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



Montana Fish, Wildlife & Parks

2011 Annual Report

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The Candidate Conservation Agreement with Assurances for Fluvial Arctic Grayling in the Upper Big Hole River State and Federal Agency Partnership includes:

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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 20 CCAA's approved in 14 different states (National Candidate Conservation & Safe Harbor Workshop 2009) that have more than 1 million acres enrolled by 56 landowners that cover 34 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 Grayling CCAA) is to secure and enhance a population of fluvial (river-dwelling) Arctic grayling *Thymallus arcticus* (grayling); within the upper reaches of their historic range in the Big Hole River drainage. Under the Big Hole 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 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 grayling

4) Remove barriers to grayling migration

This planning effort will help alleviate private property concerns, as well as generate support from private landowners, which will improve habitat conditions for grayling throughout the Project Area. The goal for the grayling population inhabiting the Project Area is to increase the abundance and distribution of grayling within the Project Area (FWP and USFWS 2006). The Big Hole Arctic Grayling CCAA is a collaborative effort among private landowners, state and federal agencies, and non-government organizations. These stakeholders have

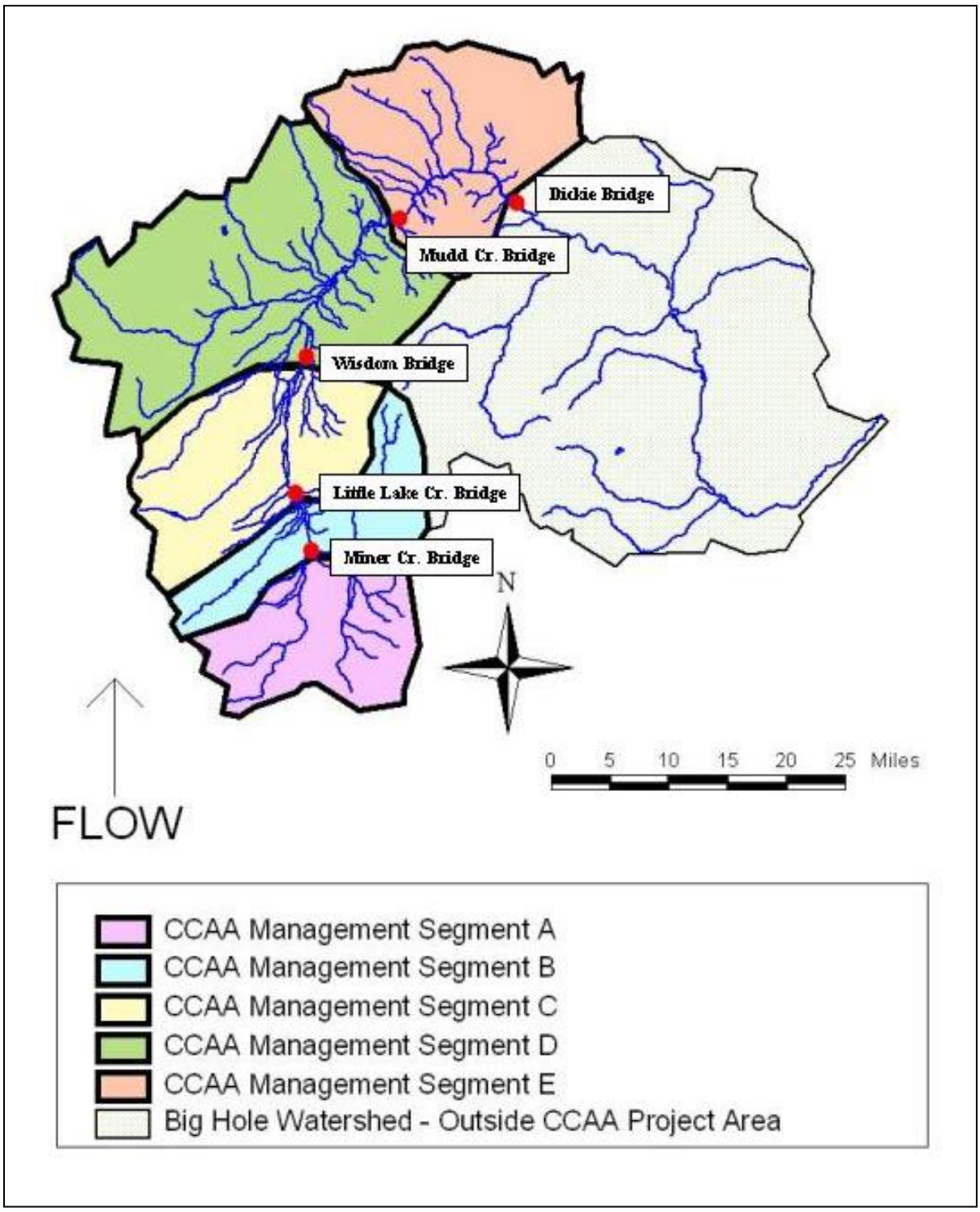

Figure 1. The Big Hole Arctic Grayling CCAA Project Area and Management Segments.

agreed to work together for the common goals of preserving grayling, improving the Big Hole watershed fish populations, addressing private property concerns, maintaining the

current land ownership, 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 2011 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 that determined 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 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 of Arctic grayling in Montana and North America. As a result, on September 8, 2010, the Service published a revised finding concluding that Arctic grayling in the upper Missouri River basin constitute a DPS, and were warranted protection as threatened or endangered under the Endangered Species Act. 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 candidate species, including the Arctic grayling. Under the settlement, a final listing decision is due in 2014.

III. Landowner Enrollment

On August 1, 2006 the USFWS issued FWP an ESA section 10(a)(1)(A) Enhancement of Survival Permit # TE-104415, authorizing the Big Hole Arctic Grayling CCAA. The issuance of this permit allowed for the official enrollment of any non-federal landowner within the Big Hole Arctic Grayling CCAA Project Area. Enrolled non-federal landowners are provided incidental take coverage and regulatory assurances once the non-federal landowner, FWP, and the USFWS counter-sign the Certificate of Inclusion and approve a site-specific conservation plan for the enrolled property. Currently, there are 33 landowners (Participating Landowners) that have enrolled 155,357 acres of private and 9,690 acres of DNRC leased land into the Big Hole Grayling CCAA (Table 1, Figure 2). Four participating landowners have un-enrolled 5,491 acres of private land after it was determined they could not meet the requirements of the program. 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. As of December 31, 2011 the USFWS had counter-signed 32 of the 33 Certificates of Inclusion signed and submitted by FWP.

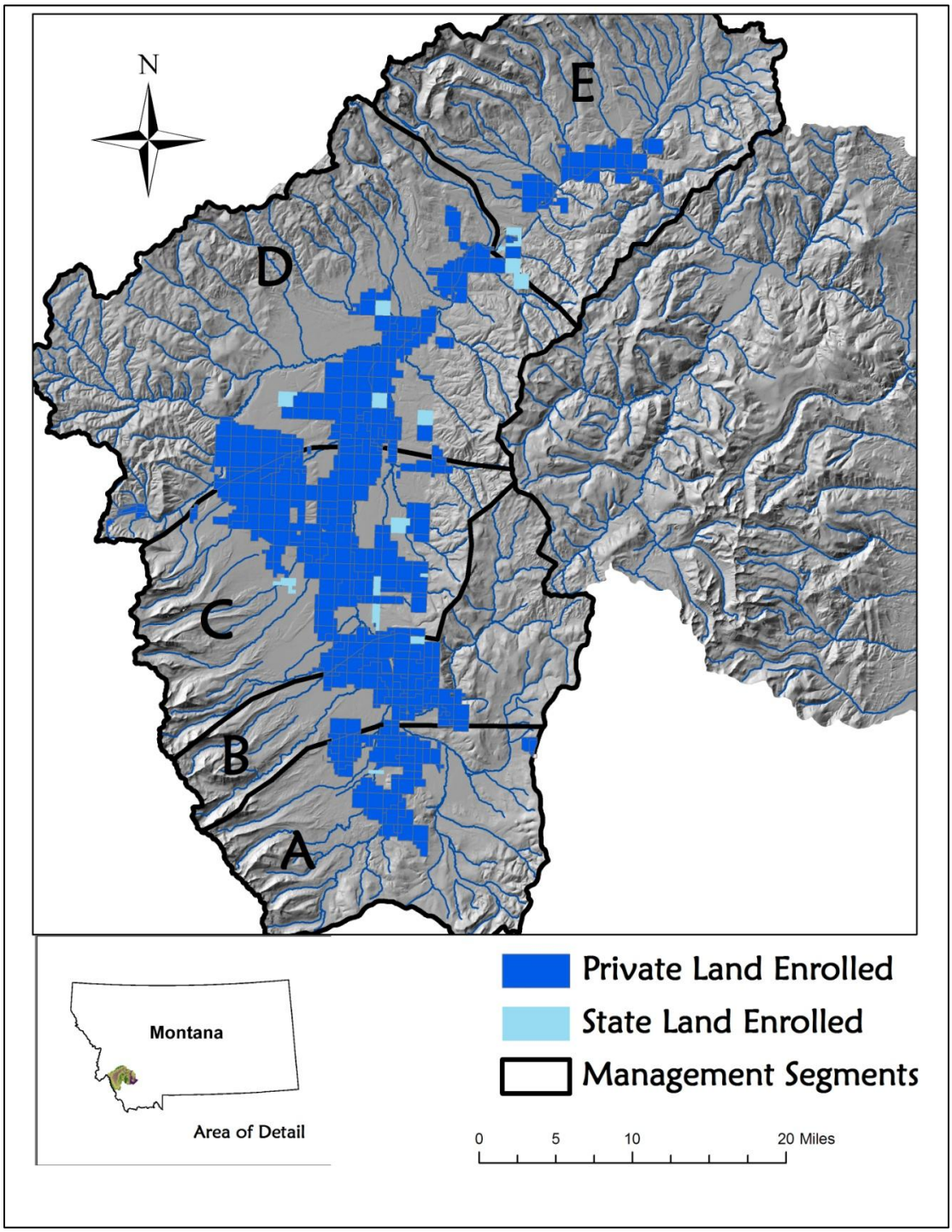

Figure 2. December 31, 2011 area of state and private land enrolled into the Big Hole Arctic Grayling CCAA Program. Enrolled land includes 33 landowners and 155,357 private acres and 9,690 acres of DNRC leased lands.

Table 1. 2011 Status of CCAA enrolled properties

Landowner	Management Segment(s)	Private Land Enrolled (Acres)	State Land Enrolled (Acres)	Enrollment Status
Ernest Bacon (2007)	E	980	0	Enrolled; COI signed
Beartooth Capital (Steel Creek Ranch (2008)	C	2,011	1,600	Enrolled; COI signed
Big Hole Grazing Association (2006)	C&D	4,575	0	Enrolled; COI signed; Extension approved*
Big Hole River LLC. (2006)	D	1,473	0	Enrolled; COI signed; Extension approved
Christiansen's East Bench (2007)	E	6,336	1,280	Enrolled; COI signed
Circle 3 Land & Cattle, LLC (2009)	C	2,260	0	Enrolled by Previous Owner
Diamond Ranch - Robert Wueste (2008)	A	4,393	1,620	Enrolled; COI signed
Dooling Livestock Company (2006)	A	6,300	640	SSP Completed
John & Phyllis Erb / Erb Livestock Co (2006)	C&D	23,174	560	Enrolled; COI signed; Extension approved
Finch Ranches, LLC (2007)	B	1,052	0	Enrolled; COI signed; Extension approved
Foster Company (2006)	C	2,140	400	Enrolled; Pending COI Approval
H Lazy J Ranch - Tom Mitchell (2006)	A&B	3,370	640	Enrolled; COI signed; Extension approved
Harrington Company (2007)	C&D	8,334	640	Enrolled; COI signed, Extension approved
Dick Hirschy Cattle Inc. / Heidi Hirschy (2007)	A, B,C&D	24,136	0	Enrolled; COI signed; Extension approved
Fred and Lynn Hirschy (2007)	C	1,550	0	Enrolled; COI signed; Extension approved
Jack Hirschy Livestock, Inc. (2007)	C&D	14,787	0	Enrolled; COI signed, Extension approved
Ralph Huntley and Son, Inc. (2006)	C	9,200	560	Enrolled; COI signed; Extension approved
Husted Ranches, Inc. (2006)	B&C	3,744	0	Enrolled; COI signed; Extension approved
Johnson Brothers, Inc. (2006)	B&C	2,490	0	SSP Completed
LaMarche Creek Ranch (2006)	E	1,670	0	SSP Completed
Lapham Ranch Company (2006)	A&B	7,000	0	SSP Completed
John Nelson (2007)	C&D	3,340	640	Enrolled; COI signed, Extension approved
Peterson Brothers Cattle Company (2007)	A&B	2,400	400	Enrolled; COI signed, Extension approved
Quarter Circle 3T Ranch (2007)	D	2,530	640	Enrolled; COI signed, Extension approved
Ralston Ranch, Inc. (2006)	E	2,773	0	SSP Completed

Table 1. 2011 Status of CCAA enrolled properties, continued

Stanley Rasmussen (2006)	D	160	0	Enrolled; COI signed; Extension approved
Reinhardt Ranch Company (2006)	E	900	70	Enrolled; COI signed; Extension approved
Rocky Mountain Ranches (2006)	B	3,445	0	Enrolled; COI signed; Extension in progress
Rufenacht Land & Cattle	D	1,109	0	Enrolled; COI signed
K.L. Spear (2007)	E	700	0	Enrolled; COI signed, Extension approved
Upper Big Hole LLC. (2006)	A	3,100	0	SSP Completed
Weaver Ranch (2007)	D	680	0	Enrolled
Wisdom River Cattle Company (2006)	C	3,245	0	SSP Completed
Totals		155,357	9,690	

* Approved extensions allow the agencies 24 additional months to complete the landowner's site-specific plan.

IV. Big Hole Arctic Grayling CCAA Rapid Assessments

The Participating Landowners in the Big Hole 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 grayling on the property and the validation of water rights compliance. Immediate threats to grayling may include structures, mechanical devices or pollutants that pose a threat of immediate mortality to 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 Grayling

All surveys for immediate threats to grayling have been conducted on enrolled properties. No immediate threats to 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 Upper Big Hole LLC, Lapham Ranch Company, Dooling Livestock, Johnson Brothers, Inc., Wisdom River Cattle Company, and LaMarche Creek Ranch in 2011. 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. In addition to the required monitoring, continuous stage recorders were installed in the Spokane Ditch, Strowbridge Ditch, Ferris Ditch, Huntley Ditch and the Pendleton Ditch to provide flow information that will assist with the development of the site-specific plans and instream flow conservation projects.

In addition to irrigation infrastructure improvements, 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 2011, three landowners reduced irrigation diversions that resulted in 18.36 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 5).

Table 5. Summary of reduced diversions by enrolled landowners to improve streamflows in 2011.

Date	Landowner	Source	Ditch	Returned to Stream (cfs)
8/11/2011	Erb Livestock	Rock Creek	Barnett	2
8/15/2011	Jackson Ranches	Big Hole River	Lapham	1.8
8/30/2011	Big Hole Grazing Association	Rock Creek	Upper Diversion	1.26
9/1/2011	Erb Livestock	Big Hole River	Spokane Ditch	12.3
9/21/2011	Erb Livestock	Big Hole River	Spokane Ditch	1

C. Streamflow Monitoring required by CCAA

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 the downstream margins of Management Segments A, B, and E. In addition DNRC continuously monitored flow in at least one tributary within each Management Segment and five important 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 2011 the Upper Big Hole LLC, Lapham Ranch Company, Dooling Livestock Company, Johnson Brothers, Inc., Wisdom River Cattle Company (verbal), LaMarche Creek Ranch, submitted records that are summarized in Table 6.

Meeting Date	Compliance Check Date	Landowner	Irrigation withdrawals in Compliance with SSP & water rights	Landowner Submitted Diversion Records
6/21/2011	6/21/2011	Dooling Livestock Company	Yes	Yes
	ditches observed off	Dooling Livestock Company	Yes	
6/21/2011	6/21/2011	Upper Big Hole LLC	Yes	Yes
	9/9/2011	Upper Big Hole LLC	Yes	
5/12/2011	6/28/2011	Johnson Brothers, Inc	Yes	Yes
	9/6/2011	Johnson Brothers, Inc	Yes	
6/22/2011	6/22/2011	Wisdom River Cattle Company	Yes	Yes (verbal)
	9/21/2011	Wisdom River Cattle Company	Yes	
5/18/2011	6/23/2011	LaMarche Creek Ranch	Yes	Yes
	9/21/2011	LaMarche Creek Ranch	Yes	
5/18/2011	6/29/2011	Lapham Ranch Co	Yes	Yes
	ditches observed off	Lapham Ranch Co	Yes	

V. Site-Specific Conservation Plans

Site-specific conservation plans are developed for each Participating Landowner and the Agencies. 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 grayling.

A. Completed and Approved

Seven site-specific conservation plans are currently under implementation; Dooling Livestock Company, Upper Big Hole LLC, Johnson Brothers, Inc., Wisdom River Cattle Company, LaMarche Creek Ranch, and Lapham Ranch Company; and the Ralston Ranch. Seven site-specific plans are currently in draft form and are waiting final landowner, FWP and USFWS approval. 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 extensions to complete site-specific plans on fourteen properties enrolled in the Big Hole Grayling CCAA (Table 1). Extensions provide an additional 24 months to complete the SSP.

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 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 2011 are reported below.

A. Entrainment Surveys

In 2011, FWP completed entrainment surveys on 9.6 miles of irrigation ditch on twelve enrolled properties (Table 2). A total of five grayling were captured during entrainment surveys. Entrained grayling were relocated to the nearest point of the Big Hole River or tributary downstream of the irrigation ditch (FWP and USFWS 2006). Other fish species identified during the surveys include: brook trout *Salvelinus fontinalis*, brown trout *Salmo trutta*, rainbow trout *Oncorhynchus mykiss*, mountain whitefish *Prosopium williamsoni*, burbot *Lota lota*, longnose dace *Rhinichthys cataractae*, mottled sculpins *Cottus bairdi*, longnose suckers *Catostomus commersoni* and white suckers *Catostomus catostomus*.

Table 2. MFWP electrofishing Entrainment surveys completed in 2011 in the Upper Big Hole watershed as part of the Big Hole Arctic grayling CCAA.

Date	Source	Miles Surveyed	Arctic Grayling Entrained
July 2011	Big Hole River	0.37	0
July 2011	Warm Springs Creek	0.39	0
July 2011	Warm Springs Creek	0.40	0
July 2011	Unnamed tributary to LaMarche Creek	0.10	0
July 2011	Unnamed tributary to LaMarche Creek	0.10	0
July 2011	Miner Creek	0.29	0
July 2011	Howell Creek	0.15	0
July 2011	Howell Creek	0.31	0
August 2011	Big Hole River	0.55	0
August 2011	Big Hole River	0.55	0
August 2011	Steel Creek	0.17	0
August 2011	LaMarche Creek	0.35	0
August 2011	York Gulch	0.12	0
August 2011	Big Hole River	0.26	0

August 2011	Big Hole River	0.28	0
August 2011	Big Hole River	0.15	0
August 2011	Warm Springs Creek	0.51	0
August 2011	Rock Creek	0.44	0
August 2011	Rock Creek	0.24	0
August 2011	Rock Creek	0.10	1
August 2011	Rock Creek	0.49	0
August 2011	Rock Creek	0.59	0
August 2011	Big Lake Creek	0.27	0
August 2011	Deep Creek	0.41	0
August 2011	Big Hole River	0.10	0
August 2011	Big Hole River	0.16	0
August 2011	French Creek	0.10	0
August 2011	Big Hole River	0.72	4
August 2011	North Fork Big Hole River	0.70	0
August 2011	North Fork Big Hole River	0.26	0
Total		9.63	5

B. Projects to Minimize or Eliminate Entrainment of Grayling

Two fish exclusion devices have been designed to reduce entrainment. One device will be installed in the spring of 2012. 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 secured 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 2011, the modified fish exclusion device was constructed. The housing for the device was installed in LaMarche Creek, a grayling spawning tributary, in the fall of 2011. The screen will be installed in the spring of 2012. Monitoring will begin in spring 2012, and continue until the end of irrigating season.

C. Projects to Enhance Fish Passage

In 2011, FWP, NRCS, DNRC and Participating Landowners completed 6 fish passage improvement project (fish ladders, bridges, culvert replacements) and initiated 8 additional fish passage improvement projects that are expected to be completed in 2012 (Table 4).

Table 4. Fish passage enhancement projects completed in 2011 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA.

Associated Waterbody	Landowner (s)	Project Component	Cost
Howell Creek	Rufenacht, Erb Livestock	2 Fish Ladders	$9,900.00
Miner Creek and Little Lake Creek	Johnson Brothers	2 bridges replaced 2 culverts	$21,000
Fishtrap Creek	Earnest Bacon	1 fish ladder and 1 diversion	$16,500
Fishtrap Creek	Earnest Bacon	2 bridges replaced culverts	$24,000
Big Hole River	Erb Livestock	1 fish ladder	$6,000
Steel Creek	Harrington	1 Fish ladder	12,000

D. Projects to Enhance Riparian and Stream Channel Habitat

In 2011, FWP partnered with NRCS, USFWS, DNRC and Participating Landowners to implement 22 projects on 13 enrolled properties to protect and/or enhance stream function and riparian habitat (Table 5).

Table 5. Riparian and stream channel improvement projects completed 2011 in the upper Big Hole watershed as part of the Big Hole Arctic Grayling CCAA. .

Associated Waterbody	Landowner (s)	Project Component	Cost
Connor Gulch	Ralston Ranch	Pasture Fence	$30,510.85
Deep Creek	Ralston Ranch	Pasture Fence	$10,000.00
French Creek	Ralston Ranch	Pasture Fence	$7,800.00
Fishtrap Creek	Ernie Bacon	Riparian Fence	$8,885.00
Plimpton & Howell Creeks	Rufenacht, Erb Livestock	Riparian Fence	$30,000.00
Swamp Creek	Erb Livestock	Riparian Fence	$37,000.00
Rock Creek/Big Hole River	Erb Livestock, Huntley Ranch	Fence Repair	$24,500.00
Swamp Creek	Harrington Company	Fence Repair	$30,000.00
Big Hole River	Upper Big Hole LLC	Willow planting	*
Howell Creek	Rufenacht	Willow planting	*
Steel Creek	Beartooth Capital, Harrington Company	Willow planting	*
Swamp Creek	Erb Livestock	Willow planting	*
York Gulch	Big Hole River LLC	Willow planting	*
Big Hole River	Erb Livestock, Dick Hirschy Cattle, Upper Big Hole LLC	Noxious Weed Treatment	**
Big Lake Creek	Husted Ranch	Noxious Weed Treatment	**
Governor Creek	H Lazy J	Noxious Weed Treatment	**
Little Lake Creek	Husted Ranch	Noxious Weed Treatment	**
Miner Creek	Johnson Brothers	Noxious Weed Treatment	**
Rock Creek	Erb Livestock, Wisdom River, John Nelson	Noxious Weed Treatment	**
Steel Creek	Harrington Company	Noxious Weed Treatment	**

Swamp Creek	Harrington Company, Erb Livestock, John Nelson	Noxious Weed Treatment	**
Warmsprings Creek	Finch Ranches LLC	Noxious Weed Treatment	**

*$12,000 was allocated for all brood source willow planting efforts

**$7,570.42 was allocated for all noxious weed treatment sites

E. Projects to Improve Stream Flows and Irrigation Water Management

In 2011, FWP partnered with NRCS, USFWS, DNRC and Participating Landowners to implement 11 projects on 10 enrolled properties to enhance the ability to control and measure irrigation withdrawals and reduce the need to divert water for livestock watering purposes (Table 4).

Table 6. Projects completed from 2006 - 2011 to improve streamflows and irrigation management improve fish passage - connectivity.

Associated Water Body	Landowner (s)	Project Component	Cost
North Fork Big Hole River	Erb Livestock	Diversion Design	$20,490.00
Miner Creek	Diamond Ranch	Irrigation Efficiency Project*	$24,050.00
Fishtrap Creek	Ernie Bacon	Fishtrap Creek Bridge	$24,000.00
Miner Creek and Little lake Creek	Johnson Brothers	Miner Creek and Little lake Creek Bridges	$21,000.00
Big Hole River	Husted Ranch	Channel Activation	$7,320.00
York Gulch	Big Hole River LLC	Livestock water**	$17,309.00
Mudd Creek	Big Hole River LLC	Headgate	$7,300.00
Steel Creek	Harrington Company	Headgates	$12,280.00
Big Hole River	Stanley Rasmussen	Headgates	$15,000.00
Rock Creek	Erb Livestock, Wisdom River, John Nelson	Headgates	$61,000.00

* Irrigation structures include headgates, diversions and/or measuring devices

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

In addition to improvements in irrigation related infrastructure, the Big Hole 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; Figure 1). In 2011, enrolled landowners reduced irrigation diversions resulting in over 18 cubic feet per second (cfs) of water diverted for irrigation, returning to the Big Hole River or its tributaries in response to Big Hole River flows below established flow targets (Table 7).

F. Projects to Expand Grayling Distribution into Historically Occupied Waters

One of the CCAA grayling population goals is for grayling to reoccupy or utilize habitats in historic waters within 10 years of Big Hole 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 for three years after the projects were completed, but resulted in capture of only one grayling. In spring 2010, FWP initiated a project to re-colonize Rock Creek by developing fertilized grayling eggs from the fluvial Arctic grayling brood reserve in Remote Sites Incubators (RSIs). In fall 2010, MFWP electrofishing surveys in Rock Creek captured 401 young-of-the-year grayling that were produced from the RSIs. RSI were used again in 2011, and fall surveys captured 492 young-of-the-year grayling and 18 age-1 grayling in Rock Creek. These efforts will be continued with the goal of reestablishing Rock Creek as a productive spawning and rearing tributary. (Details on the Rock Creek re-colonization efforts can be found in the 2010 and 2011 Arctic Grayling Monitoring Report)

VII. Monitoring

The Big Hole 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 1). 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 2011, FWP conducted electrofishing surveys to characterize abundance and distribution of grayling and other species within the 10 designated sampling reaches (A-E), which include 23.9 miles of mainstem and 10.2 miles in tributaries (Table 8). Additional surveys included two mainstem and nine tributary reaches. Data from the additional surveys are presented in Appendix A. In 2011 4,089 fish were captured during fall electrofishing surveys including Arctic grayling, brook trout, brown trout, rainbow trout, and burbot. In 2011, 669 grayling were captured, of which 567 were young-of-the-year.

Table 8. Fish per mile captured during FWP fall one-pass electrofishing surveys of the Big Hole CCAA monitoring reaches.

Electrofishing Survey Reach	Miles	AG/Mile	EBT/Mile	RBT/Mile	LL/Mile	LUI/Mile
Big Hole CCAA (A)	1.33	0.00	144.36	3.01	0.75	3.01
Governor Creek (A)	2.78	0.00	64.39	0.36	3.96	1.08
Big Hole CCAA (B)	1.78	0.00	179.21	8.99	8.99	3.37
Miner Creek (B)	0.53	0.00	83.02	0.00	11.32	1.89
Big Hole CCAA (C)	6.32	1.74	28.32	0.63	0.63	0.47
Rock Creek (C)	2.90	175.86	90.00	0.34	0.00	15.17
Big Hole CCAA (D)	5.83	0.34	2.92	2.06	1.37	0.00
Steel Creek (D)	2.49	17.67	207.63	0.40	0.80	5.22
Big Hole CCAA (E)	4.34	0.46	0.92	9.91	11.75	0.00
Deep Creek (E)	1.53	3.92	35.29	25.49	5.23	1.31

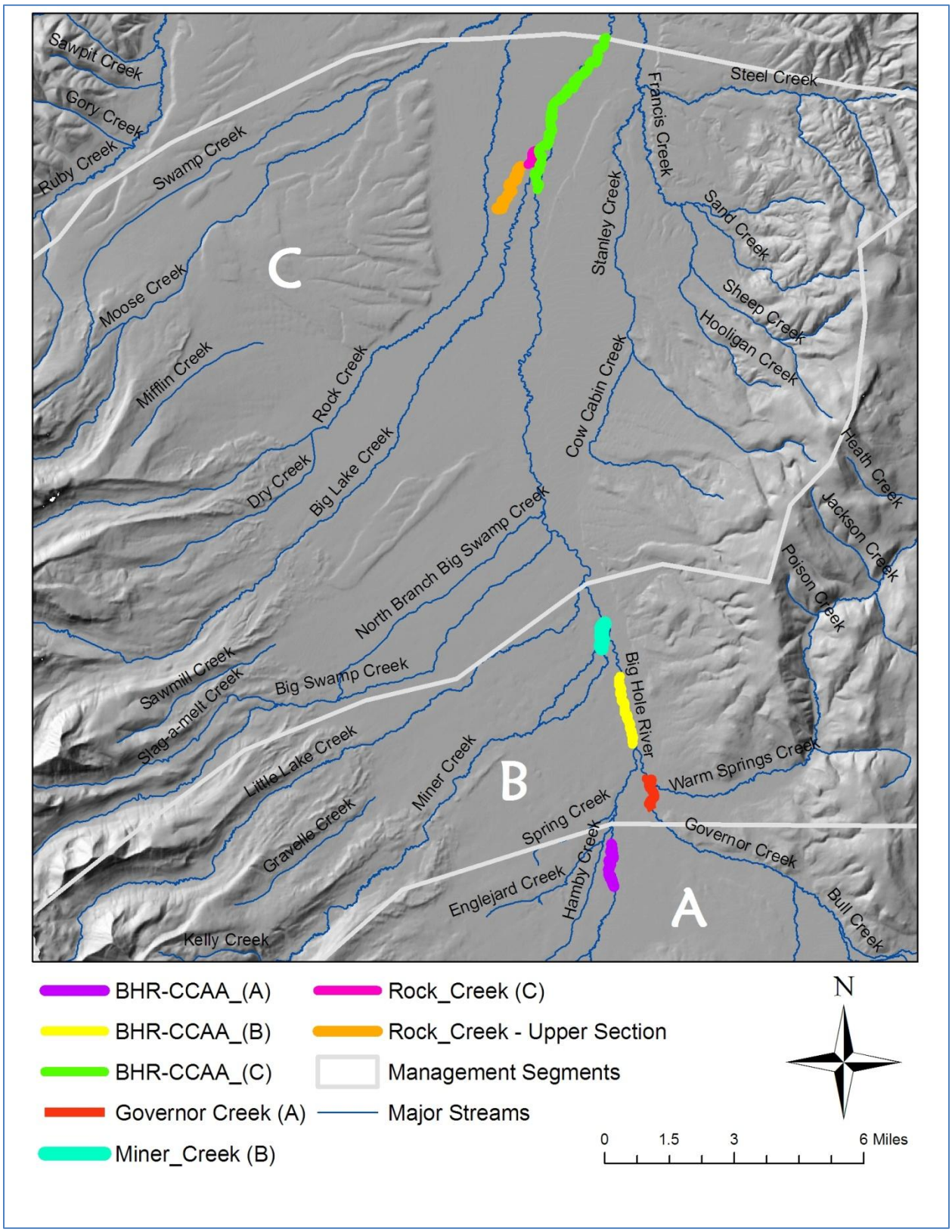

Figure 3. Big Hole CCAA fish population monitoring reaches (A – C).

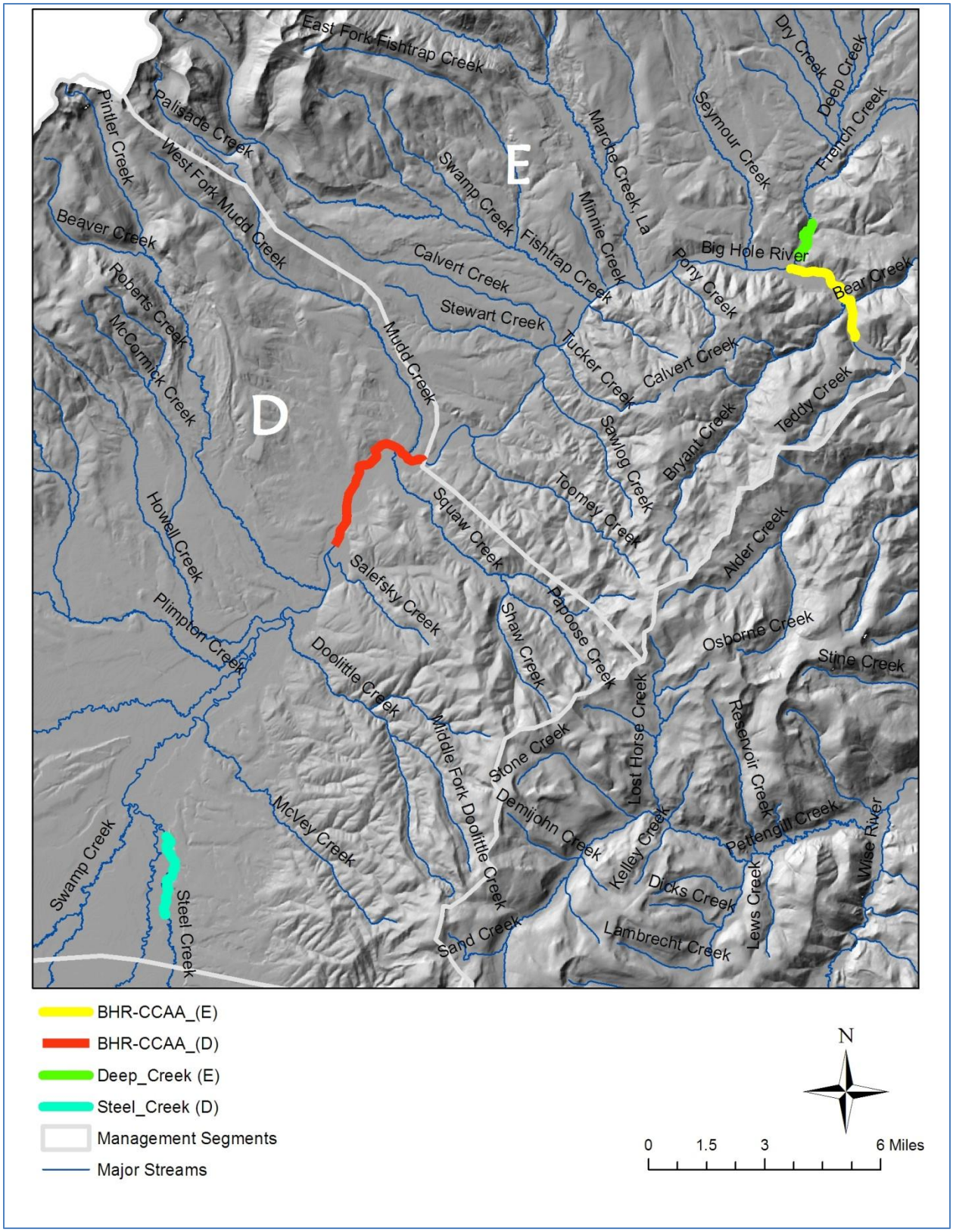

Figure 4. Big Hole CCAA fish population monitoring reaches (D and E).

The Big Hole Arctic Grayling CCAA document outlines grayling population abundance goals within the Project Area. The abundance goals state; Based on the 10 CCAA monitoring sites, the index of abundance (CPUE based on cumulative total captures/total distance) for age-1 and older 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 grayling population abundance trend in the 10 CCAA monitoring sites from 2006 – 2011 are shown in Figure 5.

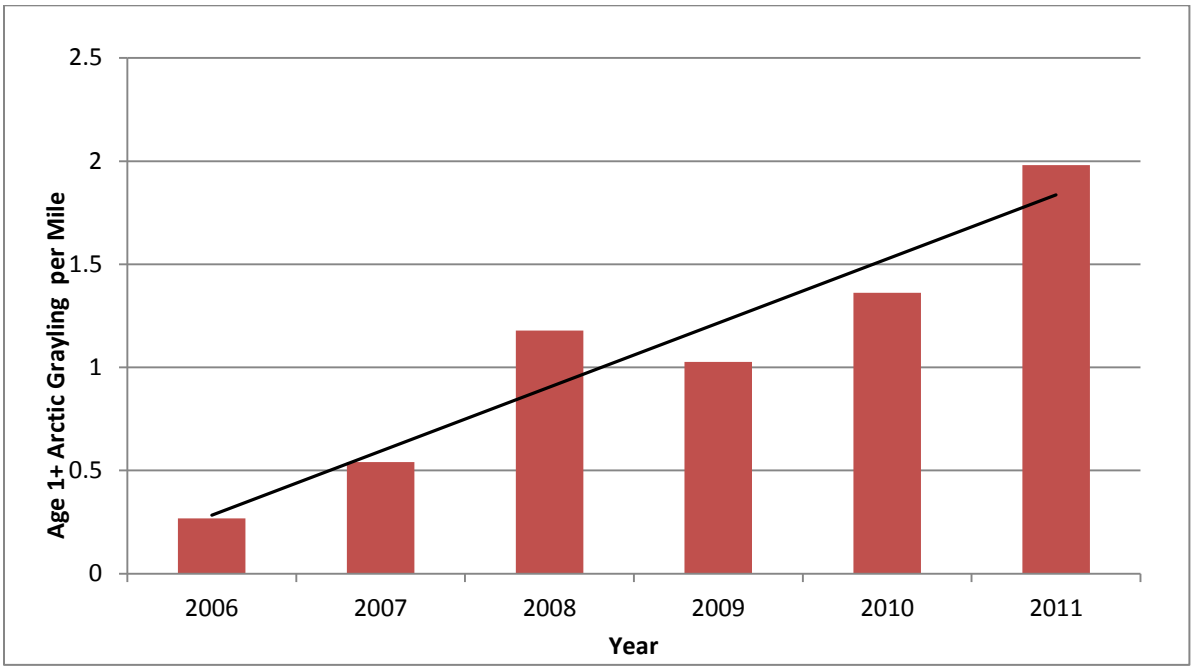

Figure 5. Population abundance trend of age-1 and older grayling based on catch-per-unit-effort (grayling/mile) data from the 10 CCAA monitoring reaches from 2006 – 2011.

B. Stream Temperature Monitoring

Stream temperatures were monitored in the ten Big Hole CCAA management segments from May 1 – October 1, 2011. Temperature data are summarized by reach as mean and maximum (degrees Fahrenheit), and hours exceeding seventy-seven degrees Fahrenheit, the upper incipient lethal temperature for grayling (Lohr et. al. 1996; Table 9).

Table 9. Stream temperature monitoring results for 2011.

Monitoring Site	Mean Temperature	Maximum Temperature	Hours Exceeding 77˚F
BHR CCAA (A)	52.4	69.5	0
Governor Creek (A)	55.1	76.2	0
BHR CCAA (B)	54.1	67.8	0
Miner Creek (B)	53.9	70.5	0
BHR CCAA (C)	56.8	72.5	0
Rock Creek (C)	56.0	72.6	0
BHR CCAA (D)	57.8	71.7	0
Steel Creek (D)	57.2	73.7	0
BHR CCAA (E)	56.6	70.4	0
Deep Creek (E)	51.9	67.3	0

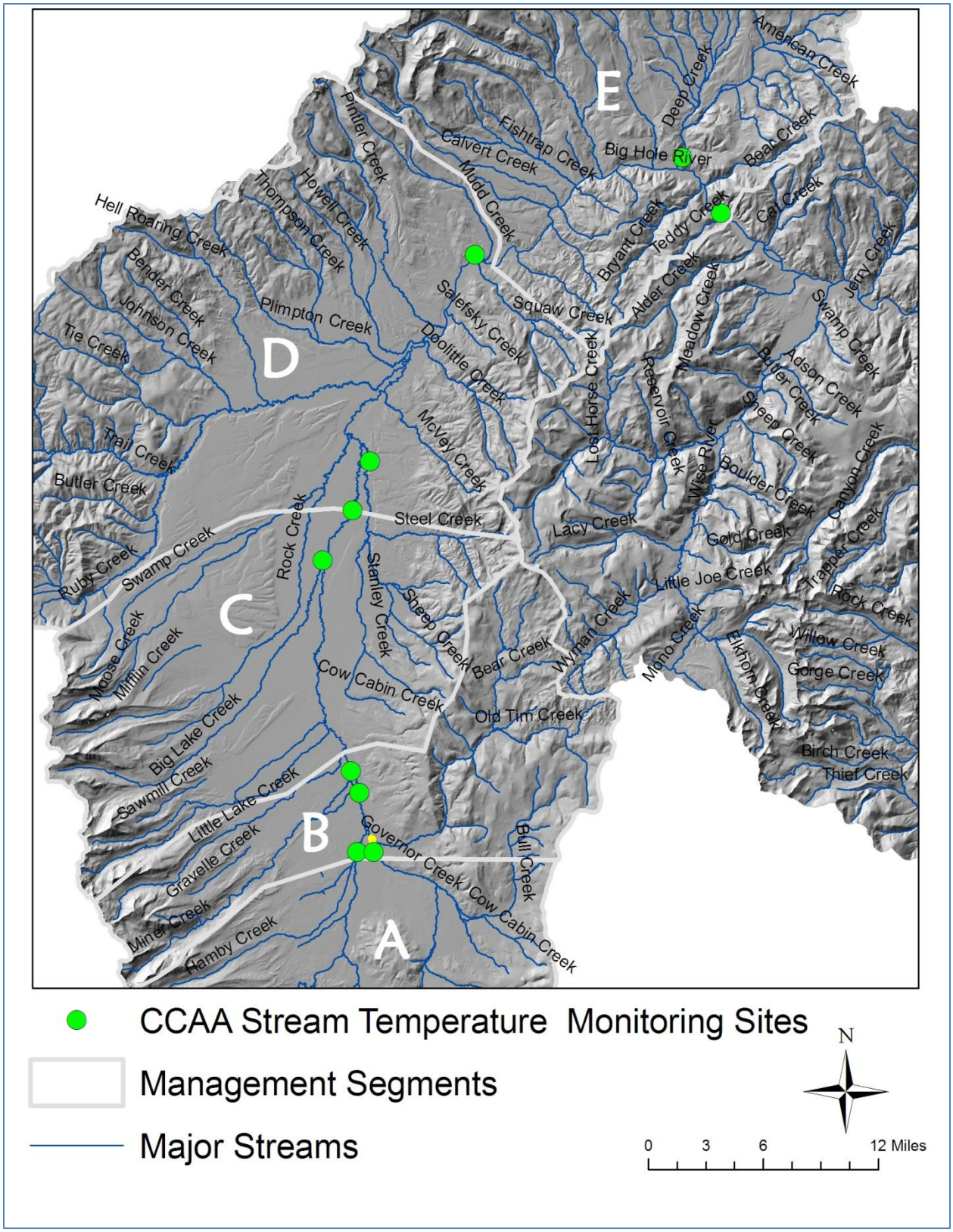

Figure 4. Big Hole CCAA stream temperature monitoring sites (A - E).

C. Stream Morphology Parameter Monitoring

In 2006, ten permanent channel cross-sections were established within each of the 10 grayling population monitoring reaches. The width, depth and channel shape are measured at two locations at each site (Table 8). Cross sections are repeated every 2 years, and results will be analyzed after five years of data has been collected (2014).

D. Streamflow Monitoring

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

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

The monitoring of compliance with approved site-specific plans has occurred annually on all properties with completed SSPs (Dooling Livestock Company, Upper Big Hole LLC, Johnson Brothers Inc., Lapham Ranches, Wisdom River Cattle Company, LaMarche Creek Ranch, and Ralston Ranch; Table 9). FWP field personnel checked 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 grayling 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.

Table 9. Summary of compliance site-visits conducted by FWP in 2011.

Date	Landowner	Irrigation withdrawals in Compliance with SSP & water rights	Grazing of Riparian Pastures in compliance with SSP	Landowners monitored and documented irrigation withdrawals and riparian grazing as agreed in SSP	Comments
6/21/11	Dooling Livestock Company	Yes	N/A	Yes	Monitored documents provided and compliance expectations discussed with landowner
6/21/11	Dooling Livestock Company	Yes	N/A	Yes	Total Divs = 3.7 cfs
5/16/11	Upper Big Hole LLC	Yes	Yes	Yes	No immediate threats observed, no barriers to fish passage observed
6/21/11	Upper Big Hole LLC	Yes	Yes	Yes	Total Divs = 2.3 cfs
6/28/11	Johnson Brothers, Inc	Yes	Yes	pending	
9/6/11	Johnson Brothers, Inc	Yes	Yes	Yes	
5/19/11	Wisdom River Cattle Company	Yes	Yes	Yes	Rock Creek Fence discussion

Table 9. Summary of compliance site-visits conducted by FWP in 2011, concluded.

12/9/2011	Wisdom River Cattle Company	Yes	Yes	Yes	Discussed water and grazing year
6/20/11	LaMarche Creek Ranch	Yes	Yes	Yes	Discussed potential projects
10/18/11	LaMarche Creek Ranch	Yes	Yes	Yes	Discussed water and grazing year
5/18/11	Lapham Ranch Company	Yes	Yes	Yes	
12/10/12	Lapham Ranch Company	Yes	Yes	Yes	Discussed water and grazing year

F. Landowner Monitoring of Riparian Grazing and Irrigation Diversions for Approved Site-Specific Plans

The Big Hole Grayling CCAA requires that landowners with approved site-specific plans monitor and document irrigation withdrawals. At a minimum, monitoring and documentation occurs every two weeks once a headgate at a point of diversion is opened and when reductions in diversions are required by the CCAA to meet flow targets (FWP and USFWS 2006). Dooling Livestock Company, Upper Big Hole LLC, Johnson Brothers, Inc., Wisdom River Cattle Company, Lapham Ranch Company, and LaMarche Creek Ranch were required to monitor actions associated with irrigation diversions in 2011.

Landowners with riparian habitat that is considered either "Not Sustainable" or "At Risk" at the time the site-specific plan was approved must monitor the timing of use, duration, herd class and size of herd grazing in those riparian pastures (NRCS 2004). In 2011, Upper Big Hole LLC, Wisdom River Cattle Company, LaMarche Creek Ranch, and Lapham Ranch Company were required to monitor actions associated with livestock grazing in riparian areas. All landowners provided FWP with documentation of the monitoring that occurred in 2011. Dooling Livestock Company was not required to monitor grazing in riparian pastures because all riparian areas on the property were "Sustainable" when the site-specific plan was approved. Johnson Brothers, Inc is not required to monitor grazing in riparian pastures until 2012, when all necessary infrastructure is in place (See Johnson Brothers, Inc. site-specific plan Certificate of Inclusion # Big Hole Grayling CCAA – 0029).

G. Riparian Re-Assessments on Enrolled Property

The NRCS' Riparian Assessment Method was used to determine existing 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 2011, riparian habitat on four properties was re-assessed (original assessment dates were in 2007). On all 4 properties, riparian habitat attained, or maintained, a sustainable rating (Table 11).

Table 11. Riparian Re-Assessments completed in 2011 on enrolled property

Enrolled Property	Reach Name	2007 Score	Rating	2011 Score	Rating
Ralston Ranch	Deep Creek	75 and 78	At Risk	90	Sustainable
Ralston Ranch	Bryant Creek	92	Sustainable	90	Sustainable
Ralston Ranch	Big Hole River	73	At Risk	91	Sustainable
Ralston Ranch	Connor Gulch	70	At Risk	86	Sustainable
Ralston Ranch	Bear Creek	95	Sustainable	97	Sustainable
LaMarche Creek Ranch	Minnie Creek	91	Sustainable	80	Sustainable
LaMarche Creek Ranch	LaMarche Creek (A)	71	At Risk	96	Sustainable
LaMarche Creek Ranch	LaMarche Creek (B)	71	At Risk	86	Sustainable
John H. Nelson	Big Lake Creek	82	Sustainable	95	Sustainable
John H. Nelson	Rock Creek	78	At Risk	86	Sustainable
Quarter Circle 3T	Plimpton Creek	95	Sustainable	95	Sustainable
Quarter Circle 3T	Plimpton Creek	72	At Risk	88	Sustainable
Quarter Circle 3T	Plimpton Creek	58	At Risk	97	Sustainable
Quarter Circle 3T	Spring Creek	79	At Risk	97	Sustainable

VIII. Progress in Implementing Approved Site-Specific Plans

Seven site specific plans are approved and under implementation by enrolled landowners. Each site-specific plan contains an implementation schedule for actions designed to enhance conditions for grayling on the enrolled property. The following are summary tables of actions completed in 2011 for Dooling Livestock Company, Upper Big Hole LLC, Johnson Brothers Inc., Wisdom River Cattle Company, LaMarche Creek Ranch, and Lapham Ranch Company (Tables 11 - 17)

Table 10. Summary of actions in 2011 on the Dooling Livestock Company property identified in the Implementation Schedule of the site-specific plan.

Conservation Measure	Location	Expected Date of Implementation	Actual Date of Implementation
Surveys for Entrained Grayling	Selected portions of the irrigation ditches throughout enrolled property	2011	2011
Compliance monitoring	Enrolled property	Biannually 2011	6/21/11 and 9/23/10
Improvements to irrigation control structures and installation of flow measuring devices at four points of diversion on Little Swamp Creek	4 points of diversion on Little Swamp Creek	2014	2 improvements were completed in 2010 on Little Swamp Creek
Installation of fish passage devices in Berry Creek and Little Swamp Creek*	All diversions owned and operated by the Participating Landowner on Berry Creek and Little Swamp Creek that do not allow for fish passage	2014	1 diversion on Berry Creek was fitted with a fish passage device in 2010

Table 11. Summary of actions in 2011 on Upper Big Hole LLC identified in the Implementation Schedule of the site-specific plan.

Conservation Measure	Location	Expected Date of Implementation	Actual Date of Implementation
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	6/21/11 and 9/9/11

Table 12. Summary of actions in 2011 on Johnson Brothers Inc. 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	Spring 2010	Spring 2010
Initiate conservation measures to improve riparian habitats	Enrolled property	Spring 2010	Spring 2010
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	6/28/11 and 9/6/11

Table 13. Summary of actions in 2011 on Wisdom River Cattle Company 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	Spring 2010	Spring 2010
Initiate conservation measures to improve riparian habitats	Fields 6A, 6B, 8, 9, 14, 16, 17A, 17B and 21	Spring 2010	Spring 2010
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	5/19/11 and 12/9/11

Table 14. Summary of actions in 2011 on LaMarche Creek Ranch 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		
Initiate conservation measures to improve riparian habitats	East, West, LaMarche Creek Riparian, and Rock Pastures	2011	2011
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	6/23/11 and 9/21/11
Riparian Re-Assessments	LaMarche Creek	2011	2011

Table 15. Summary of actions in 2011 on Lapham Ranch Company 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	Kyle will provide dates		
Initiate conservation measures to improve riparian habitats			
Compliance Monitoring	Enrolled property	Bi-annually starting in 2010	6/29/11 and 12/10/12

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

In 2010, 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 is warranted but precluded due to higher priority listing needs. This decision reversed the 2007 decision to remove grayling from the Candidate Species List. Due to the current legal status of grayling, ESA-defined take (harm, harass or kill) did not apply to the implementation or monitoring of the Big Hole Grayling in 2011.

X. NRCS Special Funding

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

XI. Literature Cited

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XII. Acknowledgements

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XIII. APPENDIX A

Big Hole River Monitoring Reach	Reach Length (miles)	Arctic Grayling	Brook Trout	Rainbow Trout	Brown Trout	Burbot
CCAA Monitoring Section (A)	1.33	0	192	4	1	4
CCAA Monitoring Section (B)	1.78	0	319	16	16	6
Miller Braid	1.30	1	4	0	2	7
CCAA Monitoring Section (C)	6.32	11	179	4	4	3
Wisdom Reach	5.35	6	117	8	4	4
CCAA Monitoring Section (D)	5.83	2	17	12	8	0
CCAA Monitoring Section (E)	4.34	2	4	43	51	0
Jerry Creek - Management Section	3.70	8	NA	NA	NA	NA
Fall Mainstem Totals	29.95	30	832	87	86	24

Big Hole River Tributary Monitoring Reach	Reach Length (miles)	Arctic Grayling	Brook Trout	Rainbow Trout	Brown Trout	Burbot
Governor Creek (A)	2.78	0	179	1	11	3
Miner Creek (B)	0.53	0	44	0	6	1
Big Lake Creek	1.85	6	103	0	4	17
Rock Creek - upper section	2.13	309	224	1	0	39
Rock Creek (C)	0.77	201	37	0	0	5
Steel Creek (D)	2.49	44	517	1	2	13
Swamp Creek	2.69	37	308	5	4	10
Mussigbrod Slough	1.49	1	NA	NA	NA	NA
Pintlar Creek - West Braid	0.26	2	NA	NA	NA	NA
Plimpton Creek - upper section	3.72	2	365	1	2	5
Plimpton Creek	2.65	19	141	7	20	26
Howell Creek	0.77	3	NA	NA	NA	NA
Fishtrap Creek	1.04	6	57	34	3	6
LaMarche Creek	1.02	3	69	19	1	5
Deep Creek (E)	1.53	6	54	39	8	2
Fall Tributary Totals	25.72	639	2098	108	61	132

TOTALS	Reach Length (miles)	Arctic Grayling	Brook Trout	Rainbow Trout	Brown Trout	Burbot
2011 Fall Mainstem Totals	29.95	30	832	87	86	24
2011 Fall Tributary Totals	25.72	639	2098	108	61	132
201 Fall Big Hole Watershed Totals	55.67	669	2930	195	147	156