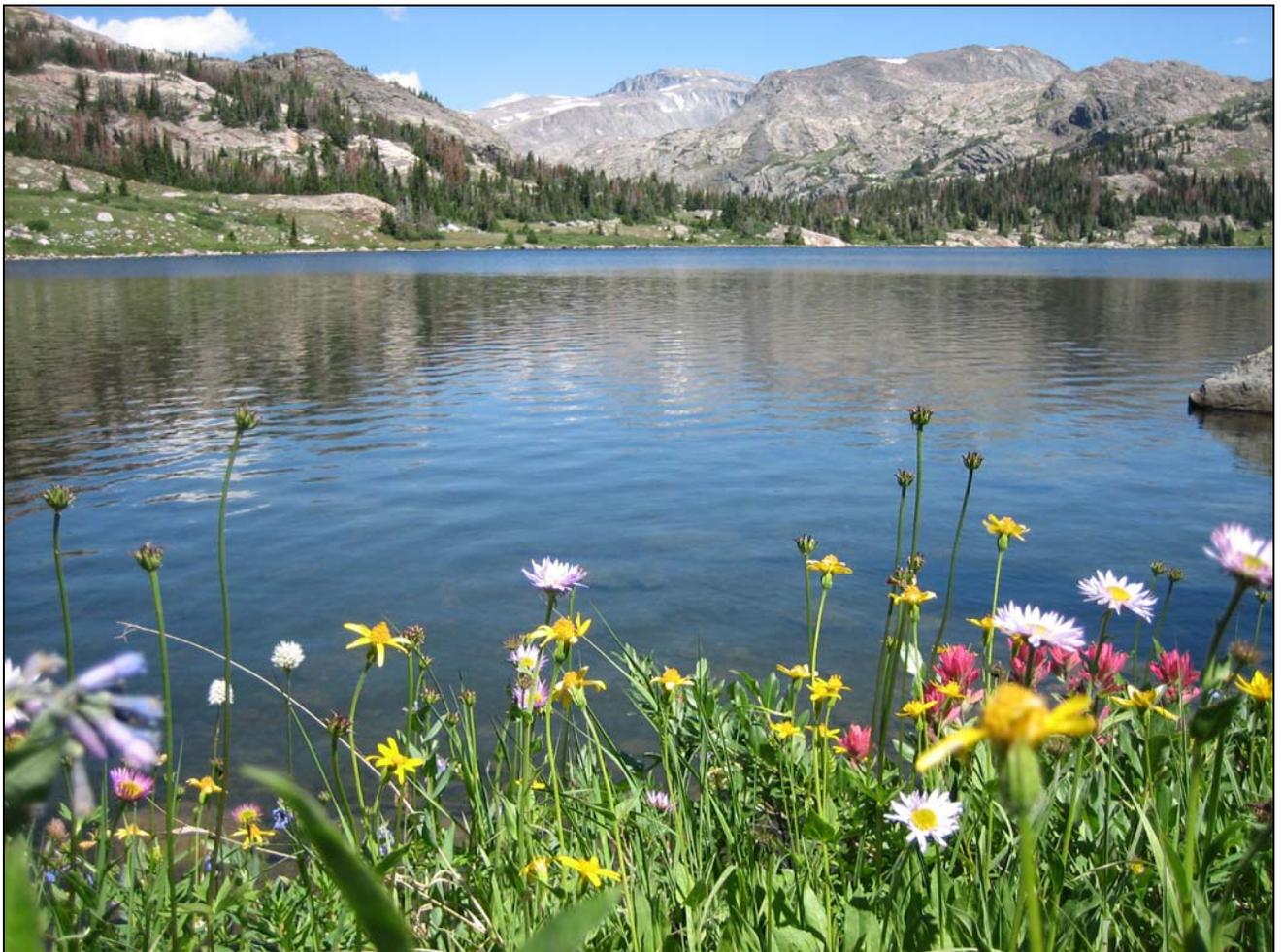


# 2009 ACCOMPLISHMENT REPORT

Bighorn National Forest – Supervisor’s Office  
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Sheridan, WY 82801

## AQUATICS PROGRAM



Lake Helen, Cloud Peak Wilderness

# TABLE OF CONTENTS

TABLE OF CONTENTS .....	2
LIST OF TABLES .....	2
LIST OF FIGURES .....	2
INTRODUCTION .....	3
AIR QUALITY .....	3
FISHERIES.....	3
<i>Buckskin Ed Creek Rehabilitation</i> .....	3
<i>Population Estimates</i> .....	4
HYDROLOGY .....	5
<i>Eastside Water Rights Investigation</i> .....	5
<i>Stream Monitoring</i> .....	5
<i>South Tongue River Rehabilitation – Boy Scout Project</i> .....	6
<i>Mill Creek</i> .....	7
PROGRAM MANAGEMENT .....	7
<i>Best Management Practice Reviews</i> .....	7
<i>Miscellaneous</i> .....	8
Fire Program Support .....	9
Burned Area Emergency Response - Australia.....	8
<i>Education</i> .....	10
<i>NEPA Project Support</i> .....	8
Big 6 .....	8
Johnson Creek Vegetation Management.....	9
Garland Blowdown.....	9
WUI Fuels .....	9
Duncan Lake Communication Site .....	9
Paintrock Lakes Redevelopment.....	9
<i>Training</i> .....	9
Rosen Level I – Applied Fluvial Geomorphology .....	10
Little Colorado River – Native Fish Monitoring.....	10
Proper Functioning Condition of Riparian Areas .....	10

## LIST OF TABLES

TABLE 1. STREAM SURVEY SITES MONITORED IN 2009 .....	6
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## LIST OF FIGURES

FIGURE 1. BUCKSKIN ED CREEK .....	3
FIGURE 2. ELECTROSHOCKING THE NORTH TONGUE RIVER .....	4
FIGURE 3. DEAD SWEDE STREAM REHABILITATION .....	4
FIGURE 4. QUARTZ CREEK OVERVIEW, BIG BEND MONITORING SITE .....	5
FIGURE 5. SOUTH TONGUE RIVER BOY SCOUT PROJECT. THE “BEFORE” CONSTRUCTION PHOTO SHOWS BANK EROSION, CHANNEL WIDENING, AND SEDIMENT DEPOSITION. THE “AFTER” CONSTRUCTION PHOTO SHOWS RECONSTRUCTED CHANNEL GEOMETRY TO ACHIEVE PROPER WIDTH-DEPTH RATIOS, AND IN-STREAM WOOD STRUCTURES, ROCK STRUCTURES, AND WILLOWS STABILIZING CHANNEL BANKS AND POINTBARS. ....	6
FIGURE 6. MILL CREEK CULVERT OUTLET, BEFORE AND AFTER 2009 CONSTRUCTION.....	7
FIGURE 7. PRESCRIBED FIRE AT BUCK CREEK VEES .....	9
FIGURE 8. WALLABY WEIR, BEFORE AND AFTER THE 2009 KILMORE-EAST MURRINDINDI COMPLEX SOUTH FIRE, VICTORIA, AUSTRALIA .....	8
FIGURE 9. TONGUE POINT, BEFORE AND AFTER THE 2009 WILSONS PROMONTORY CATHEDRAL FIRE, VICTORIA, AUSTRALIA.....	8
FIGURE 10. ENDANGERED HUMPBAC CHUB MONITORING, LITTLE COLORADO RIVER, ARIZONA .....	10

# INTRODUCTION

The Bighorn National Forest has combined air, minerals and geology, soils, hydrology, fisheries, 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, Dan Scaife, 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. Dan Scaife accepted a new position on the Idaho Panhandle National Forest and his position on the Bighorn National Forest has been vacant since October 2009.

Lead Fisheries Biologist, Will Young, serves as the primary contact for fisheries issues and provides administrative support to the program leader. This position is responsible for overseeing implementation of on-the-ground fisheries projects and provides some of the day-to-day supervision of seasonal employees. Will Young accepted a new position on the Tongass National Forest and his position on the Bighorn National Forest has been vacant since April 2009.

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 2009, the seasonal workforce consisted of one GS-05 fisheries technician, one GS-05 hydrologic technician, 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 2009. 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

## Buckskin Ed Creek Rehabilitation

Buckskin Ed Creek is a tributary to South Paint Rock Creek in the Paint Rock Creek-South Paint Rock Creek Watershed and contains a large population of non-native brook trout (*Salvelinus malma*). In 2007, the Wyoming Department of Game and Fish (WDGF) identified Buckskin Ed Creek as a drainage to restore native Yellowstone cutthroat trout (*Oncorhynchus clarki bouveri*) in the watershed that historically supported the native species.



Figure 1. Buckskin Ed Creek

WDGF 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, individuals from WDGF and the Bighorn National Forest initiated treatment in the 7.5 miles of Buckskin Ed Creek and the upstream 1 mile of Spring Branch. Fish toxicant, rotenone and antimycin, was applied to all fish-bearing waters in the Buckskin Ed Creek sub-watershed. Antimycin was applied via drip stations at six locations, while a rotenone sand mix was applied by hand along stream margins and tributary springs. Immediately upstream of where Buckskin Ed Creek flows over a natural fish-barrier waterfall, potassium permanganate was applied to neutralize residual toxicant from flowing downstream.

Yellowstone cutthroat trout conservation efforts are planned to continue in Soldier Creek and South Paintrock Creek in 2010-2011, which are also located in the Paint Rock Creek-South Paint Rock Creek Watershed.

## Population Estimates

Aquatics Program personnel assisted WGF with population estimates in the North Tongue and South Tongue Rivers, using backpack and raft electrofishing techniques. Results from the 2009 population estimates can be obtained from the WGF. In general, the species captured include: rainbow trout, brook trout, Yellowstone cutthroat trout, Snake River finespotted cutthroat trout. In addition, mountain sucker, a Forest Service Region 2 sensitive species, was identified at the Pine Island station on the South Tongue River.



**Figure 2. 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.



**Figure 3. Dead Swede stream rehabilitation**

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.

## HYDROLOGY

### Eastside Water Rights Investigation

An adjudication of domestic water uses in the Bighorn River Basin was completed in 2005. That adjudication included the western portion of the hydrologic divide of the Bighorn National Forest. Those efforts produced a high quality product for the west side of the Forest, which included improved documentation of discrete uses (non-stock), mapped information of on-site conditions, and spatial data for incorporation into the Forest's electronic database.

Although the previous effort produced a high quality product, the eastern portion the Forest is now inconsistent with the level of information that has been gathered across the Forest. A purchase order, to conduct an investigation of the non-stock uses along the eastern portion of the hydrologic divide, was awarded to a contractor, who began work in the fall of 2006. The cost to evaluate these water uses is estimated at \$1,000 – \$1,500 per water use and is expected to continue over the next 5 years, depending on available funding. Money has been made available through TIN requests to the Regional Office.

Objectives of the water rights investigation are to:

- Develop an electronic database of discrete water uses (non-stock) for the entire Forest
- Improve the understanding of consumptive water uses on the Forest
- Meet legal obligations of the Forest Service, with regards to water rights
- Develop consistency in water rights documentation and spatial data forest-wide

### Stream Monitoring

Long-term stream monitoring sites 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 6<sup>th</sup>-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 a specific NEPA decision. In some instances, project-level sites also double as long-term monitoring sites.



Figure 4. Quartz Creek overview, Big Bend monitoring site

There are seventy-four 6<sup>th</sup>-level watersheds that contain lands administered by the Bighorn National Forest. Seventy-two watersheds have been evaluated, although only nineteen have met the criteria that allowed establishment of a long-term stream monitoring site. Two remaining 6<sup>th</sup>-level watersheds need to be evaluated for potential long-term stream survey sites: Paint Rock Creek-Trout Creek watershed and Long Park Creek watershed. If suitable sites are found in 2010, permanent long-term monitoring stations will be established and surveyed.

Eight total stream surveys were completed in 2009 (see table below). Seven existing long-term sites and four existing project-level sites are planned to be re-surveyed in 2010.

**Table 1. Stream survey sites monitored in 2009**

Stream Name	Site Name	Survey Type
EF Big Goose Creek	Park Reservoir	LTM
Sourdough Creek	Powerline	LTM
Poison Creek	Section 24	LTM
Doyle Creek	Two Elk	LTM
Quartz Creek	Big Bend	LTM
Little Bighorn River	Dayton Gulch	both
WF South Tongue River	Woodrock	Project
North Tongue River	Experimental Pasture	Project

### South Tongue River Rehabilitation – Boy Scout Project

Construction of the Boy Scout project took place on August 3<sup>rd</sup> 2009 and was completed by September 11<sup>th</sup> 2009. The objectives of the project were to stabilize streambanks and increase the diversity of aquatic habitat along approximately one mile of the South Tongue River. Accelerated bank erosion resulted in a loss of overhanging cover, increased sediment availability, decreased habitat complexity, and other negative effects. Benefits of this project include streambank stabilization, increased sediment transport, and improvement of aquatic habitat condition by increasing in-channel complexity. The Boy Scout project was made possible through cooperative funding from the Wyoming Wildlife and Natural Resource Trust and the Wyoming Department of Game and Fish.



**Figure 5. South Tongue River Boy Scout project. The “before” construction photo shows bank erosion, channel widening, and sediment deposition. The “after” construction photo shows reconstructed channel geometry to achieve proper width-depth ratios, and in-stream wood structures, rock structures, and willows stabilizing channel banks and pointbars.**

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, in order to evaluate the effect that these structures have on fish populations in the area (see discussion above in the Fisheries section for more detail).

## Mill Creek

Mill Creek is unique because it contains a genetically pure population of native Yellowstone cutthroat trout, existing in marginal habitat. Mill Creek begins as several small threads that eventually join as a single channel, and flows sub-surface into karst at the forest boundary. Altogether, approximately one mile of stream is inhabitable by fish.

Mill Creek is bisected by Forest Road 17, where the preexisting culvert was a barrier to fish migration. Fish population data identified a difference in size classes between the fish upstream and downstream of the culvert. The objective of the culvert installation was to improve the accessibility of fish into upstream habitats, following aquatic organism passage design tools. The new culvert was installed October 9, 2009.



Figure 6. Mill Creek culvert outlet, before and after 2009 construction

## 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.

Two livestock grazing BMP reviews were conducted on the Forest in 2009, one on the Tongue District (Lower Unit pasture of the Walker Prairie allotment) and one on the Medicine Wheel/Paintrock District (Wiley Sundown pasture of the Wiley Sundown allotment). The BMP review on the Powder River District was cancelled in 2009 due to snow covering the ground and is rescheduled for 2010. The timber BMP review was also rescheduled for 2010 because the selected timber project was not completed in 2009.

Overall, the application of BMPs provides adequate protection for designated uses and enables interdisciplinary teams to identify opportunities for soil and watershed improvements.

## Miscellaneous

### Burned Area Emergency Response - Australia

Amy Nowakowski assisted in the post-fire recovery efforts following the February 7<sup>th</sup> Black Saturday Bushfires in Victoria, Australia during a 30-day international assignment in March 2009. Amy was a member of a 12-person interdisciplinary United States Burned Area Emergency Response team that identified values at risk (i.e., life and property, soil and water quality, threatened and endangered fish habitat) downstream of the burned area and recommended post-fire emergency hillslope stabilization treatments. The team assessed watershed condition and erosion hazards on the 280,000 acre Kilmore-East Murrindindi Complex South Fire and the 59,000 acre Wilsons Promontory Cathedral Fire.



Figure 7. Wallaby Weir, before and after the 2009 Kilmore-East Murrindindi Complex South Fire, Victoria, Australia



Figure 8. Tongue Point, before and after the 2009 Wilsons Promontory Cathedral Fire, Victoria, Australia

## 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 air, soils, geology and minerals, hydrology, and fishery resources. The following projects were part of the 2009 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 began the hydrology/fisheries/soil specialist report for the EIS. The decision is expected to be signed in 2010, 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 initiated by Amy Nowakowski in 2009. The project is expected to be signed by the Tongue District Ranger in 2010.

## **Garland Blowdown**

The Garland Blowdown Salvage project proposes to commercially harvest live and blown down trees that were damaged in a 2007 wind event on the Tongue Ranger District in the Upper Dry Fork Watershed. The proposed action includes harvesting approximately 500 acres of timber and decommissioning six existing road segments (approximately five miles) which will reduce the overall road density in the project area. Field assessment began in 2008 and the hydrology/fish/soil specialist report was completed by Amy Nowakowski in 2009. The decision to implement the proposed action was signed by the Tongue District Ranger in May 2009, however commercial harvest is not likely to occur until 2010 or later.

## **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 initiated by Amy Nowakowski in 2009. 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.

## **Paintrock Lakes Redevelopment**

The Medicine Wheel Paintrock Ranger District proposes to redevelop the recreation sites in the Paintrock Lakes area by decommissioning Upper Paintrock Lake Campground and adding campsites to Medicine Lodge Lake Campground and/or Lower Paintrock Lake Campground to maintain the overall number of campsites in the area. Dan Scaife and Amy Nowakowski attended an interdisciplinary field visit to the campgrounds, and Amy prepared a site visit report for the project record. The decision is expected to be signed by the end of the calendar year.

## **Fire Program Support**

The Aquatics Program provides annual support to the wildland fire and prescribed burning programs on the Bighorn National Forest. In 2009, Amy Nowakowski and botany technician Beth Davidson assisted with prescribed burns on the Powder River Ranger District in November.



**Figure 9. Prescribed fire at Buck Creek Vees**

## Education

Amy Nowakowski gave a presentation to students in the Principles of Fish and Wildlife Management class at Sheridan College. The presentation discussed fisheries management in the Forest Service and in the Burned Area Emergency Response program. Students were exceptionally bright and stayed after class to discuss fisheries management well after the scheduled class was over.

## Training

### Rosgen Level I – Applied Fluvial Geomorphology

Amy Nowakowski attended the Rosgen Level I Applied Fluvial Geomorphology course at Lubrecht Forest, MT in June 2009. The five-day course focused on the principles of fluvial geomorphology, hydraulics, sediment mobility, and streambank erosion, using the Rosgen stream classification system.

### Little Colorado River – Native Fish Monitoring

Amy Nowakowski volunteered with the U.S. Fish and Wildlife Service in October as part of the native fish monitoring efforts on the Little Colorado River in the Grand Canyon. Field work included PIT-tagging the federally endangered humpback chub as part of a long-term mark-recapture population study, and processing other native fish such as bluehead sucker, flannelmouth sucker, and speckled dace.



Figure 10. Endangered humpback chub monitoring, Little Colorado River, Arizona

### Proper Functioning Condition of Riparian Areas

Proper Functioning Condition (PFC) courses are taught by an interagency, interdisciplinary group of instructors across the western U.S. each year. Dan Scaife is a returning member of both the Wyoming and Colorado Riparian Teams and instructed the PFC course in Denver, CO in June. Amy Nowakowski joined the Wyoming Riparian Team in June and shadowed the instructors during the June PFC training in Lander, WY. The Proper Functioning Condition protocol is a qualitative assessment of the riparian ecosystem at the reach-scale. It evaluates the physical function of the ecosystem and identifies the riparian area to be either: properly functioning, functioning at risk, or non-functional.