# CANDIDATE CONSERVATION AGREEMENT WITH ASSURANCES FOR FLUVIAL ARCTIC GRAYLING IN THE UPPER BIG HOLE RIVER

Montana Fish, Wildlife & Parks

2015 Annual Report

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Montana Fish, Wildlife & Parks

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# I. Introduction

A Candidate Conservation Agreement with Assurances (CCAA) is an agreement between the U.S. Fish and Wildlife Service (USFWS) and any non-Federal entity whereby non-Federal property owners who voluntarily agree to manage their lands or waters to remove threats to species at risk of becoming threatened or endangered receive assurances against additional regulatory requirements should that species be subsequently listed under the Endangered Species Act (ESA). According to the USFWS, since 2000 there have been 26 CCAA's approved in 18 different states (National Candidate Conservation & Safe Harbor Workshop 2009) that have more than 1 million acres enrolled by 71 landowners that cover 41 species. The project areas associated with these CCAA's range from a one-acre area aiming to protect the Greater and Lesser Cave Beetles in Kentucky to a 417,000 -acre area targeting multiple species in California (Womack 2008).

The conservation goal of the CCAA for the Fluvial Arctic Grayling in the Upper Big Hole River (Big Hole Arctic Grayling CCAA) is to secure and enhance a population of fluvial (river-dwelling) Arctic Grayling Thymallus *Arcticus* within the upper reaches of their historic range in the Big Hole River drainage. Under the Big Hole Arctic Grayling CCAA, Montana Fish, Wildlife and Parks (FWP) holds an ESA section 10(a)(1)(A) Enhancement of Survival Permit issued to it by USFWS on August 1, 2006 and will issue Certificates of Inclusion to non-Federal property owners within the Project Area who agree to comply with all the stipulations of the Program and develop an approved site-specific conservation plan (Figure 1). Site-specific conservation plans will be developed with each landowner by an interdisciplinary technical team made up of individuals representing FWP, USFWS, USDA Natural Resources Conservation Service (NRCS), and Montana Department of Natural Resources and Conservation (DNRC) (collectively the Agencies). The conservation guidelines of the Big Hole Arctic Grayling CCAA will be met by implementing conservation measures that:

**1)** Improve streamflows

**2)** Improve and protect the function of riparian habitats

**3)** Identify and reduce or eliminate entrainment threats for Arctic Grayling

**4)** Remove barriers to Arctic Grayling migration

This planning effort will help alleviate private property concerns, as well as generate support from private landowners to improve habitat conditions for Arctic Grayling throughout the Project Area. The goal for the Arctic Grayling population inhabiting the Project Area is to increase the abundance and distribution of Arctic Grayling within the Project Area (FWP and USFWS 2006).

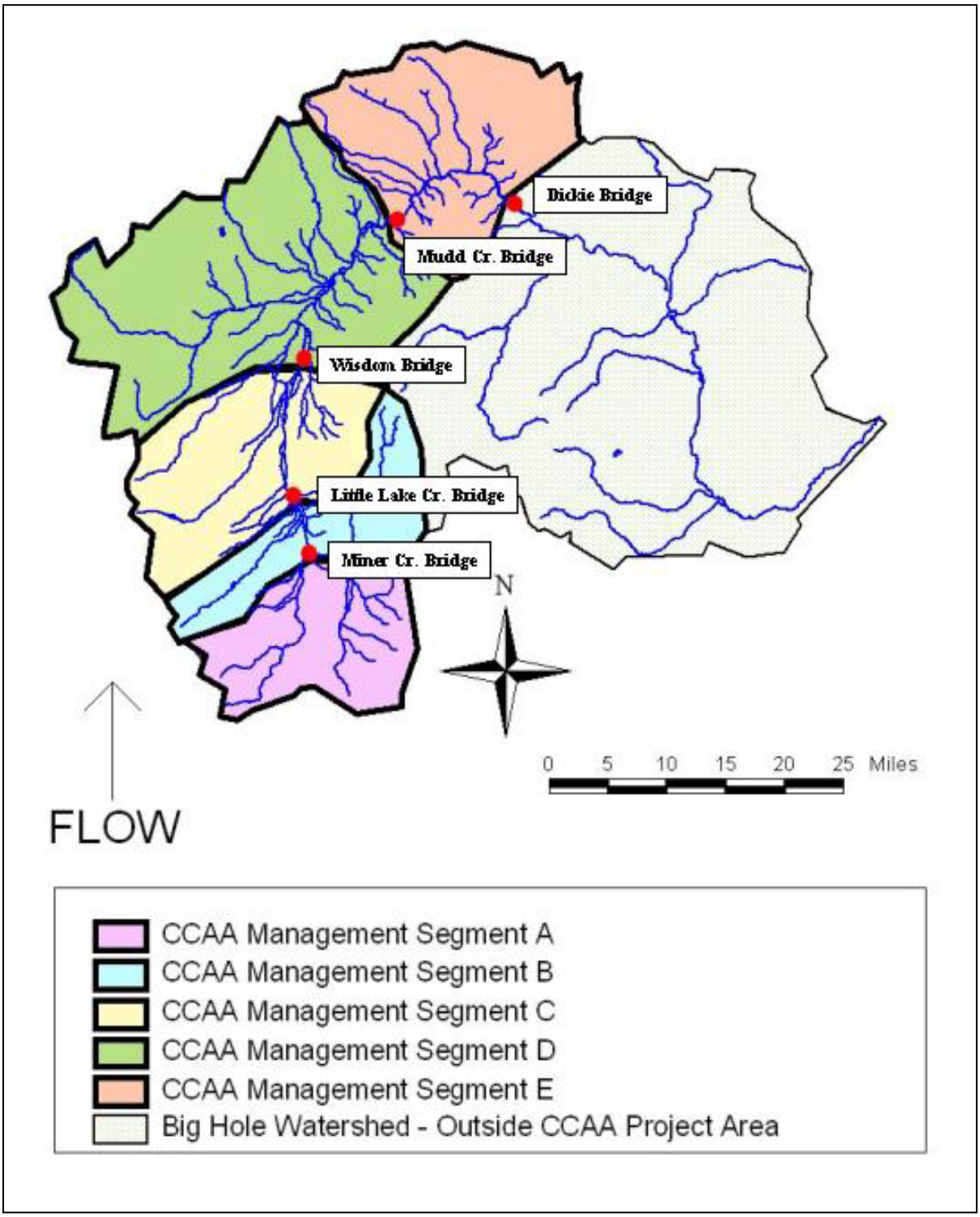


**Figure 1.** The Big Hole Arctic Grayling CCAA Project Area & Management Segments.

The Big Hole Arctic Grayling CCAA is a collaborative effort among private landowners, state and federal agencies, and non-government organizations. These stakeholders have agreed to work together for the common goals of conserving Arctic Grayling, improving the Big Hole watershed fish populations, addressing private property concerns, and enhancing the overall health of the upper Big Hole watershed.

This year's report includes a summary listing of current enrollment, signed site-specific plans, a summary of conservation actions implemented in 2015 and FWP project funding as part of the Big Hole Arctic Grayling CCAA.

## II. Legal Status of Montana Arctic Grayling

On April 24, 2007, the USFWS published a revised 12- month finding determining that fluvial Arctic Grayling in the upper Missouri River basin did not constitute a species, subspecies or Distinct Population Segment (DPS) and therefore were no longer warranted for listing under the ESA (FR 50 CFR Part 17). This determination removed Arctic Grayling from the Candidate Species List. Arctic Grayling remained a "Species of Special Concern" in Montana and a sensitive species by the US Forest Service and Bureau of Land Management. On November 15, 2007, a lawsuit was filed by the Center for Biological Diversity, the Federation of Flyfishers, the Western Watersheds Project, George Wuerthner and Pat Munday to challenge the USFWS determination. In the settlement, the Service agreed to publish a new status review finding on or before August 30, 2010. As part of the settlement, the Service agreed to consider different life history forms (fluvial and/or adfluvial) as an upper Missouri River DPS. Since the 2007 finding, additional research has provided new information on population genetics in Montana and North America. As a result, on September 8, 2010, the Service published a revised finding that concluded that Arctic Grayling of the upper Missouri River basin did constitute a DPS, and were warranted protection as threatened or endangered under the Endangered Species Act but that listing was precluded at that time by the need to complete other listing actions of a higher priority. In 2011, the Center for Biological Diversity reached an agreement with the USFWS to move forward on listing decisions on 757 species, including the Arctic Grayling. Under the settlement, a proposed listing decision was due in 2014. On August 19$^{th}$, 2014, the USFWS announced its finding that the Upper Missouri River Distinct Population Segment (DPS) of the Arctic Grayling does not warrant protection under the Endangered Species Act (ESA) (Federal Register on August 20, 2014). The USFWS reached this conclusion after analyzing recent genetic information, and the significant conservation efforts carried out by private landowners, federal and state agency partners to improve conditions for Arctic Grayling in the Upper Missouri River basin. On February 5$^{th}$ 2015, a lawsuit was filed in federal district court in which the plaintiffs (listed above) challenged the USFWS Notice of 12-month Petition Finding that was published August 20, 2014.

## III. Landowner Enrollment

On August 1, 2006, the USFWS issued FWP an ESA section 10(a) (1) (A) Enhancement of Survival Permit # TE-104415, authorizing the Big Hole Arctic Grayling CCAA. The issuance of this permit allowed for the official enrollment of any non-federal landowner within the Big Hole Arctic Grayling CCAA Project Area. Enrolled non-federal landowners are provided incidental take coverage and regulatory assurances once the non-federal landowner, FWP, and the USFWS counter-sign the Certificate of Inclusion and the approved site-specific conservation plan for the enrolled property. Currently, there are 33 landowners (Participating Landowners) that have enrolled 154,938 acres of private and 6,830 acres of DNRC leased land into the Big Hole Arctic Grayling CCAA (Table 1, Figure 2). Enrollment for the Big Hole Arctic Grayling CCAA will remain open until 90 days prior to a proposed ESA listing date for upper Missouri River Arctic Grayling that would be published by the USFWS in the Federal Register.

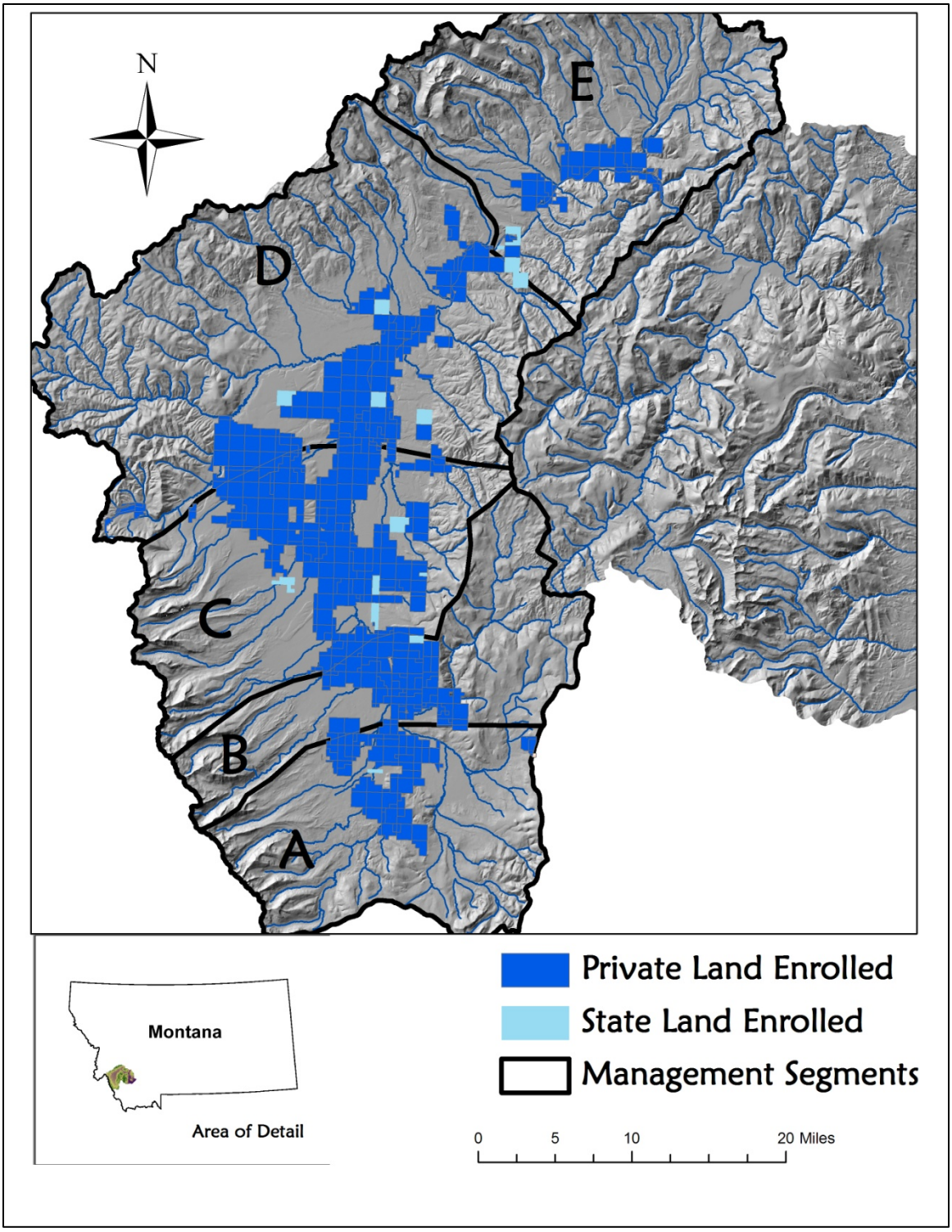


**Figure 2.** January 1, 2016 area of state and private land enrolled into the Big Hole Arctic Grayling CCAA Program. Enrolled land includes 32 private landowners and 154, 938 private acres and 6,830 acres of DNRC leased lands.

**Table 1.** Property numbers of enrolled landowners and their associated CCAA management segment, enrolled acres and enrollment status.

| | Property Number* | Management Segment(s) | Private Land Enrolled (Acres) | State Land Enrolled (Acres) | Enrollment Status |
|---|---|---|---|---|---|
| | 1 | C & D | 14,970 | | SSP Complete |
| | 2 | A | 6,327 | 640 | SSP Complete |
| | 3 | A & B | 2,825 | | SSP Complete |
| | 4 | C & D | 2,812 | 640 | SSP in Draft |
| | 5 | D | 2,512 | 640 | SSP in Review |
| | 6 | D | 680 | | Enrolled |
| | 7 | B | 3,445 | | SSP in Draft |
| | 8 | B & C | 2,487 | | SSP Complete |
| | 9 | B | 6,817 | | SSP Complete |
| | 10 | E | 2,752 | | SSP Complete |
| | 11 | E | 901 | 70 | SSP in Draft |
| | 12 | A | 2,048 | | SSP Complete |
| | 13 | C | 3,799 | | SSP Complete |
| | 14 | C & D | 23,208 | 560 | SSP Complete |
| | 15 | D | 1,408 | 1,600 | SSP Complete |
| | 16 | E | 680 | | SSP Complete |
| | 17 | D | 1,114 | | SSP Complete |
| | 18 | D | 167 | | SSP Complete |
| | 19 | B & C | 3,760 | | SSP in Review |
| | 20 | C & D | 9,496 | 560 | SSP in Draft |
| | 21 | D | 8,771 | 640 | SSP Complete |
| | 22 | A & B | 1,490 | | SSP Complete |
| | 23 | C & D | 1,559 | | SSP Complete |
| | 24 | E | 1,058 | | SSP Complete |
| | 25 | A, B, C &D | 24,281 | | SSP Complete |
| | 26 | C & D | 4,678 | | SSP Complete |
| | 27 | D & E | 6,520 | 1,280 | SSP in Draft |
| | 28 | D | 1,468 | | SSP Complete |
| | 29 | A & B | 4,230 | 200 | Enrolled |
| | 30 | E | 333 | | Enrolled |
| | 31 | B | 6,550 | | Enrolled |
| | 32 | A | 740 | | SSP Complete |
| | 33 | A | 1,052 | | SSP in Draft |
| **Totals** | **33** | | 154,938 | **6,830** | **161,768** |

* Property names are on file at Montana Fish, Wildlife & Park's Dillon Field Office.

## IV. Big Hole Arctic Grayling CCAA Rapid Assessments

The Participating Landowners in the Big Hole Arctic Grayling CCAA must allow the Agencies to conduct a "rapid assessment" of the enrolled property within 90 days of enrolling into the Big Hole Arctic Grayling CCAA. The rapid assessment focuses on the identification of immediate threats of mortality to Arctic Grayling on the property and the validation of water rights compliance. Immediate threats to Arctic Grayling may include structures, mechanical devices or pollutants that pose a threat of immediate mortality to Arctic Grayling. Examples include: unscreened pumping from a creek or river, or toxic effluent entering a creek or river. Additional information may be gathered through the assessments that assist with the development of the site-specific conservation plan with the Participating Landowner (Petersen and Lamothe 2006).

### A. Surveys for Immediate Threats to Arctic Grayling

All surveys for immediate threats to Arctic Grayling have been conducted on enrolled properties. No immediate threats to Arctic Grayling were identified during the surveys. Monitoring of enrolled property for immediate threats continues as site-specific conservation plans are being developed by the Agencies.

### B. Water Rights Compliance Evaluation

Compliance monitoring for water rights associated with CCAA site specific plans was conducted for the following properties: 1-5, 8-10, 12-19, 21-28, and 32 in 2015. These efforts, completed by DNRC, included two site visits on each property to assess compliance of flow rates and period of use described in the landowner's water right. Some of the required monitoring for enrolled properties was provided by the District Court –appointed water commissioner. Also, continuous stage recorders installed in the Spokane, Strowbridge, Ferris, LaMarche, Huntley, and Pendleton Ditches provided flow information for water rights compliance, instream flow conservation projects, and the ongoing development of the site- specific plans.

### C. Streamflow Monitoring required by CCAA

In concert with the two USGS real-time streamflow gages located at Management Segments C and D (Figure 1), DNRC continued to operate and maintain three real-time streamflow gages located at Management Segments A, B, and E. In addition, DNRC continuously monitored flow in at least one tributary within each Management Segment and six key irrigation ditches.

### D. DNRC Water Rights Monitoring of Compliance with Approved Site-Specific Plans

Landowners with approved SSP are required to submit water rights compliance records to DNRC at the end of each irrigation season. In 2015 the following enrolled properties had approved SSPs during the irrigation season: properties 1-5, 8-10, 12-19, 21-28, and 32. Submitted records are summarized in Table 2.

**Table 2.** Landowner Compliance Monitoring dates in 2015.

| Pre-Season Meeting Date | Compliance Check Dates (2015) | Property # | Irrigation withdrawals in Compliance with SSP & water rights | Landowner Submitted Diversion Records |
|---|---|---|---|---|
| 21-Jul | 22-Apr | 1 | Y | Agency Collected |
| | 17-Aug | 1 | Y | |
| 15-Apr | 15-Apr | 2 | Y | Yes |
| | 11-Aug | 2 | Y | |
| 3-Jun | 2-Jun | 3 | Y | Yes |
| | 14-Jul | 3 | Y | |
| 30-Jun | 27-May | 4 | Y | Agency Collected |
| | 17-Aug | 4 | Y | |
| 27-Oct | * | 5 | | No |
| | * | 5 | | |
| 21-Apr | * | 8 | Y | Yes |
| | * | 8 | Y | |
| 21-Apr | 21-Apr | 9 | Y | Yes |
| | 4-Jun | 9 | Y | |
| 15-Apr | 21-Apr | 10 | Y | Yes |
| | | 10 | Y | |
| 15-Apr | plan under revision | 12 | n/a | n/a, property sold |
| | plan under revision | 12 | | |
| 23-Apr | Water Commissioner | 13 | Y | Water Comm Records |
| | Records | 13 | Y | |
| 22-Apr | 21-Apr | 14 | Y | Agency Collected |
| | 8-Sep | 14 | Y | |
| absentee | 21-Apr | 16 | Y | Agency Collected |
| | 18-Aug | 16 | Y | |
| 4/22 (lessee) | 7-Jul | 17 | Y | Agency Collected |
| | | 17 | Y | |
| absentee | 11-Jun | 18 | Y | Agency Collected |
| | | 18 | | |
| 22-Apr | 22-Apr | 19 | Y | Yes |
| | 16-Sep | 19 | Y | |
| 21-Jul | 27-May | 21 | Y | Agency Collected |
| | 7-Jul | 21 | Y | |
| 2-Jun | 2-Jun | 22 | Y | Agency Collected |
| | 22-Oct | 22 | Y | |
| 21-Jul | 2-Jun | 23 | Y | Agency Collected |
| | 5-Aug | 23 | Y | |
| 27-Oct | * | 24 | | No |
| | * | 24 | | |
| 30-Jun | 2-Jun | 25 | Y | Agency Collected |
| | 11-Aug | 25 | Y | |
| 4/23 (Mgr) | Water Commissioner | 26 | Y | Water Comm Records |
| | Records | 26 | Y | |
| 18-Aug | 17-Aug | 27 | Y | no |

| Pre-Season Meeting Date | Compliance Check Dates (2015) | Property # | Irrigation withdrawals in Compliance with SSP & water rights | Landowner Submitted Diversion Records |
|---|---|---|---|---|
| | | 27 | | |
| 4/15 (Frick) | 11-Jun | 28 | Y | no |
| | | 28 | | |
| no | 2-Jun | 32 | Y | no |
| | | 32 | | |

## V. Site-Specific Conservation Plans

Site-specific conservation plans are developed for each Participating Landowner by the Agencies and the landowner. The site-specific conservation plans identify conservation actions that will lead to: improved streamflows, enhanced riparian and stream channel condition, improved fish passage and reduced levels of entrained Arctic grayling.

### A. Completed and Approved

Twenty-eight site-specific conservation plans are currently under implementation for property numbers; 1-5, 8-10, 12-19, 21-28, and 32 in 2015 (Table 1). All site-specific plans are ten-year agreements between the Participating Landowners, FWP, and the USFWS. Updates on the implementation of these site-specific plans, including compliance monitoring results, will be included annually in future reports.

### B. Extension Requests Approved by the USFWS

FWP did not submit approval for extensions to complete site-specific plans in 2015. Extensions provided additional time to complete the SSP and document past and ongoing conservation actions for Arctic Grayling on the property receiving the extension.

## VI. Conservation Measures

Through the process of developing site-specific conservation plans for Participating Landowners, the Agencies identify projects that reduce or eliminate entrainment of Arctic Grayling, eliminate barriers to fish passage, maintain adequate streamflows and protect and/or improve riparian and stream habitat quality. Projects and related conservation efforts completed in 2015 are reported below.

### A. Entrainment Surveys

In 2015, FWP completed entrainment surveys on 7.16 miles of irrigation ditch on 5 enrolled properties (Table 3). A total of 29 Arctic Grayling were captured in one irrigation ditch during entrainment surveys and returned to the Big Hole River. Arctic Grayling were captured during 3 different electrofishing runs in this ditch starting in July and ending in October. All Arctic Grayling captured were 2015 young-of-the-year. Because of the high rate of entrainment in this ditch, FWP will explore screening or other options to reduce or eliminate the loss of Arctic Grayling in this ditch. Other fish species identified during the surveys include: Eastern Brook

Trout *Salvelinus fontinalis*, Brown Trout *Salmo trutta*, Rainbow Trout *Oncorhynchus mykiss*, Mountain Whitefish *Prosopium williamsoni*, Burbot *Lota lota*, Longnose Dace *Rhinichthys cataractae*, Mottled Sculpin *Cottus bairdi*, Longnose Suckers *Catostomus commersoni*, and White Suckers *Catostomus catostomus*.

**Table 3.** FWP electrofishing Entrainment surveys completed in 2014 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

| Date | Source | Miles | Number of Arctic Grayling rescued |
|---|---|---|---|
| 7/10/2015 | Big Hole River | 0.72 | 0 |
| 7/10/2015 | Deep Creek | 0.35 | 0 |
| 7/10/2015 | Deep Creek | 0.29 | 0 |
| 7/10/2015 | Deep Creek | 0.45 | 0 |
| 7/10/2015 | Seymour Creek | 0.40 | 0 |
| 7/13/2015 | Big Hole River | 0.42 | 10 |
| 7/13/2015 | North Fork BHR | 0.81 | 0 |
| 7/13/2015 | North Fork BHR | 0.35 | 0 |
| 7/14/2015 | Rock Creek | 0.71 | 0 |
| 7/14/2015 | Big Hole River | 0.26 | 0 |
| 7/14/2015 | Big Hole River | 0.30 | 0 |
| 7/14/2015 | Big Hole River | 0.27 | 0 |
| 7/15/2015 | Big Swamp Creek | 0.30 | 0 |
| 7/15/2015 | N.B. Big Swamp Creek | 0.35 | 0 |
| 7/15/2015 | LaMarche Creek | 0.34 | 0 |
| 8/21/2015 | Big Hole River | 0.42 | 16 |
| 10/22/2016 | Big Hole River | 0.42 | 3 |
| | **TOTAL** | **7.16** | **29** |

**B. Projects to Minimize or Eliminate Entrainment of Arctic Grayling**

Designs for fish exclusion devices previously pursued by The Agencies have not been suitable for the Project Area due to the lack of stream channel grade needed to maintain a functioning screen. In 2010, U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program assisted the Arctic Grayling Recovery Program to secure funding through the NRCS's Conservation Innovation Grant to modify the design of an existing fish exclusion device, making it more suitable to conditions in the Project Area. In May 2012, the modified fish exclusion device was installed in LaMarche Creek, an Arctic Grayling spawning tributary. The device was monitored for function until irrigation water was no longer diverted in August, which included 15+ site visits and three electrofishing surveys in the irrigation ditch downstream of the screen. Surveys resulted in the capture of no Arctic Grayling. In 2013, an additional fish exclusion device of similar design was installed in an irrigation ditch originating from Rock Creek, a Big Hole River tributary that inhabits relatively high densities of Arctic Grayling. The larger capacity of the Rock Creek irrigation ditch will further test the designs capability for excluding Arctic Grayling from irrigation ditches in the Project Area. Results of the 2014 and 2015 entrainment surveys identified a large irrigation ditch originating from the Big Hole River below Wisdom entraining young-of-the-year Arctic Grayling. These Arctic Grayling (281 captured over two years) were

returned to the Big Hole River downstream of the diversion for this ditch. Exclusion devices or structure modification are being investigated in 2016, as well as continued entrainment monitoring and rescue operations.

### C. Projects to Enhance Fish Passage

In 2015, FWP, NRCS, DNRC and Participating Landowners completed 6 fish passage improvement project (fish ladders, bridges, weirs, culvert replacements, and a siphon; Table 4).

**Table 4.** Fish passage projects completed in 2015 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA. Projects include improving or modifying irrigation diversion to provide fish passage, installing fish ladders or installing bridges.

| Associated Waterbody | Enrolled Landowner | Project Component |
|---|---|---|
| Big Lake Creek | Property 26 | Fish Ladder |
| Big Lake Creek | Property 26 | Fish Ladder |
| Swamp Creek | Property 24 | Fish Ladder |
| Swamp Creek | Property 24 | Fish Ladder |
| Swamp Creek | Property 24 | Fish Ladder |

### D. Projects to Enhance Riparian and Stream Channel Habitat

In 2015, FWP partnered with NRCS, USFWS, DNRC and Participating Landowners to implement projects on 4 enrolled properties to protect and/or enhance stream function and riparian habitat (Table 5).

**Table 5.** Riparian and stream channel improvement projects completed in 2015 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

| Associated Waterbody | Enrolled Landowner | Project Component |
|---|---|---|
| Miner Creek | Property 8 | Riparian Fence |
| Little Lake Creek | Property 8 | Riparian Fence |
| Steel Creek | Property 21 | Riparian Fence |
| Big Hole River | Property 20 | Riparian Fence |
| Big Hole River | Property 14 | Riparian Fence Repair |
| Steel Creek | Property 15 | Hardened Cattle Crossing |

### E. Projects to Improve Streamflows and Irrigation Water Management

In 2015, FWP partnered with NRCS, USFWS, DNRC, the Big Hole River Foundation and Participating Landowners to implement 10 projects on 6 enrolled properties to enhance the ability to control and measure irrigation withdrawals and reduce the need to divert water for livestock watering purposes (Table 6).

In addition to improvements to irrigation infrastructure, the Big Hole Arctic Grayling CCAA requires reductions to irrigation diversions in response to streamflows dropping below established seasonal flow targets at each of the five gaging stations (Miner Lakes Road, the mouth of Miner Creek, the Wisdom Bridge, Mudd Creek Bridge, and Dickie Bridge). In 2015, 13 enrolled landowners, and two non-enrolled landowners, reduced irrigation diversions that

resulted in 232 cubic feet per second (cfs) returning to the Big Hole River or its tributaries in response to Big Hole River flows below established flow targets.

**Table 6.** Projects completed in 2015 to improve streamflows include project that improve irrigation efficiency and ability to control and measure irrigation withdrawals and projects that reduce the need to divert water for livestock.

| Associated Water Body | Enrolled Landowner | Project Component |
|---|---|---|
| Big Lake Creek | Property 26 | 1 Diversion, 1 Headgate and 1 Fish Ladder |
| Big Hole River | Property 2 | Solar Powered Stock Tank* |
| Big Lake Creek | Property 1 | 1 Stock Well, and 2 Tanks |
| Big Hole River | Property 22 | 2 Stock Tanks |
| Ruby Creek | Property 1 and 25 | Measuring Device |
| Fishtrap Creek & Swamp Creek | Property 24 | 3 Headgates, 3 Diversions, 3 Fish Ladders |
| LaMarche Creek | Property 16 | Measuring Device |
| Moose Creek | Property 1 | 1 Headgate |

*Stock water systems have multiple benefits including: improved instream flows, riparian habitat, and a grazing agreement.

**F. Projects to Expand Arctic Grayling Distribution into Historically Occupied Waters**

One of the CCAA Arctic Grayling population goals is for Arctic Grayling to reoccupy or utilize habitats in historic waters within 10 years of Big Hole Arctic Grayling CCAA implementation (FWP and USFWS 2006).

Rock Creek was historically a productive spawning tributary for Arctic Grayling in the Project Area near Wisdom, MT (Shepard and Oswald 1988). Connectivity between Rock Creek and the Big Hole River was disrupted in the early 1990's when an irrigation system was relocated and captured all the flow from Rock Creek. In 2006, Rock Creek was re-connected to the Big Hole River by constructing a new channel in an abandoned high-flow channel. Additional stream restoration and riparian restoration was completed on 2.5 miles of Rock Creek. Extensive monitoring efforts after the projects were completed for three years but captured only one Arctic Grayling. In spring 2010, FWP initiated a project to re-colonize Rock Creek by developing fertilized Arctic Grayling eggs from the fluvial Arctic Grayling brood reserve in Remote Sites Incubators (RSIs) with the goal of reestablishing Rock Creek to a productive Arctic Grayling stream. These efforts ended in 2013. In 2014, the first wild Arctic Grayling young-of-the-year were captured in Rock Creek throughout the project area during fall electrofishing efforts (Details on the Re-colonization efforts can be found in the 2010 - 2014 Arctic Grayling Monitoring Report). Monitoring efforts in 2015 found natural reproduction in Rock Creek, marking two years in a row.

In spring 2013, FWP began an assisted recolonization of Arctic Grayling into the upper mainstem Big Hole River and Governor Creek (CCAA Management Segment A). RSIs were used to hatch Arctic Grayling eggs from the Big Hole River conservation broodstock directly into upstream sections of the mainstem Big Hole River and tributaries to expand on Rock Creek efforts and increase distribution of Arctic Grayling in the upper Big Hole River system. In 2014, these efforts were expanded to include Miner Creek (CCAA Segment B) Twin Lake (CCAA Segment C) Trail Creek (CCAA Segment D) and Wise River. Twin Lake and Trail Creek are within the CCAA project area. Wise River enters the Big Hole River just downstream of the

project area. Reintroducing Arctic Grayling in to Twin Lakes, and tributaries to the Big Hole River will assist in the recolonization of Arctic Grayling throughout the Big Hole River. During 2015 fall electrofishing in Governor Creek, 2 age-1 Arctic Grayling from RSI efforts were captured throughout the shocking reach. These are the first documented Arctic Grayling in Governor Creek since the 1980's. No grayling were captured in Miner Creek.

Arctic Grayling re-colonization in the upper Big Hole River, Miner Creek and Governor Creek will continue through 2017 (Details on Re-colonization efforts can be found in the 2010 - 2015 Arctic Grayling Monitoring Report). Recolonization efforts in Twin Lake, Wise River and Trail Creek will continue for 5 years at each site (through 2018).

## VII. Monitoring

The Big Hole Arctic Grayling CCAA requires specific monitoring associated with the conservation measures implemented under this agreement and the resulting biological responses of the Arctic Grayling population. Arctic Grayling abundance and distribution are monitored from FWP electrofishing surveys on one mainstem and one tributary reach within each of the five management segments (Figure 3). Additionally, stream temperature, stream discharge and channel morphology parameters, are monitored on each of the ten reaches (FWP and USFWS 2006). Mainstem reaches are located near the lower boundary of each management segment (A through E) and tributary reaches include Governor Creek, Miner Creek, Rock Creek, Steel Creek and Deep Creek. Additional monitoring is conducted to evaluate restoration projects.

### A. Fish Population Monitoring

In 2015, FWP conducted electrofishing surveys to characterize abundance and distribution of and other species within the 10 designated sampling reaches (A-E), which include 19.3 miles of mainstem and 8.6 miles in tributaries (Table 7). Additional surveys included 6.4 miles of tributary reaches. A total of 1,509 fish were captured during fall 2015 electrofishing surveys including Arctic Grayling, brook trout, brown trout, rainbow trout, and burbot. During these surveys, 122 Arctic Grayling were captured.

**Table 7.** Total fish captured during FWP fall one-pass electrofishing surveys of the Big Hole Arctic Grayling CCAA monitoring reaches, and other mainstem and tributary reaches.

| Big Hole River Reach | Reach Length Kilometers (Miles) | Arctic Grayling | Brook Trout | Rainbow Trout | Brown Trout | Burbot |
|---|---|---|---|---|---|---|
| Big Hole Arctic Grayling CCAA (A) | 1.33 | 0 | 124 | 0 | 5 | 4 |
| Big Hole Arctic Grayling CCAA (B) | 2.51 | 0 | 42 | 5 | 167 | 3 |
| Little Lake Creek | 6.32 | 5 | 47 | 2 | 33 | 1 |
| Big Hole Arctic Grayling CCAA (C) | 5.83 | 10 | 6 | 5 | 6 | 2 |
| Big Hole Arctic Grayling CCAA (D) | 3.28 | 3 | 2 | 41 | 37 | 0 |
| Big Hole Arctic Grayling CCAA (E) | 1.33 | 0 | 124 | 0 | 5 | 4 |
| Total | 19.3 | 19 | 221 | 53 | 248 | 10 |

| Big Hole Tributary Reach | Reach Length Kilometers (Miles) | Arctic Grayling | Brook Trout | Rainbow Trout | Brown Trout | Burbot |
|---|---|---|---|---|---|---|
| Governor Creek (A) | 1.53 | 2 | 114 | 0 | 31 | 5 |
| Miner Creek (B) | 0.60 | 0 | 77 | 0 | 5 | 10 |
| Rock Creek (C) | 2.20 | 2 | 23 | 0 | 1 | 3 |
| Steel Creek (D) | 2.91 | 42 | 188 | 1 | 2 | 35 |
| Deep Creek (E) | 1.41 | 12 | 47 | 21 | 19 | 4 |
| Swamp Creek | 1.75 | 39 | 135 | 0 | 7 | 16 |
| North Fork BHR | 2.88 | 0 | 5 | 0 | 25 | 2 |
| Plimpton Creek | 1.80 | 7 | 56 | 0 | 2 | 21 |
| Total | 15.95 | 261 | 645 | 22 | 92 | 96 |

The Big Hole Arctic Grayling CCAA document outlines population abundance goals within the Project Area. Based on the 10 CCAA monitoring sites, the index of abundance (CPUE based on cumulative total captures/total distance) for age-1 and older Arctic Grayling will exhibit a positive trend over the 5-year period following execution of the Agreement (FWP and USFWS 2006). Results of age-1 and older Arctic Grayling population abundance trend in the 10 CCAA monitoring sites from 2006 – 2015 are shown in Figure 4.

## B. Stream Temperature Monitoring

In 2015, FWP collected stream temperature data at 13 locations (six mainstem and seven tributary) in the upper Big Hole Watershed (Figure 5). Stream temperature data were collected at the upper boundary of the project area, Big Hole Arctic Grayling CCAA standardized monitoring sites that include one mainstem and one tributary location within each management segment (A – E), and two additional tributary sites (Figure 3). Stream temperature data were collected in the Big Hole River at Saginaw Bridge, Miner Lakes Road, and the confluence with Miner Creek, Wisdom Bridge, Mudd Creek Bridge, and Dickie Bridge. Big Hole River tributary sites included Governor Creek, Miner Creek, Rock Creek, Steel Creek, Swamp Creek, Plimpton Creek, and Deep Creek.

Stream temperature data were recorded at 60-minute intervals from May 1 through October 1. Data were summarized as daily minimum, maximum and mean, maximum and mean for the

monitoring period., and hours and days exceeding 21.1º C (70º F) and 25º C (77º F; Table 8). The thermal stress threshold for salmonid species is considered 21.1º C (70 º F; Behkne 1991), and 25º C (77º F) represents the upper incipient lethal temperature for Arctic Grayling (Lohr et al. 1996).

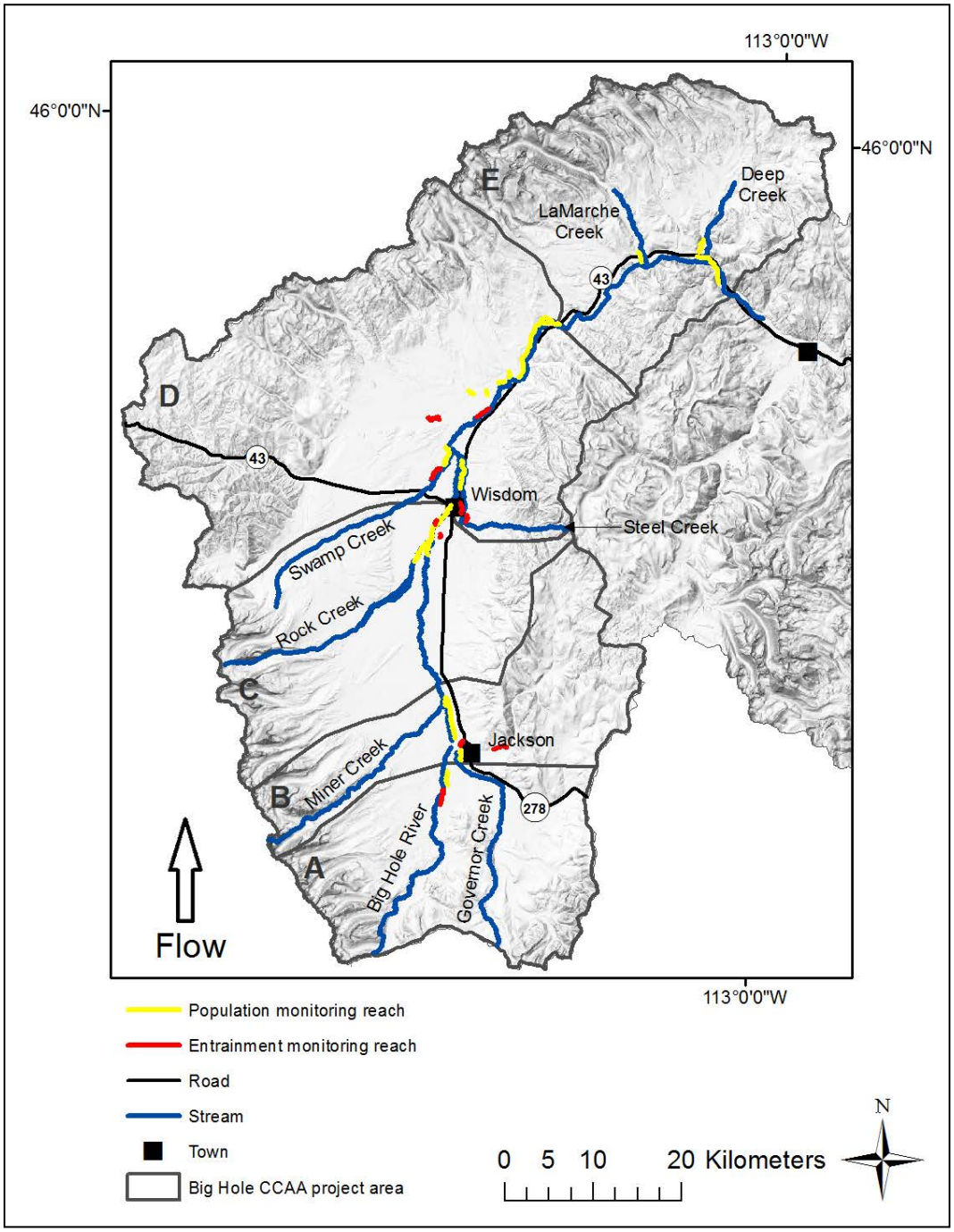


**Figure 3.** Big Hole River and tributary fish population monitoring reaches.

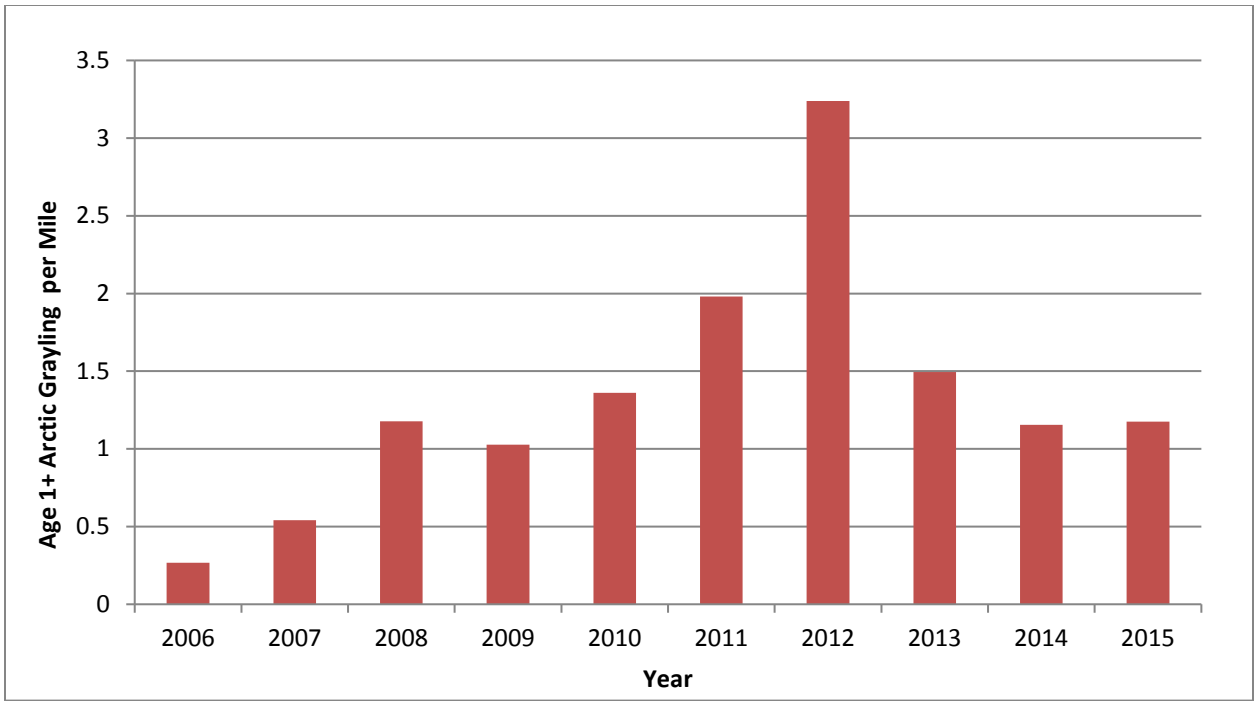


**Figure 4.** Population abundance trend of age-1 and older Arctic Grayling based on catch-per-unit-effort (/mile) data from the 10 CCAA monitoring reaches from 2006 – 2015.

**Table 8.** Stream temperature monitoring results for 2015.

| Monitoring Site (Big Hole Arctic Grayling CCAA Management Segment) | Mean Seasonal Temperature °C (°F) | Maximum Seasonal Temperature °C (°F) | Cumulative Hours Exceeding 25° C (77° F) |
|---|---|---|---|
| Saginaw Bridge | 10.9 (51.6) | 20.4 (68.8) | 0 |
| BHR CCAA (A) | 12.2 (53.9) | 21.9 (71.5) | 0 |
| Governor Creek (A) | 13.6 (56.4) | 26.1 (78.9) | 10 |
| BHR CCAA (B) | 13.2 (55.8) | 22.6 (72.6) | 0 |
| Miner Creek (B) | 13.4 (56.2) | 23.9 (75.1) | 0 |
| BHR CCAA (C) | 14.9 (58.9) | 23.4 (74.2) | 0 |
| Rock Creek (C) | 13.6 (56.4) | 20.3 (68.6) | 0 |
| BHR CCAA (D) | 15.6 (60.1) | 26.2 (79.2) | 41 |
| Steel Creek (D) | 15.2 (59.4) | 25.8 (78.5) | 5 |
| Swamp Creek | 14.2 (57.6) | 25.6 (78.1) | 5 |
| Plimpton Creek | 14.5 (58.1) | 26.2 (79.1) | 14 |
| BHR CCAA (E) | 14.9 (58.8) | 25.9 (78.6) | 11 |
| Deep Creek (E) | 12.9 (55.3) | 23.7 (74.7) | 0 |

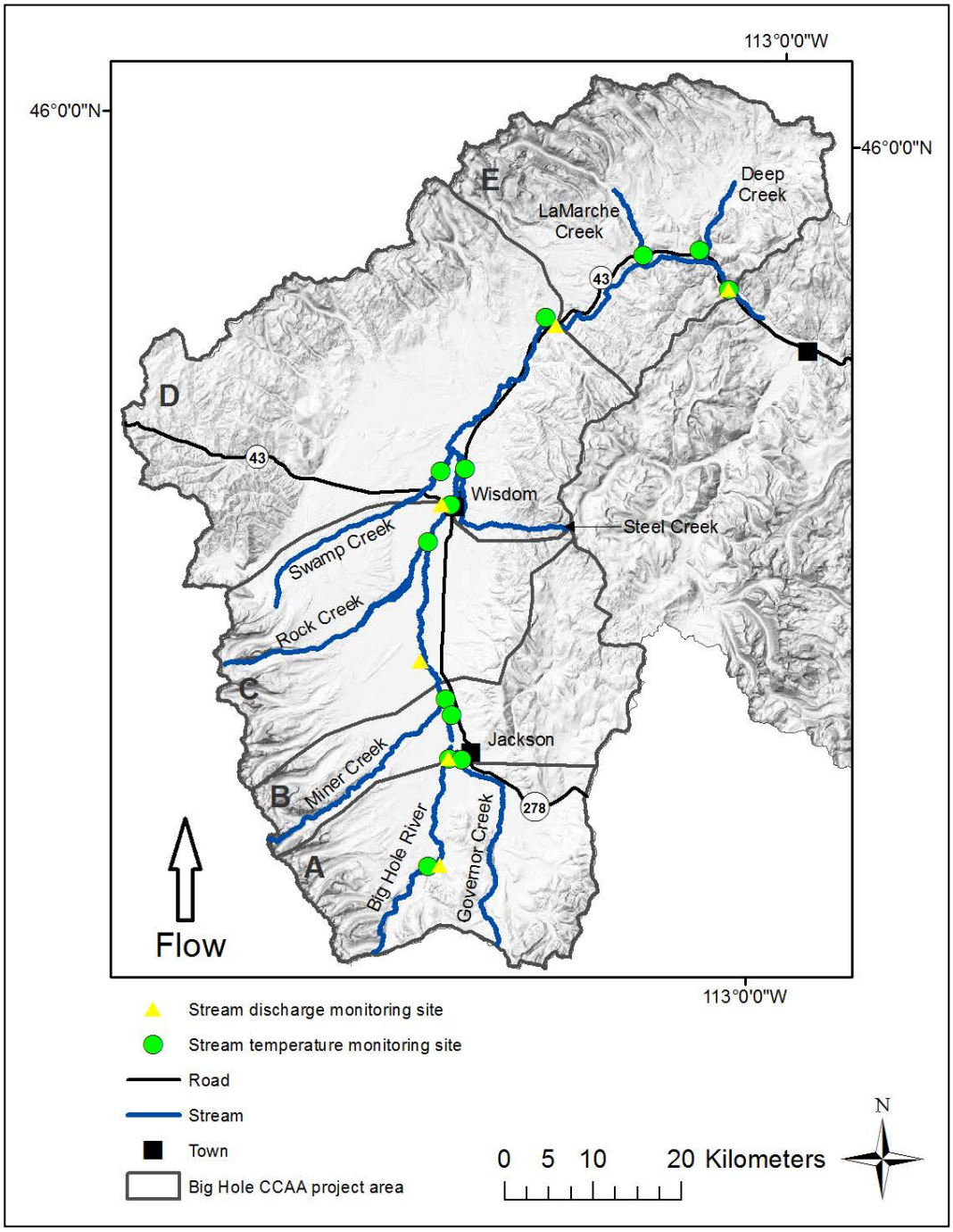


**Figure 6.** Stream temperature (green circle) and stream discharge (yellow triangle) monitoring sites located in the Big Hole Arctic Grayling CCAA project area in 2015.

## C. Stream Morphology Parameter Monitoring

Conservation measures used to improve channel and riparian habitats include grazing strategies in riparian areas and stream reaches, stream restoration, improving instream flows and improving riparian vegetation. To evaluate riparian conditions, Riparian Assessments are completed (NRCS Riparian Assessments) every 5 years on enrolled stream reaches with the goal of reaching sustainable condition in 15 years from the time that conservation measures are implemented. Sustainable riparian conditions are essential for function flood plains, stream morphology, sediment transport, and fish habitat. In addition to riparian assessments, the USFWS agreed to complete stream morphology monitoring at 10 permanent channel cross sections within each of the 10 population monitoring reaches (Figure 7). These were established in 2006. Surveys on each of the 10 stream reaches were coordinated with Riparian Assessments. At each reach: 2 pool cross sections, 3 riffle cross sections, 1,000 ft longitudinal profiles and pebble counts at each riffle cross section were collected.

Baseline surveys have been completed on all 10 reaches and repeat surveys have be completed on six reaches and are currently being analyzed (Table 9). Analysis includes bankfull width, bankfull area, maximum depth, average depth, width to depth ratio, floodplain width, entrenchment ratio substrate composition, slope, sinuosity, and stream classification. Analysis of the six reaches that have had repeat surveys is currently being reviewed and the other four reaches are scheduled for repeat surveys. No new surveys were completed in 2015 because the Agencies are modifying the protocol to determine a more effective way to measure geomorphic conditions.

To evaluate if conservation measures that benefit riparian conditions are being translated into improved fisheries habitat, floodplain function and stream resiliency an effectiveness monitoring program is being developed that will measure changes in channel geomorphology on 5-10 reaches that represent different management/restoration efforts implemented through the CCAA. Effectiveness monitoring is intended to evaluate progress toward achieving project goals and objectives. Effectiveness monitoring will focus on collecting data necessary to calculate the metrics to measure the performance of remedial actions and restoration activities for the specific project.

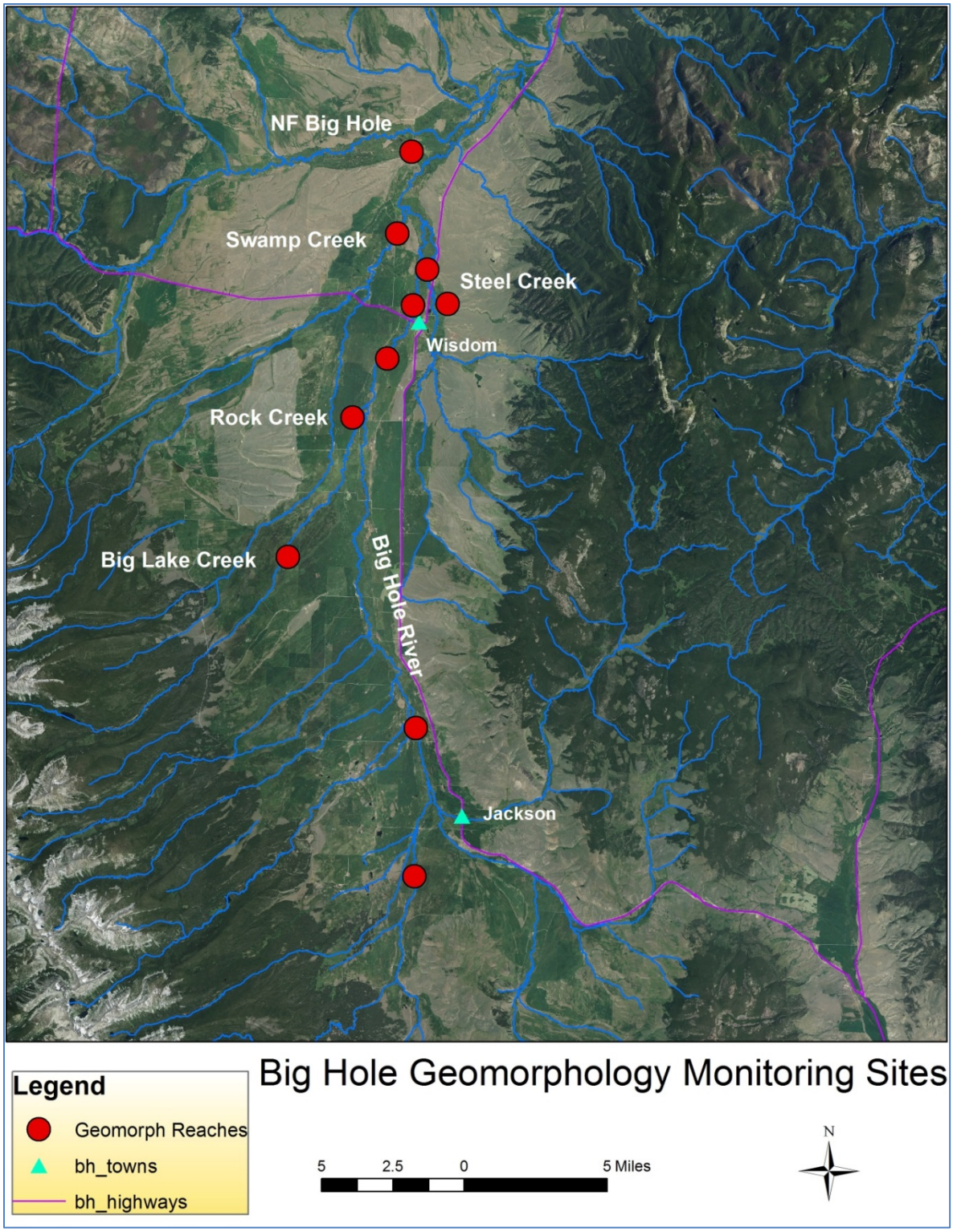


**Figure 7.** Stream geomorphology sites at ten stream reaches which have either been restored or have a change in management to improve habitat for Arctic Grayling through the CCAA Program.

**Table 9.** Geomorphology monitoring reaches for the Big Hole Arctic Grayling CCAA with Riparian Assessment results, conservation actions and channel survey years.

| Site # | Stream | Reach/ Location | Initial Riparian Assessment Year: Score | Repeat Riparian Assessment Year/Score | Treatment/ Year | Channel Surveys |
|---|---|---|---|---|---|---|
| 1 | Big Hole | Schindler | 2006: 60% | 2011: 68% | Restoration/Fencing, Grazing Plan 2010 | Baseline 2010 Repeat: 2013 |
| 2 | Big Hole | Little Lake Creek | 2005: 51 % | 2012: 77% | Restoration/Fencing/ Grazing Plan 2007 | Baseline 2013 |
| 3 | Big Hole | McDowell | 2006: 60% | 2012: 87% | Restoration/Fencing/ Grazing Plan 2007 | Baseline 2007 Repeat 2008, 2010 |
| 4 | Rock Creek | Restoration Reach | 2008: 86% | 2012: 92% | Restoration/Fencing/Grazing Plan 2007 | Baseline 2007 Repeat 2009, 2012 |
| 5 | Swamp Creek | Restoration Reach | 2007: 68% | 2012: 70% | Restoration/Fencing/Grazing Plan 2009 | Baseline 2007 Repeat 2009, 2011 |
| 6 | Steel Creek | Lower | 2007: 75% | 2012: 83% | Fencing/Grazing Plan 2010 | Baseline 2007, Repeat 2013 |
| 7 | Steel Creek | Upper | 2007: 36% | 2012: 57% | Fencing/Grazing Plan 2010 | Baseline 2010\2011 |
| 8 | NF Big Hole | LNF Road | 2006: 47% | 2012: 75% | Fencing/Grazing Plan 2010 | Baselien2009/2010, Repeat 2013 |
| 9 | Big Hole | Wisdom Reach | 2009: 75% | 2012: 68% | Restoration/Fencing 2008 | Baseline 2009 |
| 10 | Big Lake Creek | BHGA | 2006: 33% | 2013: 73% | Grazing Management Plan 2014 | Baseline 2009,2010 |

## D. Streamflow Monitoring

Along with two USGS real-time streamflow gages located at management segments C and D, DNRC continued to operate and maintain four real-time streamflow gages located at the upper project boundary and at management segments A, B, and E (Figure 8). In addition, DNRC continuously monitored flow in at least one tributary within each management segment and six key irrigation ditches.

Snowpack and precipitation data were monitored by NRCS (available at www.nrcs.gov), and results are based on the period-of-record (1981 through 2010).

In 2015, the Big Hole basin snowpack was 74% of average and precipitation was 92% of average. Below average snowpack and precipitation resulted in Big Hole Arctic Grayling CCAA stream discharge targets being met only 73% of the time.

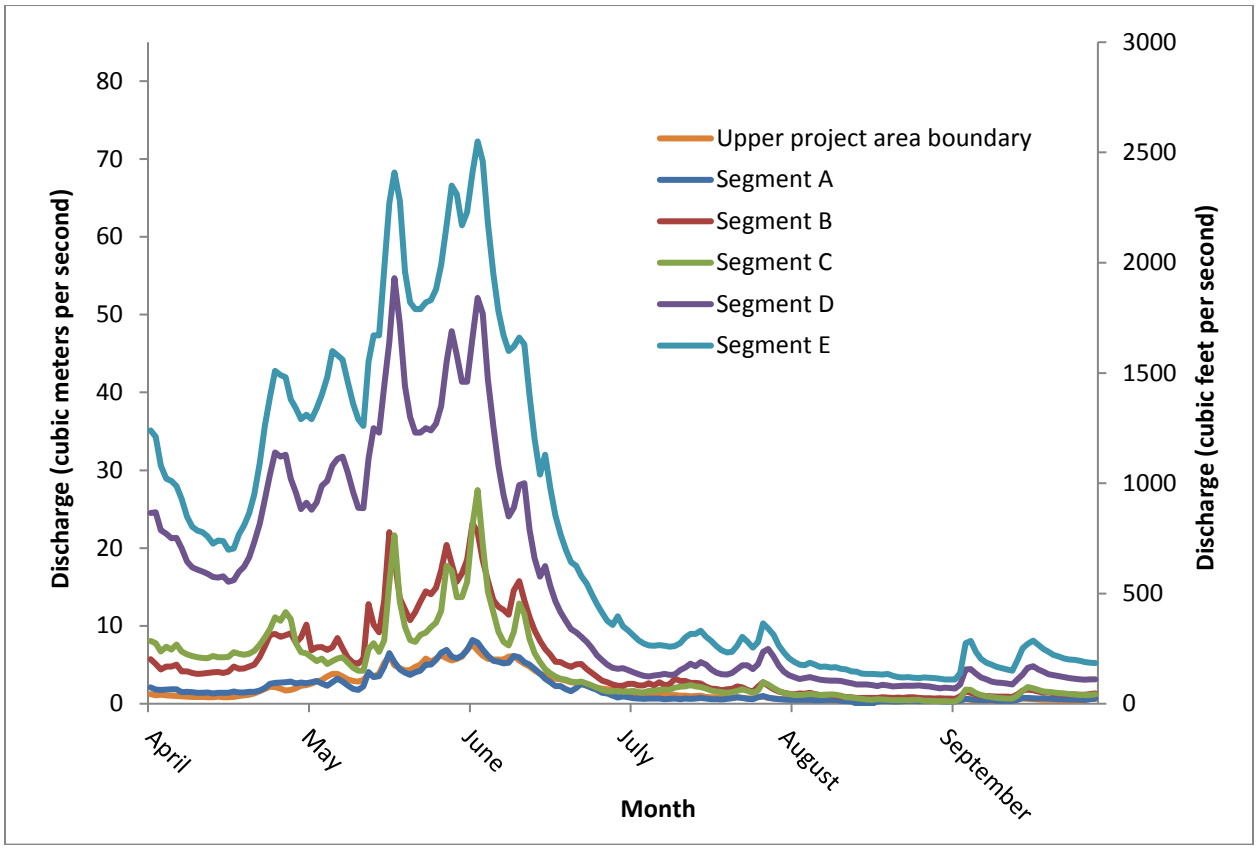


**Figure 8.** Stream discharge data collected from the Big Hole River at real-time gaging stations located at the upper Big Hole Arctic Grayling CCAA project area boundary (Saginaw Bridge) and the lower boundary of each Big Hole Arctic Grayling CCAA management segment (A through E) in 2015.

## E. FWP Monitoring of Compliance with Approved Site-Specific Plans

The monitoring of compliance with approved site-specific plans has occurred annually on the following Properties: 1-5, 8-10, 12-19, 21-28, and 32. All landowners with approved site-specific plans were in compliance with their plan in 2015. FWP field personnel check the amount of water being diverted by the landowners, the trend of riparian areas under a grazing or riparian

management plan, the ability of fish to access fish passage structures and for any evidence of immediate threats of harm or mortality to on the enrolled property. The initial compliance meetings focus on the expectations for monitoring of the riparian management and irrigation diversion agreements in the approved site-specific plan. The necessary field forms for documenting actions are provided to the landowners at that time.

**F. Landowner Monitoring of Irrigation Diversions for Approved Site-Specific Plans**

The Big Hole Arctic Grayling CCAA requires that landowners with approved site-specific plans monitor and document irrigation withdrawals at a minimum of every two weeks once a headgate at a point of diversion is opened and when reductions in diversions are required by the CCAA when streamflows in the Big Hole River drop below flow targets (FWP and USFWS 2006). These records are shared with the Agencies at the end of each irrigation season.

**G. Riparian Re-Assessments on Enrolled Property**

The NRCS' Riparian Assessment Method are used to determine condition of riparian habitats on enrolled lands and serve as the basis for specific conservation measures implemented under the site-specific plan. The CCAA Agreement states that riparian habitats on all enrolled property are required to maintain or restore "sustainability" as defined by the NRCS within 15 years of initiating a site-specific plan. Progress towards "sustainability" is determined by riparian re-assessments, conducted every 5 years. In 2015, no riparian habitat required re-assessment based on Implementation Schedules in completed site-specific plans.

# VIII. Progress in Implementing Approved Site-Specific Plans

Twenty-five site specific plans were approved and under implementation by enrolled landowners in 2015 (several landowners signed their plans in the fall of 2015, so conservation actions will be included in the 2016 report). Each site-specific plan contains an implementation schedule for actions designed to enhance conditions for Arctic Grayling on the enrolled property. The following are summary tables of actions completed in 2015 for Properties 1-5, 8-10, 12-19, 21-28, and 32 (Tables 10 - 36).

**Table 10. Summary of actions in 2015 on Property 1 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Summer 2014 | Annually starting in 2014 |
| Compliance Monitoring | Agencies | Bi-annually starting in 2014 | Annually starting in 2014 |
| Investigation of potential locations to install infrastructure necessary to eliminate the need to divert water for the sole purpose of providing water to livestock | Agencies and Participating Landowner | December 31, 2015 | Complete<br>Installed Stock Water Systems:<br>1 system in Swanson Unit: 2015<br>2 systems in Pope Unit: 2015<br>2 systems Yank Unit: 2015 |
| Inventory sites for improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | Initiate in Summer 2014 | Complete<br>Installed Irrigation Infrastructure:<br>1 headgate on Moose Creek: 2015<br>1 measuring device on Ruby Creek: 2014 |
| Entrainment Surveys | Agencies | Initial survey by 2014 and then per Entrainment Monitoring Protocol | Completed in 2014 |
| Riparian Re-assessments | Agencies | 2018 and 2023 | |
| Initiate the development of a riparian management plan for riparian pastures rating “at risk” or “not sustainable” | Agencies and Participating Landowner | May 1, 2016 | Initiated but not completed |
| Implement riparian management plan | Participating Landowner | May 1, 2017 | |
| Installation of fish passage devices | Agencies and Participating Landowner | No later than 2018 | Completed in Swanson Unit:2015 |

**Table 11. Summary of actions in 2015 on Property 2 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conserve measures to improve streamflows | Participating Landowner | Spring 2009 | Annually starting spring 2009 |
| Compliance monitoring | Agencies and Participating Landowner | Fall 2009 | Bi-annually starting spring 2009 |
| Monitoring Little Swamp and Berry Creeks for presence of WCT | Agencies | 1 time between 2009-2011 | Completed in 2011 |
| Irrigation improvements at 4 locations on Little Swamp Creek | Agencies and Participating Landowner | Fall 2014 | Completed in 2014 |
| Provide fish passage through existing diversions | Diversions shown in Figure 5 | Fall 2013 | Completed in 2013 |
| Entrainment Surveys | Agencies | Initial survey by 2009 then per Entrainment Monitoring Protocol | 2009 and 2010 |
| Riparian Assessments | Agencies | 2013 and 2018 | 2013 |

**Table 12. Summary of actions in 2015 on Property 3 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Develop alternatives for channelized reach of Englejard Creek | Agencies and Participating Landowner | Summer 2022 | Initial walk through with consultants Summer 2015 |
| Comply with requirements in Section B – Improving Streamflows | Participating Landowner | Spring 2017 | |
| Compliance Monitoring | Agencies and Participating Landowner | Biannually starting in 2017 | |
| Installation of additional irrigation infrastructure needs (Water Management Component #3) fish ladders, other, TBD | Agencies and Participating Landowner | December 31, 2018 | |
| Entrainment Surveys | Agencies | Initial surveys by 2018, then per Entrainment Monitoring Protocol | 2018 |
| Population Monitoring | Agencies | Annually on CCAA Segment A and Governor Creek. | Annually |
| Riparian Re-assessments | Agencies | 2018, 2023 | |

**Table 13. Summary of actions in 2015 on Property 4 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2015 | Spring 2015, annually |
| Compliance Monitoring | Agencies | Bi-annually starting in 2015 | Spring 2015 |
| Improvements to irrigation control structures, flow measuring devices, fences, fish ladders or stock water needs | Agencies and Participating Landowner | December 31, 2019 | Complete |
| Develop conservation measures to enhance or maintain riparian habitat | Agencies and Participating Landowner | December 31, 2015 | Initiated in 2014 but not complete |
| Entrainment Surveys | Agencies | Initial survey by 2018, and then per Entrainment Monitoring Protocol | Completed in 2006 and 2007 |
| Riparian Re-assessments | Agencies | 2017 and 2023 | |
| Fish Population, Streamflow, and Temperature Monitoring | Agencies | Annually | Annually |

**Table 14. Summary of actions in 2015 on Property 5 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2015 | Spring 2015 |
| Compliance Monitoring | Agencies and Participating Landowner | Biannually starting in 2015 | Biannually starting in 2015 |
| Entrainment Surveys | Agencies | Initial survey by 2015 and then per Entrainment Monitoring Protocol | |
| Population Monitoring | Agencies | Annually starting in 2015 | Annually |

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Riparian Re-assessments | Agencies | 2016 and 2021 | Completed in 2016 |
| Assessment of Irrigation Infrastructure needs | Agencies and Participating Landowner | 2015 | Completed in 2015 |
| Installation of identified irrigation infrastructure, fish ladder, riparian fence or stock water. | Agencies and Participating Landowner | December 31, 2018 | Completed |

**Table 15. Summary of actions in 2015 on Property 8 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2010 | Spring 2010, annually |
| Initiate conservation measures to improve riparian habitats | Participating Landowner | Spring 2010 | Spring 2010 |
| Monitoring of the effectiveness of fish passage structures | Agencies | 2011 and 2014 | Completed in 2011 |
| Installation of additional riparian and pasture fence (Figure 6) Fields R1, R5, R8 and R9 | Agencies and Participating Landowner | No later than December 31, 2011 | Completed |
| Meet potential permitting obligations associated with potential animal feeding operations on enrolled property. | Agencies and Participating Landowner | No later than December 31, 2014 | Completed |
| Entrainment Surveys | Agencies | Initial survey by 2011 and then per Entrainment Monitoring Protocol | Completed in 2011 and 2012 |
| Fish Population Monitoring | Agencies | Annually | Annually |
| Finalize Riparian Grazing Plan | Agencies and Participating Landowner | March 1, 2012 | Completed |
| Initiate Riparian Grazing Plan | Participating Landowner | Spring 2012 | Completed |
| Removal of culverts potentially acting as migration barriers on Little Lake Creek and Miner Creek | Agencies and Participating Landowner | No later than December 31, 2014 | Completed 2 bridges in 2013 and 2014 |
| Riparian Assessments | Agencies | 2011 and 2016 | 2011 – Need to completed RA in 2017 |
| Compliance Monitoring | Agencies | Biannually starting in 2010 | Biannually since 2010 |

**Table 16. Summary of actions in 2015 on Property 9 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Fall 2010 | Fall 2010 |
| Initiate conservation measures to improve riparian habitats | Agencies and Participating Landowner | Fall 2010 | Fall 2010 |
| Construction of riparian fence along Woody Creek | Agencies and Participating Landowner | No later than December 31, 2015 | Completed in 2010 |
| Installation of fish passage structures (4) in irrigation diversion along Warm Springs Creek | Agencies and Participating Landowner | No later than December 31, 2015 | Completed by 2015 |
| Determine potential permitting obligations for potential animal feeding operations on the enrolled property | Agencies and Participating Landowner | No later than December 31, 2015 | In progress |
| Entrainment Surveys | Agencies | Initial survey in 2011, then per Entrainment Monitoring Protocol | Completed in 2011 |

| | | | |
|---|---|---|---|
| Riparian Re-assessments | Agencies | 2013 and 2018 | 2013 |
| Fish Population Monitoring | Agencies | Annually | Annually |
| Compliance Monitoring | Agencies | Bi-annually starting in 2011 | Biannually since 2011 |

**Table 17. Summary of actions in 2015 on Property 10 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve riparian habitats | Participating Landowner | Summer 2011 | Summer 2011 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2011 | Summer 2011 |
| Installation of fence on French Crk and Connor Gulch | Agencies and Participating Landowner | By December 31, 2012 | Completed in 2012 |
| Installation of Irrigation infrastructure at PODs in Table 9 | Agencies and Participating Landowner | By December 31, 2012 | Completed all major improvements |
| Entrainment Surveys | Agencies | Initial assessment by 2012, then per Entrainment Monitoring Protocol | 2006, 2007, 2011 and 2012 |
| Riparian Re-assessments | Agencies | 2011, 2016 and 2021 | 2011 and 2016 |
| Fish Population Monitoring | Agencies | Annually | Annually |
| Compliance Monitoring | Agencies | Bi-annually starting in 2011 | Biannually since 2011 |

**Table 18. Summary of actions in 2015 on Property 12 identified in the Implementation Schedule of the of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Riparian Management Plan | Participating Landowner | Summer 2009 | Summer 2009 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2009 | Spring 2009 |
| Compliance Monitoring | Agencies | Annually starting in 2009 | Biannually since 2009 |
| Entrainment Surveys | Agencies | Initial survey by 2009 then per Entrainment Monitoring Protocol | Completed in 2007, 2009 and 2012 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessments | Agencies | 2018 and 2023 | |

**Table 19. Summary of actions in 2015 on Property 13 identified in the Implementation Schedule of the of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2011 | Spring 2011 |
| Initiate conservation measures to improve riparian habitats | Participating Landowner | Spring 2011 | Spring 2011 |
| Installation of additional riparian and pasture fence (Figure 10) Fields 9 and 14 | Agencies and Participating Landowner | No later than December 31, 2013 | Completed by 2013 |
| Installation of infrastructure that eliminates the need to divert water from Big Lake and Rock Creek for watering livestock | Agencies and Participating Landowner | No later than December 31, 2015 | Two stock water systems installed by 2014 |
| Determine potential permitting obligations associated with potential animal feeding operations on enrolled property. | Agencies and Participating Landowner | No later than December 31, 2016 | Completed |
| Improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | No later than December 31, 2015 | Completed |
| Entrainment Surveys | Agencies | Initial surveys completed by 2011 then per Entrainment Monitoring Protocol | Completed in 2006 and 2012 |

| | | | |
|---|---|---|---|
| Riparian Assessments | Agencies | 2012 and 2017 | 2012 |
| Installation of fish passage devices in Big Lake Creek and Rock Creek | Agencies and Participating Landowner | No later than December 31, 2016 | Completed |

**Table 20. Summary of actions in 2015 on Property 14 identified in the Implementation Schedule of the site-specific plan.**

**Miller Unit**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Summer 2012 | Summer 2012 |
| Initiate conservation measures to improve riparian and channel condition | Participating Landowner | Summer 2012 | Summer 2012 |
| Riparian Assessments | FWP and NRCS | 2012, 2017, 2022 | 2012 |
| Complete and implement riparian grazing plan (if needed) | Agencies and Participating Landowner | May 1, 2013 | 2013 |
| Noxious Weed Management | Agencies and Participating Landowner | 2012 and annually thereafter as funding is available | Annually |
| Entrainment Surveys | FWP | Initial surveys by 2012 then per Entrainment Monitoring Protocol | 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 |
| Compliance Monitoring | Agencies | Biannually starting in 2011 | Biannually starting in 2011 |

**HMNF Unit**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2012 | Spring 2012 |
| Initiate conservation measures to improve riparian and channel condition | Participating Landowner | Spring 2012 | Spring 2012 |
| Installation of additional riparian and pasture fence | Participating Landowner & Agencies | December 31, 2012 | Completed on North Fork |
| Riparian Assessments | FWP and NRCS | 2012 and 2017, 2022 | 2012 |
| Complete and implement riparian grazing plan | Agencies and Participating Landowner | May 1, 2013 | 2013 |
| Address remaining fish passage issues | Agencies and Participating Landowner | December 31, 2014 | Complete |
| Identification and installation of mutually agreeable infrastructure to reduce the need to divert water for livestock | Agencies and Participating Landowner | December 31, 2014 | Complete |
| Improvements to irrigation infrastructure | Agencies | December 31, 2014 | Complete |
| Noxious Weed Mapping and Management | Agencies and Participating Landowner | Annually as funding is available | Annually |
| Entrainment Surveys | FWP | Initial surveys by 2012 then per Entrainment Monitoring Protocol | 2006 – 2015 annually |
| Compliance Monitoring | Agencies | Biannually starting in 2012 | Biannually starting in 2012 |

**Buffalo Unit**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Agencies and Landowner | Summer 2012 | Summer 2012 |
| Initiate conservation measures to improve riparian and channel condition | Landowner | Summer 2012 | Summer 2012 |
| Installation of additional riparian and pasture fence | Agencies | October 1, 2011 | Completed 2012 and 2013 |
| Identify and implement stock water alternatives | Agencies | December 31, 2015 | In progress |
| Investigate minimum flow targets | DNRC | Summer 2012 | Complete |

| | | | |
|---|---|---|---|
| Riparian Assessments\ Riparian Complex Monitoring surveys | FWP and NRCS | 2012 and 2017 | 2012 |
| Improvements to irrigation infrastructure | Agencies | December 31, 2014 | Complete |
| Entrainment Surveys | FWP | Initial survey 2015, then per Entrainment Monitoring Protocol | 2006 – 2015 annually |
| Compliance Monitoring | Agencies and Landowner | Biannually starting in 2012 | Biannually starting in 2012 |

**Table 21. Summary of actions in 2015 on Property 15 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Location | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2013 | Annually starting in May 2013 |
| Compliance Monitoring | Agencies | Bi-annually starting in 2013 | Biannually starting in 2013 |
| Improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | Install Measuring Device by 2015 | Complete |
| Entrainment Surveys | Agencies | Initial assessment by 2015, then per Entrainment Monitoring Protocol | 2011 and 2013 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re Assessments | Agencies | 2013, 2018, 2023 | 2013 |

**Table 22. Summary of actions in 2015 on Property 16 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2012 | Spring 2012 |
| Compliance Monitoring | Agencies | Biannually starting in 2012 | Biannually starting in 2012 |
| Improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | 2015 | |
| Entrainment Surveys | Agencies | Initial survey by 2012 then per Entrainment Monitoring Protocol | Completed in 2011 |
| Population Monitoring | Agencies | Annually | 2006-2014 |
| Riparian Re-assessments | Agencies | 2012, 2017 and 2023 | 2013 |
| Initiate Grazing Management Plan | Participating Landowner | 2012 | 2012 |

**Table 23. Summary of actions in 2015 on Property 17 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve riparian and channel condition | Participating Landowner | Spring 2011 | Spring 2011 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2013 | Spring 2013 |
| Compliance Monitoring | Agencies | Biannually starting in 2013 | Biannually starting in 2013 |
| Installation of identified irrigation infrastructure | Agencies and Participating Landowner | December 31, 2018 | Initiated, not complete |

| | | | |
|---|---|---|---|
| Entrainment Surveys | Agencies | Initial surveys by 2013 then per Entrainment Monitoring Protocol | 2011, 2012 and 2013 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessments And | Agencies | 2013 and 2018, 2023 | 2013 |
| Riparian Complex Monitoring | Agencies | 2012, 2017, 2022 | 2012 |
| Identify and implement stock water alternatives | Agencies | December 31, 2015 | Initiated, not complete |

**Table 24. Summary of actions in 2015 on Property 18 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Implement Grazing Management Plan | Participating Landowner | 2007 | 2007 |
| Modify Riparian Fence | Agencies and Participating Landowner | 2012 | 2012 |
| Compliance Monitoring | Agencies | Annually starting in 2012 | Biannually starting in 2012 |
| Fish Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessments | Agencies | 2012, 2017, 2022 | |
| Entrainment Surveys | Agencies | Initial survey by 2012 then per Entrainment Monitoring Protocol | Completed in 2006 |
| Improvements to Irrigation Control Structures and Measuring Devices (Pending 2012 assessment) | Agencies and Participating Landowner | Completed by 2017, if necessary | Completed |

**Table 25. Summary of actions in 2015 on Property 19 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Grazing Management Plan | Participating Landowner | Summer 2014 | Summer 2014 |
| Develop conservation measures to enhance riparian habitat | Agencies and Participating Landowner | Summer 2015 | Summer 2015 |
| Initiate measures to improve streamflow | Participating Landowner | Spring 2014 | Spring 2014 |
| Compliance Monitoring | Agencies | Biannually starting in 2014 | Biannually starting in 2014 |
| Riparian Re Assessments | Agencies | 2017, 2023 | |
| Addition irrigation or other infrastructure – fish ladders etc. | Agencies and Participating Landowner | 2016 | Initiated and completed some projects, not complete |
| Installation of additional infrastructure | Agencies and Participating Landowner | 2018 | |

**Table 26. Summary of actions in 2015 on Property 21 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Riparian Management Plan | Participating Landowner | Summer 2014 | Summer 2014 |
| Develop conservation measures to enhance or maintain riparian habitat | Participating Landowner | Summer 2015 | Summer 2015 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2014 | Spring 2014 |
| Compliance Monitoring | Agencies | Biannually starting in 2014 | Biannually starting in 2014 |
| Entrainment Surveys | Agencies | Initial survey by 2014 then per Entrainment Monitoring Protocol | 2006, 2014, 2015 |

| | | | |
|---|---|---|---|
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessment | Agencies | 2014<br>2017, 2023 | Will be completed in 2017 |
| Identify any additional irrigation infrastructure, measuring device, fish passage, stock water or fencing needs | Agencies and Participating Landowner | 2016 | Completed |
| Address any irrigation, measuring device, fish passage needs, stock water or fencing needs | Agencies and Participating Landowner | 2018 | Completed in 2015 |

**Table 27. Summary of actions in 2015 on Property 22 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Riparian Management Plan, investigate management strategies for pasture 3 | Participating Landowner | Summer 2015 | Summer 2015 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2015 | Spring 2015 |
| Compliance Monitoring | Agencies | Annually starting in 2015 | Biannually starting in 2015 |
| Entrainment Surveys | Agencies | Initial survey by 2018 then per Entrainment Protocol | Completed in 2013 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessments | Agencies and Participating Landowner | 2018 and 2023 | |

**Table 28. Summary of actions in 2015 on Property 23 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Summer 2014 | Spring 2014 |
| Compliance monitoring | Agencies | Biannually starting in 2014 | Biannually starting in 2014 |
| Inventory potential sites for installation of additional riparian and pasture fence / riparian management plan | Participating Landowner and Agencies | May 1, 2015 | Complete |
| Installation of infrastructure necessary to eliminate the need to divert water for the sole purpose of providing water to livestock | Agencies and Participating Landowner | December 31, 2017 | Complete |
| Improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | Fall 2018 | Complete |
| Entrainment Surveys | Agencies | Initial survey by 2014 then per Entrainment Monitoring Protocol | Completed in 2007 |
| Riparian Re-assessments | Agencies | 2014, 2019 and 2024 | Will be completed in 2017 |
| Inventory of irrigation structures needing fish passage devices and installation of devices. | Agencies and Participating Landowner | No later than 2018 | Complete |

**Table 29. Summary of actions in 2015 on Property 24 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve Streamflows | Participating Landowner | Summer 2015 | Summer 2015 |
| Compliance Monitoring | Agencies | Biannually starting in 2015 | Biannually starting in 2015 |
| Weed Treatment Program | Participating Landowner | Annually starting 2014-until not necessary | Annually starting in 2014 |
| Identify any additional irrigation infrastructure, measuring device, fish passage, stock water, fencing or stream restoration needs | Participating Landowner and Agencies | December 31, 2017 | Complete |
| Address any irrigation, measuring device, fish passage needs, stock water, fencing or stream restoration needs | Agencies and Participating Landowner | December 31, 2019 | Installed 4 new irrigation infrastructure projects by 2015, will complete by 2017 |
| Entrainment Surveys | Agencies | Initial survey by 2018 then per Entrainment Monitoring Protocol | Completed in 2013 |
| Riparian Re-assessments | Agencies | 2018 and 2023 | |

**Table 30. Summary of actions in 2015 on Property 25 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Summer 2013 | Summer 2013 |
| Compliance Monitoring | Agencies | Biannually starting in 2013 | Biannually starting in 2013 |
| Installation of additional riparian and pasture fence | Participating Landowner and Agencies | No later than Fall 2014 | Complete |
| Installation of infrastructure necessary to eliminate the need to divert water for the sole purpose of providing water to livestock | Agencies and Participating Landowner | December 31, 2014 | Initiated |
| Improvements to irrigation control structures and installation of flow measuring devices | Agencies and Participating Landowner | Fall 2016 | Complete |
| Entrainment Surveys | Agencies | Initial survey by 2017 then per Entrainment Monitoring Protocol | Completed in 2006 and 2011 |
| Riparian Re-assessments | Agencies | 2013 and 2018 | 2013 |
| Installation of fish passage devices | Agencies and Participating Landowner | No later than 2018 | Complete |

**Table 31. Summary of actions in 2015 on Property 26 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Grazing Management Plan | Participating Landowner | 2014 | 2014 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2014 | Spring 2014 |
| Compliance Monitoring | Agencies | Annually starting in 2014 | Biannually starting in 2014 |

| | | | |
|---|---|---|---|
| Entrainment Surveys | Agencies | Initial survey by 2014 then per Entrainment Monitoring Protocol | Completed in 2012 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Reassessments | Agencies | 2018 and 2023 | |
| Provide fish passage at identified PODs | Agencies and Participating Landowner | Completion of identified projects by 2017 | Completed 2015 |
| Adequately functioning diversion, headgate, measuring device | Agencies and Participating Landowner | Completion of identified projects by 2017 | Completed 2015 |

**Table 32. Summary of actions in 2015 on Property 27 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | 2014 | 2014 |
| Compliance Monitoring | Agencies | Biannually starting in 2014 | Biannually starting in 2014 |
| Entrainment Surveys | Agencies | Initial survey by 2018 then per Entrainment Monitoring Protocol | Initial survey completed in 2013 |
| Install fish passage | Agencies and Participating Landowner | 2014 | Fish ladders installed by 2015 |
| Install functioning headgates and measuring devices | Agencies and Participating Landowner | 2016 | Completed 2015 and 2016 |
| Riparian Reassessments | Agencies | 2017 and 2022 | |
| Implement Riparian Grazing Plan | Participating Landowner | 2017 | |

**Table 33. Summary of actions in 2015 on Property 28 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Grazing Management Plan | Participating Landowner | 2012 | 2012 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2012 | Spring 2012 |
| Compliance Monitoring | Agencies | Annually starting in 2012 | Biannually starting in 2012 |
| Entrainment Surveys | Agencies | Initial surveys by 2012 then per Entrainment Monitoring Protocol | 2012 |
| Fish Population Monitoring | Agencies | Annually | Annually |
| Riparian Reassessments | Agencies | 2012, 2017, 2022 | 2012 |
| Install two headgate structures | Agencies and Participating Landowner | 2015 | Completed in 2010 |

**Table 34. Summary of actions in 2015 on Property 31 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2015 | Spring 2015 |
| Implement Riparian Management Plan | Participating Landowner | 2015 | Summer 2015 |
| Develop Riparian Management Plan | Agencies | 2015 | 2015 |
| Implement Riparian Management Plan | Agencies and Participating Landowner | December 31, 2017 | |
| Compliance Monitoring | Agencies | 2018 | Biannually starting in 2015 |

| | | | |
|---|---|---|---|
| Entrainment Surveys | Agencies | Initial survey by 2015 then per Entrainment Monitoring Protocol | Completed in 2012 with previous owner |
| Identify and install any irrigation infrastructure, fish passage, stock water or fencing needs | Agencies and Participating Landowner | By December 31,2018 | Completed |
| Riparian Re-assessments | Agencies | 2017 and 2022 | |
| Population Monitoring | Agencies | Annually | Annually |

**Table 35. Summary of actions in 2015 on Property 32 identified in the Implementation Schedule of the site-specific plan.**

| Conservation Measure | Responsibility | Expected Date of Implementation | Actual Date of Implementation |
|---|---|---|---|
| Begin to implement Riparian Management Plan | Participating Landowner | Spring 2014 | Spring 2014 |
| Initiate conservation measures to improve streamflows | Participating Landowner | Spring 2014 | Spring 2014 |
| Compliance Monitoring | Agencies | Annually starting in 2014 | Biannually starting in 2014 |
| Entrainment Surveys | Agencies | Initial survey by 2018 then per Entrainment Monitoring Protocol | Completed in 2013 |
| Population Monitoring | Agencies | Annually | Annually |
| Riparian Re-assessments | Agencies | 2018 and 2023 | |
| Irrigation Infrastructure Improvement | Agencies and Participating Landowner | December 31, 2019 | Complete |

# IX. Summary of Estimated Take Associated with the Big Hole Arctic Grayling CCAA

In 2014, the USFWS determined that listing the upper Missouri River Basin Distinct Population Segment of Arctic Grayling, as threatened or endangered under the Endangered Species Act was not warranted. Due to the current legal status of Arctic Grayling, ESA-defined take (harm, harass or kill) did not apply to the implementation or monitoring of the Big Hole Arctic Grayling in 2015.

# X. NRCS Special Funding

In 2011, NRCS secured funding for a 3 year, permanent seasonal position in cooperation with FWP. The position was hired under FWP to assist with CCAA grazing management plans, fisheries monitoring, and CCAA monitoring. This position was hired in the spring of 2012 and finished December 31, 2014. NRCS continued to pursue and meet the obligations of existing EQIP contracts with enrolled landowners in 2015.

# XI. Literature Cited

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