were present at the time of sampling.

Little Muddy Creek

Little Muddy Creek flows into North Muddy Creek east of BLM Road 5304. One potential sampling reach was visited in June 2005 (Figure 13 and Appendix C). Little Muddy Creek was found to have insufficient flow for sampling and is unlikely to support fish.

Horse Creek Sub-drainage

The Horse Creek sub-drainage is 173mi² in the northwestern portion of the Green River watershed (Figure 3). Fourteen potential sampling reaches were visited in September 2005, of which three were not sampled because the streams were dry (Figure 14 and Appendix C). Ten fish species were identified in the Horse Creek sub-drainage in 2005, of which five are native (MTS, MSC, SPD, MWF, CRC) to the stream (Appendix J). No target species were identified, although hybridization between WHS and FMS was noted at three sites in the drainage. These FXW ranged in length from 10.6 to 21.2 in (Figure 15).

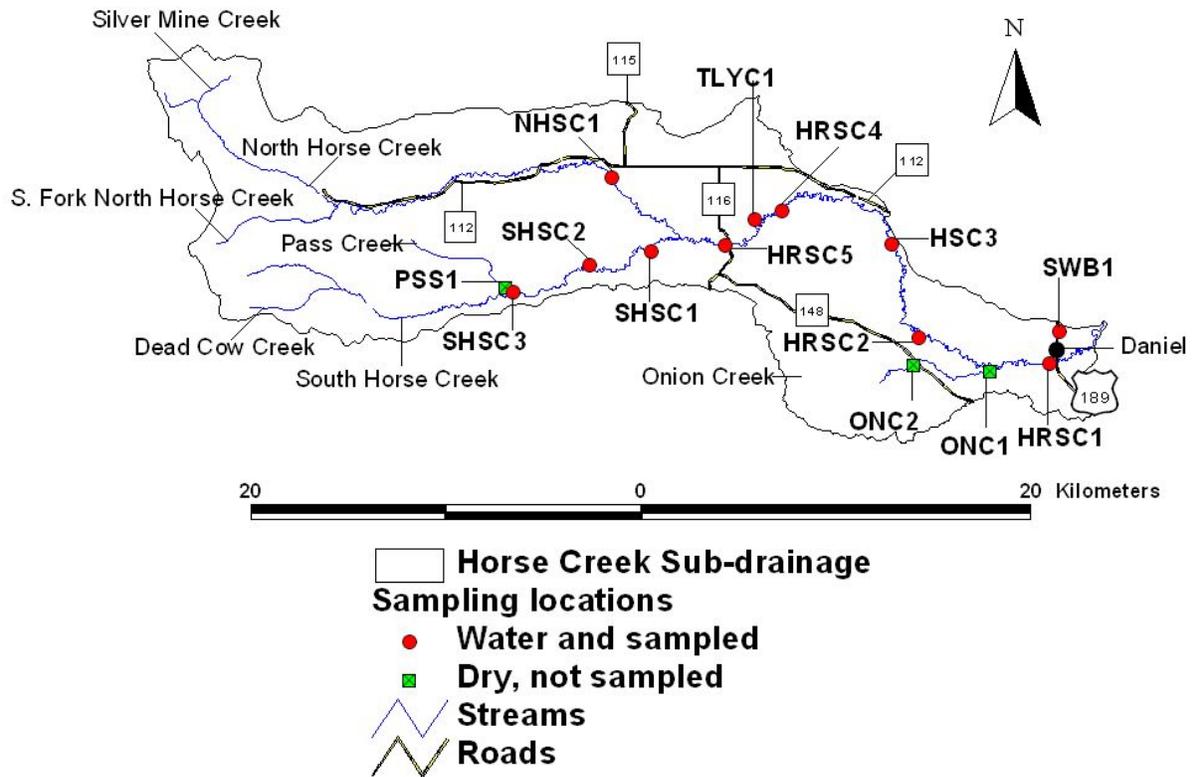


Figure 14. Locations of reaches visited in the Horse Creek sub-drainage in 2005.

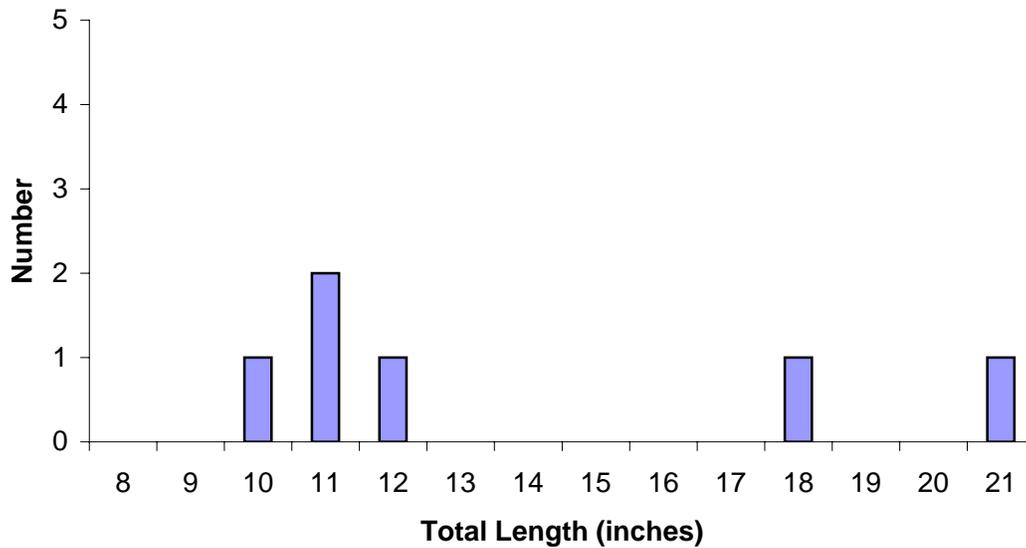


Figure 15. Length-frequency of FXW identified from the Horse Creek sub-drainage in 2005.

Horse Creek

Horse Creek flows into the Green River east of Daniel, WY. Five reaches were sampled on Horse Creek during September 2005 (Figure 14 and Appendix C). The mean wetted width of these reaches was 24.7 ft and the maximum depth was 4.8 ft. Horse Creek became intermittent in the vicinity of HRSC3, but the rest of the reaches exhibited flow. Three residual pools at HRSC3 were sampled with a bag seine, while the other four reaches were sampled with electrofishing equipment. Reach HRSC4 was lengthened to 692 ft to end at a habitat transition, HRSC5 was lengthened to 732 ft to end at a habitat transition, and HRSC3 was shortened to 479 ft due to a lack of water.

The mean wetted width of Horse Creek reaches was 24.7 ft and the maximum depth was 4.8 ft. Ten fish species were identified, of which five are native (MTS, MSC, SPD, CRC, and MWF) to the stream (Appendix J). Hybridization between WHS and FMS was noted in two individuals from reach HRSC1 (Appendix J). Right pelvic fin clips were taken from FXW for genetic analyses.

Taylor Spring Creek

Taylor Spring Creek is a previously unnamed and undocumented spring creek located entirely on private property. Taylor Spring Creek flows approximately 6 miles before joining

Horse Creek east of Sublette County Road 116. One reach was sampled on Taylor Spring Creek approximately 1 mi upstream of its confluence with Horse Creek in September 2005 (Figure 14 and Appendix C). The mean wetted width of the reach was 12.8 ft and the maximum depth was 3.0 ft. Eight fish species were collected from Taylor Spring Creek, including four species native (CRC, SPD, MSC, and MTS) to the stream (Appendix J). No target species or hybrids were identified from Taylor Spring Creek.

South Horse Creek

South Horse Creek flows into North Horse Creek west of Sublette County Road 116 to form Horse Creek. Three reaches were sampled on South Horse Creek in September 2005 (Figure 14 and Appendix C). The mean wetted width of these reaches was 16.5 ft and the maximum depth was 3.1 ft. Seven fish species were identified from South Horse Creek, of which four are native (CRC, MTS, MSC, and SPD) to the stream (Appendix J). Hybridization between FMS and WHS was noted in four individuals from two reaches (Appendix J). Right pelvic fin clips were taken from three of these individuals for genetic analyses.

North Horse Creek

North Horse Creek flows into South Horse Creek west of Sublette County Road 116 to form Horse Creek. One reach was sampled in September 2005 on North Horse Creek (Figure 14 and Appendix C). The mean wetted width of this reach was 29.2 ft and the maximum depth was 4.3 ft. Four fish species were identified from North Horse Creek (Appendix J). All four species are native (CRC, MTS, MSC, and SPD) to the stream.

Scott Werbelow Pond

This is a small private pond located north of Daniel, WY (Figure 14). This pond was sampled because the owner had reported finding unusual fish there. A trap net was set for 2.25 hours in July 2005. Four fish species were identified (Appendix J), of which two are native (SPD and MTS) to the drainage.

Onion Creek

Onion Creek flows into Horse Creek west of Daniel, WY. Two potential sampling reaches were visited in August 2005 (Figure 14 and Appendix C), but Onion Creek was dry. A small reservoir was found in the upper reaches of this stream and will be sampled with gill and/or trap nets in 2006.

Pass Creek

Pass Creek flows into South Horse Creek in the vicinity of reach SHSC3. One potential sampling site was visited in September 2005 just upstream of its confluence with South Horse Creek (Figure 14 and Appendix C). Pass Creek was dry.

LaBarge Creek Sub-drainage

The LaBarge Creek sub-drainage is 186mi² in the western portion of the Green River watershed (Figure 3). Eleven potential sampling reaches were visited in June 2005 (Figure 16 and Appendix C). Of these 11 reaches, eight were not sampled due to the stream being dry, having insufficient flows to support fish, high gradient, or heavy flows. Four fish species were identified, of which two are native (MTS and MSC) to the stream. (Appendix K). No target species or hybrids were collected from the LaBarge Creek sub-drainage in 2005. No reaches were planned on the LaBarge Creek mainstem since the fish community in that stream is already well documented.

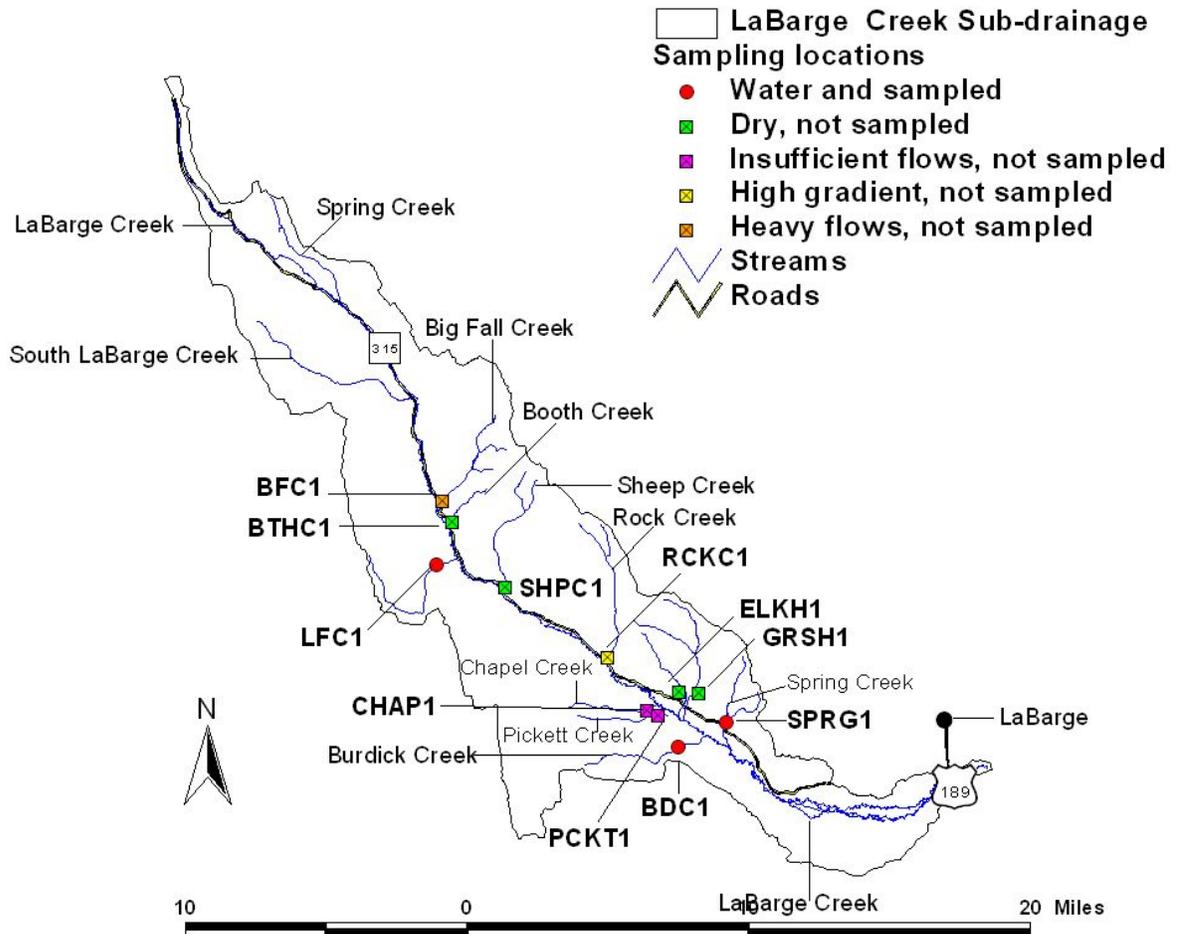


Figure 16. Locations of reaches visited in the LaBarge Creek sub-drainage in 2005.

Burdick Creek

Burdick Creek is the most downstream south-side tributary to LaBarge Creek. One reach was sampled on Burdick Creek in June 2005 (Figure 16 and Appendix C). The mean wetted width of the reach was 4.6 ft and the maximum depth was 3.0 ft. One fish species (MTS) was identified from Burdick Creek (Appendix K). MTS are native to the stream.

Little Fall Creek

Little Fall Creek is the most upstream south-side tributary to LaBarge Creek that was sampled in 2005. One reach was sampled on Little Fall Creek in June 2005 (Figure 16 and Appendix C). The mean wetted width of the reach was 6.9 ft and the maximum depth was 3.12 ft. Two fish species were identified from Little Fall Creek (Appendix K). One species (MTS) is native to the stream.

Spring Creek

Spring Creek is the most downstream tributary to LaBarge Creek. One reach was sampled on Spring Creek during June 2005 (Figure 16 and Appendix C). The mean wetted width of the reach was 7.9 ft and the maximum depth encountered was 2.5 ft. One non-native fish species (BNT) was identified from Spring Creek (Appendix K).

Big Fall Creek

Big Fall Creek was the most upstream tributary to LaBarge Creek slated for sampling in 2005. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C), but was not sampled due to heavy flows.

Booth Creek

Booth Creek is a tributary to LaBarge Creek and is located just downstream from Big Fall Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C), but Booth Creek was dry.

Chapel Creek

Chapel Creek is a tributary to LaBarge Creek upstream of Burdick Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C). Chapel Creek had insufficient flow for sampling and is unlikely to support fish.

Elk Hollow Creek

Elk Hollow Creek is a tributary to LaBarge Creek and is located almost directly opposite of Chapel Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C), but Elk Hollow Creek was dry.

Grassy Hollow Creek

Grassy Hollow Creek is a tributary to LaBarge Creek and is located just downstream of Elk Hollow Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C), but Grassy Hollow Creek was dry.

Pickett Creek

Pickett Creek is a tributary to LaBarge Creek downstream of Chapel Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C). Pickett Creek had insufficient flow for sampling and is unlikely to support fish.

Rock Creek

Rock Creek is a tributary to LaBarge Creek and is located upstream of Elk Hollow Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C). Rock Creek was not sampled due to extreme gradient.

Sheep Creek

Sheep Creek is a tributary to LaBarge Creek and is located downstream of Booth Creek. One potential sampling reach was visited in June 2005 (Figure 16 and Appendix C), but Sheep Creek was dry.

Little Sandy Creek Sub-drainage

The Little Sandy Creek sub-drainage is 283mi² in the eastern portion of the Green River watershed (Figure 3). Little Sandy Creek was sampled extensively in 2003 (Gill et al. 2004). The purpose of sampling in 2005 was to collect additional BHS fin clips for genetic analysis and to train technicians to identify FMS, BHS, RTC, and their respective hybrids.

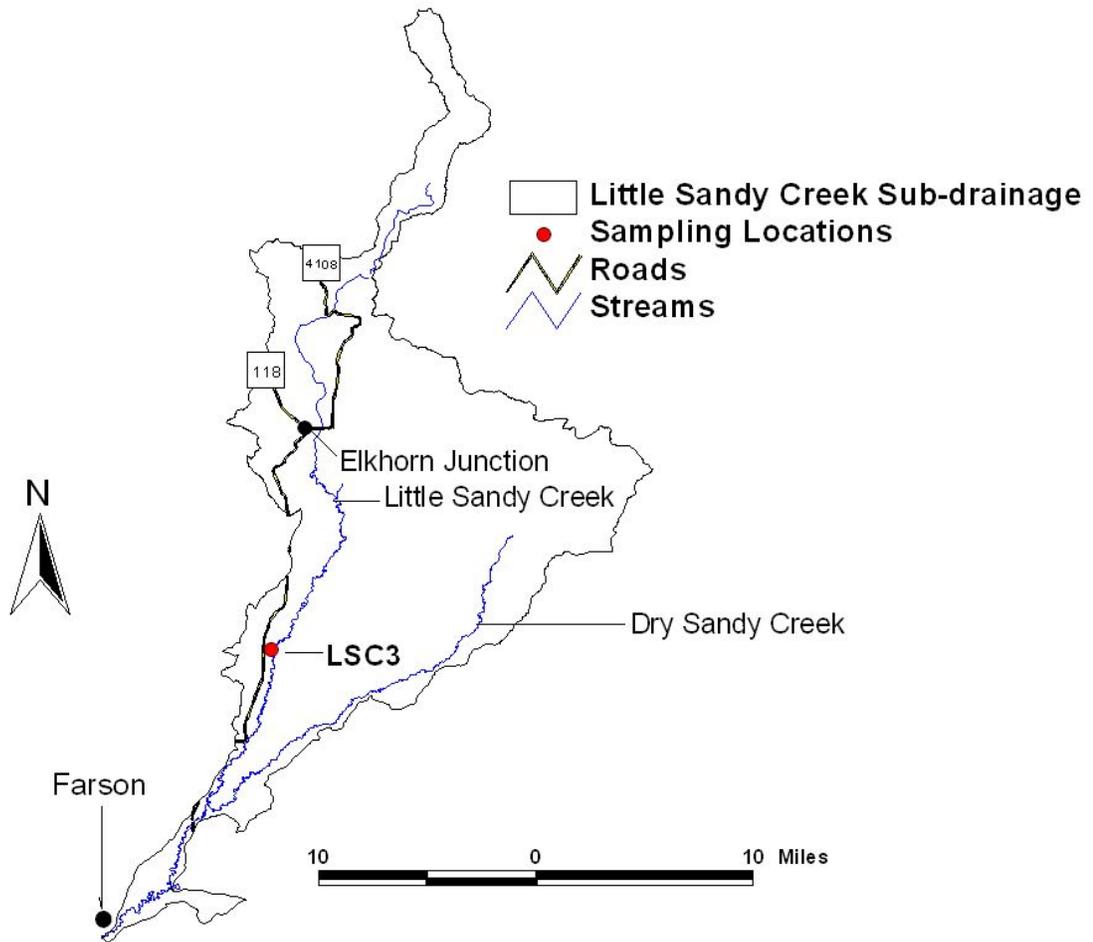


Figure 17. Location of reaches sampled in the Little Sandy Creek sub-drainage in 2005.

Little Sandy Creek

Little Sandy Creek is a tributary to the Big Sandy River in the eastern portion of the Green River watershed (Figure 3). Little Sandy Creek flows into the Big Sandy River approximately one mi southwest of Farson, WY (Figure 17). One reach (LSC3, previously sampled in 2003) was sampled on Little Sandy Creek during August 2005 (Figure 17 and Appendix C). Ten fish species were collected from the reach, of which five are native (FMS, BHS, SPD, MSC, and MTS) to the stream (Appendix L). Five FMS and 40 BHS were collected from Little Sandy Creek in 2005. The FMS ranged in length from 5.7 to 16.5 in and the BHS ranged in length from 3.3 to 11.7 in (Figure 18). Hybridization was noted between WHS and native suckers (FMS and BHS) as well as between FMS and BHS (Figure 19 and Appendix L). Hybridization between WHS and FMS was noted in six individuals ranging in length from 5.5 to

15.5 in. Hybridization between WHS and BHS was noted in 37 individuals ranging in length from 3.6 to 12.0 in. In addition, hybridization between BHS and FMS (FXB) was noted in two individuals which were 11.9 and 12.9 in. Right pelvic fin clips were taken from each FXB and 22 BHS for genetic analyses. In total, 127 suckers were identified from this reach. The sucker community was dominated by WHS, BHS, and BXW (Figure 20 and Appendix L).

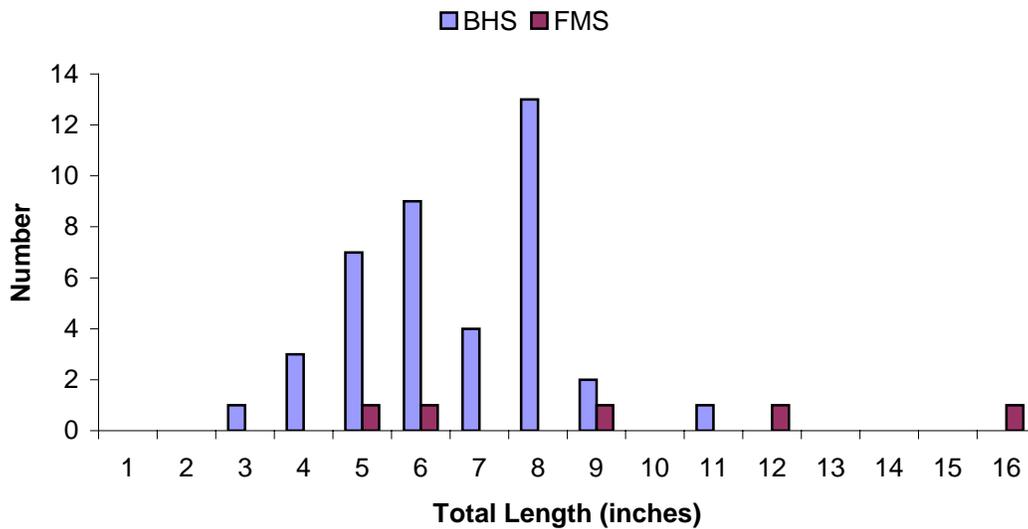


Figure 18. Length-frequency of FMS and BHS collected from reach LSC3 in 2005 (n=45).

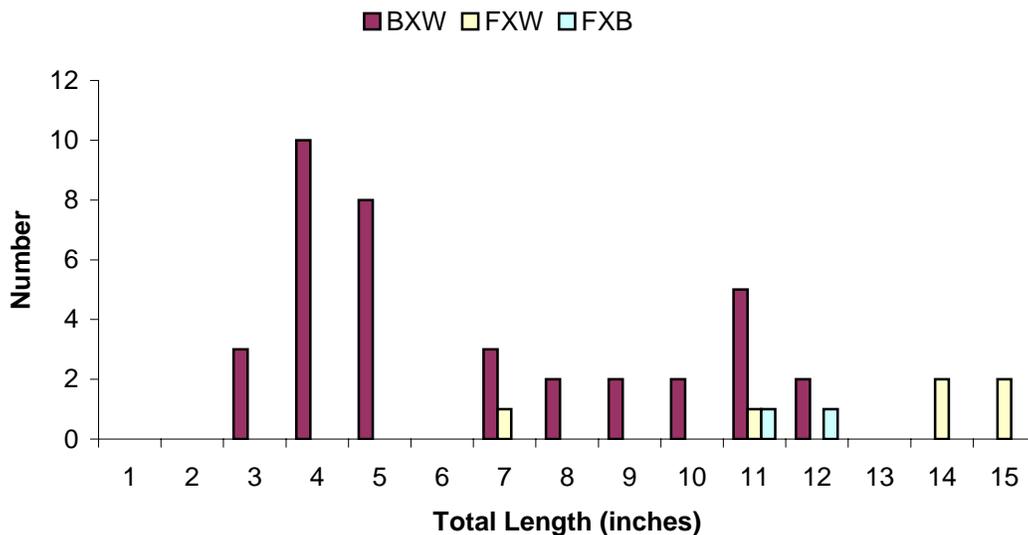


Figure 19. Length-frequency of BXW, FXW, and FXB collected from reach LSC3 in 2005 (n=45).

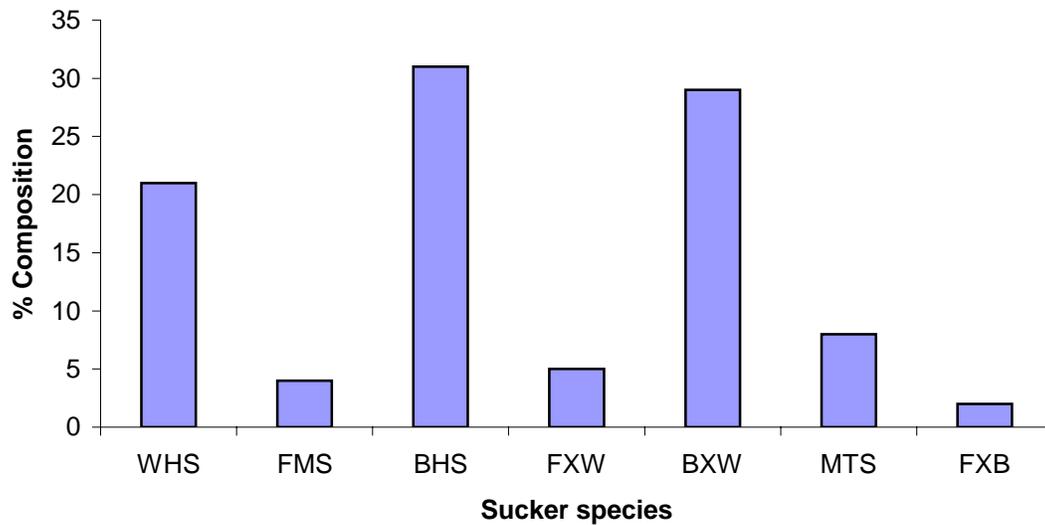


Figure 20. Relative abundance of WHS, FMS, BHS, FXW, BXW, MTS, and FXB collected at reach LSC3 in 2005 (n=127).

Lower Big Sandy River Sub-drainage

The Lower Big Sandy River sub-drainage is 325mi² in the eastern portion of the Green River watershed (Figure 3). This portion of the Big Sandy River watershed was sampled in 2005 to define the distribution of FMS, BHS, RTC, and their hybrids downstream of Big Sandy Reservoir. The Big Sandy River upstream of Big Sandy Reservoir was extensively sampled in 2003 and again in 2004 (Gill et al. 2004 and 2005). One target species (FMS) was identified from the Lower Big Sandy River sub-drainage in 2005.

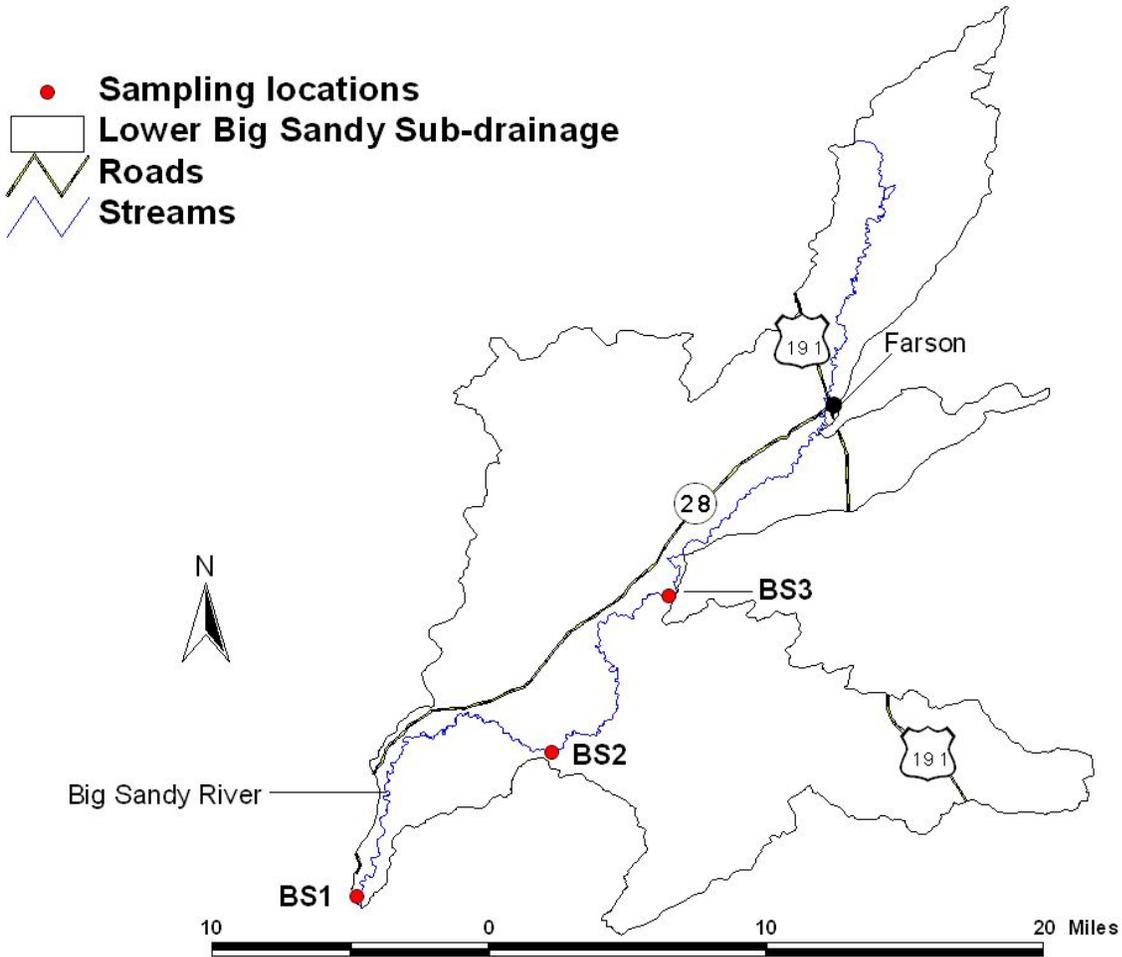


Figure 21. Locations of reaches sampled in the Lower Big Sandy River sub-drainage in 2005.

Big Sandy River

The Big Sandy River sub-drainage is located in the eastern portion of the Green River watershed (Figure 3). Three reaches were sampled on the Big Sandy River downstream of Farson, WY in July 2005 (Figure 21 and Appendix C). The mean wetted width of the reaches was 31.2 ft and the maximum depth was 3.9 ft. Reach BS3 was lengthened to 672 ft to end at a habitat transition. Thirteen fish species were identified from the Big Sandy River, of which four are native (FMS, MTS, MSC, and SPD) to the stream (Appendix M). Flannelmouth sucker were the only target species identified, with two individuals collected from among three sampled reaches (Figure 22 and Appendix M). Right pelvic fin clips were taken from each FMS for genetic analyses.

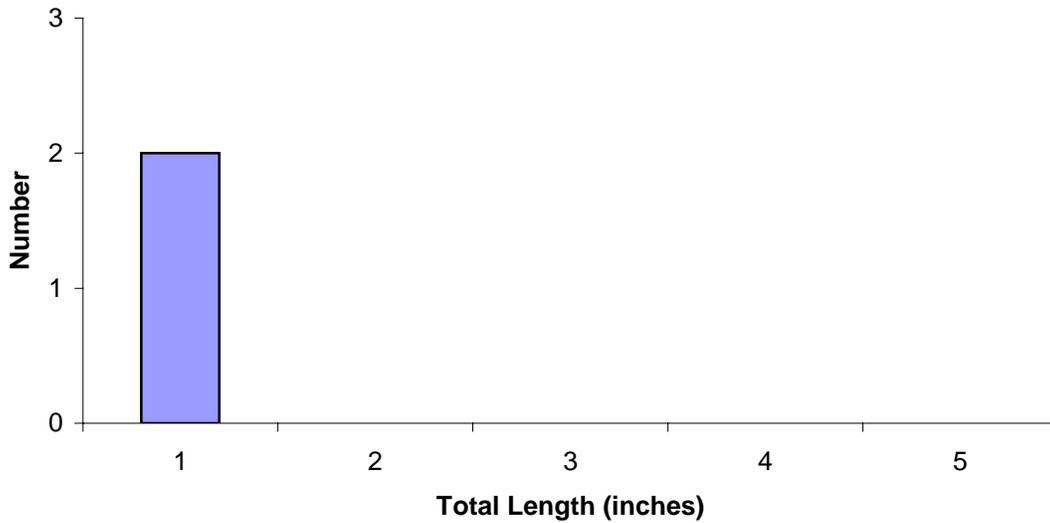


Figure 22. Length-frequency of FMS collected from the Lower Big Sandy River sub-drainage in 2005.

Middle Beaver Creek Sub-drainage

The Middle Beaver Creek sub-drainage is 147mi² in the northwestern portion of the Green River watershed (Figure 3). A total of 14 reaches were visited in the drainage in late August and early September 2005 (Figure 23 and Appendix C). Of these, six reaches were not sampled because they were dry. Six fish species were identified, of which three are native (MTS, MSC, and SPD) to the drainage (Appendix N). No target species or hybrids were identified from the Middle Beaver Creek sub-drainage in 2005.

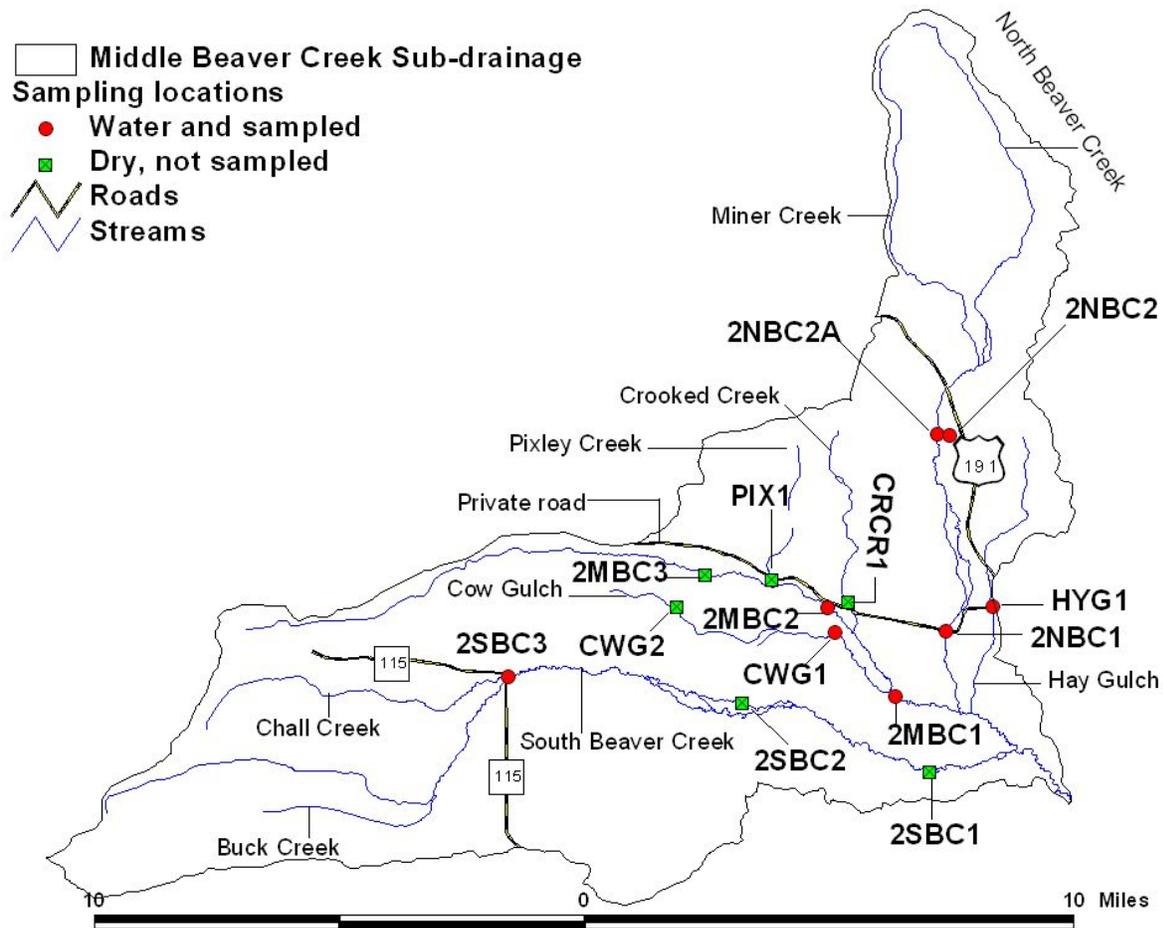


Figure 23. Locations of reaches visited in the Middle Beaver Creek sub-drainage in 2005.

South Beaver Creek

Three potential sampling reaches were visited on South Beaver Creek in September 2005 (Figure 23 and Appendix C). Two of these reaches were dry. One reach was sampled on South Beaver Creek just downstream of the confluence with Chall Creek in September 2005.

The mean wetted width of this reach was 16.4 ft and the maximum depth was 3.3 ft. Five fish species were identified from South Beaver Creek, of which three are native (MTS, MSC, and SPD) to the stream (Appendix N).

Cow Gulch

Cow Gulch is a small tributary to Middle Beaver Creek. Two potential sampling reaches were visited on Cow Gulch in September 2005 (Figure 20 and Appendix C). One reach was dry, whereas the other reach had sufficient flow to sample (CWG1).

Cow Gulch was dry in the upper and lower segments of the stream, but in the middle segment, local springs provided sufficient flow for fish to persist. One reach in this area (CWG1) was sampled in September 2005. The mean wetted width was 4.9 ft and the maximum depth was 2.3 ft. Five fish species were identified, of which two are native (SPD and MSC) to the stream (Appendix N).

Middle Beaver Creek

Three potential sampling reaches were visited on Middle Beaver Creek. Of these three, one was dry (2MBC3). Two reaches were sampled on Middle Beaver Creek during September 2005 (Figure 20 and Appendix C). The mean wetted width of Middle Beaver Creek reaches was 14.2 ft and the maximum depth was 2.3 ft. 2MBC1 was lengthened to 820 ft to sample the available fish-inhabited water and 2MBC2 was shortened to 352 ft for the same reason. Similar to Cow Gulch and South Beaver Creek, Middle Beaver Creek was dry for most of its length. Local springs provided flow sufficient for sampling at the confluence of Cow Gulch and Middle Beaver Creek (2MBC1, Figure 20). Reach 2MBC2 was a residual pool behind an irrigation diversion structure. Six fish species were identified from Middle Beaver Creek, of which three are native (MTS, MSC, and SPD) to the stream (Appendix N). Four right pelvic fin clips were taken from WHS to verify phenotypic identification of WHS in Middle Beaver Creek.

North Beaver Creek

Three reaches were sampled on North Beaver Creek in August and September 2005 (Figure 20 and Appendix C). The mean wetted width of the reaches was 5.6 ft and the maximum depth was 2.6 ft. Reach 2NBC1 was the only reach that was the full 656 ft long; 2NBC2 (shortened to 187 ft long due to poor fish habitat) was located in a barely flowing irrigation ditch, and 2NBC2A (3.3 ft long) was a residual pool located on North Beaver Creek mainstem. Six fish species were identified from North Beaver Creek, of which three are native (MTS, MSC, and SPD) to the stream (Appendix N).

Hay Gulch

Hay Gulch is a tributary to North Beaver Creek. One reach was sampled on Hay Gulch in September 2005 (Figure 20 and Appendix C). The mean wetted width of the reach was 10.2 ft

and the maximum depth was 2.0 ft. Three fish species were identified from Hay Gulch, of which one is native (MSC) to the stream (Appendix N).

Pixley Creek

Pixley Creek is a tributary to Middle Beaver Creek downstream of 3MBC3. One potential sampling site was visited on Pixley Creek in August 2005 (Figure 20 and Appendix C), but Pixley Creek was dry. Pixley Creek appears to flow only when the small reservoir upstream of this stream segment overflows.

Crooked Creek

Crooked Creek is a tributary to Middle Beaver Creek downstream of Pixley Creek. One potential sampling site was visited on Crooked Creek in August of 2005 (Figure 20 and Appendix C), but Crooked Creek was dry. Crooked Creek appears to flow only when the small reservoir upstream of this stream segment overflows.

Muddy Creek Sub-drainage

The Muddy Creek sub-drainage is 156mi² in the northwestern portion of the Green River watershed (Figure 3). Eleven potential sampling reaches were visited during 2005 (Figure 24 and Appendix C). Two of these reaches were not sampled due to insufficient flows and it is unlikely these reaches support fish. Five of the 12 fish species identified during sampling are native (FMS, MTS, MSC, SPD, and MWF) to the sub drainage (Appendix O). Four FMS were identified from one reach in the sub-drainage (Figure 25), and hybridization between BHS and WHS was noted in one reach.

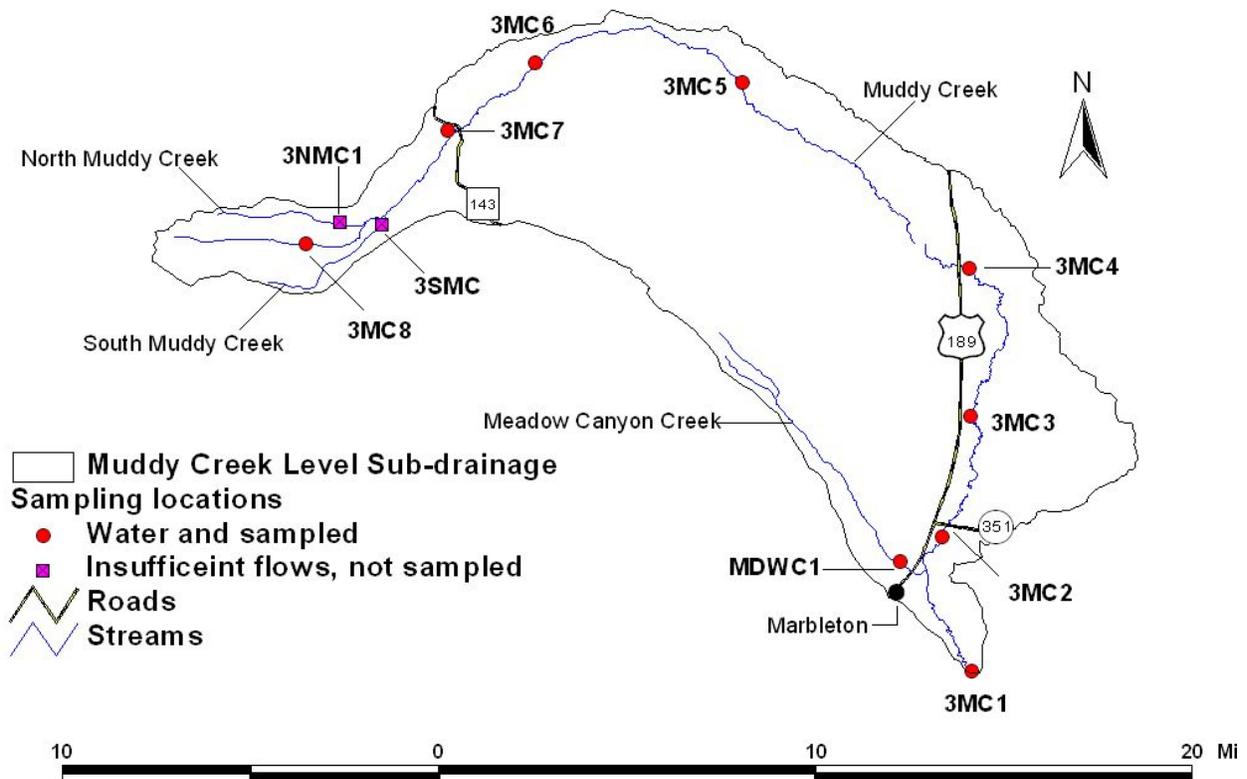


Figure 24. Locations of reaches visited in the Muddy Creek sub-drainage in 2005.

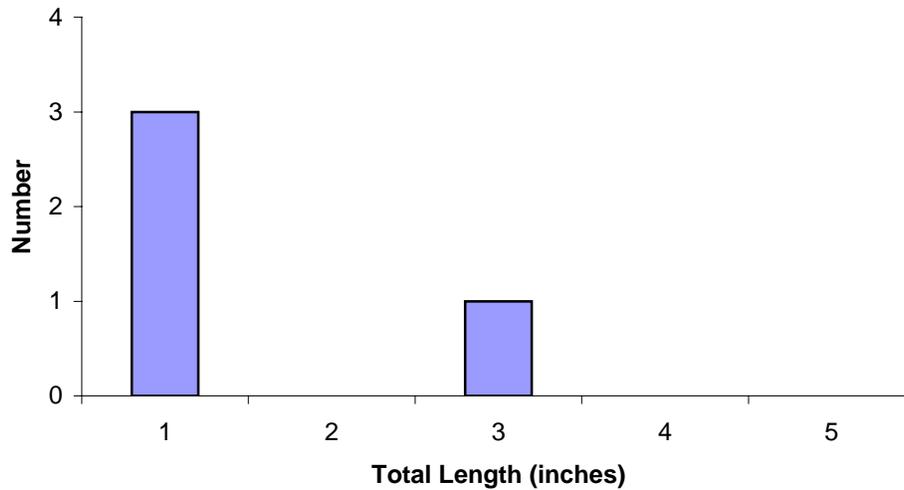


Figure 25. Length-frequency histogram of FMS collected from the Muddy Creek sub-drainage in 2005.

Muddy Creek

Muddy Creek flows into the Green River east of Marbleton, WY. Ten potential sampling reaches were visited in 2005, of which two were not sampled due to insufficient flows (Figure 24 and Appendix C). The mean wetted width of the reaches was 10.1 ft and the maximum depth was 3.3 ft. Ten fish species were identified in Muddy Creek, of which five are native (FMS, MTS, MSC, SPD, and MWF) to the drainage (Appendix O). Right pelvic fin clips were taken from each FMS for genetic analysis. In addition, hybridization between BHS and WHS was noted in one 4.4 in individual at 3MC3. Right pelvic fin clips were taken from each FMS and BXW for genetic analyses.

Meadow Canyon Creek

Meadow Canyon Creek is a tributary to Muddy Creek north of Marbleton, WY. One reach was sampled on Meadow Canyon Creek in August 2005 (Figure 24 and Appendix C). The mean wetted width of the reach was 5.3 ft and the maximum depth was 1.6 ft. Two of the three fish species identified are native (SPD and MSC) to the stream (Appendix O). No target species or hybrids were identified.

North Muddy Creek

North Muddy Creek is a tributary to Muddy Creek upstream of Sublette County Road 143 (Figure 24). North Muddy Creek had insufficient flow for sampling and is unlikely to support fish.

South Muddy Creek

South Muddy Creek is a tributary to Muddy Creek upstream of Sublette County Road 143 (Figure 24). South Muddy Creek had insufficient flow for sampling and is unlikely to support fish.

Upper Big Sandy River Sub-drainage

The Upper Big Sandy sub-drainage is 386 mi² in the upper portion of the Big Sandy River watershed (Figure 3). Two reaches in the Upper Big Sandy River sub-drainage were sampled in 2005. The purpose of this sampling was to provide exercise in recognizing identifying characters for FMS, BHS, and their hybrids. No tissue samples were taken and habitat was not documented. The Big Sandy River above Big Sandy Reservoir was extensively sampled in 2003 and 2004 (Gill et al. 2004 and 2005).

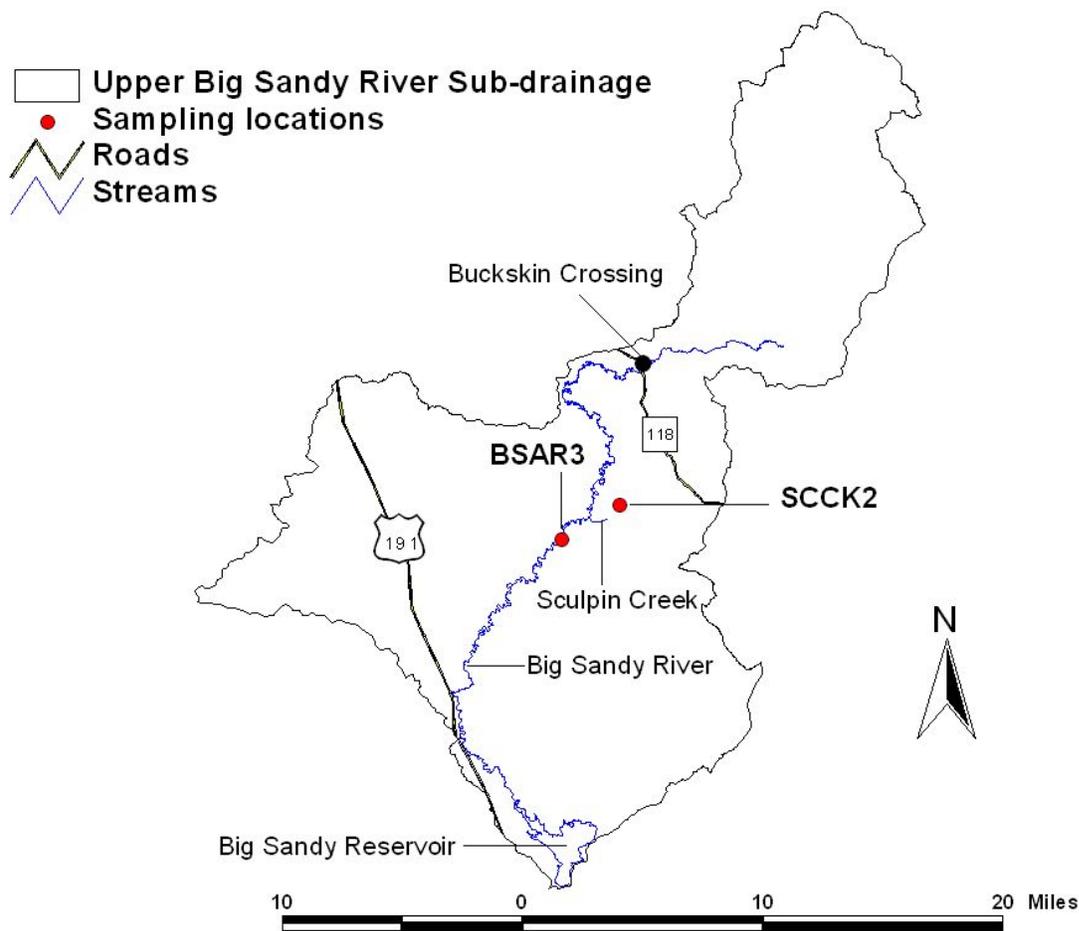


Figure 26. Locations of reaches sampled in the Upper Big Sandy River sub-drainage in 2005.

Big Sandy River

One reach (BSAR3, previously sampled in 2003) was sampled on the Big Sandy River between U.S Highway 191 and Sublette Country Road 118 in August 2005 (Figure 26 and Appendix C). The mean wetted width of the reach was 45.6 ft. Five fish species were identified from this reach, of which three are native (FMS, MSC, and SPD) to the stream (Appendix P). Eight FMS were identified (Figure 27), although no right pelvic fin clips were taken for genetic analysis. One BBT was identified, representing the farthest known upstream occurrence of this non-native species from Big Sandy Reservoir.

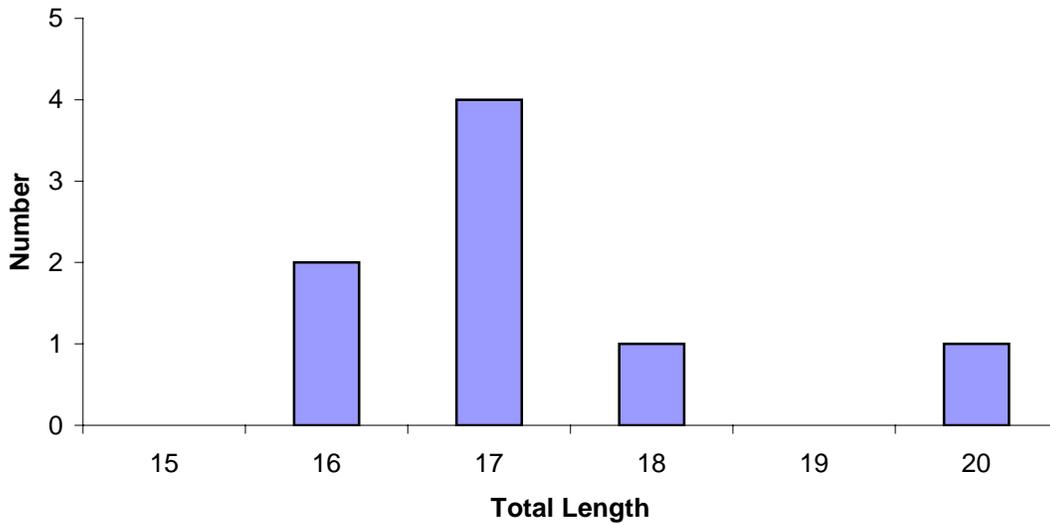


Figure 27. Length-frequency of FMS collected from reach BSAR3 in 2005.

Sculpin Creek

Sculpin Creek is a small tributary to the Big Sandy River upstream of BSAR3 (Figure 23). One reach was sampled on Sculpin Creek in August 2005 (Figure 23 and Appendix C). Due to time constraints, the length of the reach sampled was reduced to 256 ft. Three fish species (WHS, LKC, and RSS) were identified from this reach (Appendix O). None of these species are native to the stream.

Upper Hams Fork sub-drainage

The Upper Hams Fork sub-drainage is 370mi² in the western portion of the Green River watershed (Figure 3). The Hams Fork River was extensively sampled in 2004 (Gill et al. 2005). Sampling in 2005 consisted of follow-up work on Willow Creek, which was not sampled in 2004.

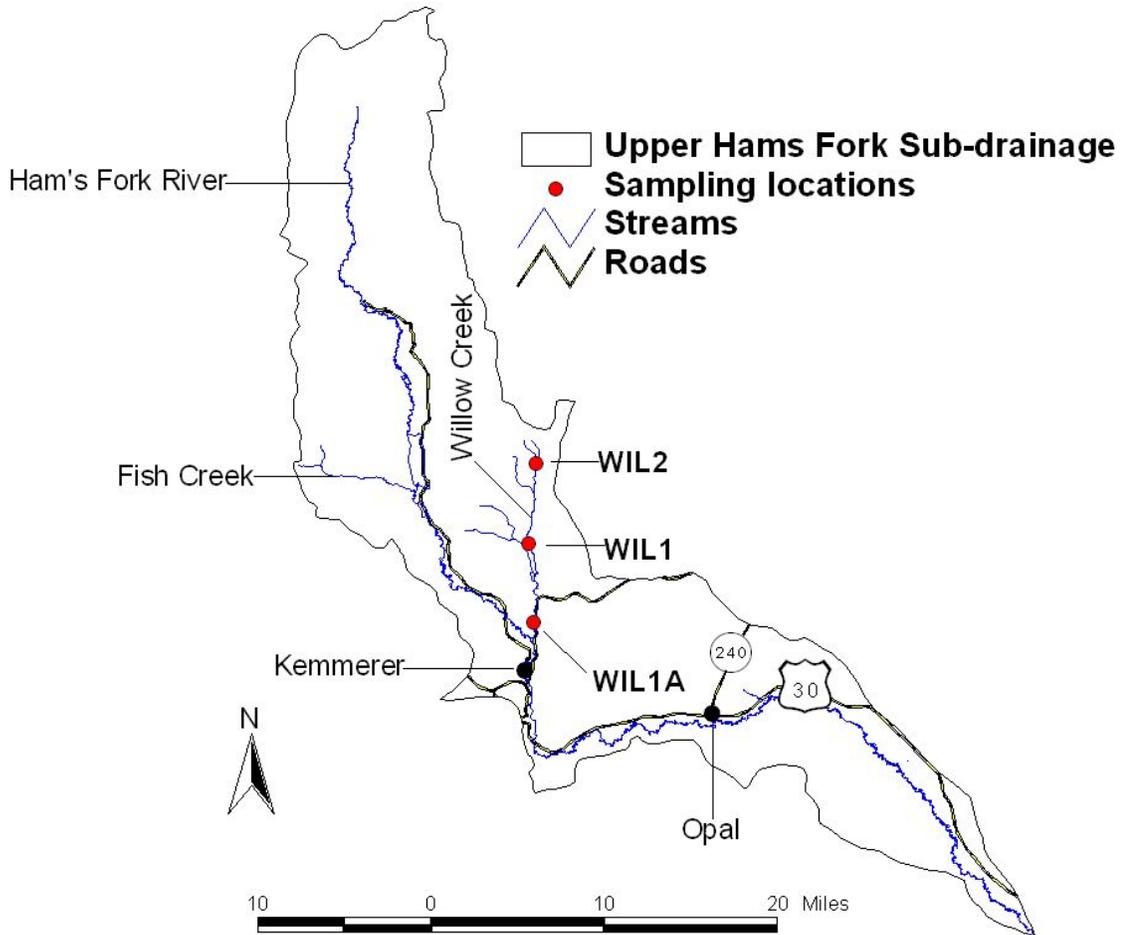


Figure 28. Locations of reaches sampled in the Upper Hams Fork sub-drainage in 2005.

Willow Creek

Willow Creek is a tributary to the Hams Fork River north of Kemmerer, WY. Three reaches were sampled on Willow Creek in June 2005 (Figure 28 and Appendix C). The mean wetted width of the reaches sampled was 11.5 ft and the maximum depth was 4.3 ft. Reach WIL2 was shortened to 623 ft due to beaver dam complexes and reach WIL1 was shortened to 607 ft for the same reason. Two of the six fish species identified are native (MSC and MTS) to the stream (Appendix Q). No target species or hybrids were identified.

Upper New Fork River sub-drainage

The Upper New Fork River sub-drainage is 231mi² in the northern portion of the Green River watershed (Figure 3). Two reaches were sampled in this sub-drainage in September 2005 (Figure 29 and Appendix C). No target species or hybrids were identified.

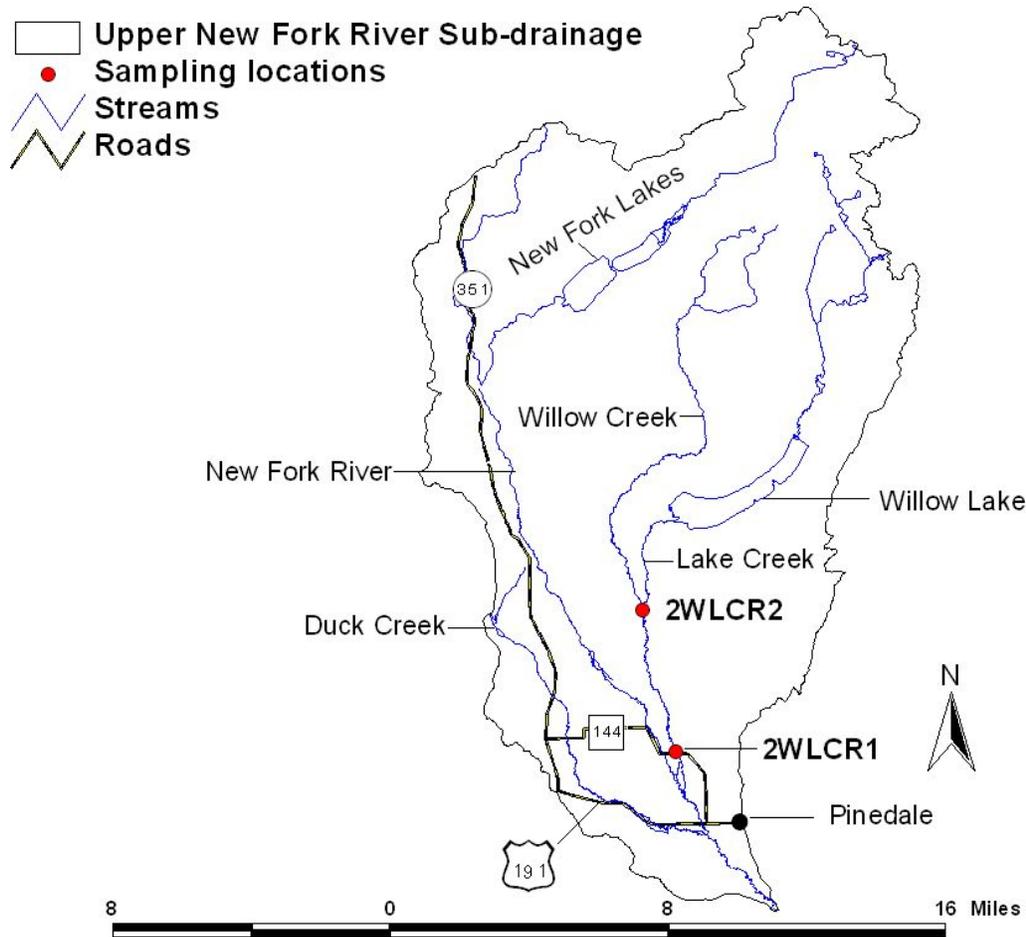


Figure 29. Locations of reaches sampled in the Upper New Fork River sub-drainage in 2005.

Willow Creek

Two reaches were sampled on Willow Creek in September 2005 (Figure 29 and Appendix C). The mean wetted width of the reaches was 25.0 ft and the maximum depth encountered was 4.6 ft. Reach 2WLCR1 was lengthened to 757.86 ft to end at a habitat transition. Six fish species were identified from Willow Creek, of which two are native (MSC and SPD) to the stream (Appendix R).

Summary

The objectives outlined for the 2005 portion of Phase II of this study have been met. Sampling was not completed throughout the entire target area (Green River drainage upstream of Fontenelle Dam), but areas not sampled in 2005 will be sampled in 2006. In addition to sampling in the target area, follow up work was conducted in portions of five sub-drainages downstream of Fontenelle Dam.

The project biologist and three technicians visited 106 potential sampling reaches in 2005. Of these reaches, 30 were not sampled due to various local conditions. In total, 76 reaches across 14 sub-drainages were sampled to determine the distribution and abundance of BHS, FMS, and RTC (target species). Two of the three target species (FMS and BHS) were identified in 2005. Bluehead sucker were identified in one stream reach (Figure 4). Flannelmouth sucker were identified in nine stream reaches (Figure 5). Roundtail chub were not identified from any of the stream reaches sampled in 2005. Target species were only identified from streams containing deepwater (maximum depth greater than 1.5 ft) habitat.

Bluehead sucker were not found in the Green River drainage upstream of Fontenelle Dam in 2005. The only occurrence of BHS in 2005 came from Little Sandy Creek, where BHS had been previously documented (Gill et al. 2004). Bluehead sucker hybrids (BXW) were also noted in the same Little Sandy Creek reach. Upstream of Fontenelle Dam, BHS were not identified, but a single BXW was found in the Muddy Creek-Green River sub-drainage. Flannelmouth sucker were found in two sub-drainages upstream of Fontenelle Dam in 2005. They were limited to Cottonwood Creek and one reach on Muddy Creek, where four juvenile FMS were found. Flannelmouth sucker were also documented from two reaches (one individual from each reach) on the Big Sandy River downstream of Farson, WY and from previously sampled sites on the Big Sandy River (upstream of Big Sandy Reservoir), Little Sandy Creek, and Bitter Creek (upstream of Point of Rocks, WY). Of the nine reaches where FMS were identified in 2005, FXW were identified in three reaches and WHS were identified in eight reaches (indicating the potential for hybridization). No RTC were identified during the 2005 field season.

The native and non-native species composition was documented for all stream reaches. Twelve non-native and seven native species were identified across the 76 reaches. Non-native species were more numerous than native species in many reaches, and it was unusual to find a

reach where non-native species were absent. However, there were some reaches where only native species were identified.

South Beaver Creek, Trail Ridge Creek, and Spring Creek in the Green River-Beaver Creek sub-drainage contained only native fish, although in the case of Trail Ridge Creek and Spring Creek, the native fish community consisted of only one species (MTS). Similarly, the fish community of Burdick Creek in the LaBarge Creek sub-drainage consisted of one native species (MTS). The fish community of North Horse Creek in the Horse Creek sub-drainage consisted of four native species (CRC, MSC, MTS, and SPD).

The fish community of reaches sampled in the Green River-Birch Creek sub-drainage consisted entirely of native species (MTS, MSC, and CRC). Fogarty Creek contained MTS and MSC, Pine Grove Creek contained only CRC, and Black Canyon Creek contained only MTS.

Summary 2003, 2004, and 2005.

To date, the project biologist and technicians have sampled 236 reaches in the Green River in Wyoming to determine the distribution and abundance of BHS, FMS, and RTC. Two of the three target species were identified in 2003 (BHS and FMS). In 2004, all three target species were identified. Two of the three target species were identified in 2005 (FMS and BHS), although the BHS identification came from a stream reach where BHS were previously documented in 2003. Bluehead sucker have been documented in 4% of the reaches sampled thus far (nine of 236 reaches) (Figure 30). In 2003 and 2004, BHS were documented from the Big Sandy River and Little Sandy Creek, the Green River (downstream of Fontenelle Dam), and the Blacks Fork River. The only documentation of BHS in 2005 came from a previously sampled reach on the Little Sandy River.

Flannelmouth sucker have been documented in 25% of the reaches sampled thus far (59 of 236 reaches) (Figure 31). The distribution of FMS in 2003, 2004, and 2005 was more widespread than BHS. Flannelmouth sucker have been documented in the Big Sandy River, Little Sandy Creek, Green River downstream of Fontenelle Dam, Bitter Creek, Blacks Fork River, Hams Fork River, Smiths Fork River, Muddy Creek (tributary to the Blacks Fork), Henrys Fork, Cottonwood Creek, and Muddy Creek (tributary to the Green River by Marbleton, WY).

Perhaps the greatest threat to native FMS and BHS in the Green River drainage of Wyoming is the occurrence of and subsequent hybridization with WHS. White sucker are

widespread throughout the drainage and were documented in 50% of the reaches sampled (117 of 236 reaches, Figure 33). The only known population of BHS in Wyoming that is not sympatric with WHS occurs in Ringdahl Reservoir in the Henrys Fork sub-drainage southwest of Green River, WY. The only known population of FMS in Wyoming that is not sympatric with WHS occurs in the upper portions of the Bitter Creek sub-drainage upstream of Point of Rocks, WY. Due to the threat of introgression with WHS, these populations should be protected and, if possible, expanded. The feasibility of removing WHS from certain stream reaches should also be considered.

Roundtail chub have been documented in 7% of the reaches sampled thus far (17 of 236 reaches, Figure 32). They have only been documented from the Blacks Fork River sub-drainage, including the Blacks Fork River, Hams Fork River, and Muddy Creek. Aside from this survey, RTC have also been documented in some lakes in the New Fork River sub-drainage, east of Pinedale, WY (Pete Cavalli, Wyoming Game and Fish file information) and in the Muddy Creek sub-drainage (tributary to the Little Snake River, Wyoming Game and Fish file information). Surveys in 2006 should further define the range of roundtail chub in these sub-drainages.

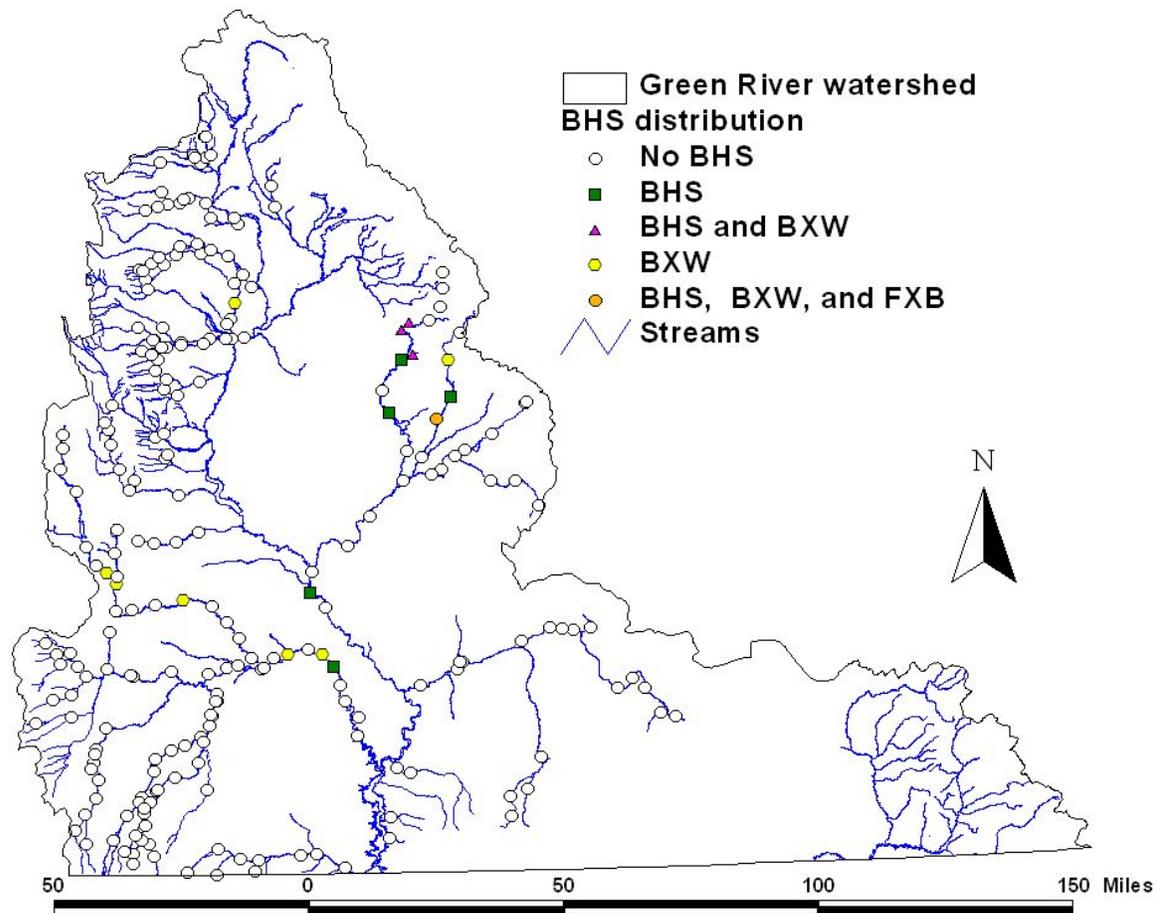


Figure 30. Locations of reaches where BHS or hybrids were identified in 2003, 2004, and 2005.

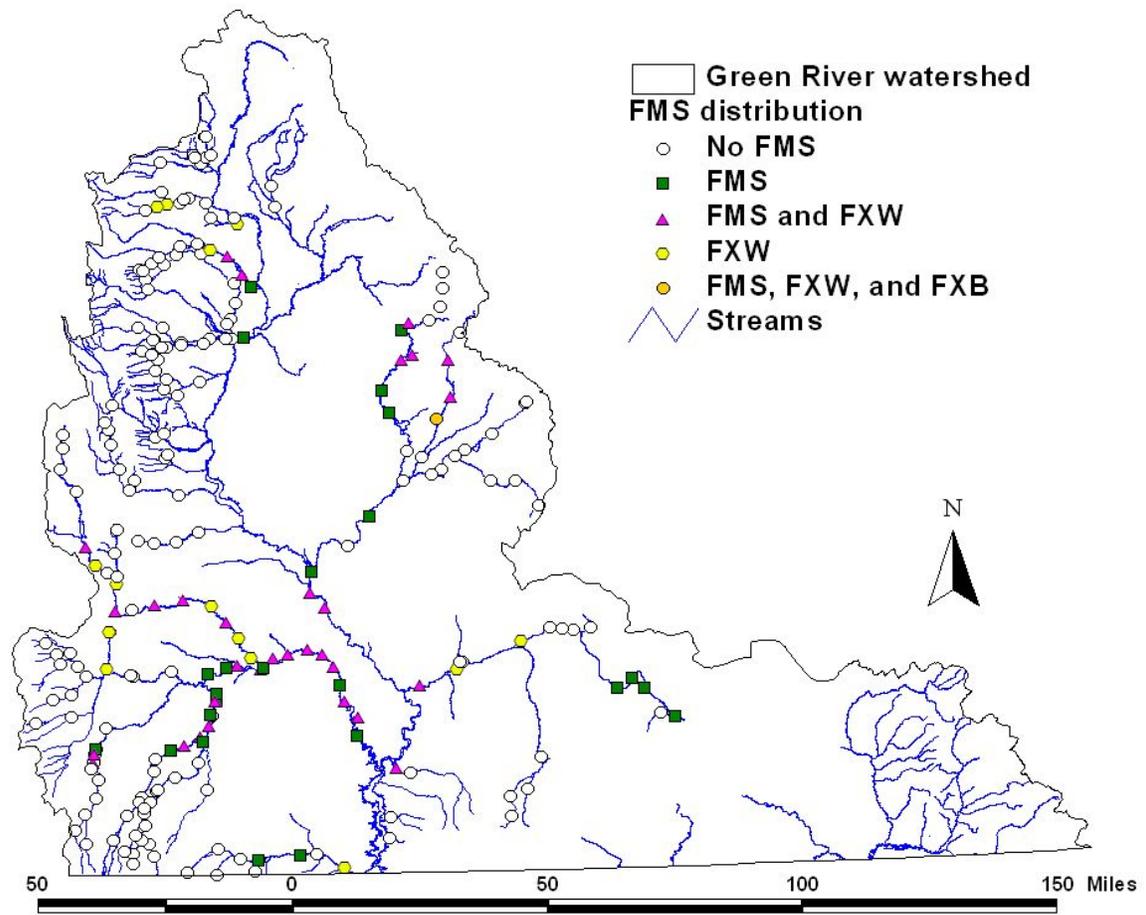


Figure 31. Locations of reaches where FMS or hybrids were identified in 2003, 2004, and 2005.

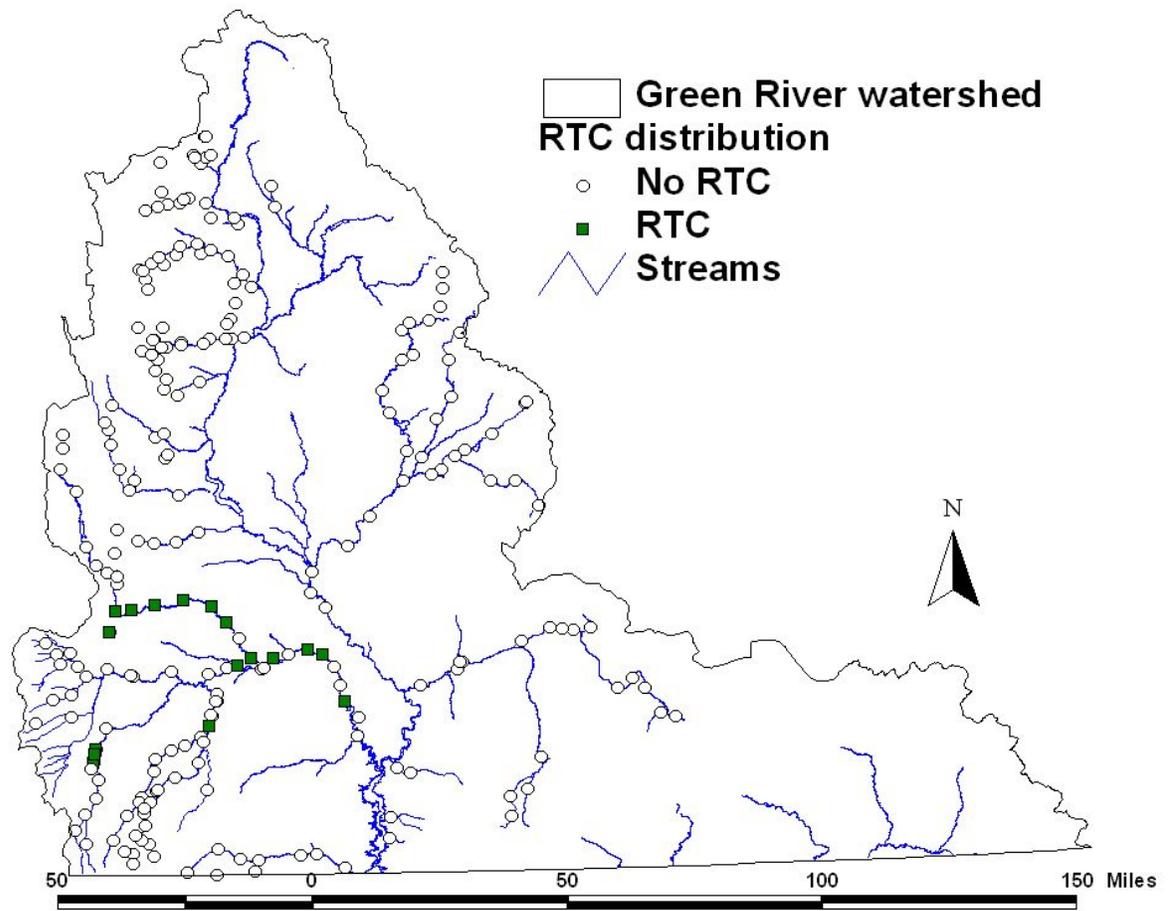


Figure 32. Locations of reaches where RTC were identified in 2003, 2004, and 2005.

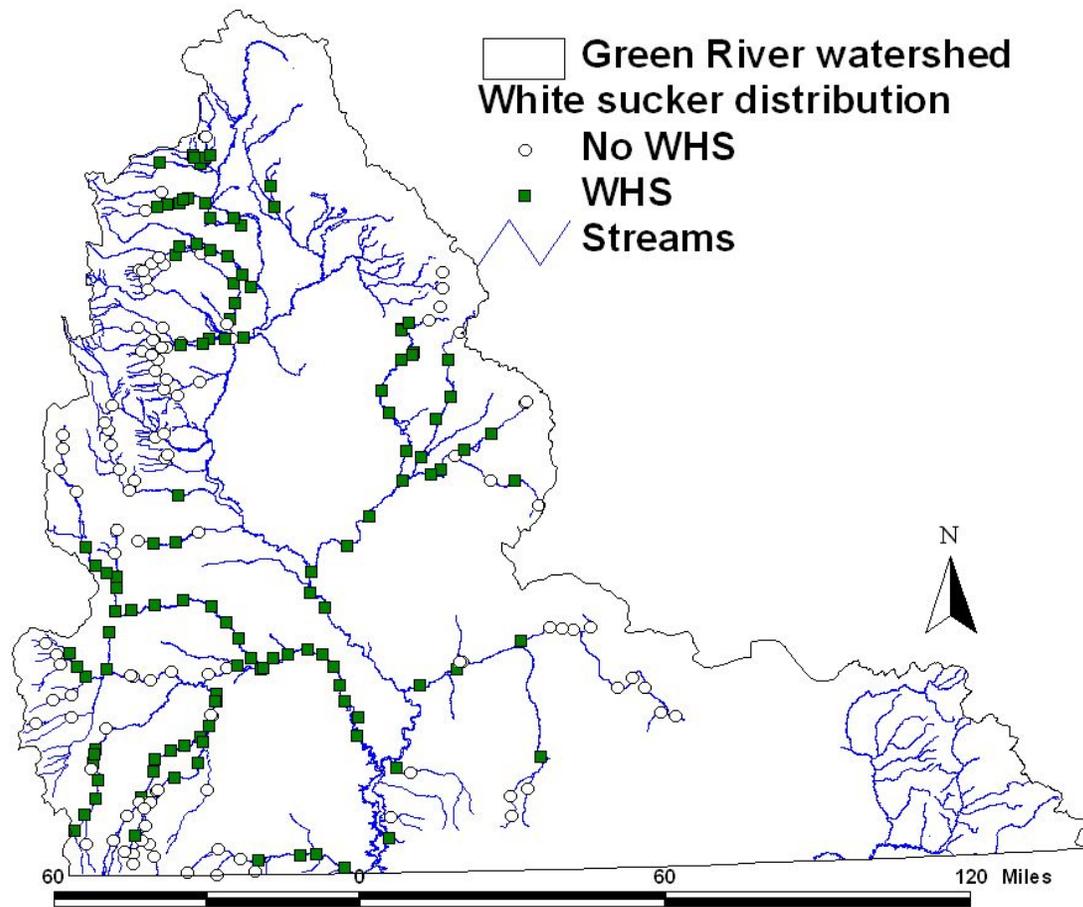


Figure 33. Locations of reaches where WHS were identified in 2003, 2004, and 2005.

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Appendices

Appendix A.— Species codes and common and scientific names of fish species identified in the Green River drainage during the summer 2005 field season.

Species code	Common name	Scientific name
<u>Native Species</u>		
BHS	bluehead sucker	<i>Catostomus discobolus</i>
CRC	Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>
FMS	flannelmouth sucker	<i>Catostomus latipinnis</i>
MSC	mottled sculpin	<i>Cottus bairdi</i>
MTS	mountain sucker	<i>Catostomus platyrhynchus</i>
MWF	mountain whitefish	<i>Prosopium williamsoni</i>
SPD	speckled dace	<i>Rhinichthys osculus</i>
<u>Introduced Species</u>		
BBT	burbot	<i>Lota lota</i>
BKT	brook trout	<i>Salvelinus fontinalis</i>
BNT	brown trout	<i>Salmo trutta</i>
CRP	common carp	<i>Cyprinus carpio</i>
FHM	fathead minnow	<i>Pimephales promelas</i>
LKC	lake chub	<i>Couesius plumbeus</i>
LND	longnose dace	<i>Rhinichthys cataractae</i>
RBT	rainbow trout	<i>Oncorhynchus mykiss</i>
RSS	redside shiner	<i>Richardsonius balteatus</i>
SRC	Snake River cutthroat trout	<i>Oncorhynchus clarki ssp</i>
UTC	utah chub	<i>Gila atraria</i>
WHS	white sucker	<i>Catostomus commersoni</i>
<u>Hybrids</u>		
BXW	bluehead x white sucker	
FXW	flannelmouth x white sucker	
FXB	flannelmouth x bluehead sucker	
<u>Other</u>		
NFP	no fish present (collected) in reach	

Appendix B.— Number of tissue samples collected in 2005 for genetic analysis.

Species	Stream	# Collected	Site ID	Location Description	UTM
FMS	Bitter Creek	5	BC2S	BLM land ~1 mile SW of Bitter Creek, WY.	12T 0702058E 4600865N
FMS	Cottonwood Creek	2	COT1	Dunham Ranch ~2miles upstream of confluence with the Green River.	12T 0581665E 4724376N
FMS	Cottonwood Creek	1	COT2	McNeel Ranch on south channel of Cottonwood Creek.	12T 0578728E 4728429N
FMS	Cottonwood Creek	1	COT3	Cottonwood Ranch ~1 mile upstream of stream split.	12T 0574168E 4733987N
FXW	Cottonwood Creek	11	COT2	McNeel Ranch on south channel of Cottonwood Creek.	12T 0578728E 4728429N
FXW	Cottonwood Creek	5	COT3	Cottonwood Ranch ~1 mile upstream of stream split.	12T 0574168E 4733987N
FXW	Cottonwood Creek	7	COT4	Cottonwood Ranch 1 mile downstream of N and S Fork confluence.	12T 0568886E 4736224N
FXW	Horse Creek	2	HRSC1	Lieberman property just S of Daniel and W of Hwy. 189 bridge.	12T 0575497E 4744681N
FXW	South Horse Creek	1	SHSC1	Antelope Run Ranch property at first road crossing.	12T 0555056E 4750431N
FXW	South Horse Creek	3	SHSC2	High Mountain Ranch property south of 4-way intersection.	12T 0551931E 4749737N
BHS	Little Sandy Creek	22	LSC3	Little Sandy Creek by Squaw Teat.	12T 0640185E 4682587N
FXB	Little Sandy Creek	2	LSC3	Little Sandy Creek by Squaw Teat.	12T 0640185E 4682587N
FMS	Lower Big Sandy River	1	BS1	Big Sandy River ~1 mile upstream of confluence with Green River.	12T 0600846E 4634413N
FMS	Lower Big Sandy River	1	BS3	Big Sandy River at first sill downstream of Bone Draw.	12T 0618972E 4651814N
BXW	Muddy Creek	1	3MC3	BLM land between County Road 200 and BLM road 2112.	12T 0576413E 4719307N
FMS	Muddy Creek	4	3MC1	Barney property ~0.50 miles upstream of confluence with Green River.	12T 0576486E 4708446N
WHS	Middle Beaver Creek	4	2MBC1	Grindstone property immediately below confluence with Cow Gulch.	12T 0565633E 4763176N

Appendix C.— Location description of sampling reaches in the across the 14 Level 5 HUCs sampled in 2005.

Site ID	Elevation (ft)	Legal Location	Location Description	Ownership
<i>Bitter Creek-Patrick Draw Level 5 HUC</i>				
BC2S	6676	R99W, T18N, S16, SW 1/4	BLM land SW of Bitter Creek, WY.	BLM
<i>Cottonwood Creek Level 5 HUC</i>				
COT1	6950	R110W, T31N, S18, NW 1/4	Dunham Ranch ~2.0 miles upstream of confluence with Green River.	Private
COT2	7036	R111W, T32N, S35, SW 1/4	McNeel Ranch property on south branch of Cottonwood Creek.	Private
COT3	7132	R111W, T32N, S17, SE 1/4	Cottonwood Ranch property ~1.0 miles upstream of stream split.	Private
COT4	7216	R112W, T32N, S11, NW 1/4	Cottonwood Ranch ~1.0 miles downstream of N&S fork confluence.	Private
SCOT1	7302	R112W, T33N, S34, NW 1/4	Wardell property ~1.0 miles upstream of N&S confluence.	Private
SCOT2	7455	R113W, T33N, S36, NE 1/4	State land west of CR 117.	State
LCC1	7676	R114W, T32N, S13, SE 1/4	BLM land just downstream of road culvert.	BLM
LCC2	8117	R114W, T32N, S33, NW 1/4	BLM land downstream of Price property.	BLM
BEEC1	7789	R114W, T32N, S23, SW 1/4	FBNF property ~0.50 miles upstream of confluence with Camp Creek .	Private
RCAS1	8068	R114W, T32N, S33, NE 1/4	BLM ~0.50 miles upstream of confluence with Little Cottonwood Creek.	BLM
<i>Green River-Beaver Creek Level 5 HUC</i>				
MPC1	6732	R111W, T29N, S4, SW 1/4	Barney property upstream of confluence with Green River.	Private
MPC2	6934	R112W, T29N, S3, SE 1/4	G7 Family Land Partnership property.	Private
MPC3	7168	R113W, T29N, S11, SW 1/4	Flying W property below road crossing.	Private
MPC4	7496	R113W, T30N, S30, NW 1/4	Springman property below culvert under road.	Private
SPC1	6796	R111W, T59N, S5, SW 1/4	Barney property @ old Hwy.189 bridge.	Private
SPC2	6997	R112W, T29N, S9, SW 1/4	Miller property ~5.0 miles west of Hwy.189.	Private
SPC3	7172	R113W, T29N, S14, NW 1/4	BLM land below road crossing.	BLM
SPC4	7456	R114W, T29N, S11, NE 1/4	Hamilton property just upstream of Fish Creek.	Private
FSHC1	7472	R114W, T29N, S11, NE 1/4	Hamilton property just upstream of confluence with S. Piney.	Private
FSHC2	7871	R114W, T30N, S29, NE 1/4.	Miller property ~1.75 miles downstream of USFS.	Private
BVR1	7332	R113W, T29N, S17, NW 1/4	Milleg Partnership property downstream of Spring Creek confluence.	Private
SBVR1	7632	R114W, T29N, S25, SW 1/4	BLM road crossing just upstream of Beaver Creek confluence.	BLM
TRDG1	7712	R114W, T29N, S23, SW 1/4	BLM land ~ 1.5 miles upstream of Beaver Creek confluence.	BLM

Appendix C.—Continued

Site ID	Elevation (ft)	Legal Location	Location Description	Ownership
SPG1	7432	R113W, T29N, S21, NW 1/4	BLM at Milleg Partnership property line.	BLM
SPG2	8043	R114W, T29N S21, NW 1/4	BLM land by Reed Ridge.	BLM
RCC1	7760	R114W, T31N, S15, SE 1/4	BLM land at confluence with Whiskey Creek.	BLM
<i>Green River-Birch Creek Level 5 HUC</i>				
DPC1	6872	R112W, T28N, S9, SE 1/4	BLM land by Dry Basin Draw (stream dry).	BLM
DPC2	7005	R113W, T28N, S24, NE 1/4	JF Ranch property above irrigation diversion.	Private
DPC3	7532	R113W, T28N, S32, SE 1/4	BLM land @ Exxon substation.	BLM
FGY1	7600	R114W, T28N, S11, SE 1/4	BLM land below culvert at Cretaceous Mountain.	BLM
PGC1	7752	R114W, T28N, S8, NW 1/4	BLM land at enclosure below powerline.	BLM
BCC1	7634	R114W, T28N, S28, SE 1/4	JF Ranch property at gas well road crossing.	Private
BRCH1	6701	R113W, T26N, S1, NW 1/4	State land west of LaBarge, WY (stream dry).	State
BRCH2	7169	R113W, T27N, S16, SE 1/4	State land by Western Camp (stream dry).	State
BVD1	7598	R114W, T27N, S1, NW 1/4	Harrower property north of Dry Piney Camp (insufficient flow).	Private
SWML1	7798	R114W, T28N, S25, NE 1/4	Mobil Oil Corp. property SW of Cretaceous Mountain (insufficient flow).	Private
SPNG1	6800	R113W, T27N, S34, SE 1/4	BLM land by Calpet (stream dry).	BLM
<i>Green River-Delaney Canyon Level 5 HUC</i>				
2MC1	6550	R112W, T25N, S18, NE 1/4	Jones property west of upper Fontenelle Reservoir (stream dry).	Private
2MC2	6801	R113W, T25N, S16, NE 1/4	State land west of 2MC1 (heavy flow).	State
2MC3	6995	R114W, T25N, S12, SE 1/4	BLM land north of Dry Hollow (insufficient flow).	BLM
NMC1	6922	R114W, T26N, S36, SE 1/4	~0.25 miles upstream of Anderson-Howard Canal.	State
NMC2	7201	R114W, T26N, S16, SE 1/4	BLM land east of Miller Mountain (insufficient flow).	BLM
DCB1	6929	R114W, T25N, S1, NW 1/4	BLM land ~1 mile upstream of stream ford.	BLM
2LMC1	7001	R114W, T25N, S1, SE 1/4	BLM land ~1 mile upstream of stream ford (insufficient flow).	BLM
<i>Horse Creek sub-drainage</i>				
HRSC1	7194	R111W, T33N, S2, SW 1/4	Lieberman property south of Daniel and west of Hwy. 189 bridge.	Private
HRSC2	7242	R112W, T33N, S1, NE 1/4	Miller property upstream of Ryegrass Draw.	Private
HRSC3	7301	R112W, T34N, S24, NW 1/4	Heeley property NW of Old Fort Bonneville.	Private
HRSC4	7434	R112W, T34N, S8, SW 1/4	Heeley property west of State-owned lands.	Private

Appendix C.— Continued

Site ID	Elevation (ft)	Legal Location	Location Description	Ownership
HRSC5	7496	R113W, T34N, S13, SE 1/4	Taylor property upstream of CR 116.	Private
TLYC1	7460	R112W, T34N, S18, NE 1/4	Taylor property between HRSC4 and HRSC5.	Private
SHSC1	7595	R113W, T34N, S22, NW 1/4	Antelope Run property at 1st road crossing.	Private
SHSC2	7612	R113W, T34N, S20, SW 1/4	High Mountain Ranch property south of 4-way intersection.	Private
SHSC3	7760	R114W, T34N, S26, SE 1/4	High Mountain Ranch property at confluence with Pass Creek.	Private
NHSC1	7679	R113W, T34N, S5, SE 1/4	Conwell-Gildae property by Merna Butte.	Private
SWB1	7201	R111W, T34N, S35, SW 1/4	Scott Werbelow Private pond north of Daniel	Private
ONC1	7295	R11W, T33N, S9, NW 1/4	Miller property south of Horse Creek (stream dry).	Private
ONC2	7299	R112W, T33N, S1, SE 1/4	Miller property south of Horse Creek (stream dry).	Private
PSS1	7798	R114W, T34N, S26, NE 1/4	High Mountain Ranch @ confluence with South Horse Creek (stream dry).	Private
<u>LaBarge Creek sub-drainage</u>				
BDC1	7133	R114W, T26N, S13, NW 1/4	~0.50 miles upstream of Anderson-Howard Canal.	BLM
LFC1	7690	R116W, T27N, S12, SE 1/4	Meadow just upstream of USFS boundary.	USFS
SPRG1	7109	R114W, T26N, S11, NE 1/4	Fox Ranch ~0.50 mile upstream of County Road 351.	Private
BFC1	7871	R115W, T28N, S31, SW 1/4	~.50 miles upstream of USFS boundary (heavy flows).	USFS
BTHC1	7823	R115W, T27N, S6, NE 1/4	~.25 miles downstream of USFS boundary below Big Fall Creek (stream dry).	Private
CHAP1	7351	R114W, T26N, S4, SW1/4	West of Viola, WY and across LaBarge Creek (insufficient flow).	Private
ELKH1	7170	R114W, T26N, S3, SW 1/4	Immediately east of Viola, WY (stream dry).	Private
GRSH1	7152	R114W, T26N, S3, SW 1/4	Just downstream of Elk Hollow Creek (stream dry)	Private
PCKT1	7247	R114W, T26N, S7, NW 1/4	Just downstream of Chapel Creek (insufficient flow).	Private
RCK1	7436	R115W, T27N, S36, NE 1/4	South of Deadline Ridge (stream dry).	State
SHP1	7758	R115W, T27N, S16, SW 1/4	Downstream of Booth Creek (stream dry).	State
<u>Little Sandy Creek Level 5 HUC</u>				
LSC3	6811	R105W, T27N, S26, SE 1/4	BLM land upstream of Sweetwater/Sublette county line.	BLM
<u>Lower Big Sandy River Level 5 HUC</u>				
BS1	6245	R109W, T22N, S28, NW 1/4	~1.0 miles upstream of confluence with the Green River.	BOR
BS2	6361	R108W, T23N, S34, NW 1/4	Sills at downstream portion of Big Bend.	BOR
BS3	6467	R107W, T24N, S32, SE 1/4	1st sill downstream of Bone Draw.	State

Appendix C.—Continued.

Site ID	Elevation (ft)	Legal Location	Location Description	Ownership
<i>Middle Beaver Creek Level 5 HUC</i>				
2SBC1	7468	R112W, T35N, S14, SE 1/4	Grindstone property NW of Bronx, WY (stream dry).	
2SBC2	7634	R112W, T35N, S7, NE 1/4	Fayette Ranch property N of Beaver Ridge (stream dry).	Private
2SBC3	7835	R113W, T35N, S4, SW 1/4	Barney property at Buck Baker's corner.	Private
CWG1	7574	R112W, T35N, S4, NE 1/4	Grindstone property between gas wells.	Private
CWG2	7798	R113W, T36N, S36, SE 1/4	Grindstone property above CWG1 (stream dry).	Private
2MBC1	7519	R112W, T35N, S10, NE 1/4	Grindstone property immediately below confluence with Cow Gulch.	Private
2MBC2	7615	R112W, T36N, S33, SE 1/4	Grindstone property at gas well road crossing.	Private
2MBC3	7778	R112W, T36N, S30, SW 1/4	Grindstone property east of South Rim (stream dry).	Private
2NBC1	7557	R112W, T35N, S1, NW 1/4	Willow Springs Ranch land ~1.5 miles above confluence with Middle Beaver.	Private
2NBC2	7759	R112W, T36N, S14, NE 1/4	Miller property above Watson Draw.	Private
2NBC2A	7768	R112W, T36N, S15, NW 1/4	Miller property above Watson Draw.	Private
HYG1	7598	R112W, T36N, S36, SE 1/4	Analind Corp. property ~1.5 miles above confluence with Beaver Creek.	Private
PIX1	7762	R112W, T36N, S29, SW 1/4	Grindstone property downstream of 2MNC3 (stream dry).	Private
CRCR1	7753	R112 W, T36N, S34, NW 1/4	Grindstone property downstream of Pixley Creek (stream dry).	Private
<i>Muddy Creek Level 5 HUC</i>				
3MC1	6738	R111W, T29N, S4, NE 1/4	Barney property ~0.50 miles upstream of confluence with Green River.	Private
3MC2	6817	R111W, T30N, S16, SW 1/4	State land south of Hwy.351.	State
3MC3	6871	R111W, T31N, S33, NE 1/4	BLM land between County Road 200 and BLM road 2112.	BLM
3MC4	6938	R111W, T31N, S9, SE 1/4	BLM land at old road crossing downstream of Hwy. 189.	BLM
3MC5	7274	R112W, T32N, S16, NW 1/4	State land west of radio tower.	State
3MC6	7592	R113W, T32N, S15, NW 1/4	FBNF Partnership property at old homestead.	Private
3MC7	7801	R113W, T32N, S30, NE 1/4	BLM land ~0.25 miles upstream of CR 143 crossing.	BLM
3MC8	8163	R114W, T31N, S10, NW 1/4	BLM land at Roundhill Ranch property line.	BLM
MDWC1	6834	R111W, T30N, S20, SW 1/4	Bradley property immediately west of Hwy.189 north of Marbleton.	Private
3NMC1	7987	R113W, T32N, S30, NW 1/4	BLM land upstream of 3MC7 (insufficient flows).	BLM
3SMC1	8004	R114W, T31N, S1, SW 1/4	BLM land downstream of 3MC8 (insufficient flows).	BLM

Appendix C.— Continued.

Site ID	Elevation (ft)	Legal Location	Location Description	Ownership
<i>Upper Big Sandy River Level 5 HUC</i>				
BSAR3	6843	R106W, T29N, S25, NW 1/4	State land west of Tabernacle Butte.	State
SCCK2	6997	R105W, T29N, S20, NE1/4	~1.0 miles upstream of confluence with the Big Sandy River.	BLM
<i>Upper Hams Fork Level 5 HUC</i>				
WIL1A	7113	R116W, T22N, S36, NW 1/4	P&M Coal property ~1 mile upstream of Ham's Fork.	Private
WIL1	7172	R116W, T22N, S1, NW 1/4	BLM land @ two-track crossing above private land	BLM
WIL2	7432	R116W, T23N, S12, SE 1/4	Road crossing below E & N fork Willow Creek confluence.	BLM
<i>Upper New Fork River Level 5 HUC</i>				
2WLCR1	7221	R109W, T34N, S19, SE 1/4	Murdoch property upstream of CR 144 crossing.	Private
2WLCR2	7335	R110W, T35N, S36, SE 1/4	Noble property at confluence of Willow and Lake creeks.	Private

Appendix D.— Level 5 HUC sub-drainages within the 2005 target area.

Level 5 HUC Name	Sampled
Alkali Creek	No
Boulder Creek	No
Cottonwood Creek	Yes
Green River-Beaver Creek	Yes
Green River-Big Twin Creek	No
Green River-Birch Creek	Yes
Green River-Delaney Canyon	Yes
Green River-Forty Rod Creek	No
Green River-Roaring Fork	No
Horse Creek	Yes
LaBarge Creek	Yes
Lower New Fork River	No
Middle Beaver Creek	Yes
Muddy (Green River) Creek	Yes
Muddy (East Fork River) Creek	No
Pine Creek	No
Pole Creek	No
Upper New Fork River	Yes

Appendix E.— Summary information for reaches sampled in the Bitter Creek-Patrick Draw sub-drainage in 2005.

<u>Stream</u>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<u>Bitter Creek</u>								
BC2S	6/29/2005	BS	141.1	5.9	FMS	56	3.5-7.0	N
					MTS	35	2.0-5.6	N
					SPD	370	1.1-4.5	N

^aThe letter code indicates the type of sampling gear used: BS=bag seine.

^bN=naive.

Appendix F.— Summary information for reaches sampled in the Cottonwood Creek sub-drainage in 2005.

<u>Stream</u>		Gear Type ^a	Station	Station	Species	Number Caught	Length	Status ^b
Site ID	Date		Length	Width			Range	
<u>Cottonwood Creek</u>								
COT1 ^c	7/19/2005	BP	656	24.3	BNT	3	5.6-6.6	I
					WHS	40	3.4-11.6	I
					FMS	2	4.9-5.6	N
					MSC	24	1.1-3.8	N
					SPD	53	1.9-3.9	N
					RSS	14	1.4-3.1	N
					FHM	2	2.2-2.5	I
COT2	7/19/2005	BP	656	21.3	FMS	1	8.7	N
					FXW	11	2.7-18.1	H
					WHS	1	15.7	I
					MSC	17	2.6-4.0	N
					MTS	2	4.4-4.7	N
					RSS	5	1.5-3.7	I
					SPD	9	1.8-4.3	N
COT3	7/20/2005	BP	689	23.6	FMS	1	10.4	N
					FXW	5	3.7-15.6	H
					WHS	44	2.6-15.6	I
					BNT	3	6.3-12.8	I
					MSC	61	2.2-5.9	N
					MTS	7	3.8-4.9	N
					RSS	34	1.7-4.6	I
COT4	7/20/2005	BP	656	26.9	SPD	74	1.8-3.4	N
					BNT	1	15.2	I
					WHS	40	2.6-17.2	I
					FXW	7	10.9-20.6	H
					RSS	22	1.5-3.6	I
					MSC	14	2.6-4.1	N
					MTS	1	4.1	N
	SPD	44	1.8-3.9	N				

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native, I= introduced, and H= hybrid.

^cFive juvenile fish collected for later ID.

Appendix F.— Continued

<u>Stream</u>		Gear Type ^a	Station	Station	Species	Number Caught	Length	Status ^b
Site ID	Date		Length (ft)	Width (ft)			Range (in)	
<u>South Cottonwood Creek</u>								
SCOT1	7/21/2005	BP	672.6	16.1	WHS	46	2.5-9.2	I
					MSC	12	1.1-5.3	N
					RSS	57	1.4-5.7	I
					SPD	159	1.3-4.3	N
					MTS	19	3.2-4.7	N
SCOT2	7/18/2005	BP	656	21.7	SRC	6	1.9-15.9	I
					WHS	7	2.1-10.2	I
					RSS	19	1.1-3.5	I
					SPD	32	1.4-3.7	N
					MTS	6	3.8-5.0	N
					FHM	1	2.5	I
					MSC	4	3.6-4.1	N
<u>Little Cottonwood Creek</u>								
LCC1	6/23/2005	BP	656	12.5	SRC	1	6.0	I
					FHM	7	1.8-2.4	I
					MTS	6	3.4-5.0	N
					SPD	49	2.0-3.6	N
LCC2	7/1/2005	BP	656	11.5	MTS	24	2.7-4.5	N
<u>Beecher Creek</u>								
BEEC1	6/23/2005	BP	656	3.6	NFP			
<u>Red Castle Creek</u>								
RCAS1	7/1/2005	BP	656	7.6	NFP			

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN=ative and I=introduced.

Appendix G.— Summary information for reaches sampled in the Green River-Beaver Creek sub-drainage in 2005.

<u>Stream</u>			Station	Station			Length	
Site ID	Date	Gear Type ^a	Length (ft)	Width (ft)	Species	Number Caught	Range (in)	Status ^b
<u>Middle Piney Creek</u>								
MPC1	6/8/2005	BP	656	11.2	BNT	4	4.8-5.8	I
					MTS	1	5.9	N
					SPD	41	1.2-3.5	N
					FHM	1	2.4	N
MPC2	7/12/2005	BP	656	18.7	BNT	2	5.6-6.9	I
					WHS	3	1.9-8.7	I
					RSS	2	1.9-2.0	I
					SPD	38	1.3-2.8	N
MPC3	7/12/2005	BP	656	15.1	BNT	4	6.2-10.0	I
					MSC	8	3.7-5.0	N
					SPD	1	4	N
					MTS	2	4.2-5.2	N
MPC4	7/13/2005	BP	656	23.0	BNT	15	2.1-14.6	I
					BKT	4	6.9-9.6	I
					MSC	157	1.8-4.2	N
<u>South Piney Creek</u>								
SPC1	7/11/2005	BP	656	13.5	BNT	21	1.8-9.4	I
					BKT	1	7.8	
					WHS	56	2.4-13.4	I
					SPD	31	1.6-3.3	N
					RSS	5	1.5-3.7	I
					FHM	2	1.6-2.4	I
					MWF	1	2.8	N
					UTC	1	1.7	I
					MTS	4	2.2-5.0	N
					MSC	1	5.6	N
SPC2	8/23/2005	BP	656	18.5	BNT	10	4.9-17.9	I
					WHS	16	1.5-10.2	I
					SPD	54	0.9-4.1	N
					MSC	32	1.4-3.1	N
					MTS	2	2.5-5.6	N
					RSS	16	1.8-3.3	I

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native and I= introduced.

Appendix G.— Continued

<u>Stream</u>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
SPC3	9/14/2005	DH	656	23.0	BNT	71	5.0-17.0	I
					WHS	9	4.3-11.1	I
					SPD	11	1.2-3.7	N
					MSC	117	1.2-4.1	N
					RSS	5	2.7-4.3	I
					MWF	19	4.0-5.0	N
SPC4	9/13/2005	SB	656	22.3	BNT	28	6.3-22.5	I
					RBT	18	5.2-14.3	I
					MWF	3	15.6-18.1	N
					SPD	5	2.4-3.5	N
					MTS	3	3.2-4.8	N
					MSC	114	1.2-4.4	N
<u>Fish Creek</u>								
FSHC1	8/26/2005	BP	656	11.2	CRC	23	5.9-14.2	N
					BNT	4	2.6-9.4	I
					RBT	3	9.6-12.1	I
					MTS	3	3.7-6.5	N
					MSC	27	1.4-4.6	N
FSHC2	8/24/2005	BP	656	16.7	BKT	3	7.1-11.9	I
					CRC	13	5.2-15.4	N
					MSC	40	1.9-4.3	N
					MTS	2	5.6-6.1	N
<u>Beaver Creek</u>								
BVR1	7/8/2005	BP	656	8.5	BNT	2	6.1-6.9	I
					MTS	15	2.5-5.5	N
					RSS	1	4	I
					SPD	10	2.7-3.4	N
					MSC	16	2.5-5.0	N

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment, BP=backpack electrofishing unit(s), and DH=barge electrofishing equipment.

^bN= native and I= introduced.

Appendix G.— Continued

<u>Stream</u>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<u>South Beaver Creek</u>								
SBVR1	7/6/2005	BP	656	5.9	CRC	2	7.1-10.6	N
					MSC	14	1.9-4.1	N
					MTS	5	3.5-5.1	N
<u>Trail Ridge Creek</u>								
TRDG1	7/6/2005	BP	656	11.8	MTS	12	1.9-5.7	N
<u>Spring Creek</u>								
SPG1	7/7/2005	BP	158	5.6	MTS	1	6.3	N
SPG2	7/7/2005	BP	656	6.9	NFP			
<u>Red Canyon Creek</u>								
RCC1	6/22/2005	BP	656	4.9	NFP			

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN=ative.

Appendix H.— Summary information for reaches visited in the Green River-Birch Creek sub-drainage in 2005.

<i><u>Stream</u></i>		Gear	Station Length	Station Width		Number Caught	Length Range		Status^b
Site ID	Date	Type^a	(ft)	(ft)	Species		(in)		
<u>Dry Piney Creek</u>									
DPC1	6/2/2005	Dry							
DPC2	6/9/2005	BP	656	9.5	NFP				
DPC3	6/8/2005	BP	656	5.3	NFP				
<u>Black Canyon Creek</u>									
BCC1	6/14/2005	BP	656	3.3	MTS	3	3.3-4.0		N
<u>Fogarty Creek</u>									
FGY1	6/14/2005	BP	656	6.6	MTS	5	2.8-3.7		N
					MSC	4	2.3-4.4		N
<u>Pine Grove Creek</u>									
PGC1	6/14/2005	BP	656	5.3	CRC	3	7.2-7.8		N
<u>Birch Creek</u>									
BRCH1	6/15/2005	Dry							
BRCH2	6/15/2005	Insufficient flow							
<u>Beaver Dam Creek</u>									
BVD1	6/15/2005	Insufficient flow							
<u>Sawmill Creek</u>									
SWML1	6/15/2005	Insufficient flow							
<u>Spring Creek</u>									
SPNG1	6/15/2005	Dry							

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN=ative.

Appendix I.— Summary information for reaches visited in the Green River-Delaney Canyon sub-drainage in 2005.

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Muddy Creek</i>								
2MC1	6/8/2005	Dry						
2MC2	6/7/2005	Heavy flows						
2MC3	6/7/2005	Insufficient flows						
<i>North Muddy Creek</i>								
NMC1 ^c	6/6/2005	BP	656	4.3	RSS	27	1.1-3.9	I
NMC2	6/7/2005	Insufficient flows						
<i>Delaney Creek</i>								
DCB1	6/7/2005	BP	656	2.6	NFP			
<i>Little Muddy Creek</i>								
LMC1	6/7/2005	Insufficient flows						

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bI=introduced.

^c Five juvenile fish collected for later ID.

Appendix J.— Summary information for reaches visited in the Horse creek sub-drainage in 2005.

<i>Stream</i>			Station	Station			Length	
Site ID	Date	Gear Type ^a	Length (ft)	Width (ft)	Species	Number Caught	Range (in)	Status ^b
<i>Horse Creek</i>								
HRSC1	9/15/2005	DH	656	24.9	WHS	69	0.9-16.8	I
					BNT	9	6.5-20.8	I
					FXW	2	18.3-21.2	H
					MTS	1	3.3	N
					MSC	102	1.4-4.4	N
					SPD	305	0.8-3.4	N
					RSS	552	0.9-3.5	I
HRSC2	9/15/2005	DH	656	32.8	MWF	1	3.1	N
					MTS	22	2.3-5.2	N
					MSC	20	1.7-5.1	N
					RSS	721	0.8-4.4	I
					SPD	312	1.0-3.5	N
					WHS	223	1.5-17.8	I
					FHM	6	1.9-2.5	I
HRSC3	9/19/2005	BS	478.9	18.0	CRC	2	4.0-4.4	N
					WHS	10	0.8-1.9	I
					SPD	13	0.9-1.3	N
					RSS	21	0.8-3.1	I
HRSC4 ^c	9/16/2005	SB	692.3	30.2	BNT	6	7.8-15.5	I
					CRC	10	3.8-18.8	N
					WHS	42	1.4-11.1	I
					MTS	27	2.0-4.9	N
					RSS	228	0.8-4.2	I
					MSC	80	1.3-5.5	N
					SPD	192	0.8-4.3	N
					BKT	3	3.2-15.7	I
HRSC5	9/21/2005	BP	731.6	17.7	BKT	2	9.6-14.2	I
					BNT	1	16.1	I
					WHS	6	1.5-9.6	I
					RSS	12	1.5-3.2	I
					MTS	46	1.2-5.7	N
					SPD	255	1.1-3.2	N
					MSC	295	1.2-5.0	N

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment, BP=backpack electrofishing unit(s), DH=barge electrofishing gear and BS=bag seine.

^bN= native, I= introduced, and H= hybrid.

^cEight juvenile fish collected for later ID.

Appendix J.— Continued

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Taylor Spring Creek</i>								
TLYC1	9/21/2005	BP	656	12.8	CRC	1	5.2	N
					BNT	1	11.9	I
					BKT	33	3.5-16.9	I
					MTS	5	2.9-5.9	N
					SPD	109	1.0-3.7	N
					WHS	1	1.4	I
					MSC	5	1.5-1.8	N
					RSS	3	2.7-3.1	I
<i>South Horse Creek</i>								
SHSC1	9/21/2005	BP	656	15.8	FXW	1	12.1	H
					WHS	57	1.6-12.1	I
					SPD	80	1.3-3.6	N
					RSS	88	0.9-3.4	I
					MSC	13	1.8-4.7	N
SHSC2	9/20/2005	BP	656	19.4	WHS	6	1.5-10.9	I
					FXW	3	10.6-11.4	H
					SPD	122	1.1-4.1	N
					MSC	71	1.2-5.1	N
					FHM	21	1.0-2.5	I
					MTS	6	2.6-4.0	N
					RSS	135	1.1-4.3	I
SHSC3	9/20/2005	BP	656	14.4	CRC	11	2.4-19.7	N
					MSC	373	1.2-5.1	N
					MTS	26	1.2-6.2	N
					SPD	33	1.1-3.8	N
<i>North Horse Creek</i>								
NHSC1 ^c	9/29/2005	BP	656	29.2	CRC	13	2.4-13.1	N
					MSC	721	0.9-4.8	N
					SPD	12	1.3-3.6	N
					MTS	11	2.2-5.2	N

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native, I= introduced, and H= hybrid.

^c11 juvenile fish collected for later ID.

Appendix J.— Continued

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Scott Werbelow Pond</i>								
SWB1	7/14/2005	TN	NA	NA	FHM	517	1.1-3.0	I
					WHS	46	4.1-6.0	I
					SPD	9	2.5-3.5	N
					MTS	1	7.4	N
<i>Onion Creek</i>								
ONC1	8/15/005	Dry						
ONC2	8/15/2005	Dry						
<i>Pass Creek</i>								
PSS1	9/20/2005	Dry						

^aThe letter code indicates the type of sampling gear used: TN=trap net.

^bN=native and I=introduced.

Appendix K.— Summary information for reaches visited in the LaBarge Creek sub-drainage in 2005.

<u>Stream</u>		Gear	Station Length	Station Width	Species	Number Caught	Length Range	Status^b
Site ID	Date	Type^a	(ft)	(ft)			(in)	
<u>Burdick Creek</u>								
BDC1	6/15/2005	BP	656	4.6	MTS	1	3.7	N
<u>Little Fall Creek</u>								
LFC1	6/15/2005	BP	656	6.9	BKT	3	3.8-8.1	I
					MSC	7	1.4-3.6	N
<u>Spring Creek</u>								
SPRG1	6/17/2005	BP	656	7.9	BNT	16	1.7-10.0	I
<u>Big Fall Creek</u>								
BFC1	6/14/2005	Heavy flow						
<u>Booth Creek</u>								
BTHC1	6/15/2005	Dry						
<u>Chapel Creek</u>								
CHAP1	6/13/2005	Insufficient flow						
<u>Elk Hollow Creek</u>								
ELKH1	6/13/2005	Dry						
<u>Grass Hollow Creek</u>								
GRSH1	6/13/2005	Dry						
<u>Pickett Creek</u>								
PCKT1	6/13/2005	Insufficient flow						
<u>Rock Creek</u>								
RCK1	6/6/2005	Extreme gradient						
<u>Sheep Creek</u>								
SHP1	6/14/2005	Dry						

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native and I= introduced.

Appendix L.— Summary information for reaches sampled in the Little Sandy Creek sub-drainage in 2005.

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Little Sandy Creek</i>								
LSC3	8/11/2005	SB	656	15.4	WHS	73	2.6-14.8	I
					FMS	5	5.7-16.5	N
					BHS	40	3.3-11.7	N
					FXW	6	7.5-15.5	H
					BXW	37	3.6-12.0	H
					MTS	11	4.2-5.9	N
					FXB	2	11.9-12.8	H
					LKC	59	1.6-5.2	I
					FHM	11	1.9-2.4	I
					MSC	5	1.7-4.1	N
					SPD	182	2.0-3.5	N
					RSS	229	1.8-3.7	I

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment.

^bN= native, I= introduced, and H= hybrid.

Appendix M.— Summary information for reaches sampled in the Lower Big Sandy River sub-drainage in 2005.

<i>Stream</i>		Gear	Station Length	Station Width	Species	Number Caught	Length Range	Status^b
Site ID	Date	Type^a	(ft)	(ft)			(in)	
<i>Big Sandy River</i>								
BS1 ^c	7/25/2005	SB	656	40.4	FMS	1	1.8	N
					CRP	1	1.8	I
					UTC	2	1.0-1.3	I
					WHS	11	1.0-1.4	I
					RSS	1	3.3	I
BS2 ^d	7/26/2005	SB	656	28.9	WHS	4	1.4-8.6	I
					MTS	2	3.6-3.7	N
					LND	1	3.5	I
					SPD	8	2.4-3.0	N
					RSS	2	2.2-3.0	I
					MSC	1	1.5	N
BS3	7/26/2005	SB/BS	672.6	24.3	BNT	1	19.8	I
					RBT	1	11.4	I
					WHS	14	1.0-12.2	I
					FMS	1	1.9	N
					FHM	5	2.0-2.4	I
					SPD	4	1.7-3.4	N
					RSS	80	0.8-2.7	I
					MTS	7	3.1-5.4	N

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment and BS=bag seine.

^bN=native and I=introduced.

^cTwo juvenile fish collected for later ID.

^dFive juvenile fish collected for later ID.

Appendix N.— Summary information for reaches visited in the Middle Beaver Creek sub-drainage in 2005.

<u>Stream</u>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<u>South Beaver Creek</u>								
2SBC1	9/8/2005	Dry						
2SBC2	9/8/2005	Dry						
2SBC3	9/9/2005	BP	656	16.4	WHS	99	1.3-10.7	I
					MSC	9	1.9-4.4	N
					RSS	59	0.9-3.6	I
					MTS	27	2.2-5.3	N
					SPD	118	0.9-3.6	N
<u>Cow Gulch</u>								
CWG1	9/7/2005	BP	656	4.9	WHS	15	4.3-13.6	I
					BKT	34	3.1-13.7	I
					RSS	61	0.9-4.6	I
					SPD	68	1.0-3.9	N
					MSC	86	1.1-4.3	N
CWG2	9/7/2005	Dry						
<u>Middle Beaver Creek</u>								
2MBC1	9/8/2005	BP	820.2	13.5	BKT	32	2.4-12.8	I
					WHS	218	1.7-16.5	I
					MSC	84	1.3-4.7	N
					SPD	222	1.0-3.7	N
					RSS	240	1.1-4.3	I
					MTS	3	3.1-4.1	N
2MBC2 ^c	9/7/2005	BP	351.51	14.8	WHS	97	1.0-8.3	I
					RSS	127	0.9-3.5	I
					MSC	14	1.3-4.2	N
					SPD	44	0.8-3.8	N
2MBC3	9/8/2005	Dry						

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native and I= introduced.

^c 14 juvenile fish collected for later ID.

Appendix N.—Continued.

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<u>North Beaver Creek</u>								
2NBC1	8/31/2005	BP	656	11.5	BKT	18	3.2-13.4	I
					MSC	86	0.8-4.8	N
					RSS	42	2.4-3.9	I
					SPD	163	1.1-3.3	N
					MTS	5	3.7-4.6	N
					WHS	10	1.7-9.6	I
2NBC2 ^c	9/6/2005	DN	187	3.9	NFP			
2NBC2A ^d	9/6/2005	DN	3.28	1.31	SPD	91	0.6-1.1	N
<u>Hay Gulch</u>								
HYG1	9/6/2005	BP	656	10.2	BKT	6	7.0-12.1	I
					WHS	2	1.3-1.4	I
					MSC	98	1.3-5.0	N
<u>Pixley Creek</u>								
PIX1	9/8/2005	Dry						
<u>Crooked Creek</u>								
CRCR1	9/8/2005	Dry						

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s) and DN=dipnet.

^bN=native and I=introduced.

^cFive juvenile fish collected for later ID.

^dNine juvenile fish collected for later ID.

Appendix O.— Summary information for reaches sampled in the Muddy Creek sub-drainage in 2005.

<i>Stream</i>		Gear	Station	Station		Number	Length	
Site ID	Date	Type^a	Length	Width	Species	Caught	Range	Status^b
			(ft)	(ft)			(in)	
<i>Muddy Creek</i>								
3MC1	8/30/2005	SB	656	20.3	RBT	1	8.5	I
					BNT	109	2.6-7.8	I
					WHS	107	1.7-12.8	I
					SPD	185	0.9-3.2	N
					MWF	19	3.1-4.2	N
					RSS	5	1.2-3.5	I
					MTS	11	1.8-5.9	N
					MSC	7	2.1-3.8	N
					UTC	3	1.5-3.3	I
					FHM	1	2	I
					FMS	4	1.4-3.4	N
3MC2	8/30/2005	SB	656	6.6	BNT	1	6.6	I
					WHS	84	1.6-12.9	I
					RSS	97	1.5-3.9	I
					FHM	2	1.5-2.7	I
					SPD	248	1.1-3.5	N
					UTC	6	1.8-5.9	I
3MC3	8/25/2005	BP	656	10.2	BNT	2	14.9-17.0	I
					WHS	119	1.7-12.5	I
					RSS	59	1.3-4.7	I
					SPD	32	1.8-4.2	N
					UTC	5	2.1-8.0	I
					BXW	1	4.4	H
3MC4	7/5/2005	BP	656	7.2	WHS	22	2.6-10.7	I
					MSC	1	4.4	N
					FHM	10	1.3-2.5	I
					SPD	30	1.9-3.2	N
					RSS	14	1.8-4.0	I
3MC5 ^c	6/21/2005	BP	656	9.2	NFP			

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment and BP=backpack electrofishing unit(s)

^bN= native, I= introduced, and H= hybrid.

^cEight larval fish collected for later identification.

Appendix O.—Continued

<i>Stream</i>		Gear	Station	Station		Number	Length	
Site ID	Date	Type^a	Length	Width	Species	Caught	Range	Status^b
			(ft)	(ft)			(in)	
3MC6	6/21/2005	BP	656	6.5	WHS	2	3.3-6.6	I
					MTS	8	2.9-4.6	N
					FHM	5	1.8-2.5	I
					MSC	22	2.6-3.3	N
3MC7	6/22/2005	BP	656	10.5	WHS	1	6.8	I
					FHM	4	2.5-2.7	I
					MTS	5	3.5-5.0	N
					MSC	13	1.9-4.5	N
					SPD	102	0.9-4.0	N
3MC8	6/30/2005	BP	656	10.2	MTS	131	1.3-6.4	N
					MSC	3	3.1-4.4	N
					FHM	3	1.1-3.0	I
<u>North Muddy Creek</u>								
3NMC1	6/22/2005	Insufficient flows						
<u>South Muddy Creek</u>								
3SMC1	6/22/2005	Insufficient flows						
<u>Meadow Canyon Creek</u>								
MDWC1	8/25/2005	BP	656	5.3	BKT	2	8.0-9.0	I
					MSC	13	1.9-4.5	N
					SPD	102	0.9-4.0	N

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN= native and I= introduced.

^cEight larval fish collected for later identification.

Appendix P.— Summary information for reaches sampled in the Upper Big Sandy River sub-drainage in 2005.

<i>Stream</i>		Station	Station			Length		
Site ID	Date	Gear Type^a	Length (ft)	Width (ft)	Species	Number Caught	Range (in)	Status^b
<i>Big Sandy River</i>								
BSAR3 ^c	8/10/2005	SB	656	45.6	FMS	8	16.8-20.0	N
					BBT	1	22.5	I
					WHS	5	14.3-16.7	I
					MSC	7	2.6-3.3	N
					SPD	1	2.3	N
<i>Sculpin Creek</i>								
SCCK2 ^d	8/10/2005	SB	255.9	10.8	WHS	1	3.3	I
					LKC	36	1.2-5.0	I
					RSS	1	3.3	I

^aThe letter code indicates the type of sampling gear used: SB=shore-based electrofishing equipment.

^bN= native and I= introduced.

^c19 juvenile fish collected for later ID.

^d13 juvenile fish collected for later ID.

Appendix Q.— Summary information for reaches sampled in the Upper Hams Fork River sub-drainage in 2005.

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Willow Creek</i>								
WIL1A	6/16/2005	BP	656	9.2	BNT	1	5	I
					WHS	30	3.0-7.3	I
					MSC	23	2.5-4.9	N
					MTS	10	3.0-5.4	N
					LND	1	3	I
					RSS	14	2.0-3.3	I
WIL1 ^c	6/16/2005	BP	607	8.2	NFP			
WIL2	6/16/2005	BP	623	17.1	NFP			

^aThe letter code indicates the type of sampling gear used: BP=backpack electrofishing unit(s).

^bN=native and I=introduced.

^cSix larval fish were collected for later identification.

Appendix R.— Summary information for reaches sampled in the Upper New Fork River sub-drainage in 2005.

<i>Stream</i>		Gear	Station Length	Station Width		Number	Length Range	
Site ID	Date	Type^a	(ft)	(ft)	Species	Caught	(in)	Status^b
<i>Willow Creek</i>								
2WLCR1	9/28/2005	DH	757.9	26.9	BNT	70	3.1-19.5	I
					SPD	137	1.1-3.6	N
					MSC	445	1.6-4.7	N
					WHS	61	1.4-17.4	I
2WLCR2	9/28/2005	BP	656	23	BNT	22	3.5-19.9	I
					BKT	1	8.1	I
					RSS	1	2	I
					WHS	69	1.4-9.1	I
					MSC	180	1.2-44	N
					SPD	116	1.0-3.2	N

^aThe letter code indicates the type of sampling gear used: : BP=backpack electrofishing unit(s) and DH= barge electrofishing gear.

^bN=native and I=introduced.