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

Montana Fish, Wildlife & Parks

2014 Annual Report

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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 of 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).

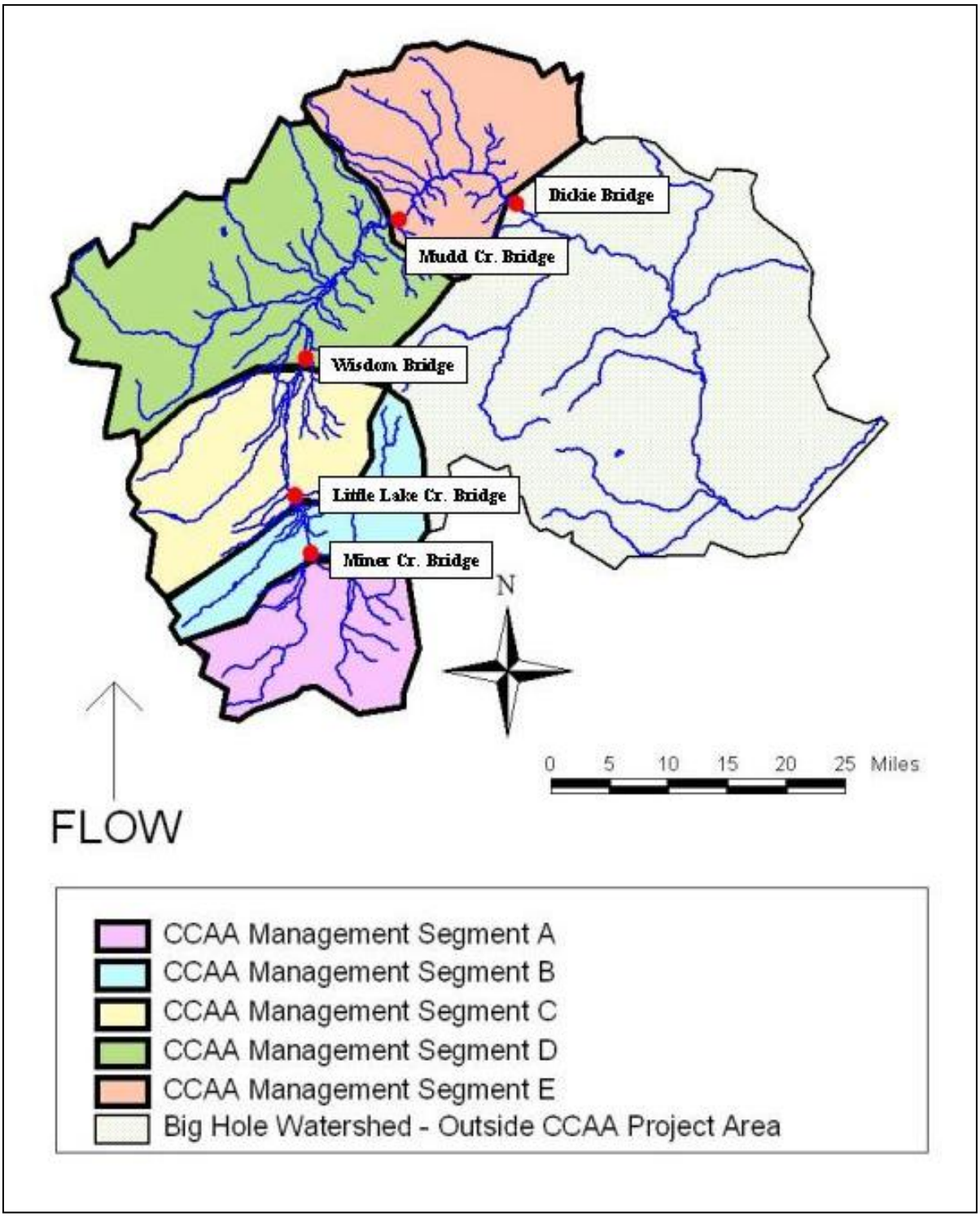

Figure 1. The Big Hole Arctic Grayling CCAA Project Area & Management Segments.

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 2014 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 19th, 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.

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 157,997 acres of private and 7,160 acres of DNRC leased land into the Big Hole Arctic Grayling CCAA (Table 1, Figure 2). Two Certificates of Inclusion were issued in 2014 and Phase 1 of the Agreement is being implemented on these properties. 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.

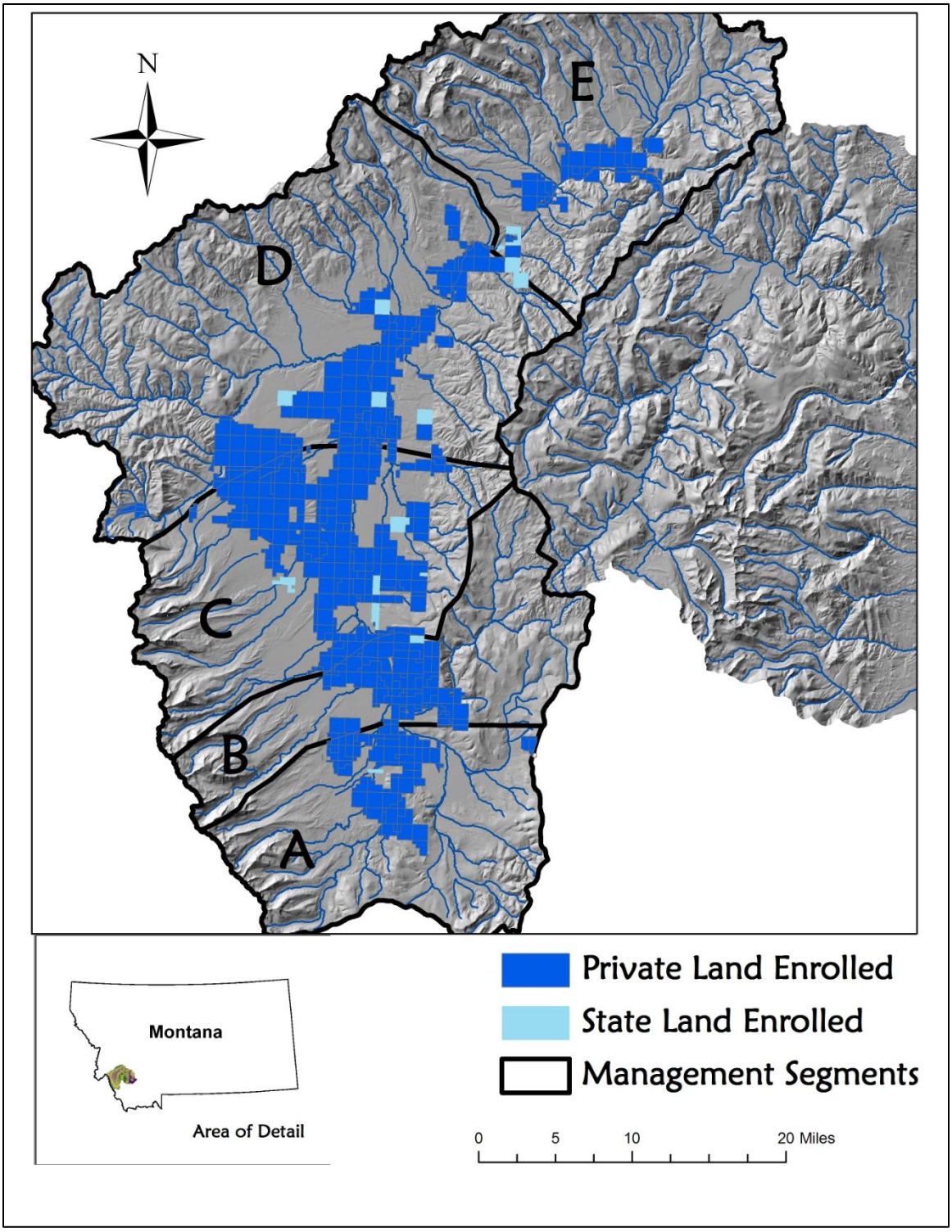

Figure 2. January 1, 2015 area of state and private land enrolled into the Big Hole Arctic Grayling CCAA Program. Enrolled land includes 33 private landowners and 157,278 private acres and 7,160 acres of DNRC leased lands.

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	E	14,970	0	SSP in Draft
	2	C	6,327	640	SSP Complete
	3	C&D	2,825	0	SSP Complete
	4	D	2,812	640	SSP in Draft
	5	E	2,512	640	SSP in Review
	6	A	2,470	400	SSP in Draft
	7	A	680	0	Enrolled
	8	C&D	3,445	0	SSP in Draft
	9	A&B	2,487	0	SSP Complete
	10	C&D	6,817	0	SSP Complete
	11	A, B,C&D	2,752	0	SSP Complete
	12	C	901	0	SSP in Draft
	13	C&D	3,100	0	SSP Complete
	14	C	3,799	0	SSP Complete
	15	B&C	23,208	560	SSP Complete
	16	B&C	1,408	1,600	SSP Complete
	17	A&B	680	0	SSP Complete
	18	C&D	1,114	0	SSP in Draft
	19	A&B	167	0	SSP Complete
	20	D	3,760	0	SSP in Review
	21	E	9,496	560	SSP in Draft
	22	D	8,771	640	SSP in Draft
	23	E	2,092	640	SSP in Draft
	24	B	1,559	0	SSP in Draft
	25	D	1,058	0	SSP in Draft
	26	E	24,281	0	SSP Complete
	27	A	4,678	0	SSP in Review
	28	C	6,520	1,280	SSP in Draft
	29	E	1,468	0	SSP Complete
	30	B	4,230	200	Enrolled
	31	E	333	0	Enrolled
	32	A & B	6,550	0	Enrolled
	33	A	740	0	SSP Complete
Totals	**33**		**157,278**	**7,160**	**164,438**

* 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 into 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: 2, 3, 9-11, 13-19, 26 – 27 and 29 in 2014. 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 2014 the following enrolled properties had approved SSPs during the irrigation season: properties 2, 3, 9-11, 13-19, 26 – 27 and 29. Submitted records are summarized in Table 2.

Table 2. Landowner Compliance Monitoring dates in 2014.

Pre-Season Meeting Date	Compliance Check Dates (2014)	Landowner	Irrigation withdrawals in Compliance with SSP & water rights	Landowner Submitted Diversion Records
5/6/2014	5/21	2	Yes	Yes
	8/21, 26	2	Yes	
5/21/2014	6/1	3	Yes	Yes
	8/20	3	Yes	
5/6/2014	5/20	9	Yes	Pending
	10/6, 16	9	Yes	
5/6/2014	5/20	10	Yes	Yes
	10/6	10	Yes	
5/6/2014	5/7, 8	11	Yes	Yes
	10/7	11	Yes	
5/7/2014	5/29	13	Yes	Pending
	8/26	13	Yes	
May, 2014	5/7, 8	14	Yes	Agency/Water Comm Collected
	9/16	14	Yes	
5/15/2014	Beg. 4/30	15	Yes	Agency/Water Comm Collected
	End 10/28	15	Yes	
May, 2014	5/27	16	Yes	Pending
	8/20	16	Yes	
4/14/2014	5/21	17	Yes	Agency Collected
	10/16	17	Yes	
4/17/2014	7/3	18	Yes	Agency Collected
	10/16	18	Yes	
*	*	19	Yes	Agency Collected
	*	19	Yes	
5/7/2014	7/8	26	Yes	Agency/Water Comm Collected
	8/26	26	Yes	
5/21/2014	5/1**	27	Yes	Agency/Water Comm Collected
	9/16**	27	Yes	
5/7/2014	6/19, 26	29	Yes	Pending
	8/27	29	Yes	

*Landowner has one diversion near Wisdom Bridge. Compliance checks can be and periodically were assessed weekly via drive-by.

**Assessment limited to Rock Creek due to miscommunication with water commissioner.

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 one site-specific conservation plans are currently under implementation for property numbers; 1-3, 9-11, 13-20, 22-24, 26, 27, and 29 and 33 in 2014 (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

To date, FWP has received approval for extensions to complete site-specific plans on 12 properties enrolled in the Big Hole Arctic Grayling CCAA. Extensions provide additional time to complete the SSP and document past and ongoing conservation actions for Arctic Grayling on the property receiving the extension. The deadline for the remaining 12 site-specific plans is May 1, 2015.

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 2014 are reported below.

A. Entrainment Surveys

In 2014, FWP completed entrainment surveys on 11.64 miles of irrigation ditch on 5 enrolled properties (Table 3). A total of 252 Arctic Grayling were captured in one irrigation ditch during entrainment surveys and returned to the Big Hole River. Arctic Grayling were captured during 9 different electrofishing runs in this ditch starting in July and ending in October. All Arctic Grayling captured were 2014 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
7/1/2014	Big Hole River	0.10	0
7/1/2014	Big Hole River	0.95	0
7/2/2014	Big Hole River	0.35	0
7/2/2014	Steel Creek	0.77	0
7/2/2014	Steel Creek	0.60	0
7/7/2014	Big Hole River	0.35	0
7/7/2014	Swamp Creek	1.22	0
7/8/2014	Big Hole River	0.55	9
7/11/2014	Big Hole River	0.40	19
7/14/2014	Big Hole River	0.36	25
7/16/2014	Big Hole River	0.40	11
7/16/2014	Big Hole River	0.52	0
7/16/2014	Warm Springs Creek	0.50	0
7/16/2014	Warm Springs Creek	0.41	0
7/20/2014	Big Hole River	0.40	49
8/4/2014	North Fork BHR	0.80	0
8/4/2014	North Fork BHR	0.32	0
8/5/2014	Big Hole River	0.40	13
9/19/2014	Big Hole River	0.55	78
10/24/2014	Big Hole River	0.55	25
10/25/2014	Big Hole River	1.14	23
	TOTAL	11.64	252.00

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 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 (252) were returned to the Big Hole River

downstream of the diversion for this ditch. Exclusion devices or structure modification will be investigated in 2015, as well as continued entrainment monitoring and rescue operations.

C. Projects to Enhance Fish Passage

In 2014, FWP, NRCS, DNRC and Participating Landowners completed 11 fish passage improvement project (fish ladders, bridges, weirs, culvert replacements, and a siphon; Table 4).

Table 4. Fish passage projects completed in 2014 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
Pintler Creek	Property 28	Fish Ladder
Rock Creek	Property 27	Fish Ladder
Fishtrap Creek	Property 25	Fish Ladder
Swamp Creek	Property 1	Bridge/Culvert Removal
Swamp Creek	Property 1	Bridge/Culvert Removal
Swamp Creek	Property 1	Bridge/Culvert Removal
Swamp Creek	Property 26	Bridge
Little Lake Creek	Property 9	Bridge
Little Lake Creek	Property 9	Bridge
Big Hole River	Property 20	Rock Weir
Swamp Creek	Property 1	Siphon

D. Projects to Enhance Riparian and Stream Channel Habitat

In 2014, FWP partnered with NRCS, USFWS, DNRC and Participating Landowners to implement 5 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 2014 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

Associated Waterbody	Enrolled Landowner	Project Component
Big Hole River	Property 26	Channel Activation
Steel Creek	Property 16	Riparian Fence Repair
Plimpton and Howell Creeks	Property 15	Riparian Fence Repair
Big Hole River	Property 22	Riparian Fence Repair
Steel Creek	Property 16	Hardened Stream Crossings

E. Projects to Improve Streamflows and Irrigation Water Management

In 2014, FWP partnered with NRCS, USFWS, DNRC and Participating Landowners to implement 16 projects on 12 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 2014, 12 enrolled landowners, and one non-enrolled landowner, reduced irrigation diversions that resulted in 260 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 2014 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
Rock Creek	Property 27	Diversion, Headgate and Fish Ladder
Rock Creek	Property 14	Stock Tank and pipeline
Big Lake Creek	Property 1	Stock Well, and Tank
Big Lake Creek	Property 1	Stock Tank Repair
Swamp Creek	Property 1	Solar Powered Stock Well, Tank and Pipeline
Big Hole River	Property 30	Stock Well, Tank and Pipeline
Miner Creek	Property 20	Stock Well and Tank
Big Hole River	Property 20	Headgate and Rock Weir Diversion
Steel Creek	Property 16	Solar Powered Stock Water Well
Fishtrap Creek	Property 25	Stock Water Tank Repair
Engeljarrd Creek	Property 3	Headgate and Weir
Fishtrap Creek	Property 25	Headgate, Diversion, and Weir
Big Hole River	Property 15	Stock Water Tank Repair
Ruby Creek	Property 26	Weir
Englejard Creek	Property 33	Weir
Pintler Creek	Property 28	Headgate, Diversion and Weir

*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).

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 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 2014 fall electrofishing in Governor Creek, 78 young-of-the-year 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.

Arctic Grayling re-colonization in the upper Big Hole River and Governor Creek will continue through 2017 (Details on Re-colonization efforts can be found in the 2010 - 2014 Arctic Grayling Monitoring Report). Once initiated, recolonization efforts in Twin Lake, Wise River and Trail Creek will continue for 5 years at each site.

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 2014, 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 8.8 miles in tributaries (Table 7). Additional surveys included 1.7 miles of mainstem reaches and 6.6 miles of tributary reaches. A total of 1,843 fish were captured during fall 2014 electrofishing surveys including Arctic Grayling, brook trout, brown trout, rainbow trout, and burbot. During these surveys, 277 were captured, of which 133 were young-of-the-year.

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 CCAA (A)	2.14 (1.33)	0	191	1	10	13
Big Hole Arctic Grayling CCAA (B)	4.04 (2.51)	0	139	3	119	1
Little Lake Creek	2.85 (1.77)	0	3	1	45	1
Big Hole Arctic Grayling CCAA (C)	10.17 (6.32)	3	39	2	19	2
Big Hole Arctic Grayling CCAA (D)	9.38 (5.83)	13	8	8	20	4
Big Hole Arctic Grayling CCAA (E)	5.28 (3.28)	0	2	35	30	2
Total	33.86 (21.04)	16	382	50	243	23

Big Hole Tributary Reach	Reach Length Kilometers (Miles)	Arctic Grayling	Brook Trout	Rainbow Trout	Brown Trout	Burbot
Governor Creek (A)	2.46 (1.53)	93	164	0	75	1
Miner Creek (B)	0.97 (0.60)	0	7	0	4	1
Rock Creek (C)	4.60 (2.86)	19	79	0	2	7
Steel Creek (D)	4.68 (2.91)	43	320	1	7	31
Swamp Creek	4.33 (2.69)	43	157	2	10	31
Plimpton Creek	1.63 (1.01)	1	na	na	na	na
Howell Creek - upper	0.82 (0.51)	10	na	na	na	na
Howell Creek – lower	0.77 (0.48)	10	na	na	na	na
Pintlar Creek	0.98 (0.61)	10	na	na	na	na
Squaw Creek	0.51 (0.32)	10	na	na	na	na
LaMarche Creek	1.64 (1.02)	10	66	6	0	6
Deep Creek (E)	2.27 (1.41)	12	25	41	17	0
Total	25.66 (15.95)	261	818	50	115	77

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 – 2014 are shown in Figure 4.

B. Stream Temperature Monitoring

In 2014, 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, 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, La Marche Creek, and Deep Creek.

Stream temperature data were recorded at 60-minute intervals from May 8 through October 1 at Big Hole Arctic Grayling CCAA monitoring sites, and May 20 through October 1 for the Swamp Creek and La Marche Creek monitoring sites. Data were summarized as daily minimum, maximum and mean, maximum and mean for the monitoring period (May 1 or May 20 through October 1), 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).

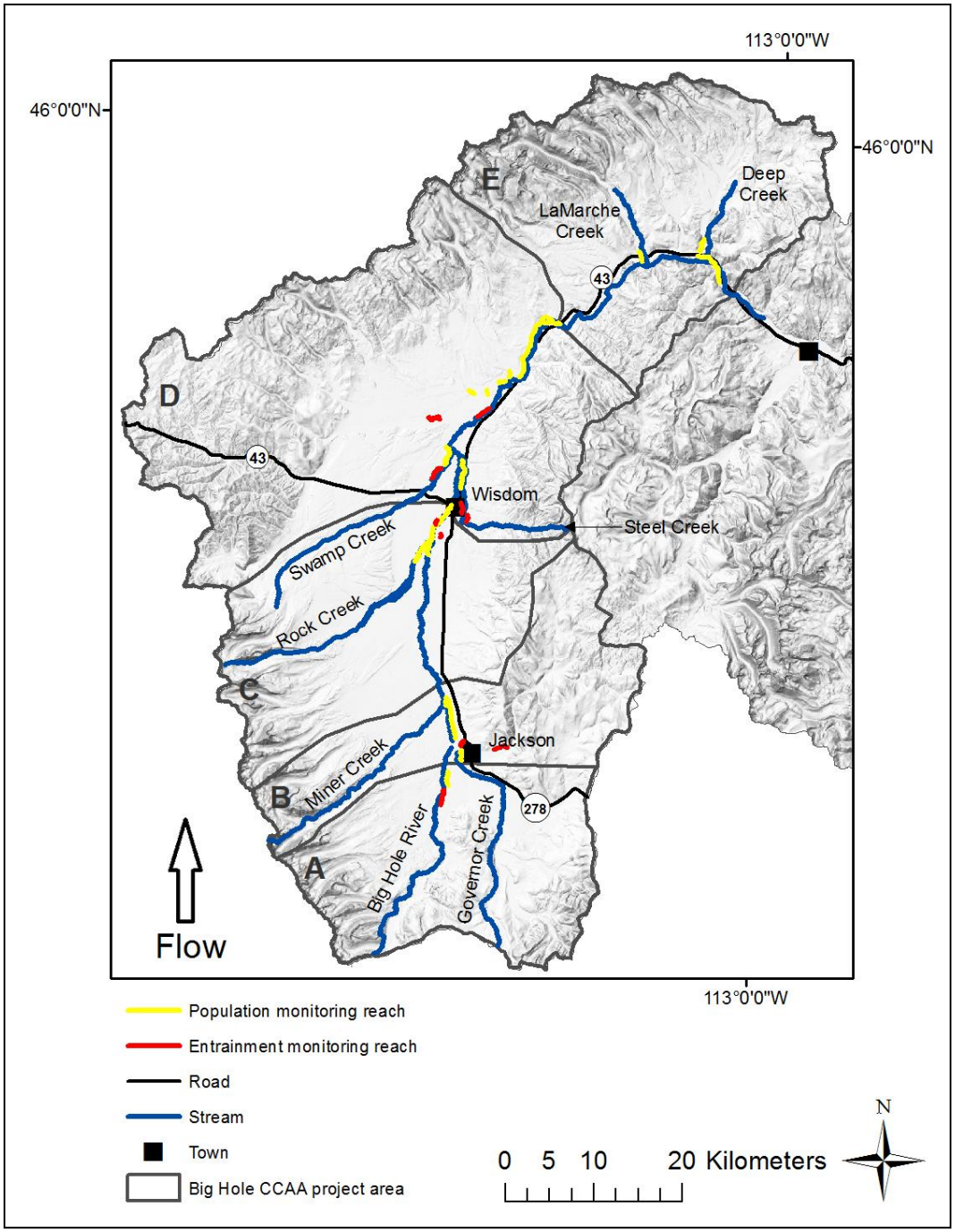

Figure 3. Big Hole River and tributary fish population monitoring reaches.

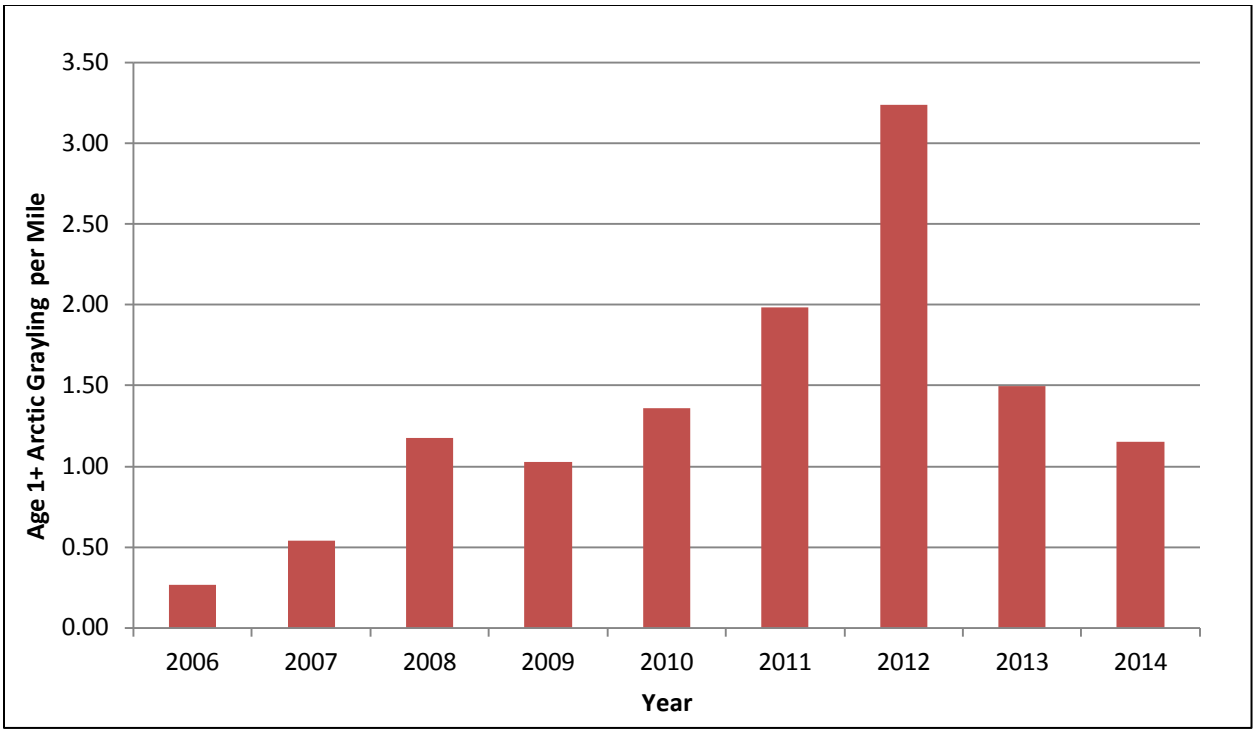

Figure 4. Population abundance trend of age-1 and older Arctic Grayling based on catch-per-unit-effort (/mile) data from the 10 CCAA monitoring reaches from 2006 – 2014.

Table 8. Stream temperature monitoring results for 2014.

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	9.9 (49.8)	17.9 (64.2)	0
BHR CCAA (A)	11.9 (53.4)	20.8 (69.4)	0
Governor Creek (A)	13.6 (56.4)	24.8 (76.7)	0
BHR CCAA (B)	13.0 (55.4)	21.7 (71.1)	0
Miner Creek (B)	12.9 (55.2)	22.1 (71.7)	0
BHR CCAA (C)	14.6 (58.3)	23.9 (75.0)	0
Rock Creek (C)	13.7 (56.7)	21.6 (70.9)	0
BHR CCAA (D)	15.2 (59.4)	24.1 (75.4)	0
Steel Creek (D)*	14.8 (58.7)	24.9 (76.8)	0
Swamp Creek	15.1 (59.1)	23.6 (74.5)	0
BHR CCAA (E)	14.5 (58.1)	23.4 (74.1)	0
La Marche Creek	10.3 (50.6)	19.4 (66.9)	0
Deep Creek (E)	12.1 (53.8)	21.7 (71.1)	0

* Steel Creek water temperature data was summarized for the period May 1 through August 1.

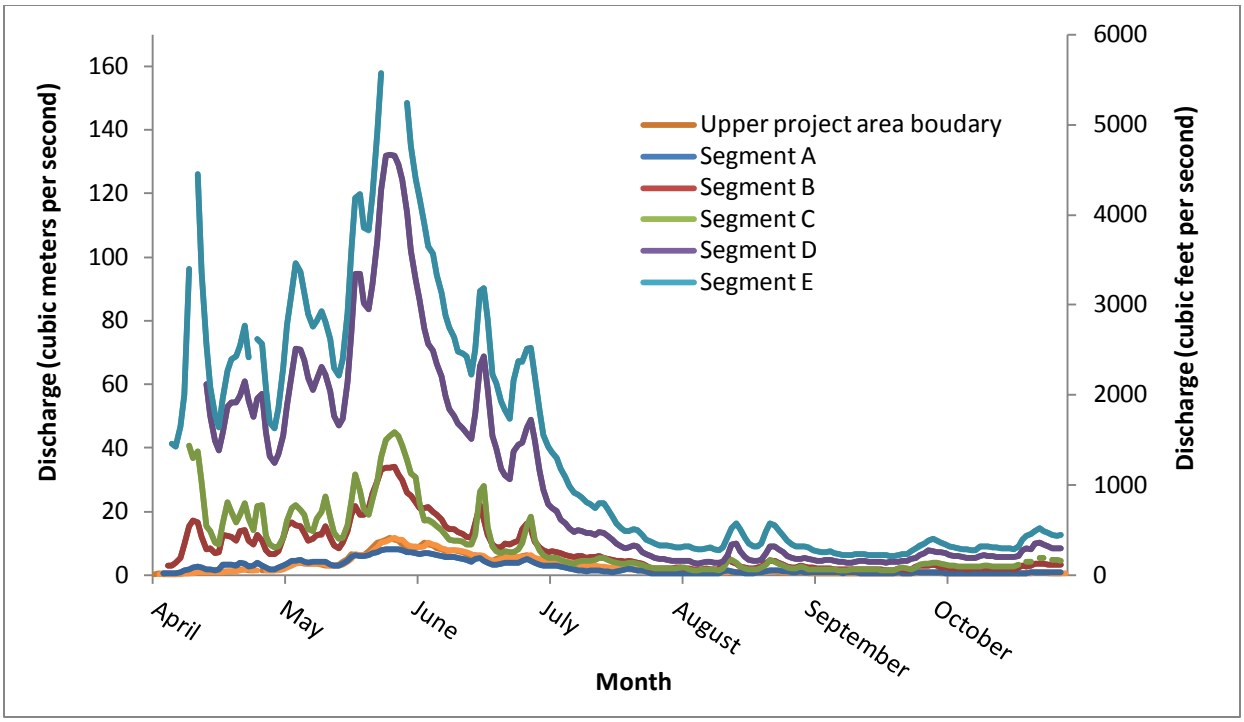

Figure 5. Stream discharge data collected from the Big Hole River at real-time gaging stations located at the upper Big Hole Arctic Grayling CCAA project area boundary (Saginaw Bridge) and the lower boundary of each Big Hole Arctic Grayling CCAA management segment (A through E) in 2014.

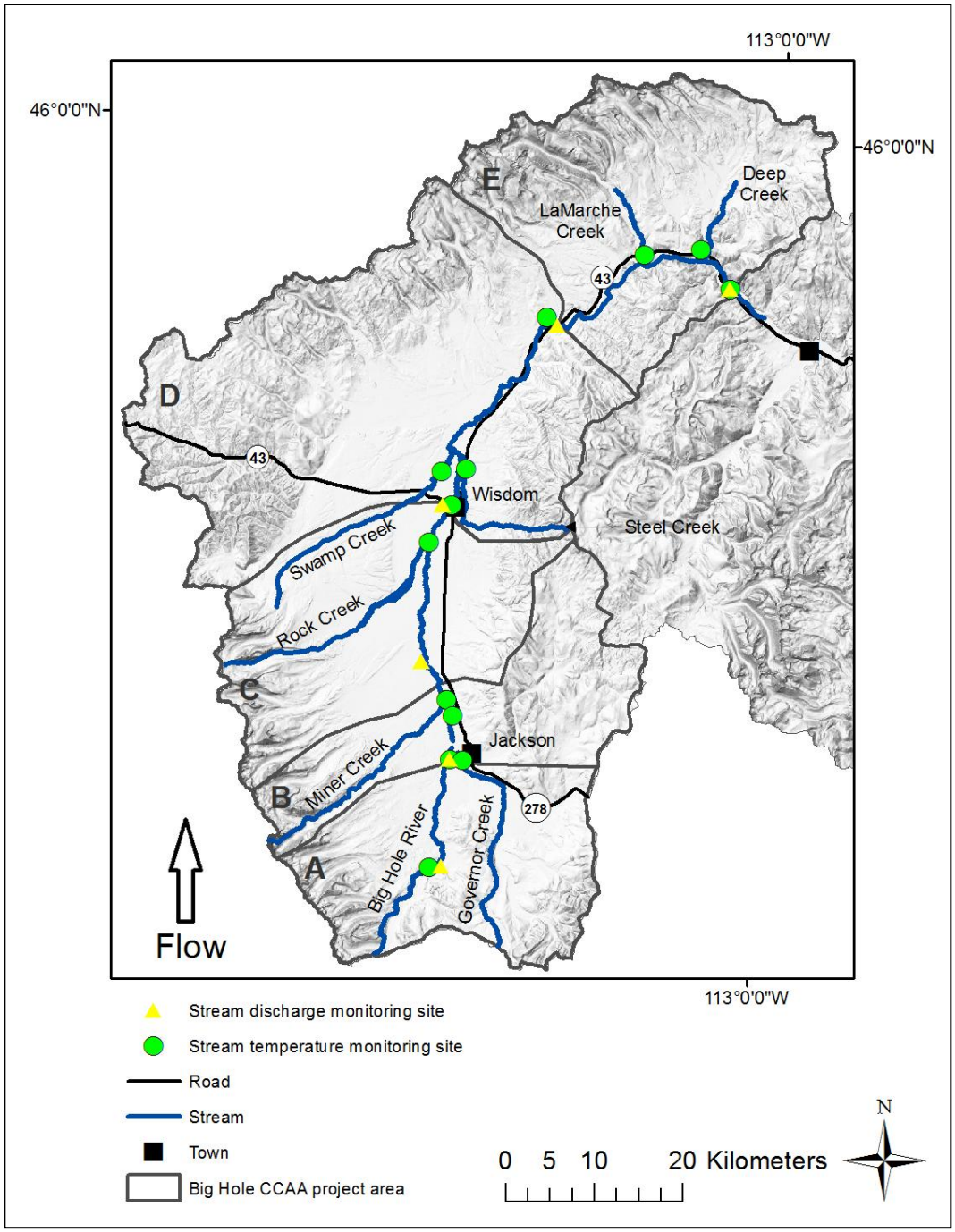

Figure 6. Stream temperature (green circle) and stream discharge (yellow triangle) monitoring sites located in the Big Hole Arctic Grayling CCAA project area in 2014.

C. Stream Morphology Parameter Monitoring

In 2006, ten permanent channel cross sections were established within each of the 10 population monitoring reaches (Figure 7). Cross sections are repeated every 2 years, and results will be analyzed after five years of data has been collected (2014). Surveys on each of the 10 stream reaches will be 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 will be 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.

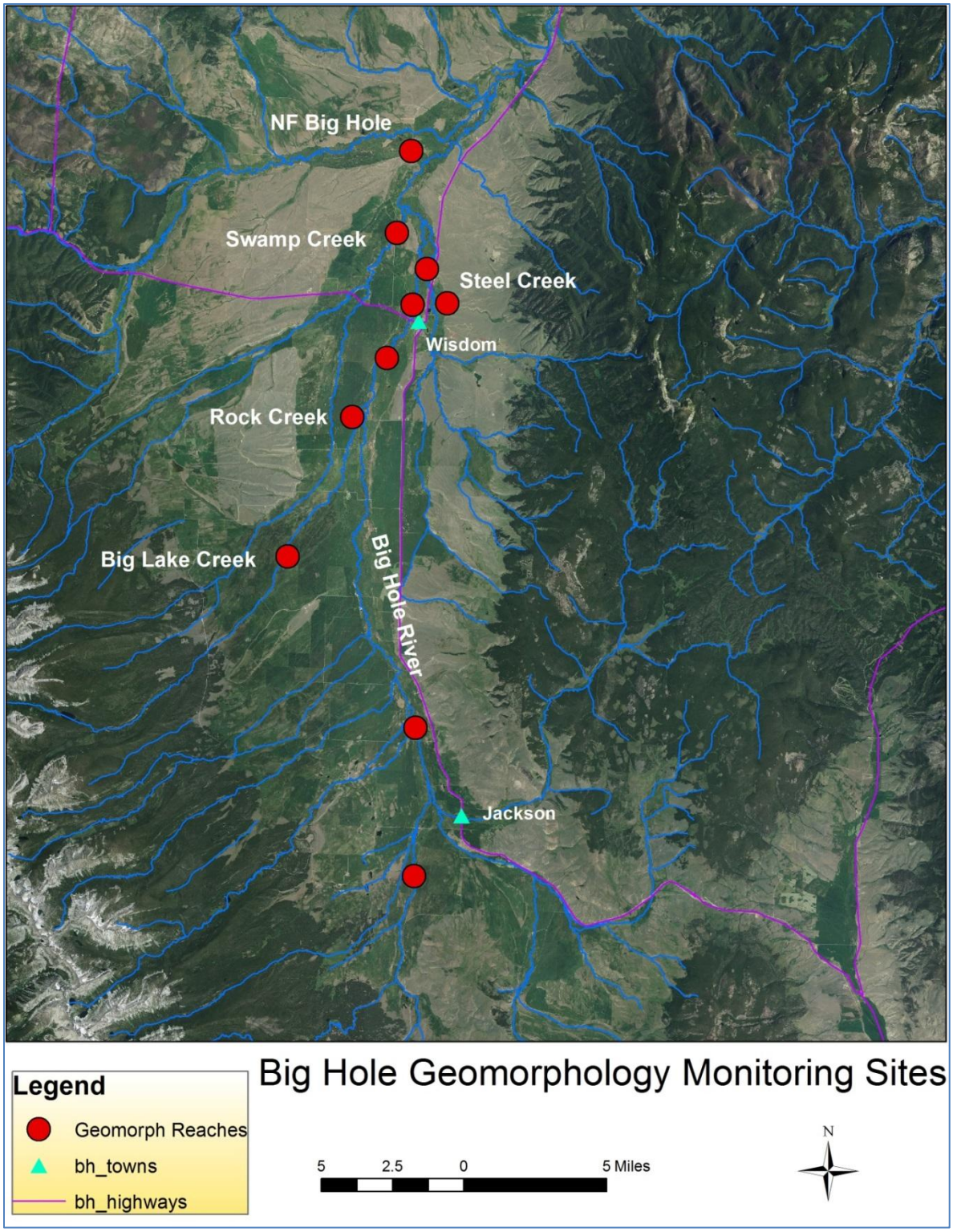

Figure 7. Stream geomorphology will be monitored at ten stream reaches which have either been restored or have a change in management to improve habitat for Arctic Grayling through the CCAA Program.

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

In concert with the two USGS real-time streamflow gages located at management segments C and D, DNRC continued to operate and maintain three real-time streamflow gages located at management segments A, B, and E (Figure 6). 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 2014, the Big Hole basin snowpack was 151% of average and precipitation was 105% of average. Above average snowpack and precipitation resulted in Big Hole Arctic Grayling CCAA stream discharge targets being met 98% of the time (FWP and USFWS 2006) (Figure 8). Management segment C spent 16 days below the 1.7 cubic meters per second (cms; 60 cubic feet per second (cfs)) stream discharge target, with a low of 1.5 cms (53 cfs) occurring on September 11. Landowners enrolled in the Big Hole Arctic Grayling CCAA contributed to meeting stream discharge targets by returning 2.1 cms (73 cfs) of irrigation and stock water to the Big Hole River and tributaries during periods when the river was below or near minimum targets.

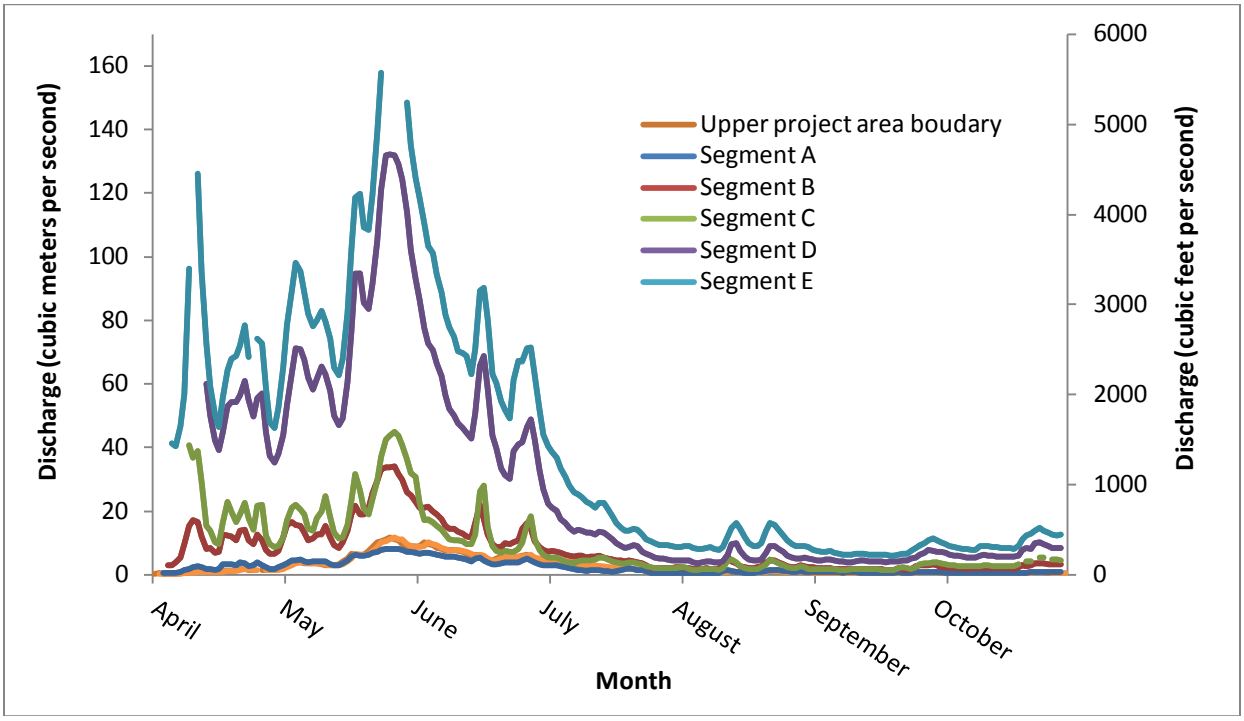

Figure 8. Stream discharge data collected from the Big Hole River at real-time gaging stations located at the upper Big Hole Arctic Grayling CCAA project area boundary (Saginaw Bridge) and the lower boundary of each Big Hole Arctic Grayling CCAA management segment (A through E) in 2014.

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: 2, 3, 9-11, 13-19, 26 – 27 and 29. All landowners with approved site-

specific plans were in compliance with their plan in 2014. FWP field personnel check the amount of water being diverted by the landowners, the grazing of livestock within riparian pastures, 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 grazing 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).

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 2014, no riparian habitat required re-assessment based on Implementation Schedules in completed site-specific plans.

VIII. Progress in Implementing Approved Site-Specific Plans

Fifteen site specific plans were approved and under implementation by enrolled landowners in 2014 (several landowners signed their plans in the fall of 2014, so conservation actions will be included in the 2015 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 2014 for Properties 2, 3, 9-11, 13-19, 26 – 27 and 29 (Tables 11 - 27).

Table 11. Summary of actions in 2014 on Property 2 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	Enrolled property	2009	2009-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2009	2009-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	complete	complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2009	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River A and Governor Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2013	2008 and 2013

Table 12. Summary of actions in 2014 on Property 3 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	Enrolled property	2013	2013-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2013	2013-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	By 2018	Completed one headgate and two measuring devices
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2013	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River A and Governor Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2013	2008 and 2013
Assessment of irrigation infrastructure needs	Enrolled property	2013	2013

Table 13. Summary of actions in 2014 on Property 9 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	Enrolled property	2010	2010-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	2010-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2011	Implemented according to the Entrainment Monitoring

			Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River C and Rock Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2011, 2016	2011
Removal of fish barriers	Enrolled property	2014	2014 – Installed 2 bridges, culvert barriers removed

Table 14. Summary of actions in 2014 on Property 10 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	Enrolled property	2010	2010-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	2010-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2009	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River B and Miner Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2008, 2013, 2018	2008, 2013
Removal of fish barriers	Enrolled property	2013	2013 – Installed 4 fish ladders

Table 15. Summary of actions in 2014 on Property 11 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	Enrolled property	2011	2011-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2011	2011-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	2016	
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2013	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River E and Deep Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2006, 2011, 2016	2006, 2011
Installation of addition riparian fencing	Connor Gulch and French Creek	2011	2011

Table 16. Summary of actions in 2014 on Property 13 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	Enrolled property	2008	2008-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2008	2008-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2009	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River A and Governor Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2007, 2013, 2018	2007, 2013

Table 17. Summary of actions in 2014 on Property 14 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	Enrolled property	2009	2009-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2009	2009-2014
Improvements to irrigation control structures and installation of flow measuring devices	Big Lake Creek and Rock Creek	2013	2015
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2011	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River C and Rock Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2006, 2011, 2016	2006, 2011
Installation of alternative sources of stock water	Rock Creek pastures	2014	2014
Installation of riparian fencing	Rock Creek pastures	2014	2013

Table 18. Summary of actions in 2014 on Property 15, McDowell Ranch identified in the Implementation Schedule of the Homestead, McDowell, North Fork (HMNF) Units site-specific plan.

Conservation Measure	Location	Expected Date of Implementation	Actual Date of Implementation
Initiate conservation measures to improve streamflows	Enrolled property	2012	2012-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2012	2012-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2012	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River C and Rock Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2006, 2012, 2017	2006, 2012
Noxious weed management	Riparian pastures	2008 - annually	2008 - 2014
Installation of riparian fencing	Swamp Creek pastures	2012	2012

Table 19. Summary of actions in 2014 on Property 15 property identified in the Implementation Schedule of the Miller Unit site-specific plan.

Conservation Measure	Location	Expected Date of Implementation	Actual Date of Implementation
Initiate conservation measures to improve streamflows	Enrolled property	2012	2012-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2012	2012-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2012	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River C and Rock Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2006, 2012, 2017	2006, 2012
Noxious weed management	Riparian pastures	2008 - annually	2008 - 2014

Table 20. Summary of actions in 2014 on Property 15 property identified in the Implementation Schedule of the Buffalo Unit site-specific plan.

Conservation Measure	Location	Expected Date of Implementation	Actual Date of Implementation
Initiate conservation measures to improve streamflows	Enrolled property	2012	2012-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2012	2012-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2012 and 2013	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments and Riparian Complex Monitoring	Riparian Pastures	2006, 2012, 2017	2006, 2012
Installation of alternative sources of stock water	Plimpton and Howell Creek pastures	2015	
Installation of riparian fencing	Plimpton and Howell Creek pastures	2011	2011

Table 21. Summary of actions in 2014 on Property 16 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	Enrolled property	2013	2013-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2013	2013-2014
Improvements to irrigation control structures and installation of flow measuring devices	South Fork of Steel Creek – measuring device needed	2015	
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2013	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2008, 2013, 2018	2008, 2013
Installation of alternative sources of stock water	Steel Creek	2015	2014
Installation of riparian fencing	Steel Creek Creek pastures	2011	2011

Table 22. Summary of actions in 2014 on Property 17 property 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	Enrolled property	2013	2013-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2013	2013-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2013	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2008, 2013, 2018	2008, 2013

Table 23. Summary of actions in 2014 on Property 18 property 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	Enrolled property	2014	2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2014	2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Inventory all PODs and structures by 2015 – installation by 2019	
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed by 2018	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2013, 2018	2013
Riparian management plan	Riparian pastures	2015	

Table 24. Summary of actions in 2014 on Property 19 property 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	Enrolled property	2012	2012-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2012	2012-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	Complete	Complete
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2012	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2007, 2012, 2017	2007, 2012

Table 25. Summary of actions in 2014 on Property 26 property 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	Enrolled property	2013	2013-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2013	2013-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	2016	
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2011	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River A, B, C and D and Governor Creek, Miner Creek, Rock Creek and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2008, 2013, 2018	2008, 2013
Installation of fish passage	PODs without passage	2018	

Table 26. Summary of actions in 2014 on Property 27 property 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	Enrolled property	2013	2013-2014

improve streamflows			
Compliance Monitoring	Enrolled property	Bi-annually starting in 2013	2013-2014
Improvements to irrigation control structures and installation of flow measuring devices	PODs on enrolled property	2017	Installed one new headgate with fish ladder and measuring device in 2014
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed by 2015	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River C and Rock Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2008, 2013, 2018	2008, 2013
Installation of fish passage	PODs without passage	2017	

Table 27. Summary of actions in 2014 on Property 29 property 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	Enrolled property	2012	2012-2014
Compliance Monitoring	Enrolled property	Bi-annually starting in 2012	2012-2014
Improvements to irrigation control structures and installation of flow measuring devices	2 remaining structures needed at PODs on enrolled property	2015	
Entrainment Surveys	Selected irrigation ditches on enrolled property	Initial surveys completed in 2012	Implemented according to the Entrainment Monitoring Protocol (CCAA, 2006)
Population Monitoring	CCAA Reaches: Big Hole River D and Steel Creek	2006-2014	2006-2014
Riparian Re-assessments	Riparian Pastures	2007, 2012, 2017	2007, 2012
Installation of fish passage	PODs without passage	2017	

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 2014.

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 2014.

XI. Literature Cited

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XII. Acknowledgements

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