AQUATICS PROGRAM

2010 ACCOMPLISHMENT REPORT

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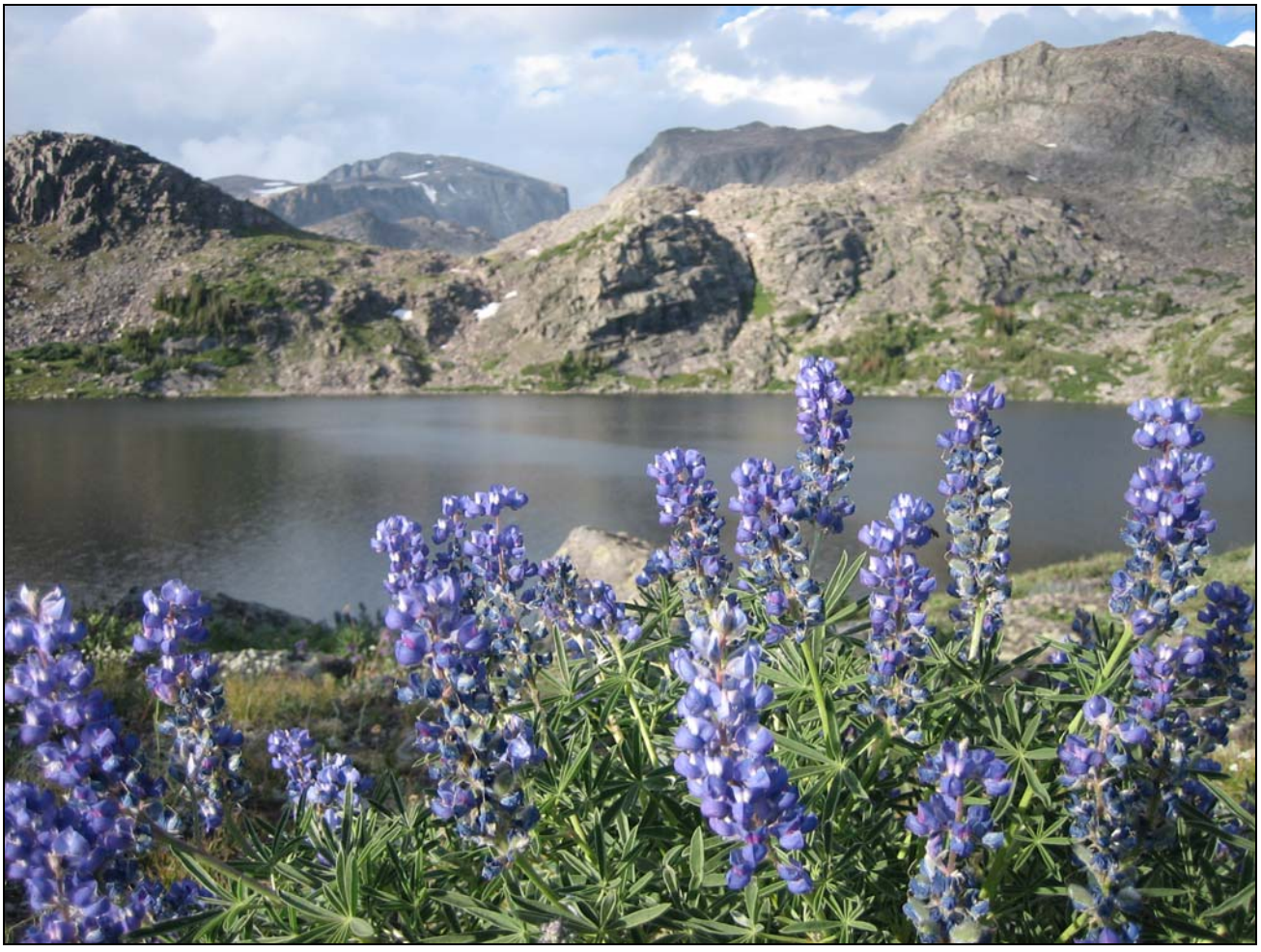

Mistymoon Lake, Cloud Peak Wilderness

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INTRODUCTION

The Bighorn National Forest has combined hydrology, fisheries, air, minerals and geology, soils, and botany into an integrated unit referred to as the Aquatics Program. The combination of these resource areas has created an integrated blend of specialists and allows for more efficient work. The Aquatics Program consists of three permanent employees.

Aquatics Program Manager, Chris Williams, is responsible for overall program direction and administration, as well as serving as the Forest Hydrologist. This position is the primary contact for hydrology issues and also serves as the point of contact for air, minerals and geology, soils, and botany. The program leader provides oversight on budget and personnel, for both permanent and seasonal employees in the Aquatics Program.

Forest Fisheries Biologist, Mike Bower, provides program management for the fisheries program and the wildlife program. The position serves as the primary contact for fisheries issues and is responsible for overseeing implementation of on-the-ground fisheries enhancement projects and monitoring efforts.

Amy Nowakowski occupies the interdisciplinary aquatics position, as Hydrologist/Fisheries Biologist. This position is divided equally between hydrology and fisheries resources and is also responsible for providing expertise on soil, geology, and air quality issues.

In 2010, the seasonal workforce consisted of one GS-05 fisheries technician, two GS-05 hydrologic technicians, and one GS-05 botany technician.

The intent of this report is to give the reader a brief view of the work accomplished by the Aquatics Program during calendar year 2010. Descriptions are intentionally brief. Please contact the Aquatics Program Manager for further detail.

AIR QUALITY

The Bighorn National Forest continued its long-term air quality monitoring program, which began in 1993. The monitoring program is part of a national effort in the western United States to determine changes in high elevation lake chemistry from particle deposition from upwind sources of pollution. Two lakes are monitored annually in the Cloud Peak Wilderness, Emerald Lake and Florence Lake, and are sampled three times per year by Wilderness Rangers. Water samples are analyzed for anions, cations, pH, alkalinity, and conductivity by the U.S. Forest Service Air Resource Management Laboratory in Fort Collins, Colorado.

FISHERIES

All fisheries population work is coordinated with and led by the Wyoming Game & Fish Department. The descriptions below provide detail on the fish population projects that were completed in 2010.

Buckskin Ed Creek, Soldier Creek, and South Paintrock Creek Rehabilitation

Buckskin Ed Creek and Soldier Creek are tributaries to South Paintrock Creek in the Paint Rock Creek-South Paint Rock Creek Watershed. These streams contain large populations of non-native brook trout (*Salvelinus malma*) and small populations of native Yellowstone cutthroat trout (*Oncorhynchus clarki bouveri*). This project was initiated to remove the non-native fish and restore the native Yellowstone cutthroat trout, a Forest Service Region 2 sensitive species. Wyoming Department of Game & Fish fisheries biologists obtained funding in the winter of 2007 to proceed with treatment and worked closely with Bighorn National Forest personnel during the spring of 2008 to develop and schedule the project.

In August 2008 and 2009, fish toxicant was used to chemically remove fish from 7.5 miles of Buckskin Ed Creek and 1 mile of Spring Branch. In 2010, the active ponds along Buckskin Ed Creek were treated for a third time to ensure adequate fish removal. Once Buckskin Ed Creek was determined to be void of fish, Yellowstone cutthroat trout (YCT) were translocated from lower Soldier Creek and South Paintrock Creek into Buckskin Ed Creek. The translocation occurred in August 2010 and involved electroshocking fish, sorting YCT from brook trout, placing all YCT into five-gallon buckets and hiking them upstream where horses could access the canyon reaches. The YCT were placed inside panniers lined with garbage bags, filled with stream water, a block of ice, and oxygen. Horses carried the YCT directly to Buckskin Ed Creek where the native fish were released. When horses could not reach the creek, they carried the YCT to Forest Road 24, where the YCT were loaded into the well-oxygenated Game and Fish stock tank. Once the fish had adequate time to recover, half the fish were loaded onto ATV panniers, while the remaining fish stayed in the stock truck. The ATVs released the YCT into Buckskin Ed Creek along the ATV trail that parallels the creek and fish in the stock truck were released where Forest

Road 24 crosses Buckskin Ed Creek. This was done to distribute the fish as best as possible throughout the Buckskin Ed Creek drainage. Altogether, 595 fish were transplanted into Buckskin Ed Creek.

Figure 1. South Paintrock Creek Yellowstone cutthroat trout translocation, 2010.

Once the native YCT were removed from Soldier Creek and South Paintrock Creek, these drainages (approximately thirteen miles) were treated with fish toxicant to remove the remaining non-native brook trout. Immediately upstream of where South Paintrock Creek flows over a natural fish-barrier waterfall, potassium permanganate was applied to neutralize residual toxicant from flowing downstream. The chemical treatment is planned to continue in 2011, and YCT will be distributed back into Soldier Creek and South Paintrock Creek once non-native fish removal is verified in these drainages.

Road/Trail Stream Crossings

Initial reconnaissance was completed for restoration of aquatic organism passage at two road crossings and one motorized trail crossing within the Yellowstone cutthroat trout reintroduction area described above. A perched culvert at the crossing of Soldier Creek by Forest Road 24 (Battle Park Road) is currently impeding upstream passage by aquatic organisms. Replacement of this culvert with a design that simulates natural stream processes is currently the highest priority for fish habitat restoration on the forest. Similarly, a crossing of Buckskin Ed Creek by Forest Road 24 is also an impediment to fish passage that could fragment the introduced population of Yellowstone cutthroat trout. A second crossing of Buckskin Ed Creek, this one by a motorized trail, is currently serving as a source of sediment affecting downstream habitats and has caused the stream channel to become unnaturally wide and shallow. Personnel plan to complete designs for restoration of these crossings during the winter of 2010/2011, to complete compliance documentation during the fall/winter of 2011/2012, and initiate construction during 2012.

Little Tongue River Rehabilitation

The headwaters of the Little Tongue River and its tributaries flow for approximately 15 miles before flowing subsurface in the Fallen City landside deposits. Wyoming Department of Game & Fish fisheries biologists identified this area as a location for Yellowstone cutthroat trout rehabilitation. In 2009 and 2010, non-native fish (brook trout, brown trout, and rainbow trout) were chemically removed from the Little Tongue River and its tributaries, upstream from Fallen City. Native Yellowstone cutthroat trout have been stocked into the drainage following chemical treatment.

Figure 2. Little Tongue River

Population Estimates

Aquatics Program personnel assisted Wyoming Game & Fish Department (WGFD) with population estimates in the North Tongue and South Tongue Rivers, using backpack and raft electrofishing techniques. Results from the 2010 population estimates can be obtained from the WGFD. In general, the species captured include: rainbow trout, brook trout, Yellowstone cutthroat trout, and Snake River finespotted cutthroat trout.

Figure 3. Electroshocking the North Tongue River

The South Tongue River has three population estimate stations that are sampled each year: Dead Swede, Boy Scout, and a control station. These stations were established to monitor effects of recent stream rehabilitation activities on fish populations in the South Tongue River. The Dead Swede rehabilitation project was completed in 2003 using in-stream rock structures and channel reconstruction. The Boy Scout rehabilitation project is approximately 0.5 miles downstream from the Dead Swede project and was completed in 2009 using both in-stream rock structures and in-stream wood (discussed further in the Hydrology section below). The objective of these restoration projects was to stabilize and restore natural channel geometry in the South Tongue River. The control station is located downstream of the two stream rehabilitation projects, and was sampled to make comparisons between fish populations within the reconstructed channels and within areas that have not been rehabilitated.

Baseline fisheries data has been collected at all three stations beginning in 2005. In addition, the Dead Swede station was sampled in 2000. The Dead Swede station shows a shift in species composition, indicating that brook trout were once the dominant species and now there are nearly equal numbers of brook trout and brown trout. Wyoming Game and Fish is currently holding the fish population data for all electroshocking surveys. Future population estimates will indicate changes at the newly-constructed Boy Scout station (completed in 2009), and the control station will continue to be sampled and will not undergo stream rehabilitation.

Wilderness Lake Assessments

Several wilderness lakes adjacent to Cloud Peak Reservoir were visited with the WGFD to sample fish populations and to conduct wilderness campsite inventories. Sampled areas included Upper and Lower Mead Lake and the South Piney Lakes. Within the wilderness, a single campsite was detected and surveyed. Fish populations were dominated by brook trout, rainbow trout, and cutthroat trout.

Figure 4. One of the South Piney Lakes in the Cloud Peak Wilderness Area

Story Fish Hatchery

The Story Fish Hatchery receives water from a small cave, adjacent to South Piney Creek at the location of the diversion dam. The cave flows subsurface and reappears as a spring at the hatchery. The spring has been flowing less and less water to the hatchery each year, as South Piney Creek has developed a new flow path. The South Piney Creek diversion dam has significantly altered the natural channel dimensions. At this location, the creek is severely widened, which reduces sediment transport and has caused mid-channel bar deposition. The over-widened creek developed a new channel thalweg along the right bank, away from the cave inlet. As a short-term resolution, Wyoming Game & Fish Department personnel reshaped the channel geometry in 2010 using heavy equipment. Cobbles and boulders were moved from the cave inlet side of the channel and placed into the new channel thalweg. This temporarily placed water back into the original channel along the left bank and forced water into the cave inlet to supply the hatchery with water over the winter. A long-term solution needs to be developed using a detailed stream analysis.

Figure 5. South Piney Creek before (left photo - July) and after (right photo - October) 2010 channel maintenance. Photos look upstream. Blue line represents channel thalweg and yellow diamond locates large boulder that was untouched during maintenance. Location of hatchery cave inlet is toward the lower right corner of photos, just outside the frame of view.

North Tongue Streambank Revegetation

In collaboration with Trout Unlimited and the Wyoming Game & Fish Department (WGFD), three streambanks were revegetated along the North Tongue River, a popular recreational fishery. In late June, a crew of volunteers from TU, the WGFD, and Sheridan County Conservation District planted willow cuttings and sedge plugs. Initial survival of transplanted willow and sedge approached 80%. The transplants were not protected from grazing wildlife or domestic livestock. Continued monitoring will indicate whether additional protection is necessary for plant establishment.

Figure 6. North Tongue River streambank revegetation

AIS Decontamination Protocol

In support of efforts to control the spread of aquatic invasive species (AIS), a new decontamination protocol for the Bighorn National Forest was instituted. A disinfection protocol that is effective in treating a wide variety of organisms was developed to prevent unintended transport of known and currently unknown AIS. The protocol utilizes a two-phase approach consisting of treatment with quaternary ammonia followed by application of one of several physical treatment options including extended desiccation, freezing, or hot-water bath. The protocol is implemented before equipment is transferred among watersheds.

HYDROLOGY

Stream Monitoring

Long-term stream monitoring locations were established as part of Forest Plan monitoring efforts. Long-term monitoring sites are located at low stream gradients (< 3%) near the outlet of a 6th-level watershed. Data collected at each site includes cross-sections, longitudinal profile, pebble count, 50 cumulative widths and depths, and photo points. In addition, project-level monitoring sites are established as part of specific NEPA decisions. In some instances, project-level sites also double as long-term monitoring sites.

There are seventy-four 6th-level watersheds that contain lands administered by the Bighorn National Forest. All watersheds have been evaluated for monitoring locations, although only nineteen have met the criteria that allowed establishment of a long-term stream monitoring site. However, fifteen additional sites have been established as project-level sites, totaling twenty-three 6th-level watersheds with stream surveys and thirty-four total stream monitoring locations across the forest. Stream surveys completed in 2010 are identified in the table below.

Table 1. Stream survey sites monitored in 2010

Stream Name	Site Name	Survey Type	Stream Name	Site Name	Survey Type
North Fork Powder River	Exclosure	LTM	North Paint Rock	Kinky White	LTM
North Tongue River	Twin Buttes	LTM	Fool Creek	Exclosure, Inside Exclosure, Outside	LTM
North Tongue River	Road 174	LTM	Bull Creek	Exclosure, Inside Exclosure, Outside	Project
North Fork Crazy Woman	Highway 16	LTM	Hunter Creek	Cattle Bridge	Project
East Fork Tensleep	Meadow	LTM	Mill Creek	Exclosure	Project
Middle Fork Tensleep	Cub Park	LTM	North Tongue River	Road 175	Project
South Tongue River	Pine Island	LTM	South Tongue River	Shutts Flatts	Project
Shell Creek	Willett	LTM	South Tongue River	Dead Swede	Project
Medicine Lodge	599	LTM	South Tongue River	Control	Project
Leigh Creek	BAR	LTM	South Tongue River	Boy Scout	Project

Figure 7. Bull Creek overview, Inside Exclosure project-level monitoring site

South Tongue River Rehabilitation – Boy Scout Project

Construction of the Boy Scout project took place in the fall of 2009. Project objectives were to stabilize streambanks and increase the diversity of aquatic habitat along approximately one mile of the South Tongue River. See the 2009 accomplishment report for further detail. The 2010 spring runoff event produced flows well over bankfull elevation in the South Tongue drainage and the highest elevations in the watershed are thought to have experienced rain-on-snow events causing instantaneous flooding. The spring flooding caused one structure to fail within the Boy Scout project area. The contractor returned in 2010 to inspect the Boy Scout project and make necessary improvements. Maintenance on the failed structure involved stabilizing the eroded right bank with an embedded log jam 5 feet below bankfull elevation (scour depth is 4.5 feet) and reshaping the channel morphology to the correct width-depth ratio. See photos below.

Figure 8. Bank failure location before (left photo) and after (right photo) 2010 maintenance

Additional maintenance work was completed on the oxbow inlet cross-vein in 2010 which included: increasing the elevation of the cross-vein throat by approximately 4-6 inches, excavating the sediment wedge deposited on the right bank, and placing sedge and willows on the left bank of the oxbow inlet. During spring runoff, a small portion of the left bank cross-vein arm slipped, a considerable amount of sediment was deposited along the right-bank blocking water from flowing into the oxbow, and scour occurred at the left bank of the oxbow inlet. Maintenance work raised the water elevation at the cross-vein and initiated flow into the oxbow.

The oxbow channel was fenced with temporary electric fencing in 2010 to temporarily exclude livestock grazing in the five acre exclosure to provide transplanted sod time to establish along the channel banks. Wyoming Game & Fish Department acquired funding through the Wyoming Governor's Big Game License Coalition for fencing materials.

This project is part of an ongoing effort to restore or maintain natural function and process in the Upper Tongue River watershed. Two projects to date, Dead Swede and Boy Scout, have eliminated excessive lateral migration of the stream channel for approximately two miles of the South Tongue River. Stabilization and habitat improvements for other

degraded stream segments within the entire watershed are being considered, as well as road improvements, trail maintenance, and other land management activities to improve overall watershed health.

Future monitoring will include additional surveys of pre-construction cross sections, surveyed in 2005 and 2009, and the longitudinal survey that was completed in 2005. Population estimates within the project area will continue, to evaluate the effect that these structures have on fish populations in the area (see discussion above in the Fisheries section for more detail).

PROGRAM MANAGEMENT

Best Management Practice Reviews

Best Management Practice (BMP) reviews are conducted each year to meet the requirements of the Clean Water Act and the direction outlined in the Revised Forest Plan (2005). The reviews follow Watershed Conservation Practices Handbook (WCPH) management measures and design criteria (USFS 2006). BMP field reviews identify if WCPH criteria are followed, if guidelines are implemented, and provide an opportunity to recognize future opportunities for soil and watershed improvements in an interdisciplinary team setting. On average, one timber BMP review is conducted on the Forest each year and one randomly selected grazing BMP review is conducted on each of three districts per year, totaling an average of four BMP reviews a year.

Five livestock grazing BMP reviews were conducted on the Forest in 2010, two on the Tongue District (PK Horse Pasture in the Lower East Tongue Allotment and Sheep Trap Pasture in the Owen Creek Allotment), two on the Powder River District (High Park Pasture in the North Canyon Allotment and Sick Pasture in the Dry Tensleep Allotment), and one on the Medicine Wheel/Paintrock District (Upper Cold Springs Pasture in the Forks Allotment). The districts with two BMP reviews had reviews cancelled in 2009 due to snow covering the ground. The timber BMP review was also rescheduled for 2011 because the selected timber project was not completed in 2010. Overall, the application of BMPs provides adequate protection for designated uses and enables interdisciplinary teams to identify opportunities for soil and watershed improvements.

Miscellaneous

Fire Program Support

The Aquatics Program provides annual support to the wildland fire and prescribed burning programs on the Bighorn National Forest. In 2010, Mike Bower, Amy Nowakowski, and hydrology technician Ashley Hutton-Powell assisted with prescribed burns and wildfire suppression on all three ranger districts.

Cow Creek Fire, Colorado

Amy Nowakowski assisted with wildfire suppression efforts on the Cow Creek Fire in Rocky Mountain National Park designated wilderness in June. Amy was a resource advisor and assessed both wildfire suppression activities and wildfire effects to natural resources, as well as identified post-fire rehabilitation opportunities.

Figure 9. Cow Creek Fire, Rocky Mountain National Park 2010

Education

Aquatics personnel assisted with a community event at the new Kleenburn Recreation Area to promote kid's fishing. The event was held in June during Free Fishing Day and was attended by approximately 150 people. This event is a cooperative effort between numerous individuals and groups including Wyoming Game & Fish Department, Bighorn National Forest, Trout Unlimited, Wal-mart, Jake's Lures, Pepsi, and Tongue River Bait.

NEPA Project Support

The Aquatics Program provides support to all NEPA projects on the Forest. On a typical project, one person from the Aquatics Program is assigned to the team and is responsible for representing hydrology, fisheries, air, soils, and geology and minerals resources. The following projects were part of the 2010 NEPA workload.

Big 6

The Big 6 Environmental Impact Statement (EIS), officially titled "Livestock Grazing and Vegetation Management on Six Geographic Areas," analyzes the reauthorization of domestic livestock grazing on 43 allotments on the Tongue, Medicine Wheel/Paintrock, and Powder River Ranger Districts on the Bighorn National Forest. The project also includes fuel management activities within a portion of those allotments. Aquatics personnel discussed the project with the interdisciplinary team, collected and analyzed field data, and Amy Nowakowski completed the hydrology/fisheries/soil specialist report for the EIS in 2010. The decision is expected to be signed in 2011, implementing a strategy using adaptive management for livestock grazing.

Johnson Creek Vegetation Management

The Johnson Creek Vegetation Management project encompasses approximately 8,000 acres in the Lower South Tongue River watershed and the Tongue River-Sheep Creek watershed on the Tongue Ranger District. A variety of timber treatments are proposed to improve the health and structure of timber stands, to reduce fuels and wildfire hazards, to improve timber stands in developed recreation sites, and to enhance Nordic ski trail opportunities. Interdisciplinary team meetings, field work, and the hydrology/fish/soils specialist report was completed by Amy Nowakowski in 2010. The project is expected to be signed by the Tongue District Ranger in 2011.

WUI Fuels

The Forest-Wide Wildland Urban Interface (WUI) Hazardous Fuels Reduction project proposes to treat dense timber stands in and around cabins and structures located on all three Ranger Districts of the Bighorn National Forest. A variety of methods would be employed, depending on site conditions and available equipment, such as commercial harvest, mechanized thinning, and firewood removal. These treatments are intended to reduce the immediate threat of wildfire by providing a more defensible space near structures. Interdisciplinary team meetings, field work, and the hydrology/fish/soil specialist report was completed by Amy Nowakowski in 2010. The project is expected to be signed in 2010.

Duncan Lake Communication Site

Wyoming Department of Transportation submitted a proposal to construct a new multi-user communication site in the Duncan Lake area on the Tongue Ranger District. The project is part of the WYOLINK statewide project to enhance homeland security across the State of Wyoming. The proposal includes building a 150 foot communication tower and approximately 18,000 feet of underground powerline from Highway 14 to the site. The Environmental Assessment (EA) was prepared by an outside group and reviews were submitted on soil, hydrology, and fish resources by Amy Nowakowski. Project construction was completed in the fall of 2010.

Tensleep Fish Hatchery

The Wyoming Game and Fish Department proposed to rehabilitate the Tensleep Fish Hatchery to protect a resident Yellowstone cutthroat trout brood stock from *Myxobolus cerebralis*, the causative agent of whirling disease, as well as from other disease threats. The project included modification of structures currently covering the hatchery's water sources, renovation of accompanying plumbing, addition of several new steel buildings to house various aquaculture and water treatment equipment, replacement of filtration and aeration equipment, reclamation of an existing effluent pond, and installation of a new water pipeline alongside existing pipes running beneath Leigh Creek. All activities occurred within the hatchery boundary on previously disturbed soils. A temporary stream crossing was constructed to allow access

across Leigh Creek for installation of the new water pipeline. A review of the project's potential effects on watershed, soils, and fishery resources was completed by Mike Bower.

West Tensleep Corridor

This project involves improving water quality in the West Tensleep Corridor by a) moving developed campgrounds and dispersed camp sites away from streams and lakes, b) initiating proper human waste management, and c) improving the wilderness trailhead. The corridor lies within the Upper Tensleep Creek municipal watershed. This project was initiated in 2010, and Chris Williams and Amy Nowakowski have been involved with initial interdisciplinary team meetings.

Clear Crazy

Mike Bower met with Powder River Ranger District personnel in anticipation of a NEPA sufficiency review for a prior decision related to a series of livestock grazing permits. A tour was completed to familiarize interdisciplinary team members with the area indicated in the prior decision and to identify information needs in advance of the to sufficiency review.

Training

Designing for Aquatic Organism Passage at Road-Stream Crossings

Chris Williams and Amy Nowakowski attended the Aquatic Organism Passage course at McClellan, California in April 2010. The five-day course focused on designing road-stream crossing structures that will accommodate aquatic organism passage, provide for more natural channel function, and maximize the long-term stability of the structure.

Other Trainings & Professional Meetings

- Colorado Wyoming Chapter of American Fisheries Society
- Yellowstone cutthroat trout interagency working group
- Wild Trout
- Supervision training
- Pre-retirement training