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

Montana Fish, Wildlife & Parks

2016 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 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).

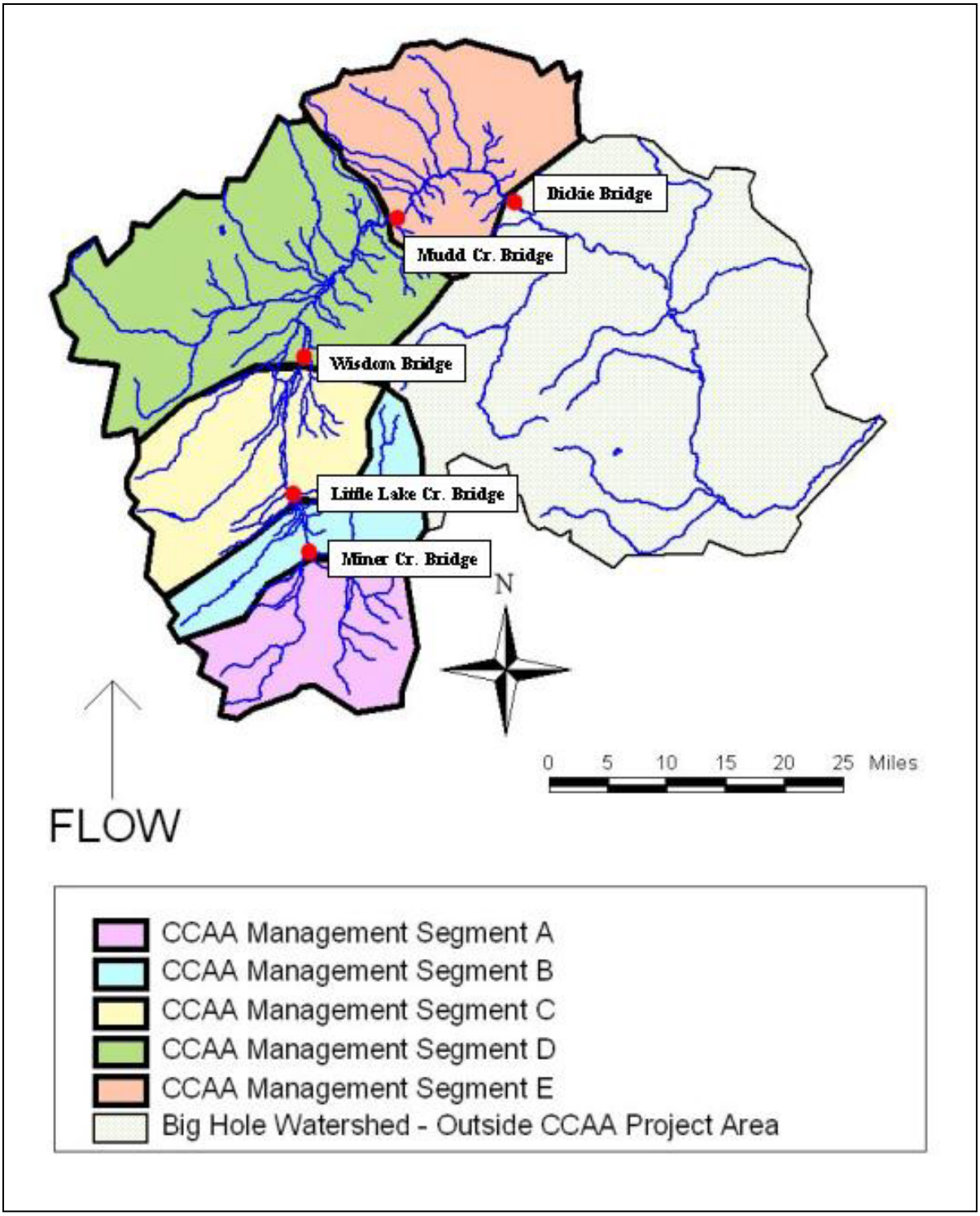

Figure 1. The Big Hole Arctic Grayling CCAA Project Area & Management Segments.

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 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. On February 5th 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. On August 30th, 2016 Montana Federal District Court Judge Haddon heard the case *Center for Biological Diversity v. Jewell*, the case in which Plaintiffs challenged the USFWS' 2014 finding that listing of the Upper Missouri Distinct Population Segment of Arctic grayling was not warranted. On September 2, 2016 Judge Haddon granted the summary judgment motions of the USFWS and State of Montana/FWP; meaning that the USFWS not warranted decision was

upheld. On October 21, 2016, the Plaintiffs filed a notice of appeal of the Arctic Grayling case with the 9th Circuit.

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 151,013 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.

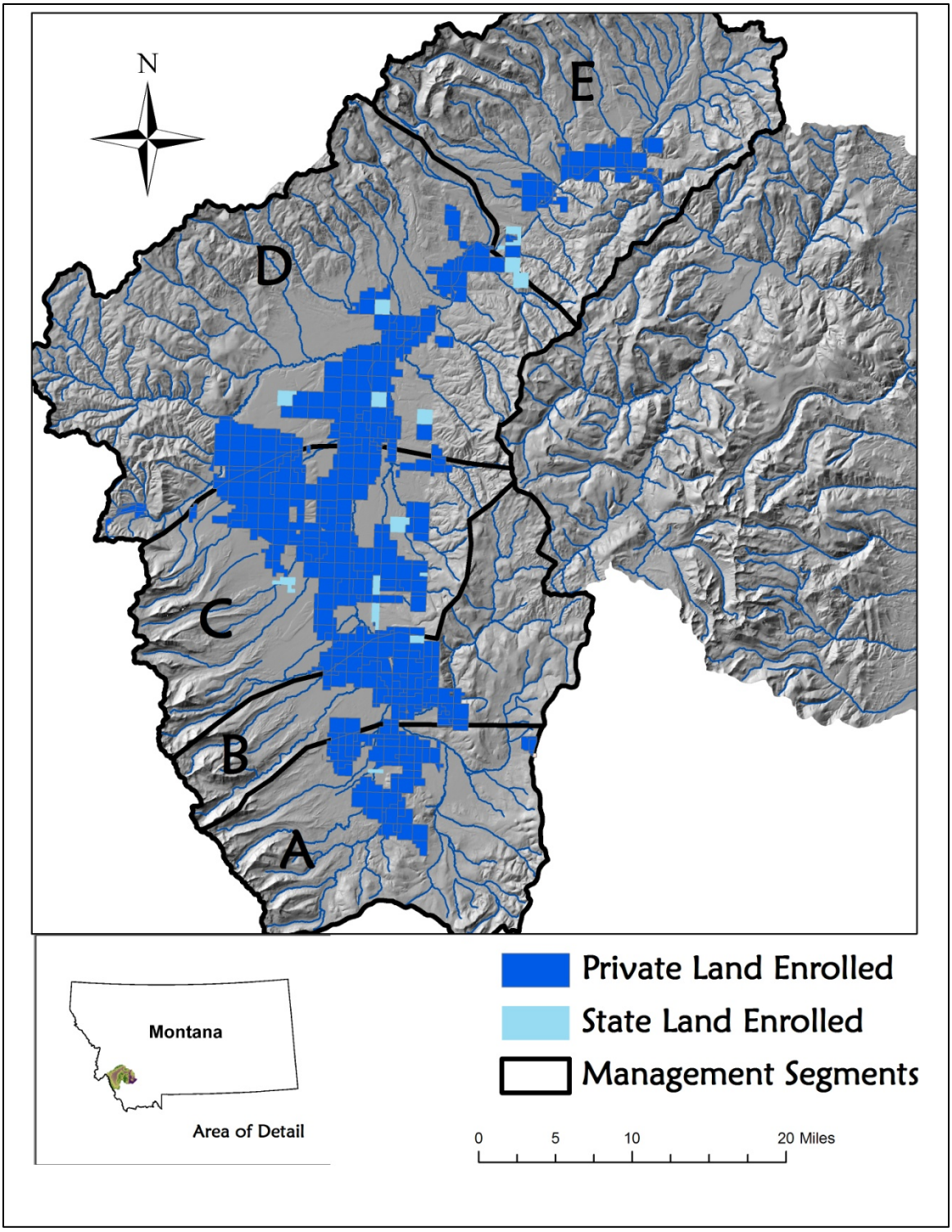

Figure 2. December 31, 2016, area of state and private land enrolled into the Big Hole Arctic Grayling CCAA Program. Enrolled land includes 33 private landowners and 151, 013 private acres and 6,830 acres of DNRC leased lands.

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 Complete
	5	D	2,512	640	SSP Complete
	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 Complete
	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 Complete
	28	D	1,468		SSP Complete
	29	A & B	4,230	200	Enrolled
	30	E	333		Enrolled
	31	B	6,550		SSP Complete**
	32	A	740		SSP Complete
	33	A	1,052		SSP Complete
Totals	**33**		154,938	**6,830**	**151,013**

* Property names are on file at Montana Fish, Wildlife & Park's Dillon Field Office.
** This property is split in to two separate ranches, one having a signed SSP and the other having SSP in Draft.

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 31 - 32 in 2016. 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 2016 the following enrolled properties had approved SSPs during the irrigation season: properties 1-5, 8-10, 12-19, 21-28, and 31 - 32. Submitted records are summarized in Table 2.

Table 2. Landowner Compliance Monitoring dates in 2016.

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
		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
		27		
4/15	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-six site-specific conservation plans are currently under implementation for property numbers; 1-5, 8-10, 12-19, 21-28, and 31 - 32 in 2016 (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 2016 are reported below.

A. Entrainment Surveys

In 2016, FWP completed entrainment surveys on 10.22 miles of irrigation ditch on 9 enrolled properties (Table 3). A total of 2 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 2016 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

Date	SOURCE	Miles	Number of Arctic Grayling rescued
7/1/2016	Big Hole River	0.27	0
7/1/2016	Deep Creek	0.22	0
7/1/2016	Deep Creek	0.44	0
7/1/2016	Big Hole River	0.46	0
7/1/2016	East Fork Fishtrap Crk	0.26	0
7/4/2016	Berry Crk	0.44	0
7/4/2016	Big Hole River	0.48	0
7/4/2016	Big Hole River	0.24	0
7/4/2016	Big Hole River	0.97	0
7/12/2016	Big Hole River	0.46	0
7/12/2016	Warm Springs Creek	0.48	0
7/12/2016	Bull Creek	0.51	0
7/12/2016	Warm Springs Creek	0.34	0
7/12/2016	Warm Springs Creek	0.27	0
7/12/2016	Big Hole River	0.29	0
7/12/2016	Big Hole River	0.35	0
7/13/2016	Big Hole River	0.56	0
7/13/2016	Governor Creek	0.31	0
7/13/2016	Big Hole River	0.52	0
7/13/2016	Big Hole River	0.60	0
7/13/2016	Big Hole River	0.67	0
7/13/2016	Big Hole River	0.42	0
7/25/2016	Rock Creek	0.24	0
9/21/2016	Big Hole River	0.42	2
		10.22	2.00

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 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, structure modification and irrigation timing were investigated in 2016. Timing of irrigation water diverted in to this ditch was adjusted to accommodate Arctic Grayling spawning periods and only 2 Arctic Grayling were captured in 2016. Monitoring will continue to determine if entrainment can be reduced or eliminated through continued adjustments in irrigation timing.

C. Projects to Enhance Fish Passage

In 2016, FWP, NRCS, DNRC and Participating Landowners completed 7 fish passage improvement project (fish ladders and bridges; Table 4).

Table 4. Fish passage projects completed in 2016 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
Swamp Creek	Property 24	Fish Ladder
Swamp Creek	Property 24	Fish Ladder
Big Hole River Side Channel	Property 25	Bridge
Big Lake Creek	Property 25	Bridge
Pintlar Creek	Property 27	2 Fish Ladders
Squaw Creek	Property 27	2 Fish Ladders
Big Lake	Property 26	1 Fish Ladder

D. Projects to Enhance Riparian and Stream Channel Habitat

In 2016, 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 2016 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

Associated Waterbody	Enrolled Landowner	Project Component
Swamp Creek	Property 14	Riparian Fence
Deep Creek	Property 10	Riparian Fence
French Creek	Property 10	Riparian Fence
Big Hole River	Property 22	Illegal Ditch Plug
Big Hole River	Property 19	Channel Restoration Design

E. Projects to Improve Streamflows and Irrigation Water Management

In 2016, FWP partnered with NRCS, USFWS, DNRC, the Big Hole River Foundation and Participating Landowners to implement X projects on X 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 2016, 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 2016 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
Squaw Creek	Property 27	1 Headgate, 1 Diversion
Big Lake Creek	Property 26	2 Headgates, 2 Diversions
Pintlar Creek	Property 27	2 Headgates, 2 Diversions
Swamp Creek	Property 24	2 Diversions, 2 Headgates
Big Lake Creek	Property 1	Solar Powered Stock Tanks and Well
Little Lake Creek	Property 19	1 Stock Well, and 2 Tanks
LaMarche Creek	Property 11	Stock Well Repair
Moose Creek	Property 1	1 Headgate and 1 Diversion
Mudd Creek	Property 27	1 Headgate and 1 Diversion Repair

*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 - 2016 Arctic Grayling monitoring Report). Monitoring efforts in 2015 found natural reproduction in Rock Creek, marking two years in a row. Monitoring efforts in 2016 did not find grayling in Rock Creek. Very few fish of any species were seen or captured during monitoring efforts likely due to extremely low flows in Rock Creek during the summer of 2016.

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 - 2017 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 2016, 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 6.4 miles of tributary reaches. A total of 1,509 fish were captured during fall 2016 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 in 2016.

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	75	2	6	15
Big Hole Arctic Grayling CCAA (B)	2.51	0	15	0	186	4
Big Hole Arctic Grayling CCAA (C)	6.32	11	24	3	133	2
Big Hole Arctic Grayling CCAA (D)	5.83	15	2	12	18	1
Big Hole Arctic Grayling CCAA (E)	3.28	5	1	54	29	1
Total	19.27	31	117	71	372	23

Big Hole Tributary Reach	Reach Length Kilometers (Miles)	Arctic Grayling	Brook Trout	Rainbow Trout	Brown Trout	Burbot
Governor Creek (A)	1.05	1	107	0	44	6
Miner Creek (B)	0.60	0	22	0	3	3
Rock Creek (C)	2.86	0	NA	NA	NA	NA
Steel Creek (D)	2.91	35	126	0	8	49
Deep Creek (E)	1.41	10	19	36	22	13
Total	8.83	46	274	36	77	71

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 – 2016 are shown in Figure 4.

B. Stream Temperature Monitoring

In 2016, FWP collected stream temperature data at 11 locations (six mainstem and five 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 one additional mainstem site (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, and Deep Creek. Data loggers at the Mudd Creek Bridge and Dickie Bridge were removed or lost during high flows.

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

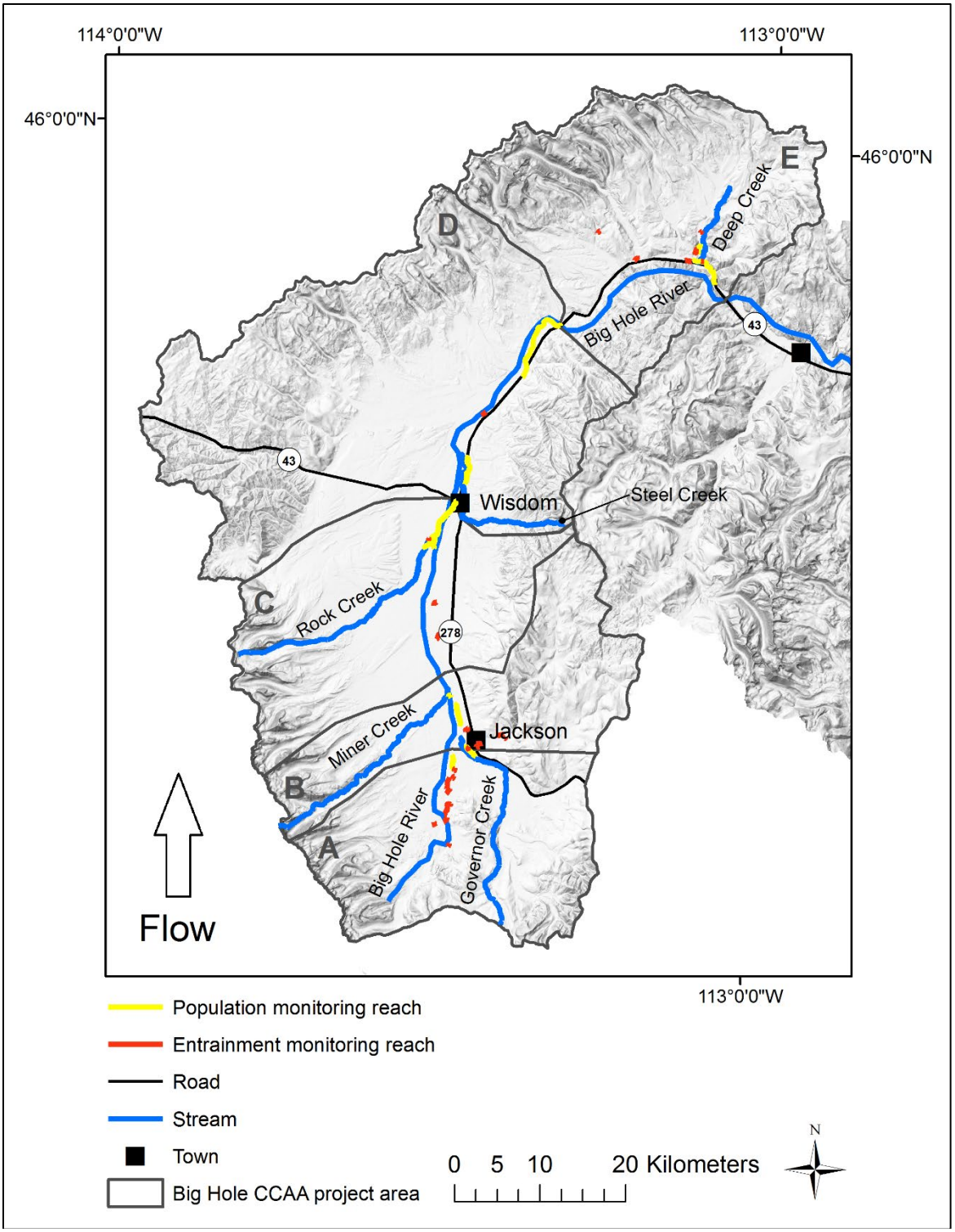

Figure 3. Big Hole River and tributary fish population monitoring reaches.

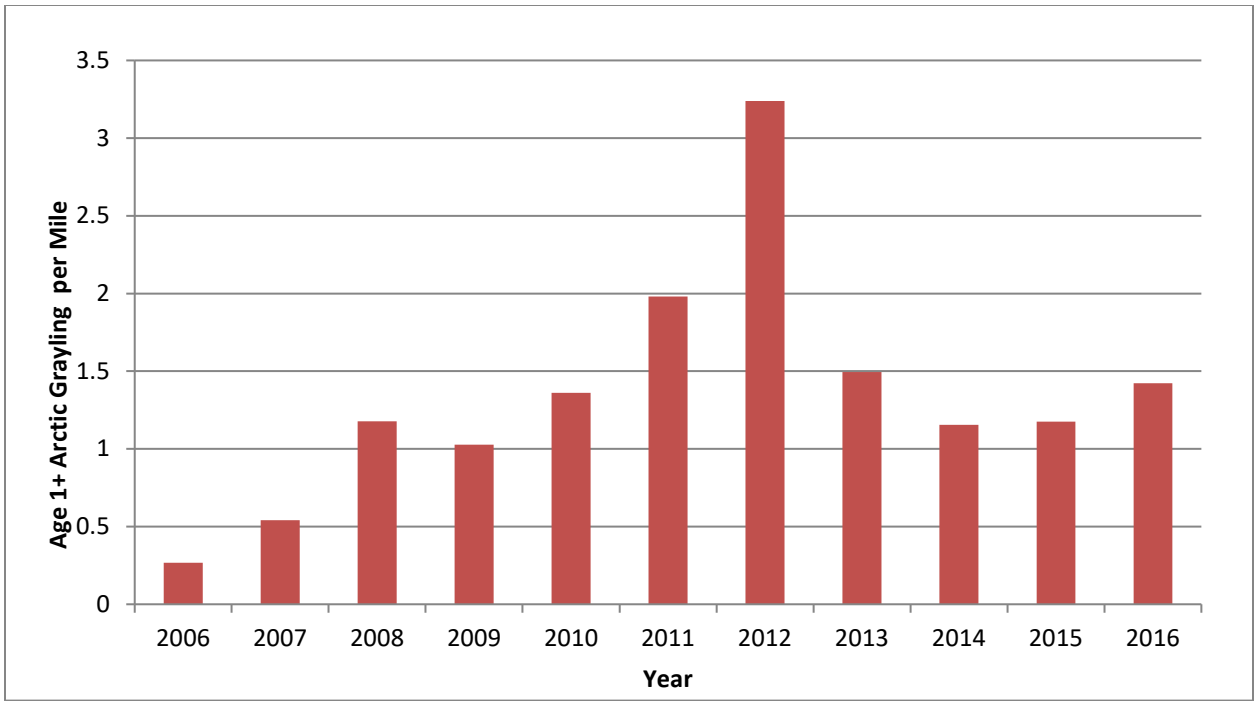

Figure 4. Population abundance trend of age-1 and older Arctic Grayling based on catch-per-unit-effort (/mile) data from the 10 CCAA monitoring reaches from 2006 – 2016.

Table 8. Stream temperature monitoring results for 2016.

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	10.7 (51.2)	20.7 (69.2)	0
BHR CCAA (A)	11.8 (53.3)	21.9 (71.4)	0
Governor Creek (A)	13.2 (55.8)	25.4 (77.7)	2
BHR CCAA (B)	12.9 (55.3)	19.8 (67.7)	0
Miner Creek (B)	13.1 (55.6)	25.1 (77.1)	2
BHR CCAA (C)	14.4 (58.0)	25.4 (77.7)	4
Rock Creek (C)	12.9 (55.3)	22.2 (71.9)	0
BHR CCAA (D)	NA	NA	NA
Steel Creek (D)	14.2 (57.6)	21.7 (71.1)	0
BHR CCAA (E)	NA	NA	NA
Deep Creek (E)	12.6 (54.7)	23.4 (74.1)	0

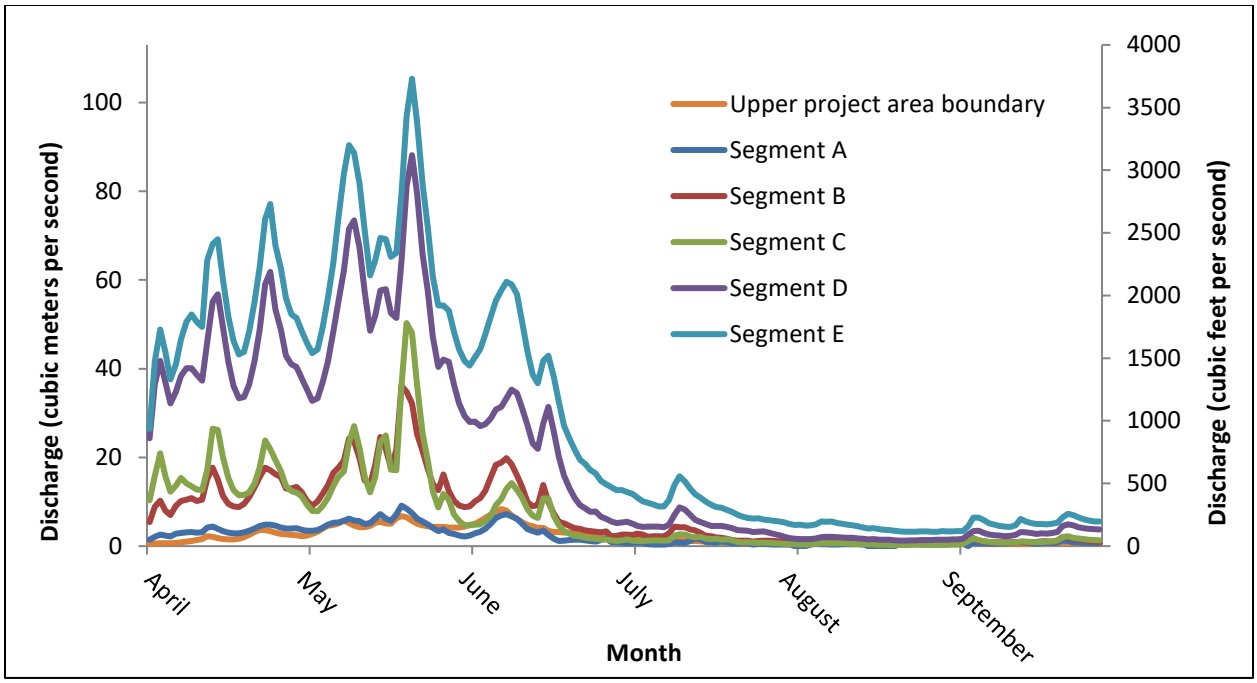

Figure 5. Stream discharge data collected from the Big Hole River at real-time gaging stations located at the upper Big Hole Arctic Grayling CCAA project area boundary (Saginaw Bridge) and the lower boundary of each Big Hole Arctic Grayling CCAA management segment (A through E) in 2016.

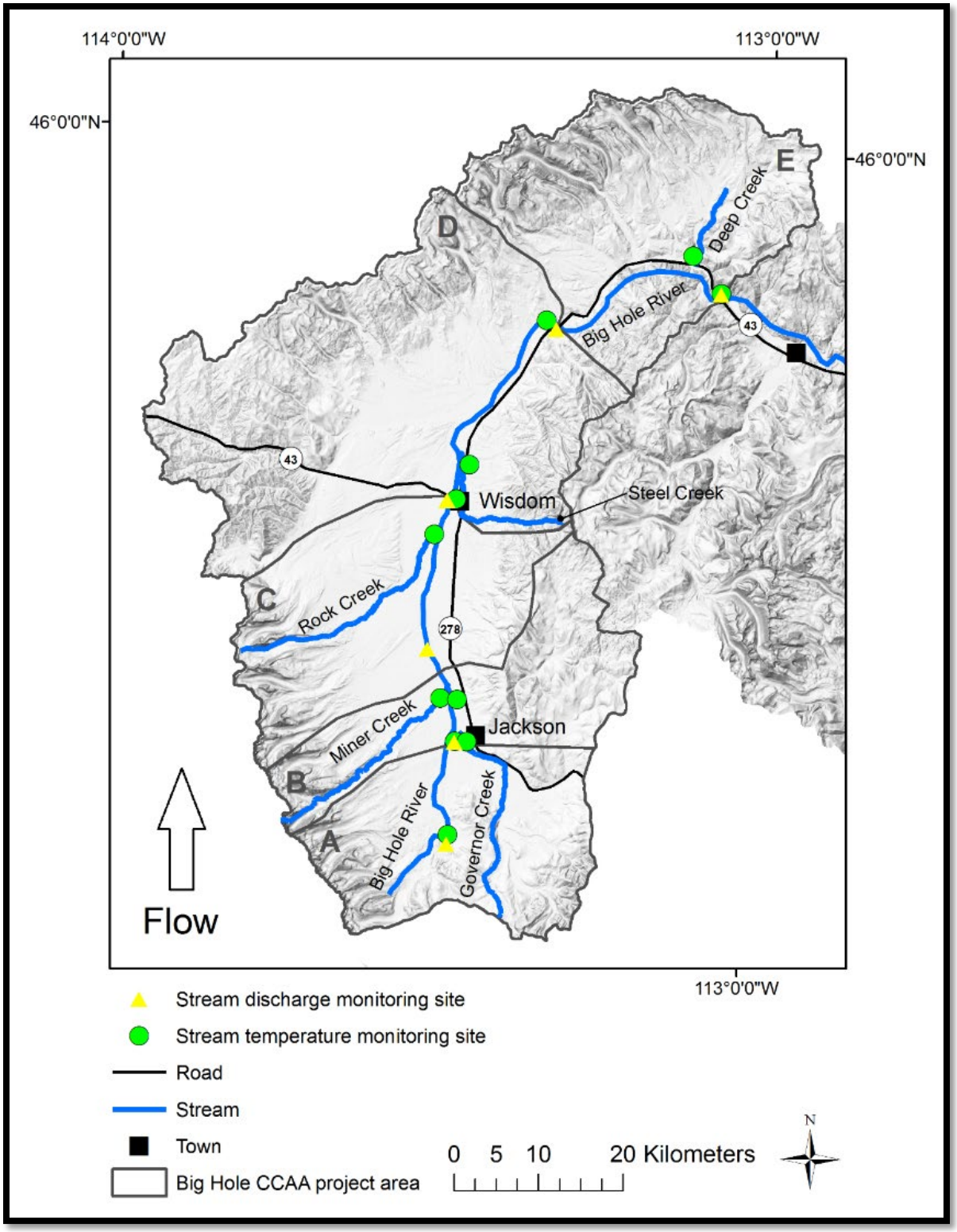

Figure 6. Stream temperature (green circle) and stream discharge (yellow triangle) monitoring sites located in the Big Hole Arctic Grayling CCAA project area in 2016.

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.

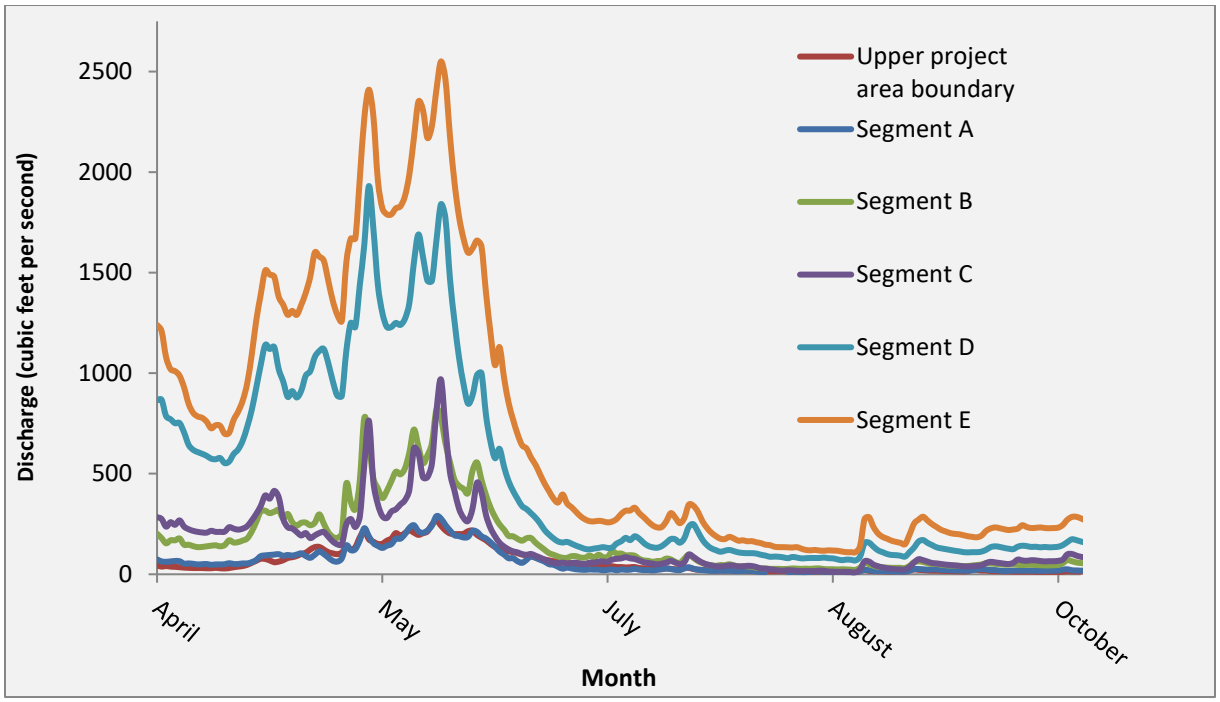

Figure 8. Stream discharge data collected from the Big Hole River at real-time gaging stations located at the upper Big Hole Arctic Grayling CCAA project area boundary (Saginaw Bridge) and the lower boundary of each Big Hole Arctic Grayling CCAA management segment (A through E) in 2015.

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 followed 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 streamflow's 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-nine site specific plans were approved and under implementation by enrolled landowners in 2016 (several landowners signed their plans in the fall of 2016, so conservation actions will be included in the 2017 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 2016 for Properties 1-5, 8-10, 12-19, 21-28, and 31-32 (Tables 10 - 36).

Table 10. Summary of actions in 2016 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 Installed Stock Water Systems: 1 system in Swanson Unit: 2015 2 systems in Pope Unit: 2015 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 Installed Irrigation Infrastructure: 1 headgate on Moose Creek: 2015 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 2016 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 2016 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 2016 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 2016 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

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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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 2016 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

Table 36. Summary of actions in 2016 on Property 33 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 2016	Spring 2016
Compliance Monitoring	Agencies	Annually starting in 2016	2016
Entrainment Surveys	Agencies	2018, 2023 As per Entrainment protocol Appendix F.	
Population Monitoring	Agencies	Annually	Annually
Investigation in to potential irrigation infrastructure improvement and stock water alternatives	Participating Landowner and Agencies	Summer 2016	Winter 2016

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 2016.

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 renewed this funding for another season, and FWP and DNRC hired a hydrologic technician with this funding from May 2016 – December 2016. NRCS continued to pursue and meet the obligations of existing EQIP contracts with enrolled landowners in 2016.

XI. Literature Cited

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