

2006 ANNUAL REPORT

Strategic Habitat Plan Accomplishments



- Aquatic Habitat
- Terrestrial Habitat
- Habitat and Access Maintenance
- Lands Administration Sections



WYOMING GAME & FISH DEPARTMENT
APRIL 2007



2006 ANNUAL REPORT

Strategic Habitat Plan

Accomplishments

**Aquatic Habitat, Terrestrial Habitat, Habitat and Access Maintenance,
and Lands Administration Sections**

Wyoming Game and Fish Department

Mission

Restore and/or manage habitat to enhance and sustain wildlife populations in the future

Vision

The Wyoming Game and Fish Department is the steward of Wyoming's wildlife, dedicated to the conservation of sustainable, functional ecosystems capable of supporting wildlife populations at least as healthy, abundant and diverse as they were at the dawn of the 21st century. We will take a holistic approach to habitat management, integrating various land uses while involving the general public, private landowners and land management agencies. Our lands will be managed to emphasize and maintain the wildlife habitat and public access values for which they were obtained.

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INTRODUCTION

One of the greatest challenges facing the Wyoming Game and Fish Department (WGFD) in the 21st century will be our ability to maintain sustainable fish and wildlife populations and meet the expectations and desire of our citizens. This challenge can be met by addressing habitat needs and issues that seek to maintain open spaces, non-fragmented quality habitats and the ability of fish and wildlife to utilize these areas. Many areas of the state are imperiled or at-risk. Potential impacts to fish and wildlife are expanding, with some of the most noticeable being energy development, increasing demands for water, other land uses, and urban sprawl. The long-term drought, fire suppression and conflicts in public expectations have caused impacts as well. At the same time, we are being asked to take a far more active role in the conservation of all wildlife species, including many considered to be at-risk. Conserving them one species at a time is impractical over the long-term. To effectively answer these challenges, the Department is actively pursuing habitat-related management decisions at a landscape level with public land managers and private landowners on lands throughout Wyoming. In recognition of this need, The Wyoming Game and Fish Commission (WGFC) adopted a Strategic Habitat Plan (SHP) in 2001. This SHP and priorities habitat areas can be viewed on the WGFD website at <http://gf.state.wy.us/habitat/StrategicPlan/index.asp>. The plan's three primary goals are:

1. Manage, preserve and restore habitat for long-term sustainable management of wildlife populations.
2. Increase wildlife based recreation through habitat enhancements that increase productivity of wildlife.
3. Increase or maintain wildlife habitat and associated recreation on Wyoming Game and Fish Commission owned and managed lands.

This is a report of the activities and strategies we implemented this past year to address the goals of the SHP. It is of paramount importance that habitat conservation in Wyoming be extended to the landscape/watershed level, working cooperatively across organizational lines within and outside the Department, and across political and legal boundaries on the ground. This requires a great deal of teamwork and a broader view of our responsibilities. The report includes a compilation of funding sources, expenditures and a summary of on-the-ground activities accomplished during 2006.

In addition, several statewide programs related to the Strategic Habitat Plan are included in this years analysis. These programs involved technical assistance and education regarding fish and wildlife habitat condition and health relative to livestock and/or big game grazing via workshops for private landowners and managers. Also included are programs for sagebrush management including land cover information derived from remote sensing satellite imagery, riparian, aspen and tall forb community management, development and refinement of a geographic information system (GIS) decision support system and GIS cumulative impact analysis system for the WGFD, in-stream flow habitat protection, and a statewide aquatic wildlife GIS database development. Using funds received from the U. S. Fish and Wildlife Service (USFWS) Landowner Incentive Program, the Department is working with private landowners to implement on-the-ground projects on prairie stream systems, cutthroat trout streams, and grassland and sagebrush habitat for sensitive fish and wildlife species on private lands. These efforts are designed to enhance sensitive wildlife species populations and distribution and to negate the need for potential listing under the Endangered Species Act administered by the USFWS. The Water Management Section is actively involved in water management efforts and evaluation of in-stream flows to protect and enhance aquatic wildlife resources.

Program performance in terms of expenditures on projects is summarized on a statewide basis in the following sections.

I. Approximate WGFD funds (figures rounded to the nearest \$1,000) expended for Strategic Habitat Plan Goals 1, 2, and 3 during calendar 2006 (These include funds expended for on-the-ground projects. It does not include expenditures for salaries or equipment for routine maintenance and operation functions).

Department Funds Expended for Goals 1, 2 and 3: \$ 1,913,000

II. Non-Department fund allocated/expended for Strategic Habitat Plan Goal 3 during 2006. Funding derived from a variety of sources including; a) Farm Bill Government Funds; b) Wyoming Wildlife and Natural Resources Trust Board; c) Other Federal Government Funding Sources; d) Other State and Local Government Funding Sources; e) Non-Governmental Organizations and Groups; f) Wyoming Wildlife Heritage Foundation; g) Wyoming Governor’s Big Game License Coalition; h) Private Landowners Contribution (Includes in-kind) among others.

Non-Department Funds Expended for Goals 1 and 2: \$2,481,000

III. Non-Department funds allocated/expended for Strategic Habitat Plan Goals 1, 2 and 3 during calendar year 2006. Funding derived from a variety of sources including: a) Farm Bill Government Funds; b) Other Federal Government Funding Sources; c) Other State and Local Government Funding Sources; d) Non-Governmental Organizations and Groups; e) Wyoming Wildlife Heritage Foundation; f) Wyoming Governor’s Big Game License Coalition; g) Private Landowners Contribution (Includes in-kind); and h) Wyoming Wildlife and Natural Resources Trust Board among others.

Non-Department Subtotal for Goal 3: \$ 45,000

IV. SUBTOTAL NON-DEPARTMENT FUNDS: \$2,526,000

V. GRAND TOTAL FOR GOALS 1, 2, and 3 \$4,439,000
Project Funds not including WGFD (M&O):

In other words, the Department was able to secure funding from outside sources amounting to approximately \$2.32 for each Department dollar expended for on-the-ground fish and wildlife habitat activities. This outside funding is a critical element for implementing the Strategic Habitat Plan and conserving our wildlife resources in collaboration with the many dedicated partners throughout the State.

Overall, personnel directly involved in implementing the Strategic Habitat Plan including routine maintenance and operation activities, oversaw spending of approximately \$4,702,250 of WGFD regular maintenance and operating funds, State Wildlife Grants from USFWS and Department Trust Funds. This figure includes wages, benefits, equipment operation expenses, supplies and on-the-ground improvement material expenses allocated as follows: approximately 55% for personnel that includes habitat inventories, monitoring, project contacts, project design and implementation. Without personnel none of these habitat projects would happen. The remainder of the funding was allocated as follows: 5% for vehicles and heavy equipment; and 40% for materials and supplies.

These expenditures resulted in on-the-ground accomplishments during 2006 as summarized below:

Strategic Habitat Plan Goals 1 and 2

<u>On-the-Ground Activity</u>	<u>On-the-Ground Accomplishment</u>
Private landowner contacts resulting in enhancement projects	189 projects
Stream/watershed inventories and assessments	54 miles 22,000 acres
Stream miles treated	162 miles
Standing water treated	173 acres
Aquatic structures installed (weirs, tress, screens, etc.)	4 barbs 1 screen 991 trees
Statewide GIS aquatic databases developed	2
In-stream Flow projects	3 application on 6.4 miles 10.4 miles surveyed
Prescribed burns	9,656 acres
Bureau of Land Management Resource Management Plan Leads	2
Conservation easements	2 acquired on 529 acres
Information and Education efforts (presentations, articles, booths, radio, television and hosting workshops)	96 formal programs
Herbicide vegetation treatments	3,730 acres
Mowing, chopping, harrower, and Lawson Aerator treatments	2,920 acres
Conifer removal from aspen stands	321 acres
Tree and shrub planting	4,100 planted
Grass and forb seeding	2,703 acres
Wheat stripper header treatments	2,000 acres
Water guzzlers installed	15
Spring developments and fencing	10
Water tanks installed	15
Water pipelines installed	26,060 feet
Fences installed to protect treatment areas	11,100 feet
Wetland developments and repairs	30 acres
Riparian habitat protection, enhancement and management	1,150 acres
Stream miles fenced for enhancement and management	327.3 miles
Livestock grazing management plans	224,151 acres
Allotment reserves	5,115 acres closed 53,560 acres forage reserve 2,726 AUMs
Upland habitat inventory (landscape analysis scale)	21.2 million acres
Upland habitat inventory (intensive project level scale)	224,992 acres
Habitat monitoring sites (annual monitoring)	217 sites monitored
Field research projects	16 projects

Strategic Habitat Plan Goal 3

<u>On-the-Ground Activity</u>	<u>On-the-Ground Accomplishment</u>
Overseeing maintenance and land management on WGFC Wildlife Management Areas and Public Access Areas	410, 692 acres of WGFC lands 36 Wildlife Management Areas 96 Public Access Areas 158 Private Sector Contracts
Conifer removal from aspen stands	28 acres
Mowing projects	245 acres
Fence removal	8 miles
Grass and forb seeding	481 acres
Prescribed burns	500 acres
Range pitting projects	550 acres
Intensive irrigation enhancements	796 acres 1,500 feet gated pipe 6 rock sills
Herbicide application	210 acres
Biological weed control with bug releases	2,350 acres
Intensive livestock/forage reserve grazing	128,358 acres
Well development	1 solar well

Not detailed in this report are numerous activities related to conservation and management that our regional personnel are involved with on a routine, continuing basis. These include attendance in numerous workshops, professional training and various working groups; educational activities involving the riparian stream demonstration trailer, habitat publications, radio programs, news releases, presentations at professional meetings and local entities (Rotary, Lion’s Club, etc.), and assistance with the annual Hunting and Fishing Heritage Expo. Numerous landowner habitat extension services, which may or may not result in tangible projects, are provided throughout the state. With the volume and intensity of development in Wyoming on federal lands, planning and coordination efforts, our personnel are deeply involved with reviewing and preparing wildlife recommendations on environmental documents and resource management agencies planning documents. While these activities tax ability to implement on-the-ground habitat projects, we feel it is an important component in providing for the management, preservation and restoration of Wyoming’s wildlife habitat and the recreational opportunities for the public.

We hope this Strategic Habitat Plan annual report provides useful information relative to habitat projects locally and on a statewide basis. Without your cooperation, input, collaboration, and support, fish and wildlife conservation in Wyoming would be impossible. We believe **“habitat”** and **“open spaces”** are the keys to maintaining wild and healthy populations of aquatic and terrestrial wildlife. We greatly appreciate your assistance and support and look forward to working with you to “Conserve Wildlife and Serve People” in the years ahead.

For additional information please contact any of the personnel listed above. Also, feel free to share this report with anyone who may be interested in the Department and Commission’s habitat efforts.

The report can also be viewed on the WGFD website at <http://gf.state.wy.us/habitat/AnnualRpts/index.asp>

LANDS ADMINISTRATION BRANCH

Lands Administration personnel continued work on several projects initiated under Strategic Habitat Plan (SHP) goals and objectives. Communication and coordination with Aquatic and Terrestrial Habitat Biologists, Habitat and Access Maintenance Section personnel, and personnel from Fish and Wildlife Division continued on several projects. Part of the function of Lands Administration is to acquire property rights by application of various strategies including fee title purchases, conservation easements, grass banks, leases and other agreements. Other Lands duties include property rights monitoring, project coordination with department personnel, land trust organizations, and with other agencies and entities, and landowner contacts.

Conservation Easement Projects

Interest in conservation easements increased dramatically in Wyoming primarily due to enhanced federal tax laws. Tax benefits were expanded for donors of conservation easements, and the new laws made conservation easements viable options for landowners with more moderate incomes. Individual deductions increased, as did the number of years landowners could claim benefits.

Interest in the Department's conservation easement program also gained momentum over the past several years due in a large part to communication between field personnel and landowners. Lands Administration personnel have considered more than twenty conservation easement proposals in recent years. Several proposals failed to advance beyond landowner discussions due to prohibitive costs or landowner preferences. Other proposals are in various stages of consideration by regional personnel, and the Department is actively pursuing some projects.

Medicine Lodge Sale and Conservation Easement

The Commission's most recent conservation easement is in place on a portion of what was once part of the Medicine Lodge Wildlife Habitat Management Area. Based on recommendations from Cody region personnel, the Commission declared approximately 209 acres on the periphery of the WHMA surplus and no longer necessary for the wildlife habitat purposes for which it was purchased. The Commission did, however, retain public access rights and a conservation easement on the property. The property was sold through a sealed bid process and the proceeds may be used for conservation purposes.

Flying A Ranch Conservation Easement

The Flying A Ranch has been participating in the Department's Private Lands Public Wildlife, Walk-in Access Program for several years. Discussions between local game wardens and the Britain family led to a conservation easement project on approximately 3,000 acres of private lands in the southern Big Horn Mountains (Figure 1). The landowners also understood the need for hunter access for elk management in the area, and have agreed to include seasonal public access in the easement. The easement's private lands will provide access to thousands of acres of state and public lands.

The project was the first conservation easement to receive a funding commitment from the Wyoming Wildlife and Natural Resource Trust Account Board (WWNRT). Other contributors include the Rocky Mountain Elk Foundation (RMEF), and the Farm and Ranch Land Protection Program (FRPP).

- Personnel have considered more than twenty conservation easement proposals.
- Conservation easement project on approximately 3,000 acres of private lands in the southern Big Horn Mountains.
- A coalition of six landowners offered to donate conservation easements.
- The JIO may also consider fee title acquisitions.
- Funding for conservation easements continue.



Figure 1. Britain's Flying A Ranch Conservation Easement.

North Fork Ranch Conservation Easement

Negotiations continued with the owners of the North Fork Ranch for a conservation easement. The North Fork Ranch is located approximately 8 miles northwest of Lander in an area rapidly transitioning from traditional agricultural land use practices to rural home site developments (Figure 2). The ranch supports important habitat for mule deer, elk, pronghorn, sage grouse and other wildlife. The property is located about a mile east of the Department’s Mexican Creek Conservation Easement. The project should be completed by the end of the year.



Figure 2. Hansen’s North Fork Ranch Conservation Easement.

Red Butte Landowner Coalition Conservation Easements

A coalition of six landowners offered to donate conservation easements on lands situated between the Commission’s Mexican Creek Conservation Easement and the proposed easement on the North Fork Ranch. For a variety of reasons, this progressive group of landowners came together to permanently restrict development on their lands. Among these reasons was concern about the increasing rate of development of private lands along the North Fork of the Popo Agie River. The group was also aware of the development restrictions planned for the North Fork Ranch and those in place at Mexican Creek (Figures 3,4,5).



Figure 3. Red Butte Conservation Easement – View of Red Butte Area.



Figure 4. Red Butte Conservation Easement – View toward Mexican Creek CE.



Figure 5. Red Butte Conservation Easement – View above Mexican Creek.

The RMEF is assisting with the donation process, and it is anticipated the project will be completed by the end of the year. Approximately 1,000 acres of private lands will have permanent development restrictions as a result of the project. A corridor for migrating wildlife will be conserved on the east slope of the Wind River Mountains.

Cooperator Funding

Funding for conservation easements continues to be a primary limiting factor facing the Department and other entities such as The Nature Conservancy, RMEF, and others. Cooperative funding is and will continue to be an important component to the Department's conservation easement efforts. For recent projects, the Commission has been fortunate to have the support and funding assistance from numerous organizations such as TNC, RMEF, the WWNRT, the Wildlife Heritage Foundation of Wyoming, Bowhunters of Wyoming, the Farm and Ranch Land Protection Program, Safari Club International, and the Wyoming Governor's Big Game License Coalition. Additional funding sources are constantly being sought.

The Johan Interagency Mitigation and Reclamation Office (JIO) is charged with the selection and monitoring of offsite mitigation projects in the vicinity of the Jonah Natural Gas Field. The JIO has determined that conservation easements will qualify for funding as wildlife mitigation projects. The JIO may also consider fee title acquisitions. Lands Administration personnel have been assisting the JIO in the development of a property rights strategy to help evaluate, prioritize and select projects.

Ongoing Projects

- Boulder Rearing Station - Supply Ditch Reroute
- Mexican Creek – Landowner Agreements
- Property Rights Monitoring
- Red Canyon Access Road and Exchange of Grazing Leases

CASPER REGION

HABITAT PROJECTS

Bates Creek Watershed Restoration Project

The project was initiated in the spring of 2004 to set back succession in aspen communities allowing for recruitment of young plants, creating uneven-aged stands across the landscape, and improving hydrologic conditions within the Bates Creek watershed.



Figure 1. Spring 2005 aspen prescribed burn.



Figure 2. Fall 2005 aspen prescribed burn.



Figure 3. Aspen regeneration following spring prescribed burn.

To date, we have cut and prescribed burned 162 acres of aspen, and prescribed burned 550 acres of big sagebrush at a cost of approximately \$157 per acre (Figures 1 and 2). This project was one of two that has been submitted to the Wyoming Legislature for large project funding utilizing the WWNRT, which seeks funding greater than or equal to \$200,000. This Bill has been approved by the Legislature and has been signed by Governor Freudenthal. This funding will go a long way in helping us achieve our goals.

The next phase is to implement a 700-acre prescribed burn during the spring and/or fall of 2007. We have contracted FireTrax, LLC to conduct the prescribed burn. In addition to the prescribed burn, we will continue cutting conifers that have encroached other aspen stands. Our goal is to treat approximately 5,000 acres of aspen and as many, if not more, big sagebrush communities within the Bates Creek watershed to restore hydrology and natural vegetative processes, which have been interrupted primarily through fire suppression. We estimate it will take approximately 16 years to completely treat what we currently have delineated.

In September 2006, we established aspen density transects which will be used over the next several years to monitor aspen response. Our initial efforts show an aspen response from 4,400 stems per acre all the way up to 102,400 stems per acre (Figures 3 and 4). The fall 2005 prescribed burn had the greatest response, which we attribute to a hotter burn.



Figure 4. Aspen regeneration following spring prescribed burn.

Bates Creek Water Yield Study

Paired basins were selected for a study that will calculate the water yield resulting from prescribed burning of conifers, aspen and sagebrush. The basins drain to Spruce Creek and East Fork Bates Creek. They share a southwest aspect and 1.72 miles of common perimeter. The Spruce Creek tributary basin comprises 1316 acres bounded by a 6.9 mile perimeter and drains to an elevation of 7360 feet, whereas the East Fork Bates Creek basin measures 1417 acres and is bounded by an 8.3 mile perimeter, draining to an elevation of 7560 feet (Figure 5). Pretreatment data will be collected for two years on both basins and treatment of the East Bates Creek basin will begin no less than two years after treatment begins in the Spruce Creek tributary basin.

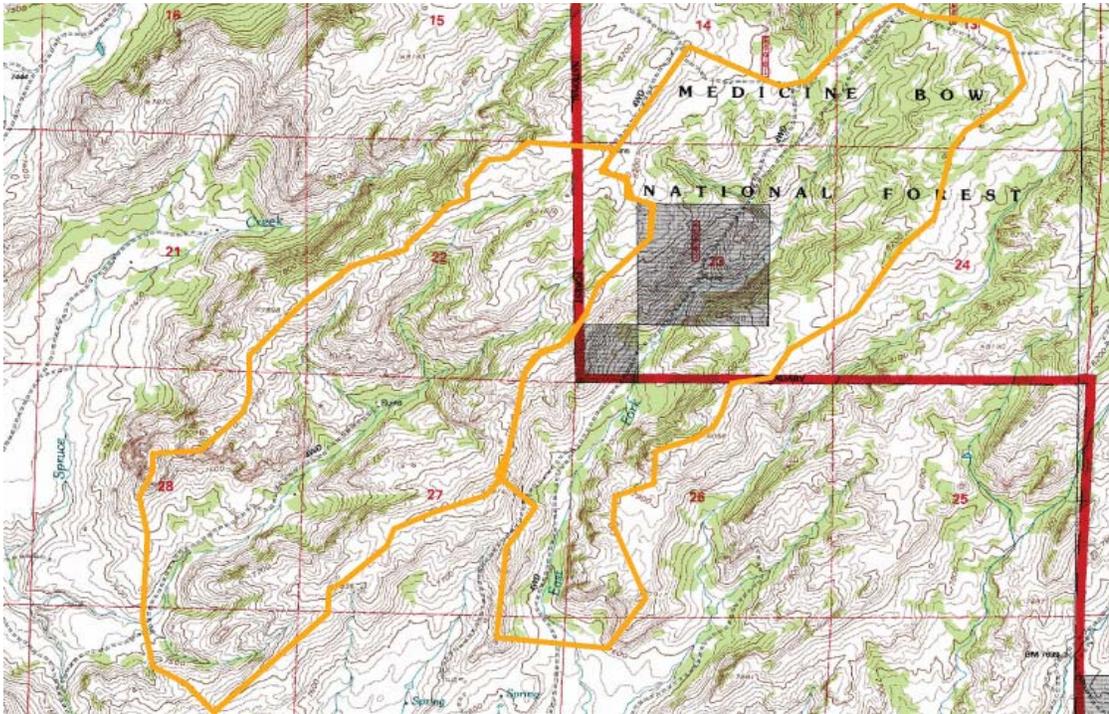


Figure 5. Paired basins selected for water yield quantification from vegetation treatments. The western basin drains to Spruce Creek. East Fork Bates Creek runs through the eastern basin.

Bates Hole Landcover Classification Project

A habitat biologist intern continued to refine the landcover classification within the Bates Hole mule deer herd unit. The intern provided feedback on how accurate the landcover classification was, and made changes where necessary to more accurately reflect the vegetative communities that currently exist within this area. We started the process in this area due to its importance to sage grouse, and the need to have sage grouse habitat delineated in the Hat Six region of the herd unit. The resulting landcover modifications will allow us to categorize habitats as potential sage grouse nesting, brood rearing or winter habitat as defined by the Western Association of Fish and Wildlife Agency guidelines.

- Rattlesnake Hills and Thunder Basin project was completed in the fall of 2006.
- 162 acres cut and RX burn Bates Creek watershed.
- Big sagebrush annual growth averaged 0.59 inches.
- 52 percent increase in big sagebrush production Rattlesnake Hills.
- \$22,700 of funding was acquired to build elk exclosures Roaring Fork Aspen Project.
- Beaver transplanted to Bolton Creek persisted through the winter and were evident in spring.
- 31 individual landowner contacts were made by Habitat Extension Services.
- Water yield study planned for basins with RX burning.

Bates Hole Habitat Inventory and Evaluation Area

Casper Region personnel wanted to convey to the public how production and utilization was affecting the big sagebrush community; hence we developed a use index. The use index continues to depict an upward trend, which indicates detrimental impacts are occurring to the big sagebrush community (Figure 6). These impacts include, but are not limited to, decline in plant vigor, poor seed production, increased plant mortality and reduced carrying capacity. In 2003, we documented the highest level ever recorded on the use index, which was the result of poor production (0.51 inches) and an average utilization level of 38 percent.

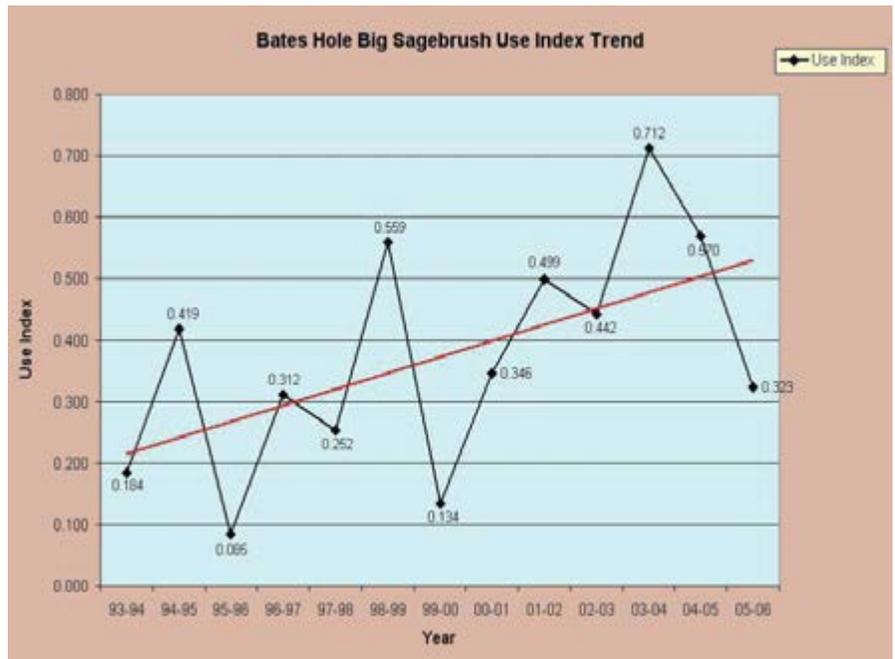


Figure 6. Bates Hole big sagebrush use index with trend line.

Big sagebrush annual growth averaged 0.59 inches in 2006, which is 14 percent greater than 2004, and 54 percent greater than 2002. We have documented a 64 percent decline in big sagebrush production between 1995 and 2006 (Figure 7).

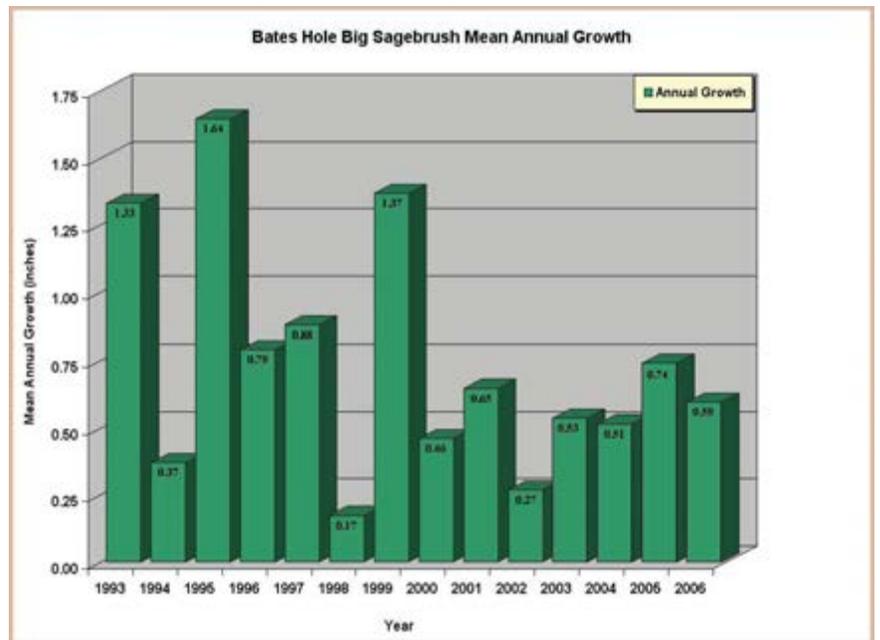


Figure 7. Bates Hole big sagebrush mean annual growth.

Watershed Habitat Assessment Method (WHAM) data were collected for Ashenfelder Creek and Roaring Fork Creek.

North Platte River Sauger Reintroduction Habitat Assessment

For years there has been an interest in restoring sauger to the North Platte. This action would put a second resident river sportfish in front of anglers below Dave Johnston power plant, increasing the utility of WGFD public access as well as restoring a native fish. There are 66 miles of river between the Dave Johnston power plant and Glendo Reservoir that could potentially be sauger habitat. Temperature loggers were set at the WGFD Bixby Access, river mile 6 below Dave Johnston Power Plant; the South Douglas Access, river mile 41; and at Orin Bridge, river mile 55; through the spring and summer 2003 to assess the possibility of hybridization of sauger

with walleye already in the system. Walleye and sauger remain genetically pure in many sympatric populations. They segregate in part by the temperatures at which they spawn, with walleye entering rivers and spawning two weeks earlier than sauger. Inspection of the datalogger readouts indicates a significant effect of the Dave Johnston power plant thermal effluent (Figure 8). Both sauger and walleye could be in the river at the same time attempting to spawn. More dataloggers will be deployed in 2008 from the power plant down to the South Douglas Access to determine the downstream extent of the effect. A literature analysis of sauger and walleye temperature and habitat preferences will also be performed.

Miracle Mile Spawning Enhancement Structure

In January 2006, the sill and gravel project was visited to 1) track changes to the sill structure since the previous visit in March 2005, 2) collect survey data for further calibration of a 2D model that predicts brown trout spawning habitat over the gravel patch and 3) to help evaluate whether further sill modification was necessary. Over 600 locations across the sill and immediately up and down stream of the sill were surveyed over a 2 day period. Survey data includes x, y, and z coordinates collected relative to reference pins located throughout the study area. At each survey location, length of the intermediate axis of a substrate particle was recorded to provide a roughness estimate. Depth and velocity were directly measured at 103 of the locations to evaluate and calibrate 2D model predictions.

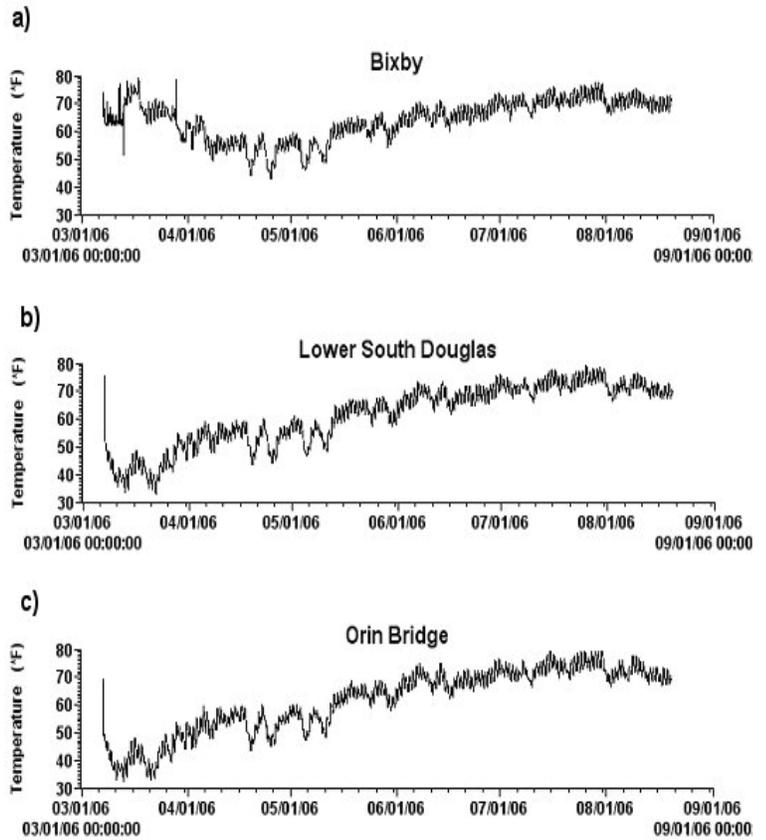


Figure 8: Temperature logger readouts at river miles 6 (a), 41 (b), and 55 (c). The elevated temperatures at Bixby during the spawning period can be seen until late April when irrigation flows begin to swamp the effect.

Table 1. Stage and discharge measurements. Upstream stage is measured at the upper end of the study reach/side channel and downstream stage is measured at the lower end of the study reach below the sill.

Date	Stage Downstream (m)	Stage Upstream (m)	Channel Discharge (cfs)	Gage Discharge (cfs)
4/21/2004	95.94	97.95	225	546
7/1/2004	96.18	98.18	670	1613
11/10/2004	95.94	98.01	---	530
11/23/2004	95.94	98.01	168	522
3/25/2005	---	97.98	---	520
1/18/2006	95.95	97.99	228	526

Sill modifications during 2005 were reflected in a 0.4 m (1.3 ft) lowering of the lowest boulder. The water surface upstream of the sill was 10 cm (~4 inches) lower in 2006 even though slightly more water was flowing in the side channel (Table 1). Therefore it is clear that sill modifications lowered the water surface elevation as anticipated. Also from Table 1, the percentage of flow going down the side channel has returned to pre-project levels.

Flow during measurement periods ranged from (168 cfs – 670 cfs) and downstream stage ranged between 95.94 and 96.18 m (Table 2). A rating at the downstream end of the study reach was developed to provide input water surface elevations for the River2D program. The rating equation was: stage height (m) = 0.0185 * discharge (m³/s) + 95.828 (R² = 0.9987).

Measured physical conditions over the gravel patch are reported in Table 2. Measurements collected on trout spawning redds downstream in 2004 show that most redds are associated with average column velocities of 0.49 to 0.61 m/s and depths between 0.20 and 0.65 m. Water velocities over the gravel patch on January 19th, 2006 were below that range (Table 2). Depths, however, were ideal for spawning brown trout.

Table 2. Depth, velocity and estimated intermediate particle dimension measured January 18, 2006 at locations within the “gravel patch” upstream of the sill.

Statistics	Average Column Velocity (m/s)	Depth (m)	Diameter (cm)
Mean	0.395	0.43	5.1
Median	0.378	0.43	5
Minimum	-0.10	0.24	2
Maximum	0.756	0.64	10
Number	31	31	77

The 6.46 m³/s flow observed in January 2006 is approximately the flow expected most years during October and November when brown trout are spawning. The weighted useable area index (WUA) to brown trout spawning habitat at 6.46 m³/s is 293 m² (Figure 9). This is about 50% of the maximum value that theoretically

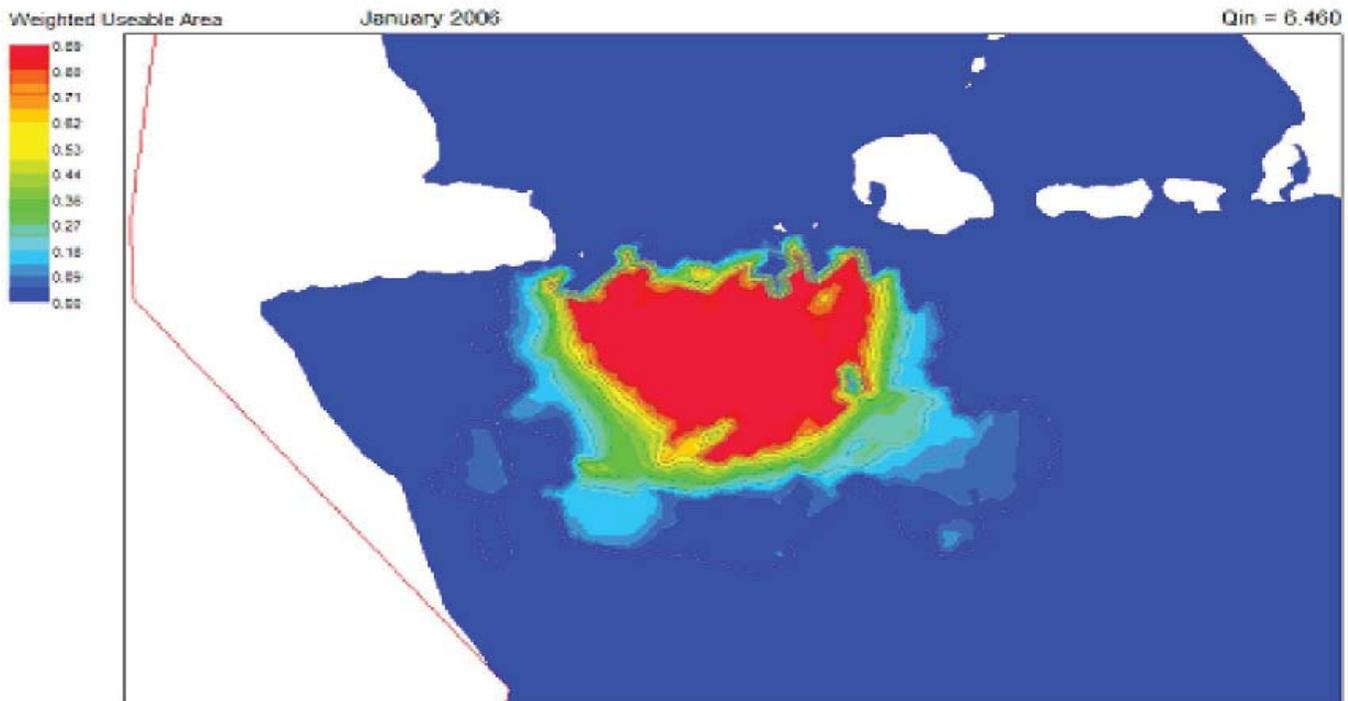


Figure 9. Screen shot from River2D illustrating spawning brown trout physical habitat upstream of the sill on January 18, 2006. Perimeter line marks the extent of the spawning gravel.

could occur if ideal depths and velocities could be created at every point over the gravel patch. While depths were ideal over most of the gravel patch, simulated velocities around the perimeter of the gravel patch were slower than ideal, limiting the overall spawning suitability. Backwater depth could be decreased slightly more to increase water velocities.

Peak brown trout spawning conditions over the gravel patch occur when discharge in the side channel is 11 m³/s (388 cfs) corresponding to a Kortes Reservoir release of about 903 cfs. The peak in WUA occurs in conjunction with higher, more suitable water velocities and suitable depths. The relationship between flow level and the WUA spawning index is fairly flat (i.e. modest gains as a function of flow) with over 80% of the maximum WUA (341 m²) occurring over the flow range 6 m³/s to 15 m³/s (Table 3). Given the choice, however, habitat conditions for spawning brown trout are expected to be higher at the higher flow levels due to additional flushing of fine sediments from the gravel interstices and delivery of oxygen to developing eggs.

Table 3. Flow release from Kortes, side channel flow, and brown trout spawning weighted useable area based on sill structure and channel conditions measured in January, 2006.

Kortes Flow Release (cfs)	Side Channel Flow At 43% of Release (cfs, cms)	Weighted Useable Area (m ²)
411	245 (5)	245
493	212 (6)	281
530	228 (6.46)	293
574	247 (7)	304
656	282 (8)	320
739	331 (9)	331
821	353 (10)	338
903	388 (11)	341
985	424 (12)	337
1232	530 (15)	285

Redd counts on the supplemented gravel were conducted in late October and November. No redds were seen in October. The highest count in November enumerated sixty-one attempted or successful redds. In consideration of the fine sediments being deposited on the gravels, freeze-coring is being evaluated as a method to examine egg viability under the current configuration of the structure.

National Grassland Big Sagebrush Inventory

Big sagebrush production in the Newcastle area decreased 148 percent in 2006 as compared to 2005. The significant decrease in annual growth is attributed to the decrease in spring precipitation, and plant health, condition and vigor. Since monitoring efforts began in 2001, we have documented an upward trend in annual growth, even though 2003 was below average and 2004 was well below average (Figure 10). The big sagebrush annual growth difference between the three sites can be attributed to big sagebrush plant condition at Frog Creek and 6-mile Basin. The plants at these two sites are more decadent, and heavily hedged, whereas the plants at the Highway 85 site are mature, more vigorous and are not as heavily hedged.

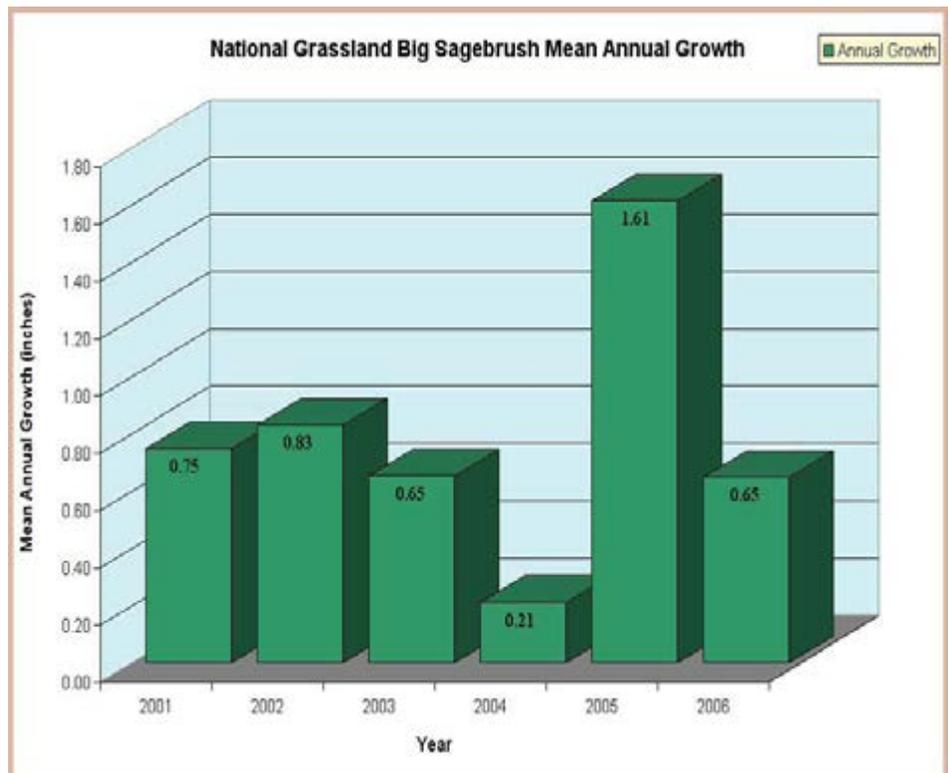


Figure 10. National Grassland big sagebrush mean annual growth.

North Laramie Range Habitat Initiative Project

True mountain mahogany annual growth averaged 2.01 inches during 2006, with a range from 1.68 inches to 2.54 inches. Annual growth has increased 62 percent since 2004, and has decreased 44 percent since we began monitoring efforts in 2000 (Figure 11). This downward trend may be contributing to the mule deer population declines wildlife biologists have documented over the past several years. We realize spring precipitation plays a vital role in true mountain mahogany annual growth, but we believe the limiting factors of annual growth in this area are plant health, condition and vigor. With this in mind, we contacted private landowners during 2006 to determine if there is interest in implementing habitat improvement projects, specifically prescribed burns, within the true mountain mahogany community. Our efforts have paid off, and we will implement a prescribed burn during the fall of 2007, weather permitting.



Figure 11. Laramie Range True mountain mahogany Mean Annual Growth.

Rattlesnake Hills Habitat Inventory and Evaluation Area

Big sagebrush annual growth in the Rattlesnake Hills area averaged 0.41 inches, a 64 percent decline since 2004 (Figure 12). We have documented an upward trend in big sagebrush production since 2000, whereas in Bates Hole the trend is downward. Since monitoring efforts began, there has been a 52 percent increase in big sagebrush production. Big sagebrush utilization has been well within acceptable parameters, which may be attributed to pronghorn shifting their winter concentration areas further to the south and east. Secondly, we have not encountered a severe winter season for almost a decade in this area, and as a result, the pronghorn may be scattered throughout their range and not concentrated on the designated winter range.

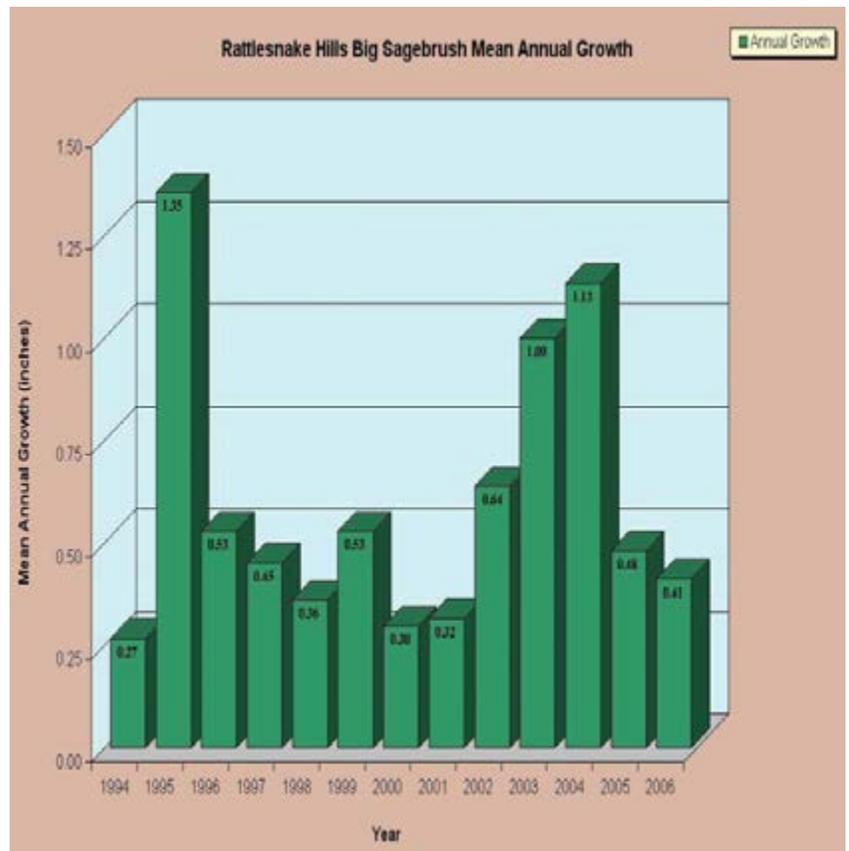


Figure 12. Rattlesnake Hills big sagebrush mean annual growth.

Casper Region Shrub Steppe Change Detection Project

The completion report for the Rattlesnake Hills and Thunder Basin project was completed in the fall of 2006. The report details the methods used to acquire the landcover classification, snowmap, changes in big sagebrush abundance and distribution, and changes in vegetative “greenness” to determine annual grass abundance and distribution. Furthermore, it provides the results of these efforts, and discusses the advantages and disadvantages of using these data to map vegetative communities and the changes that occur within these communities over time.

The next phase will be to further refine the landcover classification in those areas where the contractor had difficulties mapping vegetative communities. This process may take several years to complete due to the size of the project areas, and the amount of man-time required to make these modifications. Once complete, these data will provide a valuable planning tool in identifying areas for habitat treatments, rehabilitation of degraded vegetative communities, developing mitigation alternatives and management recommendations on future actions in these areas.

Martin Ranch Range Improvement

The project was initiated by then NRCS biologist, Rory Karhu to improve the control of cattle and management of the range by implementing a rotational grazing system and a brush management plan on a 750-acre allotment. Since Rory’s departure, the project has been administered by the Casper habitat extension biologist. In the spring of 2006, 130 acres of dense mountain big sagebrush was burned under prescription by FireTrax LLC and approximately 23,000 feet of 3-wire electric fence was constructed to divide one large pasture into three (Figure 13). Post-treatment monitoring indicates more than three times the herbaceous productivity and heavy wildlife use by mule deer, elk, and sage grouse (Figure 14).



Figure 13. Spring 2006 sagebrush prescribed burn.



Figure 14. Sage-grouse use following prescribed burn.

In spring 2007, we plan to burn approximately 350 acres of dense sagebrush in the adjacent areas and construct approximately 8,750 ft of 3-wire electric fence to better control livestock. The project is cost-shared through USDA-EQIP and the Bates Hole/Shirley Basin sage-grouse local working group funds. In addition, there are plans to treat the adjacent aspen stands as has been done through the Bates Creek Watershed Restoration Project in future years.

Casper Bureau of Land Management Field Office Resource Management Plan

The Terrestrial Habitat Biologist served as the WGFD State Cooperator on the Casper BLM Field Office Resource Management Plan revision. This plan will guide BLM management efforts the next 15 to 20 years. This will affect wildlife habitat conditions and management opportunities for many years and Department input and recommendations required a considerable amount of time and commitment.



Figure 15. Eroded bank prior to 2007 cCRP of Bates Creek.



Figure 16. Fence-line contrast on Crook Creek caused by wild horses prior to EQIP enclosure planned for 2007.

HABITAT EXTENSION SERVICES

Terrestrial Extention Services

In 2006, 31 individual landowner contacts were made. Technical and cost share assistance was provided to private landowners who are planning or implementing projects including: noxious weed management, seedling tree and shrub plantings, livestock/wildlife water developments, range inventories/rotational grazing system plans, sagebrush treatments, riparian improvements and buffers, animal feeding operation improvements, and wildlife inventories. Currently, the extension biologist is involved in 2 continuous CRP (riparian buffer or shelterbelt) projects, assistance with 9 new Environmental Quality Incentive Program (EQIP) projects, 3 Wildlife Habitat Incentive Program (WHIP) projects, 1 Farm and Ranch Protection Program (FRPP) easement, 2 wildlife inventory projects, and assistance with 7 ongoing EQIP projects and 2 Continuous Reserve Program (CRP) projects. Several projects are being coordinated with the Casper habitat biologist and the Bureau of Land Management (BLM) (Figures 15 and 16).

The extension biologist also served on the Bates Hole/Shirley Basin working group, assisted on the Hat Six Sage Grouse Study and provided assistance to the Northeast Sage Grouse local working group.

Sanchez Creek Riparian Habitat Improvement

Two exclosures were built with PLPW, HAMS and the extension biologist to protect riparian aspen along Sanchez Creek from cattle browsing. No aspen suckers were evident at the time of construction in October. Monitoring will begin in 2008. The extension biologist thought the riparian area would qualify for CCRP if the landowner were willing. Offsite water would be developed if the landowner were to enroll in CCRP.

Bolton Creek Beaver Transplant

Beaver transplanted to Bolton Creek in 2005 persisted through the winter and were evident in spring. By fall, evidence of their presence was not clear. Also, willows were in considerably worse condition than the previous year due to livestock browsing. It was learned the area was used by several operators to gather stock in the fall. In 2007, the landowner who requested the project will be approached to build an eight to twenty acre riparian exclosure to protect willows, or a 90 acre pasture for light usage. If there is interest, we will work with the NRCS to get funding; otherwise the project will be abandoned.

Bates Creek Stream Assesment

A habitat assessment and fish population estimate was conducted in response to a landowner interested in improving habitat and fishing on over a mile of Bates Creek. Three species of fish were found: rainbow trout, brook trout and creek chub. Trout numbers were low; 18 brook trout and 34 rainbow trout per mile. A trout biomass estimate of 11 lbs/ac is just 16.5% of the potential biomass estimate of 66.4 lbs/ac. Relative weights (Wr) a measure of overall body condition of brook trout, averaged 77 - reflecting post-spawn condition. Rainbow trout Wr ranged between 82 and 114 averaging 95.4. Cover and poor sediment routing were identified as the primary reasons for the low biomass in the reach. A letter with various habitat improvement alternatives will be prepared for the landowner. Temperature loggers will be installed in 2007.

Seminole Road Gas Project

Seminole Road Gas Project Contaminant Monitoring: One hundred fish representing five species: walleye, rainbow trout, brown trout, white sucker, and longnose sucker were collected for mercury and selenium analysis as baseline data prior to full gas field development and associated water releases. Previous analysis of Seminole Reservoir fish has shown walleye to exceed 0.3 ppm mercury at about eighteen inches and 0.5 ppm at twenty-three inches. Preparation of fish for metals analysis is about two thirds complete. Data will be provided to Wyoming Department of Health.

LaPrele Creek Erosion Project

NRCS needed help in habitat recommendations and advice on reducing erosion for a LaPrele Creek landowner on about 2 miles of stream. A population estimate was completed to describe population structure in two unexploited reaches of water. The population was almost entirely brown trout, but for a few young-of-the-year and one yearling rainbow trout, suggesting temperature limitation. The landowner has decided to go ahead with erosion control and three instream habitat structures.

WILDLIFE HABITAT MANAGEMENT AREAS

Springer WHMA Reseeding

Casper Region Habitat & Access Crew, with assistance from the Statewide Habitat & Access Crew, reseeded 300 acres on Springer WHMA. Reseeding occurred after the Downar Bird Farm personnel and Habitat Biologist, conducted prescribed burns on the WHMA. The burn and reseedling is part of an overall plan to improve cover and forage on the WHMA.

Springer/Bump Sullivan WHMA Food Plots

Casper Region Habitat & Access Crew planted 19.25 acres of sorghum/sudangrass hybrid for wildlife feed and cover at Bump Sullivan WHMA on an old prairie dog town (Figure 17). This area was planted as part of an agreement with the local CRM to reclaim old prairie dog towns. In August, the crew planted winter wheat in those areas where the sorghum/sudangrass had not faired well from the extreme drought experienced last summer. Winter wheat provided green grazing through the fall and winter and will produce a seed crop earlier than other plants this summer.



Figure 17. Winter wheat planting at Bump Sullivan.

On Springer WHMA, 26.4 acres of sorghum/sudangrass hybrid was planted for wildlife feed and cover. Approximately half of the crop did not succeed due to extreme drought conditions (Figure 18). The crew replanted winter wheat in those areas. The food plots created food and cover for wildlife in previously unproductive.



Figure 18. Bump Sullivan non-irrigated sorghum/sudangrass in late October.

Table Mountain WHMA Food Plots

The Casper Habitat & Access crew planted sorghum/sudangrass hybrid on 20.75 acres of irrigated land; planted 25.5 acres of winter wheat on a dryland site; and planted approximately nine acres of barnyard grass and smartweed in the dry beds of ponds 1, 5, and 7 (Figure 19). The sorghum/sudangrass hybrid provided excellent cover for pheasants.



Figure 19. Table Mountain irrigated food plot in early August.

CODY REGION

HABITAT PROJECTS

Absaroka Conservation Initiative

The RMEF, in cooperation with the WGFD, other non-profit and governmental agencies and landowners continued the Absaroka Conservation Initiative (ACI). The ACI is an effort to preserve the historic ranching, wildlife, scenic and community values along the Absaroka Front, an area identified by the RMEF as the highest priority for elk habitat in Wyoming. The primary strategy of the initiative is to secure funding for the purchase of development rights on priority parcels of land. Funds are still being sought for a model that would identify priority habitats to be conserved and areas at highest risk of development. The terrestrial habitat biologist assisted the RMEF and conservation buyers in purchasing and placing a conservation easement on a 320 acre parcel of land adjacent to the Sunshine WHMA.

Stonebridge Allotment Habitat Enhancement

A grazing management plan was developed cooperatively with the BLM and permittee to optimize wildlife habitat. The plan allows for two pastures to be grazed by livestock each year while the other four pastures are completely rested to provide forage for wintering elk. The terrestrial habitat biologist hiked the allotment with the BLM and permittee to map areas of conifer-encroached sagebrush. Prescribed burns will be conducted on the allotment in 2007 to address the encroachment on approximately 600 acres.

Kirby Watershed Wildlife Habitat Enhancement Project

The Kirby Creek CRM group is continuing to plan and implement projects that focus on restoring ecological functions within the watershed. This project is paired with a comprehensive effort to enroll the majority of the creek upstream of the project site into CCRP. Existing CCRP projects on Kirby Creek (5-years-old) are showing a tremendous vegetative response and are providing quality habitat for beaver, mule deer, sage grouse, and migratory songbirds. Serious grazing trespass incidents within the riparian buffer of one of these projects have been addressed, although riparian recovery was negatively affected.

The Kirby Watershed Wildlife Enhancement Project is being expanded to restore riparian habitat and stream form and function and improve range conditions within the 250, 000-acre Kirby Creek drainage. Work thus far has focused on removal of grazing pressure on riparian areas, extensive water development, removal of invasive Russian olive and salt cedar, and experimental weed control of white-top. A total of 4 new contracts including 1 EQIP and 3 CRP contracts that focus on riparian restoration were initiated with 2 landowners within the drainage in 2006. Projects are currently on hold until BLM environmental assessments can be completed in early 2007. A portion of West Kirby Creek on Lucy Moore's property was restored to its original channel late in the fall of 2006. Various field days, tours, and workshops within this drainage were conducted. Permanent vegetative transects and photo points on various properties were visited, monitored and photographed. Cooperators include WGFD, BLM, NRCS, RC&D, DEQ, Hot Springs County Weed and Pest, Hot Springs County Conservation District, and private landowners. Total project cost for this drainage thus far is \$902,000, excluding a portion of new contracts. The primary funding sources for this watershed include DEQ 319 funds, Continuous CRP, WVNRTF, Hot Springs County Weed and Pest, WGFD, EQIP, Private Grazing Lands Initiative, and private landowners.

- 225 acres of sagebrush and juniper were treated with RX fire in the Devils Canyon/Little Mountain area.
- Heart Mountain Ranch irrigated meadows provided forage for four operators in 2005.
- Two miles of the Shoshone River riparian system were treated for tamarisk and Russian knapweed using backpack sprayers.
- Projected initiated to restore riparian habitat and restore stream form and function in the Paint Rock Watershed.
- RX burn in aspen communities, Upper Grass Creek.
- Gooseberry drainage to restore and enhance 1,750 acres of riparian habitat.

Paint Rock Stream Enhancement

A project was initiated in 2006 to restore riparian habitat and stream form and function in the Paint Rock Watershed. The goals are to reduce severe erosion and sedimentation, reestablish native woody communities, and address fish passage issues within the drainage. Several landowner contacts were made in 2006 resulting in the initiation of 2 new contracts including 1 WHIP and 1 CRP contract. Several other landowners are interested in implementing projects in 2007. The focus is removing riparian grazing pressure, replacing diversion structures to allow better fish passage, and implementing bioengineering projects in areas with severe bank erosion. Total cost thus far is \$15,678 all of which was contributed by Continuous CRP and private landowners.

Cooperative Prescribed Fire/Mechanical Treatment Projects with the Bureau of Land Management and Forest Service

The WGFD cooperated in planning, funding and conducting several prescribed fire and mechanical treatment projects with the federal land management agencies in the Cody Region including:

- Fork in the Road: Approximately 100 acres of sagebrush were treated with prescribed fire on BLM land south of Cody. Objective of the burn was to increase diversity of age classes in sagebrush and provide a mosaic of sagebrush and grass/forb areas to benefit sage grouse.
- Battle Park Allotment: Department and Big Horn Forest personnel planned a large prescribed burn project on the Battle Park Allotment. Over a week was spent sampling and mapping sagebrush communities to gather baseline data and design treatments.
- Upper Grass Creek Prescribed Burn: Over 250 acres were treated with prescribed fire V (Figure 1). The objectives of the burns were to set back conifer encroachment, maintain sagebrush communities, and promote aspen communities.



Figure 1. Prescribed fire in aspen communities, Upper Grass Creek.

Fish Entrainment Studies

Habitat connectivity is important to healthy fisheries because fish often move many miles to utilize different habitats at differing flows, during differing seasons, and at differing life stages. If, however, fish moving from one habitat to another are entrained by diversions into canals and removed from the stream system, the fishery suffers. To evaluate the potential loss of various fish species, three entrainment studies were initiated this year, one in a cold water system and two in a warm / cool water system (Figure 2). The objectives of these studies are to describe and quantify fish entrainment throughout the irrigation season. As fish were entrained into



Figure 2. Installing the third net at one of the entrainment sampling sites.

the canal systems they were netted, identified, counted, weighed, measured, and returned to the stream. The numbers of fish caught between August 1 and October 15 were 1,230, 1,339, and 3,065 during 142, 130, and 144 hours of netting respectively. Eight species were entrained from the cold water river with more fish captured at night than during daylight. Thirteen species were entrained from the warm water river with more fish caught during the day than at night. During this first year of the study, data were only collected during 2.5 months of the irrigation season, but plans are for a full season of study next year. Funding for this study was provided by the U.S. Bureau of Reclamation, Wyoming's State Wildlife Grant Program, and the Wyoming Game and Fish Department.

Heart Mountain Grassbank

The Heart Mountain Grassbank, operated by the Nature Conservancy, provides a mechanism whereby livestock forage values can be exchanged for desired conservation outcomes. The Heart Mountain Ranch irrigated meadows provided forage for four operators in 2005. Conservation benefits included prescribed burns, drought relief and riparian restoration. The terrestrial habitat biologist serves on both the grassbank advisory council and the selection committee for grassbank participants.

Heart Mountain Habitat Enhancement

The terrestrial habitat biologist worked with managers of the Heart Mountain Ranch in completing six spring developments and exclosures. Each spring or seep area was fenced with either three wire electric or standard barbed wire fence. Fenced areas ranged from 2 to 80 acres, and two springs were developed to increase flows. The objective of the project was to avoid heavy livestock use in these areas and provide habitat for wildlife, primarily sage grouse. The project was partially funded by the Big Horn Basin Sage-grouse Local Working Group. Approximately 130 acres of sagebrush were treated with prescribed fire in the spring on The Nature Conservancy's Heart Mountain Ranch. The BLM conducted the burn with assistance from the WGFD. Objectives of the burn included enhancing brood rearing habitat for sage grouse and improving winter and transitional range for mule deer and elk.



Figure 3. Spring enclosure on the Heart Mountain Ranch.



Figure 4. Prescribed burn on the face of Little Mountain.

Devil's Canyon Bighorn Sheep Habitat Enhancement

Approximately 225 acres of sagebrush and juniper were treated with prescribed fire in the Devils Canyon/Little Mountain area. Two supplemental transplants of bighorn sheep from Oregon and Montana in 2005 and 2006 were completed here in an effort to boost the seemingly stagnant population of sheep originally transplanted in the 1970's. More burns are planned in the area in 2007. Four springs were fenced with a combination of electric, barbed wire and buck-and-pole fence to exclude livestock and increase spring flows for the benefit of livestock and wildlife. In addition, two watering tanks were installed along the rim of the canyon to provide water for bighorn sheep. The tanks are supplied with water from a spring-fed pipeline constructed in the 1990's.

Boxelder Creek Riparian Project

Photographs were re-taken of photo points established within the Boxelder Creek riparian system prior to a restoration project implemented in 2000 (Figure 5). Approximately two miles of stream were fenced to better control livestock use and conifers were cabled into banks where lateral bank erosion was severe. The stream and riparian area showed remarkable improvement with substantial increase in bank vegetation and sediment deposit in tree revetment areas. Willows had increased significantly and improved habitat conditions resulted in several new beaver dams (Figure 6).



Figure 5. Boxelder Creek before fencing, 2000.



Figure 6. Boxelder Creek six years after fencing, 2006.

Gooseberry Watershed Enhancement Project

This is an ongoing project in the 500,000-acre Gooseberry drainage to restore and enhance 1,750 acres of riparian habitat, stream form and function. The primary focus is the removal of invasive Russian olive and tamarisk and the restoration of native woody communities through a cooperative watershed. Approximately 56 stream miles (810 riparian acres) were treated with cut-stump and foliar treatments in the fall of 2006 as a follow up treatment to areas first treated in 2004. This was accomplished through a cooperative effort including personnel from the WGFD, NRCS, RC&D, Washakie and Hot Springs County Weed and Pest Districts, and several private landowners. (Figure 7).



Figure 7. Follow up treatments were applied to 810 acres in the Gooseberry drainage in 2006.

In the late fall of 2006 a timber ax implement was put to use on two previously untreated private properties and an untreated BLM allotment totaling 100 acres (Figure 8).

All cut-stump/timber ax treatments were followed by a 3:1 chemical cut-stump application of Imazapyr; all foliar treatments were accomplished with a 1.5-2% solution of Imazapyr. Contracts were initiated with 8 new landowners in this drainage in 2006 including 3 CRP contracts and 5 EQIP contracts that total 815 untreated riparian acres. Also in 2006, permanent vegetative transects and photo points on various properties were visited, monitored and photographed.

The total cost for projects implemented in the calendar year 2006 was \$57,980, excluding a portion of new contracts. The total project cost for the entire watershed thus far is \$807,327. CCRP Riparian Buffer program has been the primary funding source used to plan, implement and complete this project. Other funding sources include EQIP, Washakie County Weed and Pest, WGFD, BLM, Washakie County Conservation District, WGBGLC, WWNRT, and private landowners.



Figure 8. Timber Ax used for mechanical treatment of Russian olive and tamarisk.

Big Horn Basin Landcover Mapping Project

A project was initiated to map landcover types in the Big Horn Basin using satellite imagery and aerial photography. Satellite images taken in 2004 and 2005 covering the Basin were purchased and a contract with the University of Wyoming for interpretation will begin in 2007. The terrestrial habitat biologist and a student intern sampled over 300 points in sagebrush communities across the Basin to obtain canopy cover data. These data will be used as “training data” for interpreting the remote sensing data and categorizing sagebrush cover types by canopy classes.

HABITAT EXTENSION SERVICES

Forty-three landowner contacts were made in 2006. These contacts resulted in new or continued planning or follow up compliance on 46 different private land habitat enhancement projects. These include 9 new Continuous CRP (Riparian Buffer or Shelterbelt) projects proposed, planned, and/or implemented, development of 8 new WHIP projects, development of 3 WRP projects, assistance with the development of 11 new EQIP projects, follow up on 14 existing CRP projects, and follow up on 1 existing WRP project.

Trout Creek Habitat Extension

Multiple discussions were held with the Trout Creek ranch manager, who is attempting to modify ranch operations. Information and recommendations were provided concerning streambank stabilization, flow calculations (partial flumes, culverts, and other pipe), minimum tillage, plant species, electric fence, and beaver (management, trapping, transplanting, and removal). In addition, potential stream habitat improvement was reviewed with the ranch manger, Army Corps of Engineers, and a consultant from Montana. The main recommendations were to continue bank recovery through good grazing management, and to move livestock corrals away from the stream, which is planned for the spring of 2007. A video highlighting the Trout Creek rotating drum fish passage project was developed and aired on television, presented at TU meetings with guests from area conservation districts and national TU, and provided to the landowner and local TU group who distributed it to other state and national TU groups.

Bobcat Creek Fish Passage

Did onsite review of a Bobcat Creek irrigation diversion with the TE Ranch, ranch manager. The structure is deteriorated and needs to be replaced. The objectives of the review were to design a more fish friendly structure and reduce the heavy gravel load deposited into the irrigation ditch by the current structure. Suggestions included 1) lowering the height of the structure since the ditch was much lower than the existing structure and backed up the stream unnecessarily, using a horizontal wedgewire screen over a collection box with a side outlet leading toward the irrigation ditch, protecting the wedgewire from large rock with a secondary layer of heavy ribs on top of the screen, and reducing the size of the structure, thereby further reducing the flow of substrate.

Beck Lake Fish Screen

Beck Lake is part of a recreation area located adjacent to the city of Cody. The lake is managed as a basic-yield family fishery and is stocked annually with Yellowstone cutthroat trout, rainbow trout, channel catfish, and large mouth bass. Besides being a popular family fishery, Beck Lake is also a water storage facility with water being released during August and September to supplement flows in the Cody Irrigation Canal. In order to prevent loss of large numbers of fish from the lake to the canal, a fish screen was installed over the outlet (Figures 9 and 10). This simple screen is designed to prevent fish loss, while also accommodating the necessary outflows to the canal without causing unnecessary cleaning and maintenance. Several features were added to the design to allow easy access and maintenance whenever it is needed. This was a cooperative project with the City of Cody, Cody Canal Irrigation District, U.S. Fish and Wildlife Service, and the Wyoming Game and Fish Department.



Figure 9. The Beck Lake fish screen is basically a three-sided screen placed in front of the lake's outlet and bolted to the concrete outlet structure.



Figure 10. The panels on the front of the screen provide a flow through system in case the screen is ever plugged as well as providing easy access for headgate maintenance.

WILDLIFE HABITAT MANAGEMENT AREAS

Yellowtail WHMA

Yellowtail Area Coordinated Resource Management

The Yellowtail Area CRM group continues to seek solutions to managing Yellowtail's growing invasive plant problem. The CRM consists of the four landowners on the Yellowtail WHMA, NPS, WGF, BLM, and Bureau of Reclamation, as well as neighboring private landowners, the Bighorn County Weed and Pest, and others.

Approximately two miles of the Shoshone River riparian were treated for tamarisk and Russian knapweed using backpack sprayers. Prescribed winter grazing treatments using cattle were conducted for the sixth year on the WHMA. The objectives of the grazing treatment were to reduce fuels, invigorate decadent vegetation, create successional diversity and open up thick shrub stands. A total of about 400 acres were grazed in three pastures.

Additionally, the WHMA was grazed with Boer goats for the third year. Approximately 800 goats grazed in four pastures totaling about 600 acres. The objective of the treatment is to concentrate browsing pressure on invasive plants including tamarisk, Russian olive, Russian knapweed and licorice. Plans were made to extend goat treatments to other areas of the WHMA and expand the goat herd to 1200.

The Lovell High School took an active role in the CRM as part of the Wyoming Department of Agriculture's CRM in the Classroom Program. Students participated in several projects including re-reading and analyzing vegetative trend studies associated with the winter cattle and goat grazing programs, tagging individual tamarisk plants for monitoring and testing germination of weed seeds in goat feces.



Figure 11. Gyrotrac GT-25 mulching machine.

An interagency Russian Olive removal was completed on a test site at Yellowtail WHMA. The machine is owned and operated by NPS/Bighorn Canyon National Recreation Area (Figure 12). Habitat and Access branch personnel removed those Russian Olive trees which were too large for machine capacity, and assisted in herbicide treatment of cut stumps.

The NPS mechanically treated 25 acres of Russian olive with a Fecon Bullhog attached to a skidsteer. WGF D personnel assisted with cutting larger diameter trees with a chainsaw and treating cut stumps with chemical. A demonstration of a Gyrotrac GT-25 (Figure 11), a larger mulching machine, was held on the WHMA in December to generate interest from local contractors. Within a week a local contractor had purchased the machine and plans are being made to mechanically treat Russian olive on the CRM area in 2007.



Figures 12. Fecon machine at work.

Renner WHMA

The BLM fire crew treated 28 acres of aspen in the Dorn Draw area (Figure 13). Conifers, primarily limber pine and Douglas fir, were felled, lopped and scattered or piled to promote aspen regeneration and extend the life of aspen communities. The project is part of a larger BLM program to treat aspen along the west slope of the Bighorn Mountains



Figure 13. BLM fire crew removing conifers in aspen stands



Figure 14. Sunlight Basin meadows were mowed in lieu of fire.

Sunlight Basin WHMA

Sunlight Basin meadows were mowed in lieu of fire, to remove old decadent plant growth and stimulate grass production (Figure 14).

Cody regional employees and the Cody RMEF chapter volunteers partnered to remove eight miles of interior fencing at Sunshine WHMA.



Figure 15. Cody regional employees and the Cody RMEF chapter volunteers.

GREEN RIVER REGION

HABITAT PROJECTS

Willow Tree Springs - Sage Creek Watershed

The aquatic and terrestrial habitat biologists both served as ignition crew members to the Rock Springs BLM Field Office to implement the Willow Tree Springs prescribed burn project on April 8th and 9th. The Willow Tree Springs project is located approximately 32 miles south of Rock Springs in the headwaters of Sage Creek on the southwest face of Miller Mountain. The burn included several seep and spring sources that feed upper Sage Creek. The goal was to treat and enhance aspen, mountain shrub and sagebrush community health, and improve wildlife habitat and watershed function. Approximately 700 acres of vegetation were treated with prescribed fire in a mosaic pattern throughout the project area (Figures 1 and 2). Young aspen and mountain shrub regeneration was observed at some of the treated sites by July.



Figure 1. Prescribed fire treatment being applied in a mosaic pattern at Willow Tree Springs during April.



Figure 2. Prescribed fire being used to stimulate regeneration in decadent aspen stands on the southwest face of Miller Mountain.

An aspen regeneration monitoring site was established in the Willow Tree Springs prescribed burn at UTM zone 12, E654337, N4559140 NAD-83. An eight foot square sided, six foot high cattle panel enclosure was erected on July 7th shortly after young aspen suckers sprouted at the site. Mean aspen sucker height, sucker densities, and incidence of sucker browsing were measured inside and outside of the enclosure during October (Table 1).

Table 1. Aspen regeneration baseline data collected from trend monitoring site at the Willow Tree Springs prescribed burn area in 2006.

Aspen Information	Inside Enclosure	Outside Enclosure
Mean height of aspen regeneration (ft)	1.2	0.3
% Aspen suckers browsed	37	84
Estimated density of aspen suckers per acre	31,309	8,333

- 700 Acres treated with Rx fire in the upper Sage Creek watershed.
- Heavy browsing of aspen regeneration by wildlife in south Rock Springs area remains a concern.
- WHAM level I survey completed for West Fork Hams Fork River watershed.
- Intermittent nature of flows in the West Fork Hams Fork River limits fisheries potential.
- Grazing management changes produce riparian habitat improvement at some locations along the lower Big Sandy River.
- Completed the first year of a 2-year forage reserve pilot program for the Grizzly WHMA.

Baseline data indicated severe browsing of aspen suckers at the site during 2006. A limited amount of rodent browsing was observed inside the exclosure, which did not appear to significantly affect sucker heights or stem densities. However the combination of heavy rodent and big game (elk, deer, antelope) use of aspen suckers outside the exclosure greatly reduced mean sucker heights and stem densities (Figure 3). Livestock grazing did not occur in the burn area during 2006, so all the browsing use was attributed to wildlife. This extreme level of browsing by wildlife raises concerns that aspen regeneration may be suppressed or eliminated, preventing perpetuation of healthy aspen habitat in the area.



Figure 3. Aspen regeneration contrasted inside and outside a grazing exclosure at the Willow Tree Springs monitoring site during October.

Aspen Community Monitoring in Red Creek Watershed

Prescribed burn treatments were conducted by the BLM on the southeast face of Little Mountain during the spring of 2005. The project targeted aspen, mountain shrub and sagebrush communities in the headwaters of Daniels Creek, Snow Creek, Costello Creek, and Ely Creek, all located within the Red Creek Watershed. Efforts were initiated during May to select sites to evaluate the response of aspen regeneration to the fire treatment. Several thoroughly burned stands were inspected for regeneration, however, very few aspen suckers were observed. Even though many of the adjacent mountain shrub species produced excellent regeneration, habitat biologists assumed that there might have been a delayed response in stimulation of aspen sucker growth, and opted to return in July to reevaluate the aspen sites.

Reconnaissance during July revealed no significant increase in aspen suckering at any site, and those few suckers present were heavily browsed by wildlife. Given the poor sucker response, it was decided to abandon the aspen trend monitoring planned for this area. We speculate that either the aspen clones in this area did not retain enough vigor to produce significant suckering, or the stands possibly produced a flush of suckers during the first growing season following treatment in 2005 and suckers were aggressively browsed out by big game.

Little Bitter Creek Riparian Restoration

Plans are being developed to treat perennial pepperweed (whitetop) and tamarisk in the Little Bitter Creek watershed south of Rock Springs in the summer of 2007 (Figure 4 and 5). Cooperators in the project are Anadarko Petroleum Corporation, BLM, Kappes Ranch, Sweetwater County Weed and Pest, WGFD, and the WWNRT. Terrestrial and aquatic wildlife should benefit from the project which could serve as a demonstration area in the future.



Figure 4. An area along Little Bitter Creek infested with perennial pepperweed and tamarisk.



Figure 5. An area along Little Bitter Creek not infested with perennial pepperweed, which represents a potential target condition.

Wildlife Biologist and Game Warden Vegetation Monitoring

Wildlife biologists and game wardens completed a second season of monitoring fall shrub production. Plants selected for monitoring are considered important browse species. Dry conditions resulted in reduced browse production throughout the Region (Figure 6).

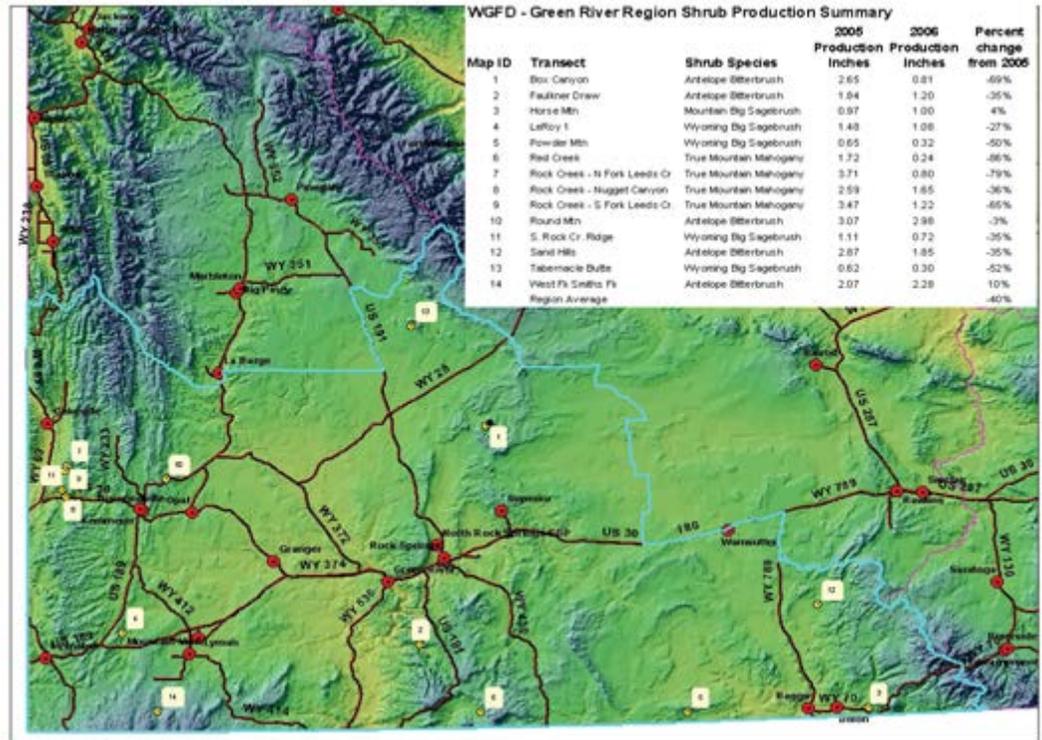


Figure 6. Shrub monitoring sites in the Green River Region and 2005-2006 shrub production monitoring results.

Rock Creek Winter Range Browse Monitoring

True Mountain mahogany is an important browse species for mule deer wintering in the Rock Creek winter range between Cokeville and Kemmerer. Production and utilization measurements have been collected since 1993 at three sites. Production correlates strongly with spring precipitation measurements recorded in Kemmerer (Figure 7). Shrub leader production dropped dramatically from 2005.

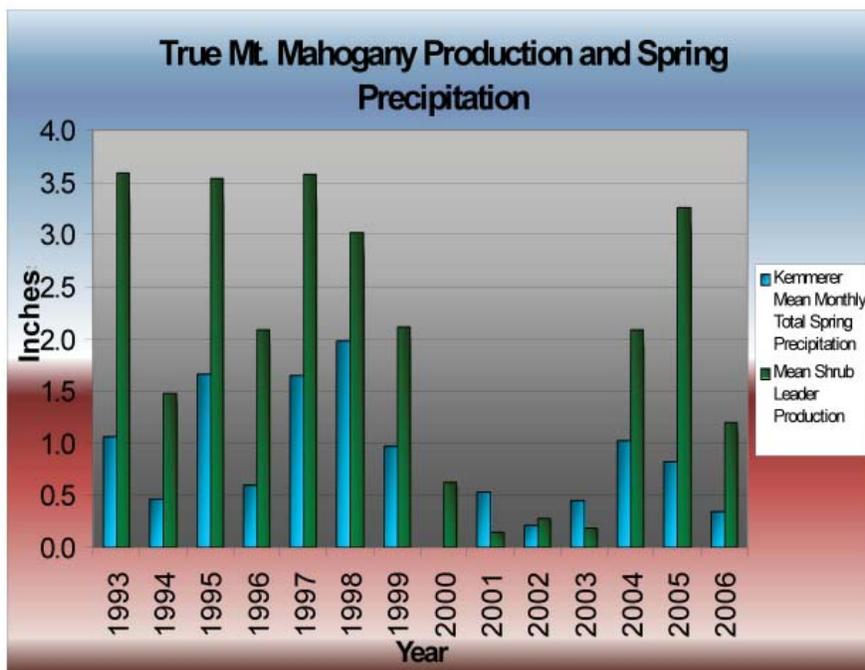


Figure 7. Mean shrub leader production and the mean monthly totals of spring precipitation. Total precipitation during the months of April, May, and June were used. One month of data was missing during the years 1997, 1999, 2002, and 2003.

Hams Fork Watershed Aspen Restoration

Meetings and field visits were held with the USFS, Kemmerer Ranger District to examine opportunities for aspen restoration in the Hams Fork watershed. It was decided that the Pole Creek area north of Kemmerer would provide a good starting area to begin developing projects. It is anticipated that project inventory, planning, and funding requests will be completed in 2007 and activities may begin as early as spring 2008.

Southwest Wyoming Remote Sensing Projects

Beta snow mapping products were released, reviewed, and comments provided for improving the product. It is anticipated that final product deliveries for snow cover mapping and land cover change analysis will be completed in 2007. Test site locations (Figure 8) were collected between 2005 and 2006 to assess land cover mapping products in southwest Wyoming. A report was prepared for BLM land cover products in southwest Wyoming. BLM training and test sites were incorporated where they were of adequate quality and available. Many BLM sites were excluded because they were too heterogeneous or small to register with LANDSAT imagery or incorrectly labeled. Classification accuracy was extremely low for both field offices land cover products. It is recommended that land cover be remapped in the Kemmerer and Rock Springs BLM Field Office areas and that existing products not be used for land management or wildlife research.

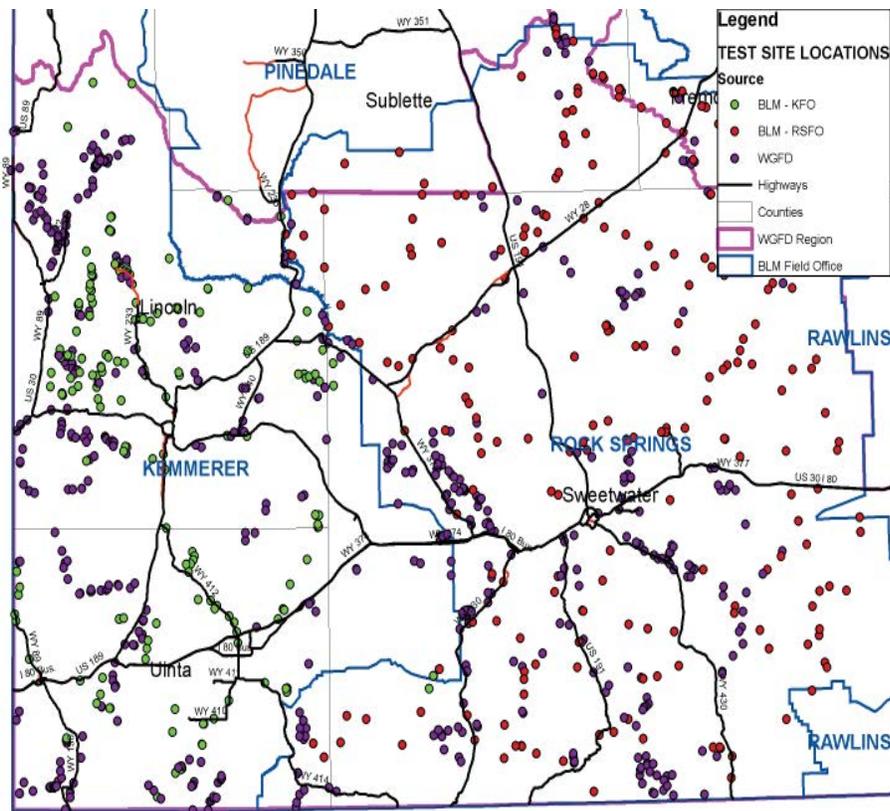


Figure 8. Remote sensing sites from BLM Kemmerer and Rock Springs Field Offices and WGFD collected between 2003 and 2006. The BLM sites displayed are those that were of adequate quality to utilize for additional analyses.

Lower Big Sandy River Willow Trend Monitoring

Willow photo point stations were repeated by the habitat biologist and a Sweetwater County Conservation District board member on October 13th at all five monitoring sites along the Lower Big Sandy River. Photo comparisons between 2005 and 2006 showed little to no change at monitoring sites 3, 4, and 5. Some deterioration in willow vigor and health was also observed in the photo comparisons at sites 3-5 likely due to continued loss of water tables, drought stress, rodent browsing, and livestock grazing use. A riparian pasture fence was erected in 2005 along the upper reach of river containing monitoring sites 1 and 2. This riparian pasture was grazed early in the summer and then rested from livestock use the remainder of the growing season, with the exception of incidental small groups of cattle for short periods that accessed the pasture through gates left open. The 2005 and 2006 photo comparisons showed an increase in herbaceous vegetative production at both sites 1 and 2. Figure 9 shows an obvious improvement in willow growth along the immediate streambank at monitoring site 1 between 2002 and 2006, and willow growth continued to excel inside the fenced enclosures at both monitoring sites 1 and 2. Willows inside the enclosure at site 1 had experienced extreme browsing by rodents during the 2005-2006 winter months, however summer regrowth allowed these willows to rebound and reach heights similar to those observed in 2005.



Figure 9. Improved grazing management resulting in recovery of willows and other riparian vegetation to stabilize the streambank at site #1 along the lower big Sandy River between 2002 and 2006.

Saltbush Observations

During field work in 2006 a saltbush species not previously recognized and likely not known to many resource professionals in southwest Wyoming, was found and identified. Currently it is taxonomically recognized as distinct species *Atriplex tridentata* Kuntze in the NRCS PLANTS database or subspecies *Atriplex gardneri* (Moq.) D. Dietr. var. *utahensis* (M.E. Jones) Dorn to many botanists in Wyoming. Commonly it is referred to as basin saltbush. It is most frequently and easily mistaken for *Atriplex gardneri* (Moq.) D. Dietr. or *Atriplex gardneri* var. *gardneri*, commonly referred to as Gardner's saltbush. It was observed along areas of the Bitter and Little Bitter Creek drainages. A literature review indicates that it is a vigorous root sprouter which could be advantageous for vegetation treatments which could benefit wildlife. Stutz et al. (1979) describe methods for identifying basin saltbush. Opportunities and feasibilities to use this plant for treatments in areas adapted for its growth are being examined.

Flaming Gorge Reservoir Habitat

Participated with the fish management crew and volunteers to construct woody debris habitat structures for non-game fish and smallmouth bass along a shoreline in the Black's Fork arm of Flaming Gorge Reservoir. Approximately 740 discarded Christmas trees collected from the local community were used to build the structures.

Beaver Management

The aquatic habitat biologist toured Currant Creek Ranch with landowner to discuss beaver management, possible cheat grass control, and ideas for instream grade control structures. In addition, he also toured the upper Corral Creek watershed located in the upper Ham's Fork River drainage with a landowner to evaluate beaver habitat and transplant potential, and then met with other ranch owning partners to discuss benefits and address their concerns with transplanting beaver to the property.

WILDLIFE HABITAT MANAGEMENT AREAS

Grizzly WHMA Grazing Management

Forage reserve styled grazing management was implemented at the Grizzly WHMA on a two-year trial basis to evaluate merits of the program and decide whether or not to pursue longer term grassbanking on the WHMA. Three neighboring ranches were asked to participate in the pilot program during 2006.

The lessee of McCarty Canyon Ranch grazed the East Rendle pasture during late May and early June with approximately 100 cow/calf pairs in exchange for reducing duration of grazing use in the North Rassmussen allotment. This exchange appeared to work out well, as photo point monitoring using a vegetative height board depicted adequate re-growth in the East Rendle pasture (Figure 10) at two sites (UTM = zone 13N E302655 N4578516 NAD-83). Baseline monitoring was established in the North Rassmussen allotment (UTM=zone 13N E300422 N4574596 NAD-83); however, the post grazing monitoring was not completed to evaluate results. Tagged willow plant transects were also established at monitoring sites in each pasture to evaluate browsing use of young plants. Incidence of browsing to tagged willow plants increased from 25% to 56% during the period when cattle grazed in the East Rendle pasture. Post grazing use willow data were not collected or evaluated in the North Rassmussen allotment.



Before Grazing



After Grazing

Figure 10. Photo point monitoring comparing wet meadow herbaceous vegetation prior to and immediately following grazing use in the East Rendle pasture.

Jack Creek Land and Cattle Company grazed the Cabin Draw pasture with 400 cow/calf pairs for about four weeks between late August and late September. This grazing use was in exchange for season long rest along the lower McKinney Creek riparian zone near the confluence with Muddy Creek in the Bridger Pass pasture of the Sulphur Springs allotment. This reach of McKinney Creek is important spawning and juvenile rearing habitat for the native fish assemblage of bluehead suckers, flannelmouth suckers, and roundtail chubs. Problems that developed with this grazing exchange included: 1) the special use agreement was delayed for approval, which postponed grazing for about one month. The Department technician overseeing grazing compliance had to return to school before the grazing use occurred, so cattle wandered unnoticed into unauthorized areas. 2) Cattle strayed through gates likely left open, and also moved through the electric fence into the Lower Muddy Riparian pasture because it was not checked routinely. 3) Small groups of cattle trickled back into the Bridger Pass Pasture sporadically throughout the summer period from the Canyon and Monument pastures because they lacked complete boundary fencing and routine herding.

Monitoring stations were established in riparian sites at Pole Gulch (UTM= Zone13N E296425 N4585522 NAD-83) and Cabin Draw (UTM=Zone13N E295372 N4586148 NAD-83). Baseline data collected included photo board points depicting pre-grazed herbaceous vegetative heights (Figure 11), and pace transect measurements of pre grazed median sedge and rush heights. Pre-grazed sedge/rush heights at Cabin Draw ranged from 4 to 28 inches, and the median height was 15 inches. Baseline sedge/rush heights at Pole Gulch were 5 to 29 ½ inches, and the median height was 14 ½ inches. Post grazing use data were not collected or evaluated in Cabin Draw pasture. The Department did not collect any monitoring data in the Bridger Pass pasture; however, BLM indicated they were able to collect riparian vegetation data and photos.



Figure 11. Photo point shows the pre-grazed herbaceous vegetation heights in the Cabin Draw pasture.

The Overland Trail Cattle Company was scheduled to graze the Dennison pasture for about three weeks during September and early October with 1200 cattle in exchange for season long rest in the McKinney Creek pasture of the Pine Grove-Bolten Allotment. However, drought conditions forced Overland Trail to graze the McKinney Creek pasture early in the summer, so the exchange agreement was dissolved and the Dennison pasture was not grazed during 2006. Baseline monitoring similar to those used in the Cabin Draw pasture were also established in the Dennison pasture. Riparian habitat monitoring was conducted along McKinney Creek at UTM Zone 13N E300913 N4594554 (NAD-83), and along Little Muddy Creek at UTM Zone 13N E303941 N4593719 (WGS-84). Measured pre-grazed sedge/rush heights at the McKinney Creek site were 4 ½ to 35 inches, and the median height was 19 inches (Figure 12). Sedge/rush heights at the Little Muddy Creek site were 6 to 25 inches, and the median height was 13 ½ inches.

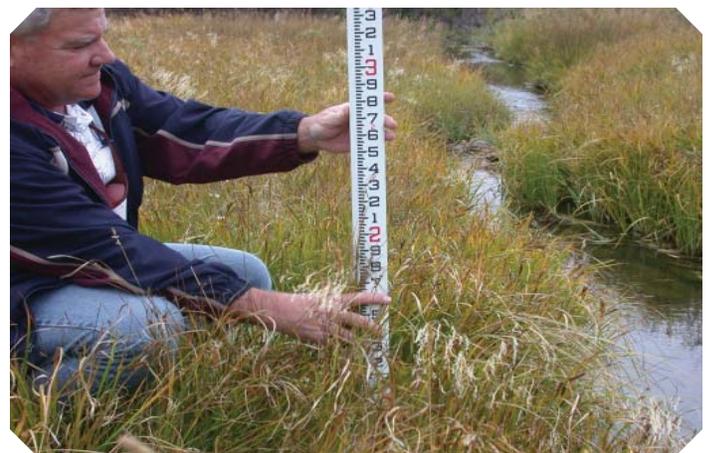


Figure 12. Measuring the pre-grazed sedge and rush heights along McKinney Creek in the Dennison pasture.

Stratton Sheep Company made their annual permitted BLM grazing use of 700 AUMs between June and July in the Shipping and West Rendle pastures. Montgomery Livestock also made use of their 90 federal AUMs during October in one pasture selected from the Shipping, West Rendle, and Wild Cow pastures, and based upon which pasture had the least amount of prior grazing use earlier in the year.

Grizzly Wildlife Habitat Management Area Expected Use Mapping

A grazing expected use analysis was completed to assist with grazing management planning. Distance to water and slope are combined to provide an estimate for the probability of use of an area. Guenther et al. (2000) describe the methods that were used and potential uses for output maps. Expected use maps can be useful for estimating grazing capacity and identifying key areas or locations for trend monitoring, salt or supplement placement, and where potential impacts to sensitive resource values may be high. Analyses were performed for early and late grazing seasons (Figure 13).

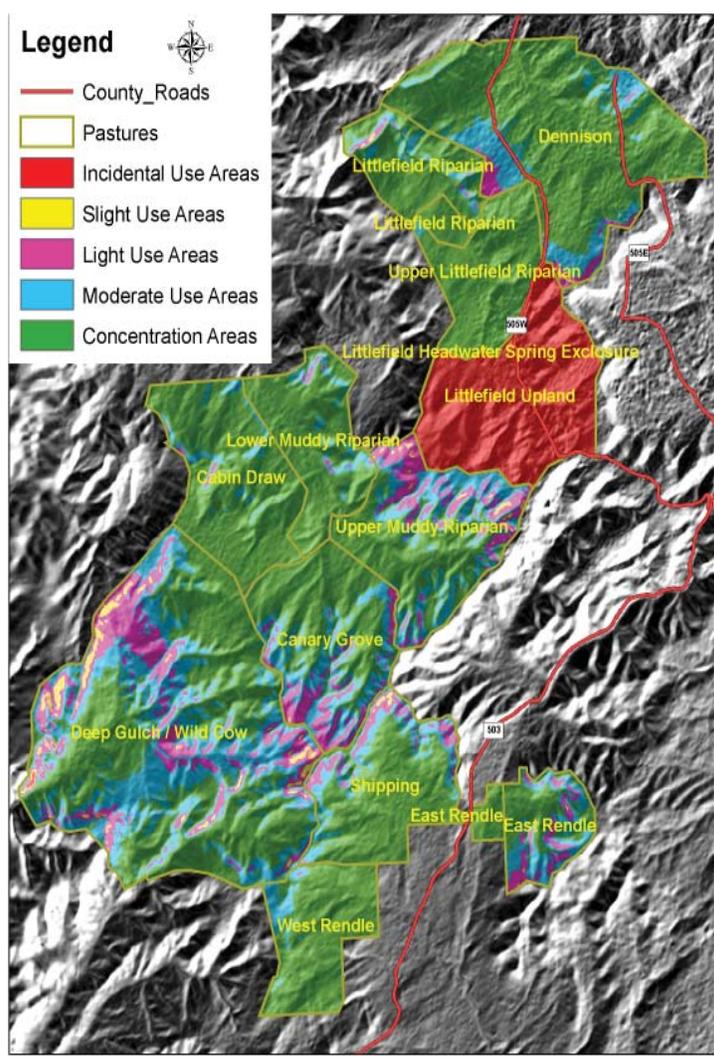


Figure 13. Late season expected use map for the Grizzly Wildlife Habitat Management Area overlaid on a shaded relief. Littlefield upland pasture is displayed as an incidental use area because water is typically not available in this pasture during the late season.

West Fork Hams Fork River Watershed Habitat Assessment Method (WHAM) Level I survey

Level I WHAM surveys were completed for the West Fork Hams Fork River Watershed during a two-week period in August. This drainage is shown in Figure 14, and is located in the southern end of the Wyoming Range between Kemmerer and Cokeville. Tributary drainages surveyed during 2006 included: Little Park Creek, Grindstone Creek, Bird Creek, Kelley Creek, Rock Creek, Allen Creek, and Spring Creek.



Figure 14. An overview of the West Fork Hams Fork Hams Fork River Watershed downstream of Big Springs.

Much of the West Fork Hams Fork and its tributaries support only intermittent flow (Figure 15), which is likely due to the geology of the area. Flowing stream reaches of support viable fish populations (Figure 16). All level I WHAM information will be entered into the new Fish Division WHAM database, where survey findings can be generated from database summary reports for the upper Hams Fork River Watershed.



Figure 15. A dry reach of the West Fork Hams Fork River observed during the 2006 WHAM survey near Nugent Park.



Figure 16. A brook trout surveyed from a flowing reach of the West Fork Hams Fork River near Big Springs.

JACKSON REGION

HABITAT PROJECTS

Flat Creek / Salt River Confluence Restoration Project

The third and final phase of the Flat Creek/Salt River Project was completed. The project was developed to mitigate for the loss of native trout habitat caused by the power plant, as part of the re-licensing for the Strawberry Hydroelectric Power Plant. The cooperators on this project are; Curtis Haderlie, Lower Valley Energy, Lincoln County Road and Bridge, Simplot, NRCS, Low Impact Energy Commission, and Federal Energy Regulation Commission.

The confluence of Flat Creek and Salt River, north of Thayne, is experiencing degradation of river and stream structures. The majority of water was flowing into the west side channel. Currently, the bulk of the flow is in the eastern channel, putting pressure on the banks between Flat Creek and Salt River. If Salt River continues its progression to the lower ¼ mile of Flat Creek stream channel, important trout spawning and migration habitat will be lost. Hence, without proper intervention, the river can and will change course, which will initiate alteration and possible damage upstream and downstream.

Expected Results:

- Maintain meander pattern to preserve river and stream structure
- Maintain spawning and migration habitat for Snake River Cutthroat (SRC)
- Reduce sediment contribution of eroding banks
- Enhance aquatic and riparian habitats to maximum ecological potential
- Provide sufficient habitat and habitat diversity to increase SRC populations
- Enhance angling opportunity at public access areas

This project addresses stabilizing eroding banks, the Salt River channel, and the confluence of Flat Creek. Modified grazing, revegetation, and instream structures are the major management changes.

In December 2004, the first phase was completed. A vortex weir was installed at the future confluence of Flat Creek and Salt River. The weir is a grade control structure that decreases near-bank shear stress, velocity and stream power, but increases the energy in the center of the channel. This structure will establish grade control, reduce bank erosion, create a stable width/depth ratio, and maintain channel capacity, while maintaining sediment transport capacity. In addition, rip-rap structures were placed for the future Salt River side-channel and along the bank where a new meander is beginning to form. The second phase of revegetation and excavation was completed spring 2005. Seven hundred riparian trees were planted and 500 feet of sod was installed.

- 16,684 acres have been targeted for future RX treatment.
- Enyon Ridge unit 828 acres was treated with RX fire.
- 35 elk were captured at the end of February 2006, and tested for brucellosis.
- 8 adult female moose were recaptured and (GPS) collars were downloaded.
- Third and final phase of the Flat Creek/Salt River Project was completed.
- The Salt River Watershed is a priority for SRC habitat preservation.
- Mechanical treatments may be used to supplement RX burning on some sites.
- JIHI group has developed eight burn units covering 36,000 acres.

The third phase of the project was completed the fall of 2006. Four barb structures were installed; requiring 150 cubic yards of rock. The structure are designed to reduce bank erosion by reducing near-bank slope, velocity, velocity gradient, stream power and shear stress. The rock was acquired from Simplot Smokey Canyon Mine and was tested for selenium content. The rock was placed in and along the river using one trackhoe and one backhoe (Figures 1 and 2). After the barbs were placed, sod matting was planted to help stabilize the structures and banks (Figure 3).



Figure 1. Placement of in-stream structures for Phase 3 of the Flat Creek / Salt River Confluence Restoration Project.



Figure 2. In-stream barbs move thalweg from the eastern bank to the middle of the Salt River Channel.



Figure 3. Sod matting is placed along the eastern bank to stabilize the barb structures.

Jackknife Creek Restoration Project

This project is one phase of an ongoing watershed improvement for the Salt River. WGFD is working with cooperators, interest groups, land managers, and landowners to promote watershed function and ecosystem integrity by enhancing the quality and diversity of both aquatic and riparian habitats.

Jackknife Creek, a tributary to the Salt River, has been identified as an important native Snake River cutthroat (SRC) spawning tributary. Numbers of small wild SRC are highest in the Etna section of the Salt, largely due to Jackknife Creek. This stream is in a degraded condition as a result of agricultural practices, grazing practices and the removal of riparian vegetation that have straightened the creek. Jackknife Creek is actively

eroding, adding to the sediment delivered to the Salt River, and impairing critical spawning habitat. Without intervention, both Jackknife Creek and the Salt River will continue to unravel, possibly change course, and initiate alteration and possible damage upstream and downstream. In 2005 improvement was planned with the following objectives:

- Restore channel geomorphology to a narrow, deep and sinuous stream
- Maintain meander pattern to preserve river and stream structure
- Maintain spawning and migration habitat for trout
- Reduce sediment contribution of eroding banks
- Enhance aquatic and riparian habitats to maximum ecological potential
- Provide sufficient habitat and habitat diversity to increase SRC populations
- Enhance angling opportunity at public access areas

Grazing management, channel design and revegetation of stream banks are the tools employed in this project.

Stillwater Ranches, owners of Jackknife Creek Ranch started this restoration project in 2006. Phase 1 of the Jackknife Creek Restoration Project was a meander reactivation on Jackknife Creek using a grant and private funds. The upper reach of the historically straightened channel was realigned to a natural planform and heavily planted with willows. The WGFD awarded a contractor \$25,000 to excavate and construct the channel and reslope the banks for the first meander below Jackknife Ck bridge (Figures 4 and 5). In addition native vegetation was re-established on the meander. Designing, obtaining permits, construction supervision and administration, grazing management and maintenance for Phase one of the restoration project was the responsibility of Stillwater Ranches.



Figure 4. Heavy equipment re-excavating Jackknife Creek channel.



Figure 5. Jackknife Creek rebuilt channel with sod matting and willow placement.

Spring Creek Complex Enhancement

The Snake River Spring Creeks Enhancement Project was initiated in the winter of 2003. River and land management practices have changed the structure and function of these important stream habitats. Currently, these spring creeks have widened, become inundated with silt and aquatic vegetation, and stream velocities have decreased. In addition, plant succession in the riparian vegetation community has progressed from willow and cottonwood to Douglas fir and other conifers. The largest contributing factor to this degradation is the lack of flushing flows from the Snake River. The river has been levied to resist flooding of private property and flushing flows are not possible. Hence, supportive funding and partnerships with fisheries and wildlife managers, private landowners, Wildlife Heritage Foundation of Wyoming, Teton County Conservation District, conservation groups, and other agencies were instigated. Enhancements were developed and prioritized with the help of cooperators.

Three Creeks Ranch is an area of housing and recreational development. The developers have implemented stream improvements in an attempt to produce blue ribbon fisheries for their investors. With the work being

implemented, the landowners downstream would like to maintain and enhance SRC spawning habitat. These habitats are critical for maintaining wild populations of SRC and are almost exclusively located on private lands. It is crucial to routinely restore, maintain, and ensure access to these spawning habitats. Therefore, plans were developed for the Spring Creek Channel Enhancement on the Jackson Hole Hereford Ranch. The possible tools for enhancement are excavation, adding spawning gravels, redistribution of large woody debris, revegetation, stream bank fill, and instream structures.

Expected Results:

- Expand aquatic habitat and increase instream diversity
- Enhance riparian vegetation to maximum ecological potential
- Decreased sediment to reduce the incidence of spawning redd loss
- Increase Snake River cutthroat trout, native fish, and game fish populations throughout the drainage
- Improve fishery quality for anglers on the Snake River

Surveys were completed and funding from Teton Conservation District was secured. The project was scheduled to be implemented December 2005. Due to delays in the upstream projects, implementation was delayed until August and December 2007.

Enyon Ridge Prescribed Burn

Jackson Interagency Habitat Initiative previously identified two burn units in Buffalo Valley for prescribed fire treatment to set succession back, reduce conifer densities and enhance aspen stands. The site provides important transitional, winter, and parturition range for elk and moose. The Diamond L unit (1,145 acres), was treated with prescribed fire October 2, 2005. The Enyon Ridge unit (828 acres), was treated with prescribed fire on October 3, 2006 (Figure 6). Numerous conifer trees were felled a year prior to implementation to create more continuous fuels and a hotter burn with the hopes of enhanced aspen stimulation and regeneration. Post treatment monitoring results will be compared and contrasted between the two units to develop prescriptions that best enhance aspen.

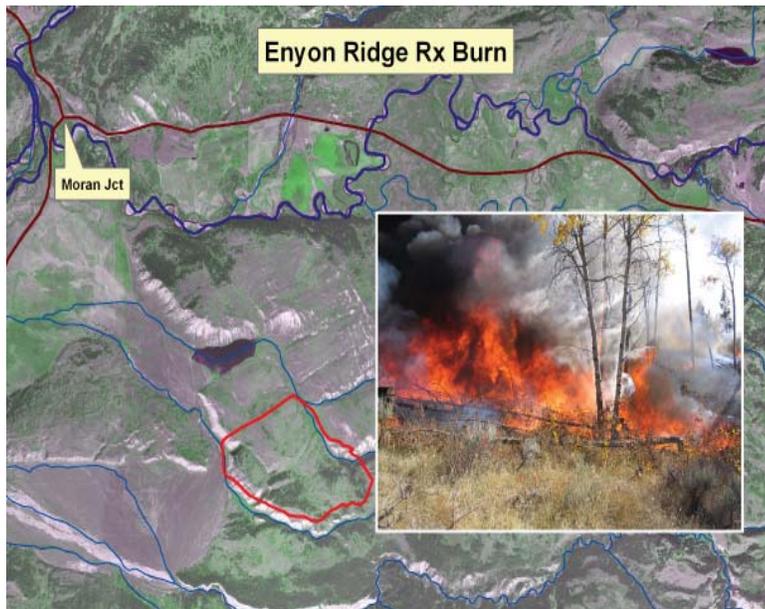


Figure 6. The Enyon Ridge burn is located SE of Moran Junction and was conducted on October 3, 2006.

Lower Gros Ventre Vegetation Treatments

The inventory conducted by David Alexander and members of JIHI resulted in a prescribed burn proposal for the lower Gros Ventre drainage. Approximately 16,684 acres have been targeted for future prescribed fire treatment. Two of the burn units totaling 5,642 acres are scheduled for treatment during 2007 (Figure 7). Funding has been secured through the RMEF (\$13,000), WFNAWS (\$18,000) and an application submitted to the WWNRT (\$50,000).

Its purpose is to improve bighorn sheep, deer, and elk winter range habitats. Fire will improve habitat and migration corridors by enhancing/increasing winter range, reducing conifer encroachment in openings, and maintaining aspen stands and open shrub/grasslands. Vegetative types targeted include montane shrub, tall forb/grasslands, sagebrush, aspen, Douglas fir, Rocky Mountain juniper, limber pine, and mixed conifer. Reduction of shrub heights, as well as reduction of conifers within aspen stands and encroachment into shrub/grass habitats is the key objective. Secondary objectives include promotion of a habitat mosaic, improvement

of forage palatability, and increasing grass vigor. Reduction of conifer basal areas in conifer-dominated stands could result in improvement of sight distances for bighorn sheep, depending upon the amount of conifer mortality generated.

Current conditions including dense forested habitat in traditional movement and winter range areas are affecting bighorn sheep by restricting movement, making sheep more susceptible to predation and reducing forage availability in winter range areas. Aspen community types are not meeting BTNF Plan desired future conditions and are typically old-aged and decadent, and are being replaced by conifers.

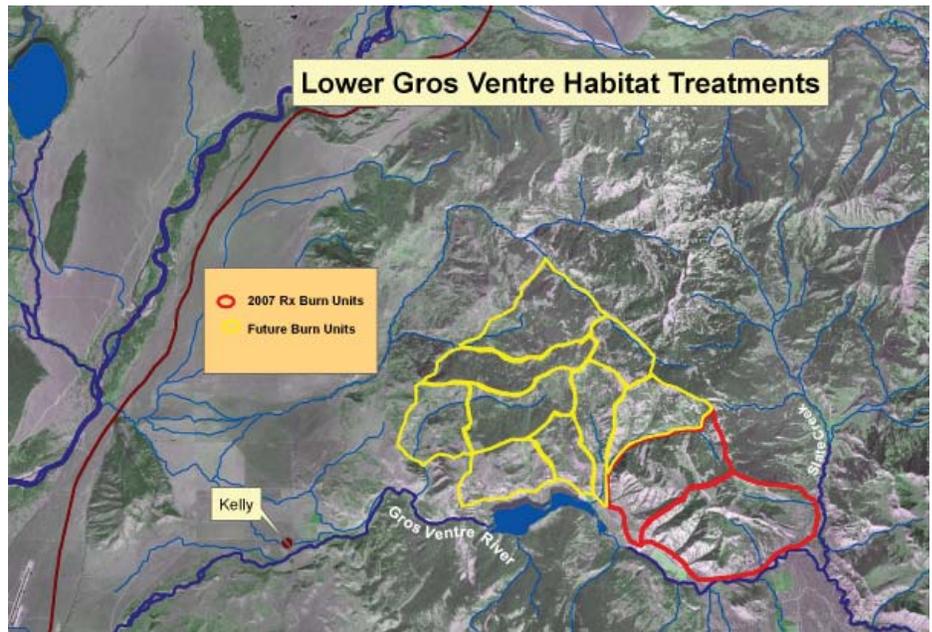


Figure 7. The lower Gros Ventre vegetation treatments are located between Turpin and Slate Creeks. Multiple burn units have been identified with two units scheduled for burning in 2007.

Gros Ventre Drainage Inventory

The JIHI group consists of biologists from the USFWS, USFS, WGFD, and Grand Teton National Park. The group functions to identify important habitats and propose appropriate enhancements for such habitats. The JIHI group, under administrative direction, collaborates on habitat inventories, treatment implementation, funding and monitoring.

The JIHI group has identified the Gros Ventre drainage as a priority for potential habitat enhancement work for large ungulates with emphasis on elk and aspen regeneration. In 2005, the group combined resources and funding to initiate habitat/community typing, in the lower Gros Ventre drainage. Dave Alexander was contracted to conduct the work. As a result of Alexander's work the JIHI group has developed eight burn units covering 36,000 acres and is proposing implementation of prescribed burns over the next several years. Approximately 6,000 acres are planned for fall burning in 2007.

River (Joy) Osborn, was hired in 2006 through the State of Wyoming Internship Program to continue the habitat/community typing along both sides of the Gros Ventre River from Slate Creek to Dry Cottonwood Creek. Many different vegetation types are present in the project area. There are four general habitat/community type groupings (Figure 8): (1)

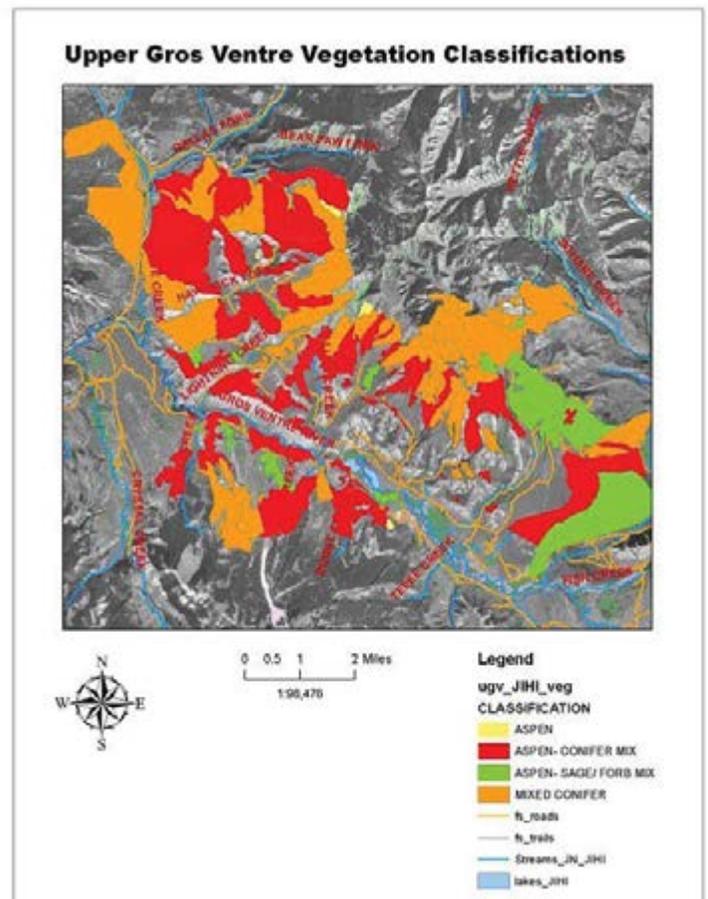


Figure 8. The middle Gros Ventre inventory project was conducted in 2006, from Slate Creek to Fish Creek. The major habitat types are illustrated above.

aspen; (2) aspen/conifer mix; (3) aspen/sage/forb mix; (4) and mixed conifer. Aspen/conifer mix, and mixed conifer make up most of the polygons with aspen/sage/forb mix being common. Unfortunately there are only eight polygons that are true aspen community types, a few of which are in poor ecological condition. Other groupings include: limber pine, sage, mountain shrub, forb-grass, willow, water and barren. These groupings are not considered as critical to the project and are not emphasized in treatment plans. Aspen stands of varying stages of succession and conifer encroachment and sagebrush and willow/riparian areas are scattered throughout the project area. This is an important winter range and migration corridor for bighorn sheep.

Future goals include maintaining existing aspen stands, and regenerating and expanding aspen on the landscape in order to increase forage production and nutritional quality of native forbs and grasses. Aspen was emphasized due to its importance as critical big game habitat.

Buffalo Valley Elk Parturition and Winter/Transitional Habitat Selection

Assistance was provided for a research study being conducted by Andrea Barbknecht from the Iowa State University. This is a collaborative effort stemming from management needs identified by the WGFD, BTNF, National Elk Refuge and Grand Teton National Park. The project is within important elk transitional, winter and parturition ranges in the Buffalo Valley area, approximately 30 miles north of Jackson.

An average of 30% (3,400 elk), of the Jackson Elk Herd Unit (JEHU) do not utilize supplemental winter feed on the National Elk Refuge or three neighboring state operated elk feedgrounds. This is one of the highest percentages of “winter free-ranging” elk among all herd units within the feedground complex of northwest Wyoming. Certain segments of the JEHU appear to have established fidelity to native winter ranges versus supplemental feeding sites. One such herd segment is located in the Buffalo Valley area, east of Moran.

Changes in harvest strategies and implementation of habitat enhancement projects (prescribed burns) may have encouraged native forage utilization by elk in the Buffalo Valley over the past 5 years (i.e mean = 924, range 729-1,187). In addition, the brucellosis seroprevalence of the winter free-ranging segment has tested much lower (1.9%, n = 55) than segments utilizing feedgrounds (25% for all feedgrounds, n=1437). While the number of winter free-ranging elk within the Buffalo Valley has been relatively constant in recent years, the fidelity of individuals to this native winter range over time is unknown. Moreover, quantification of ecological variables such as elk response to habitat enhancements, habitat-disease relationships, habitat selection, home range size, migration routes, seasonal use patterns, and response are lacking. This additional information is essential in selecting appropriate alternatives for the future management of wintering elk and associated disease transmission risks.

Specific project objectives include:

1. Increase brucellosis surveillance of the winter free-ranging segment of JEHU within the Buffalo Valley.
2. Compare seroprevalence of winter free-ranging elk in this herd segment to other herd segments utilizing supplemental feed sites.
3. Determine elk distribution, seasonal use patterns, forage and habitat selection, and site fidelity of the herd segment wintering in the Buffalo Valley and document winter conditions that trigger elk from this herd segment to utilize feedgrounds.
4. Identify elk response to habitat enhancements (prescribed burns) implemented on winter/transitional ranges.
5. Evaluate elk response to snow water equivalents (SWE) on winter/transitional ranges.
6. Determine food habits of this winter free-ranging herd segment.
7. Obtain additional information on the potential for commingling of winter free-ranging elk and cattle/horse feeding operations in the Buffalo Valley.

To address these objectives, 35 elk were captured at the end of February 2006, and tested for brucellosis (Figure 9). Of these, 26 were determined to be pregnant and outfitted with vaginal implant transmitters (VIT's) to define abortion and parturition sites. Two of the pregnant animals were seropositive for brucellosis, as well as five non-pregnant individuals (20% seroprevalence overall). No abortion events occurred during the duration of the season.

Parturition sites (24) were located using VIT's from the ground or air. Parturition events occurred primarily within the Buffalo Valley area, but some individuals moved as far as southern Yellowstone National Park before calving. Habitat data were collected at a micro- and macro-scale to determine habitat variables important in parturition site selection. Measures of cover and forage quality and availability were collected at the parturition site and reference locations for microhabitat analysis of selection. GIS layers will be used to define large-scale habitat patterns (i.e. cover type, slope, elevation, distance to water and anthropogenic variables). A second season of research will be conducted prior to data analysis.

Resource selection and population dynamics of Shira's moose (*Alces alces shirasi*) in northwest Wyoming.

Assistance was provided for a research study being conducted by Scott Becker, Master of Science Candidate, U.S. Geological Survey, Wyoming Cooperative Fish and Wildlife Research Unit, Department of Zoology and Physiology, University of Wyoming. The study stemmed from management needs identified by the Moose Working Group of the WGF, BTNF, Grand Teton National Park and the University of Wyoming. This includes the entire Jackson Moose Herd Unit located north of Jackson.

Declining population trend counts and calf:cow ratios since the late 1980s suggest a downward trend in moose numbers in northwest Wyoming. To address the potential mechanisms limiting the north Jackson moose herd assessment of physiological health, survival, reproductive rates, and resource selection is being done.

The current phase of the study began in January 2005 with the deployment of 40 collars (20 VHF & 20 GPS). In February and March 2006, 8 adult female moose were recaptured and their global positioning system (GPS) collars were downloaded (Figure 10). An additional 5 adult females were captured to deploy recovered GPS collars. In addition, 11 VHF collars were deployed on adult moose (4 males, 7 females) to maintain sample sizes for accurate survival rate estimates.



Figure 9. Helicopter capture of elk in the Buffalo Valley. Net guns and ground crews are used to quickly and humanely capture and process elk. Photo: Mark Gocke.

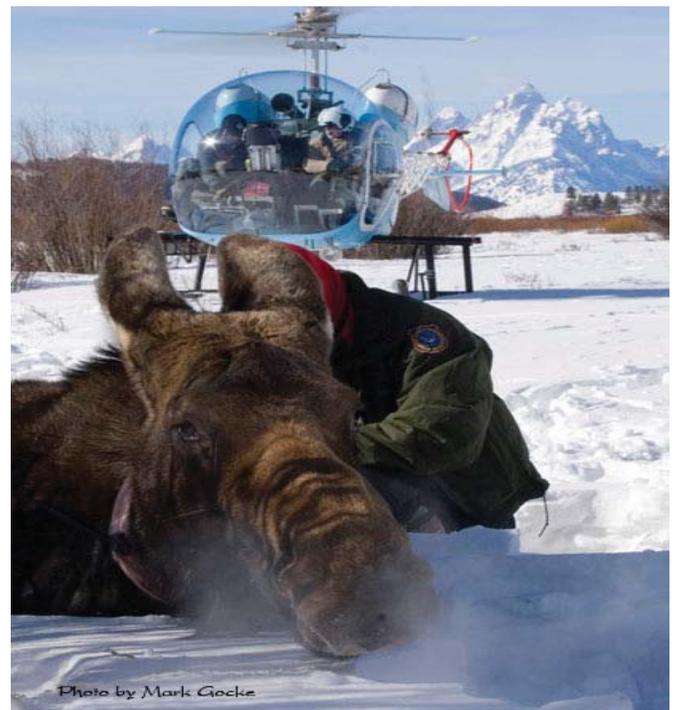


Figure 10. Moose being fitted with a radio collar for the Buffalo Valley research project. Photo: Mark Gocke.

The primary goals are: 1) investigate resource selection, seasonal distribution, and movement patterns of adult female moose to better understand the relationships between moose and their habitat requirements, 2) assess potential causes for recent population declines by estimating population parameters and measuring physiological health indices, and 3) estimate the timing and location of adult female moose movements associated with U.S. Highway 26/287 and use this information to build a model that will be used to predict important moose crossing locations.

Preliminary movement data suggests that there are 4 primary summer ranges for adult female moose that winter in the Buffalo Valley – Lava Creek, Wolverine/Rodent Creek, Mink Creek/Phelps Pass, and Yellowstone River/Thorofare Creek. There was no statistical difference between summer and winter/spring home range sizes. Mean seasonal home range sizes were approximately 4 times larger than those reported by Houston (1968) for moose in the same area.

Currently, resource selection functions are being developed to predict important highway crossing locations as well as individual and population level seasonal habitat use patterns. The information will increase the understanding of moose ecology and assist state and federal agencies in developing effective management strategies for moose and their habitats in northwest Wyoming.

Weiner Creek Prescribe Burn Treatment

The Greys River Ranger District of the BTNF, in partnership with the WGF and RMEF, proposed to prescribe burn the headwaters of Weiner and North Murphy Creek . This project is needed to incorporate fire into vegetation management in the Greys River watershed. Aspen clones, conifer stands, and sagebrush communities have become monotypic and decadent, especially in the uplands. The main goal of the project is to restore the health and functioning of aspen stands on as much as 2,000 acres in the upper Weiner Creek watershed to contribute to their long-term sustainability and values as wildlife habitat within a project area of 1,000 acres.

Expected Results:

- Improve the deteriorated watershed and forage conditions that exist in the head of Weiner Creek .
- Improve habitat conditions for spring-fall use by elk in the Squaw Creek and Weiner Creek watersheds , with an emphasis on improving habitat for elk calving.
- Maintain about 30 percent of the brush/grassland habitat type in a brush/forb habitat type, emphasizing maintenance of the aspen or conifer/brush ecotone.
- Reduce number of days that elk are utilizing feedground by approximately 2 weeks
- Increase water yield for 1 mile of stream for spawning and migration of native and game fish
- Expand aquatic habitat and increase instream diversity
- Enhance riparian vegetation to maximum ecological potential
- Increase Snake River cutthroat trout, non-game fish, and game fish populations throughout the drainage.
- Improve fishery quality for anglers on the Greys River.

Prescribed burning will be used to achieve the project goal and objectives. A mosaic burn of up to an estimated 1,000 – 2,000 acres will be treated. The late summer/fall of 2005 was targeted, but the actual timing of the prescribed burn depends on many factors to be defined in the burn plan, and will not take place until spring or late summer/fall of 2007 or possibly beyond, depending on the next available burn window.

Bradley Mountain Prescribed Burn Vegetation Treatment

The Greys River Ranger District of the BTNF, the WGFD, the (WVNRT) and other potential partners are proposing a prescribed burn on Bradley Mountain. The area consists of important elk and moose transition/winter range. Bradley Mountain is located just east of Alpine, Wyoming and along the eastern bank of the Greys River (Figure 11). The project is approximately 4,300 acres in size and managers expect to apply fire to approximately 20-40% of its surface area. Some of the area will not carry a fire due to precipitous terrain with thin soils and sparse vegetation. Mechanical treatments may be used to supplement prescribed burning on some sites.

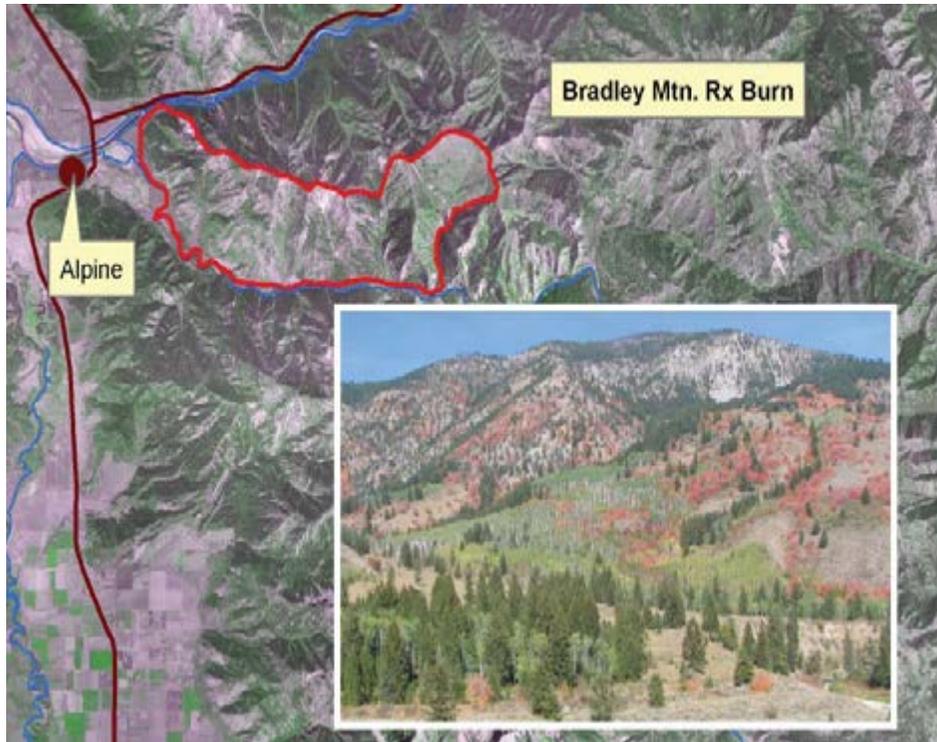


Figure 11. The Bradley Mountain project area is located just east of Alpine and is approximately 4,300 acres.

The purpose for the treatment is to improve the health and functionality of aspen, mountain shrub, sagebrush and grassland habitats.

The project was habitat/cover typed by WGFD personnel during the summer of 2006. Major habitat/cover types are:

- 1) Mixed aspen/mountain maple/mountain shrub/conifer
- 2) Mountain sagebrush/antelope bitterbrush
- 3) Aspen/subalpine fir/pine grass
- 4) Douglas fir/ninebark
- 5) Douglas fir/white spirea
- 6) Aspen/subalpine fir/pine grass
- 7) Scattered patches of curl-leaf mountain mahogany

Many of these communities are in advanced successional stages, experiencing conifer encroachment. \$40,000 has been requested from the WVNRT board for implementation. Treatments are expected to commence during the spring/fall of 2007.

Lower Cottonwood Creek Vegetation Treatment

The Greys River Ranger District of the BTNF, the WGFD, the WWNRT and other potential partners are proposing a prescribed burn in lower Cottonwood Creek. It provides important mule deer winter/transitional range and is located nine miles south of Afton (Figure 12.). The proposed burn is approximately 400 acres and consists mostly of sagebrush/bitterbrush and curl-leaf mountain mahogany cover types. Mechanical treatments may be used to supplement prescribed burning in some locations.

The treatment is intended to improve the health and functionality of the curl-leaf mahogany stands and remove competition from encroaching conifers. The burn site will be habitat/cover typed by WGFD personnel during the summer of 2007. The \$10,000 has been requested from the WWNRT for implementation and treatments are expected to commence during the spring/fall of 2007.

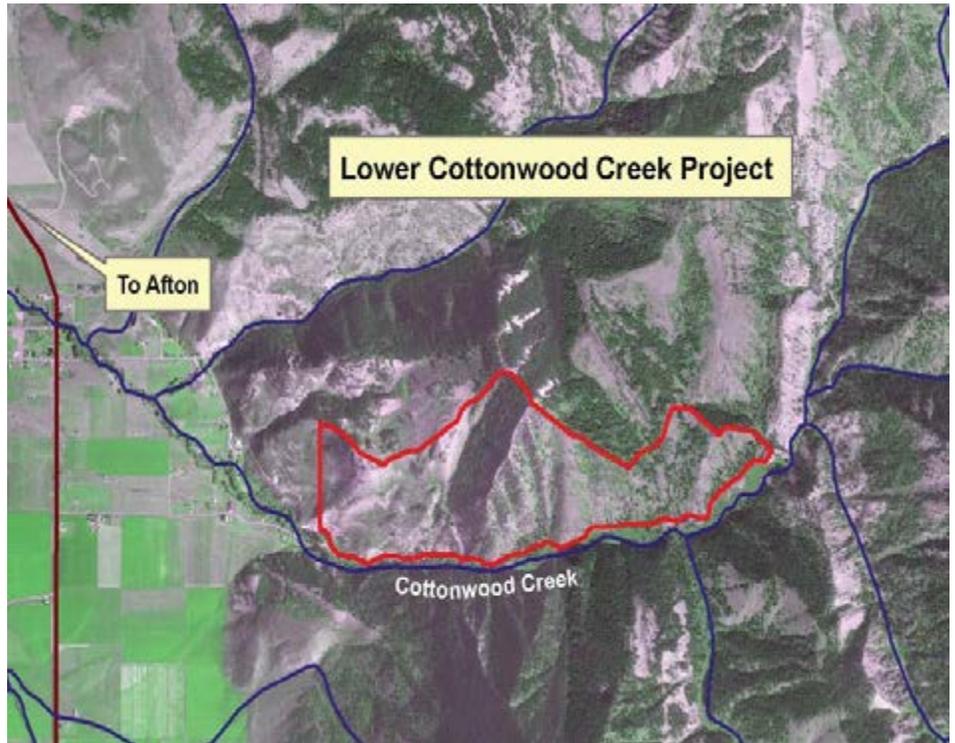


Figure 12. The lower Cottonwood Creek project is located approximately 9 miles south of Afton and is approximately 400 acres in size.

Bug Creek Vegetation Treatments

The GRRD and the WGFD have collaborated to implement a vegetation treatment in the vicinity of Bug Creek and lower Sheep Creek. This is approximately 30 miles southeast of Alpine and about 15 miles northeast of Afton (Figure 13).

The purpose for treatment is to restore the health and functioning of sagebrush habitat on the south facing slopes, including an increase in early seral grassland-type communities. Secondary purposes are to reinvigorate and restore aspen stands and meadow vegetation, and to set succession back in the conifer stand.

A prescribed burn is planned in approximately 500 acres of sagebrush and mountain meadow

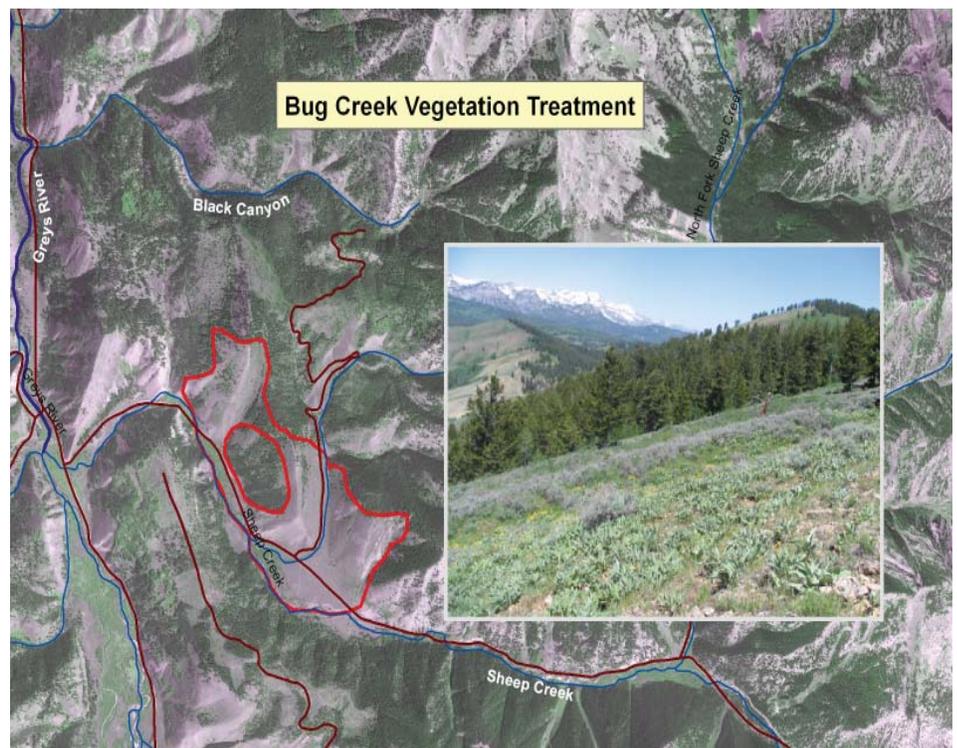


Figure 13. The Bug Creek project is located approximately 32 miles up the Greys River from Alpine and is approximately 580 acres.

habitat at the mouth of Bug Creek in 2007. The proposal also includes selective harvest of approximately 80 acres within the project area, retaining Douglas-fir trees greater than 14-inch diameter that are moderately fire resistant, and stimulating aspen regeneration where it is currently located in the stand. Stimulating aspen regeneration may include mechanically laying down aspen in the conifer stand.

Middle Greys River Inventory

WGFD and Greys River Ranger District (GRRD) personnel inventoried portions of the middle Greys River for habitat/cover typing (Figure 14 and Table 1). The inventory will aid in the selection of priority sites for future habitat enhancement treatments. Emphasis was placed on the identification of aspen community types and their successional status.



Figure 14. Location of the Middle Greys River inventory project.

Table 1. Middle Greys River Drainage Inventory Acreage Surveyed.

Name	Acres
Ridge Creek	858
Buck-Twin Creeks	2,533
Elk Creek	738
Three Forks Creek	2,371
Sheep to Park Creeks	1,840
Bear-Cabin Creeks	<u>4,292</u>
Total	12,632

Major habitat/cover types found within the drainages surveyed were Aspen/Douglas fir/ common snowberry; Aspen/subalpine fir/tall forb; Aspen/Douglas fir/pinegrass; Douglas fir/mountain maple; Douglas fir/blue huckleberry; Douglas fir/common & mountain snowberry.

In general, the majority of the aspen community types were in advanced successional stages with minimal regeneration and conifer encroachment. The inventory will be completed in 2007. This will include drainage mapping and proposing habitat enhancements for priority areas/habitat types.

LANDER REGION

HABITAT PROJECTS

Lander Front Mule Deer Habitat Improvement Project

Planning for implementation of the mule deer habitat improvement project continued. A contractor completed digitizing the habitat units mapped over the last two years by Jack Welch. Mr. Welch identified over 200 individual areas that needed improvement and those areas were digitized as well (Figure 1). After discussions with the BLM, 17 areas plus one additional water development were chosen for completion in 2007 and 2008. If funding is approved, approximately 300 acres of sagebrush will be mowed, 1,600 will be treated with the herbicide Spike and 970 acres of juniper will be cleared. Funding applications were completed for numerous organizations with \$230,000 being requested from the WWNRT. Because the request from the Trust Fund was over \$200,000, legislative approval is required during the next session in January and February 2007. Total funds requested were \$479,700.

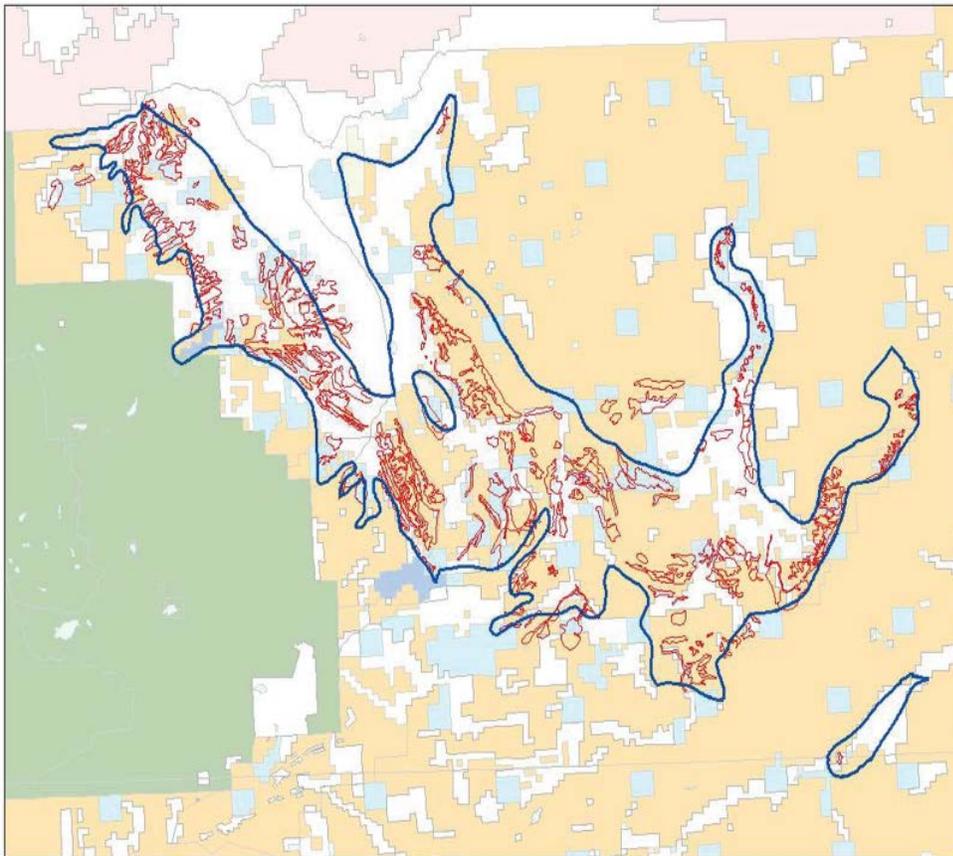


Figure 1. Selected areas (red polygons) for habitat improvement on the Lander Front Mule Deer Habitat Project.

- 450 acres of sagebrush mowed.
- Forage production across region was down about 65% from 2005.
- Mule deer projects were digitized and funding requested.
- Hansen Conservation Easement is still underway.
- 75 acres of sagebrush with the Lawson aerator and 390 acres with 20-foot rotary cutter.
- Range-pitted and seeded approximately 250 acres.
- Sunken trees in Boysen Reservoir and Ocean Lake enhance fish habitat.
- Fish entrainment in irrigation systems on WHMA's were investigated.
- Mapped the distribution of all native fish for Wyoming by 10 digit Hydrological Unit Codes for Western Native Fish Distribution Project.

Government Draw Mowing

In February, 390 acres of Wyoming big sage were mowed. NS 75 acres were treated with the Lawson aerator in Government Draw, south of Hudson, WY to improve sage grouse habitat (Figure 2). Even with the drought, regrowth was exceptional with remaining live branches having 3-4 inches of leader growth (Figure 3). Plants outside the treatment area averaged 1/4-1/2 inch growth. Grass and forb regeneration was also good. An additional mowing will be completed in February 2007.



Figure 2. Mowing sagebrush in Government Draw.



Figure 3. Three to four inch leader growth on surviving stems of Wyoming big sage after mowing treatment.

Boysen Reservoir Fish Habitat Enhancement Project

To attract crappie for the purpose of enhancing fishing opportunities at Boysen Reservoir, fisheries biologists are sinking trees in the bays just north of Tough Creek (Figure 4). Black crappies prefer habitat that provides 50% to 90% cover. This year we'll be working approximately two weeks collecting trees and brush, forming concrete weights, and sinking trees. We sank 21 trees in 2005 and 26 trees in 2006. Members from the North Platte Walleyes Unlimited club (NPWU) from Casper, have provided support. The NPWU provided \$2,800 for materials required for this year's work.

Information for the NPWU is located on the web at <http://www.npwalleyes.com/>. We'll be evaluating the habitat structures in 2007 to determine if fish inhabit them.



Figure 4. Tree structures placed in Boysen Reservoir for fish habitat.

Ocean Lake Fish Habitat Enhancement Project

On February 11, 2006, assistance was provided to a group of sportsmen from Riverton for the placement of approximately 225 discarded Christmas trees on the ice at Ocean Lake (Figure 5). The goal of 500 trees was not met due to miscommunication among the Riverton Solid Waste personnel that resulted in the chipping of collected trees just prior to the project date. The trees are placed in groups on the ice and wired to 6-inch diameter by 12-inch long concrete cylinders. At ice-off, the trees sink to the bottom where they will hopefully enhance fish habitat and encourage stabilization of lake sediments. This annual activity started in 1990.



Figure 5. Picture of the “Crew” Installing Trees on Ocean Lake.

Native Fish Mapping

The Aquatic Habitat Biologist completed GIS map of the distribution of all native fish for Wyoming by 10 digit Hydrological Unit Codes for Western Native Fish Distribution Project.

WILDLIFE HABITAT MANAGEMENT AREAS

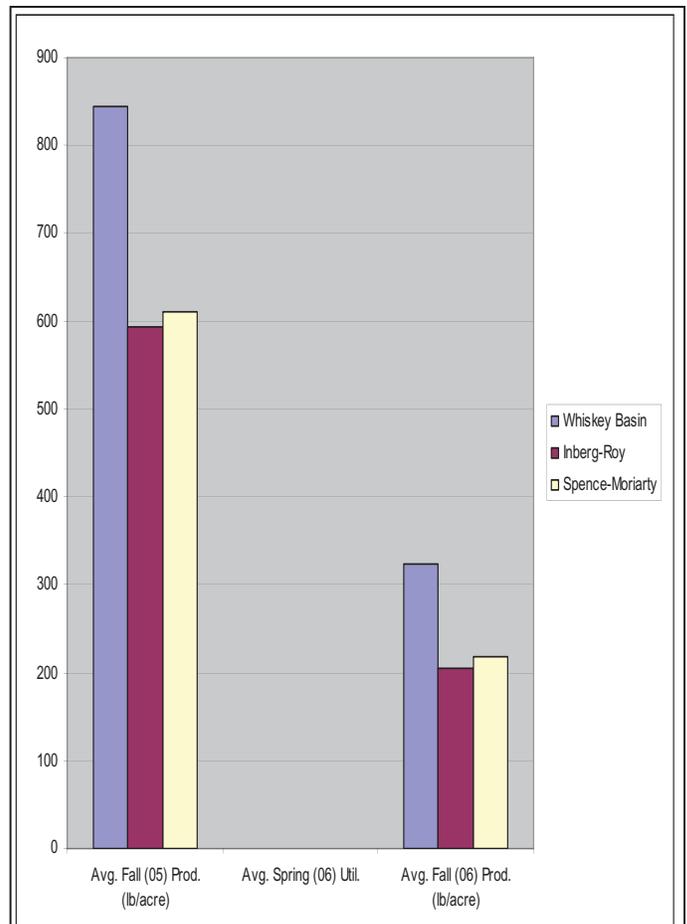
Whiskey Basin, Inberg/Roy, and Spence/Moriarty WHMAs Production Sampling

Forage production and utilization information was collected on the Whiskey Basin, Inberg-Roy and Spence-Moriarty WHMAs. Table 1 contains the results of the sampling. Production declined about 65% from 2005 across the region with similar results in these WHMAs.

Whiskey Basin Bighorn Sheep

Planning continued for the range pitting project on Whiskey Basin WHMA. Due to changes in personnel, pitting was delayed from 2006 and will occur in spring 2007. An archeologist was contracted to complete the required survey prior to pitting and found very little in the way of artifacts. Her conclusion was that there was no archeological reason to suspend the pitting. The State Historical Preservation Office has not given its final approval.

Table 1. 2005-2006 Forage production and utilization on Whiskey Basin, Inberg/Roy and Spence/Moriarty WHMAs.



Bear Creek and Wiggins Fish Entrainment on Inberg/Roy and Spence/Moriarity WHMA's

Evaluated techniques to investigate fish loss to irrigation system on Inberg/Roy and Spence/Moriarity WHMAs. (Figure 6). A trap, with wings constructed of block nets, checked daily, seemed to provide effective sampling on all the diversions from Bear Creek. Very few fish were entrained into the irrigation system during this study. The highest catch consisted of two Yellowstone cutthroat trout (YSC) in a twelve-hour period. This project was started in July after high water, so there may be more fish loss during the high, early-spring flows. Once the stream flows decrease and stream temperature becomes higher, the cutthroat appear to move less. During September, about half of the trapping effort was shifted from the irrigation canals to Bear Creek. No fish were caught, indicating little or no movement within the stream.

Since very few fish were being trapped in Bear Creek, the traps were set in the Wiggins Fork Ditch. More fish were caught, with 4 to 6 mountain whitefish (MWF) in 12-hour periods. At one point, the irrigation diversion was changed to divert more water down the ditch, which overwhelmed the trap system. During the next 12 hours, after the diversion was adjusted, over 40 MWF were caught before the trap failed.

The diversions in the East Fork Drainage were toured with the USFWS to monitor their condition and functionality. One landowner still needs to be contacted for permission before this project can be completed. This information will be used to prioritize cooperative efforts to modify the irrigation diversions to limit fish loss. The diversion on East Fork diverted the entire East Fork during the months of August and early September. The lack of water in the East Fork is diverted above the confluence with Bear Creek.

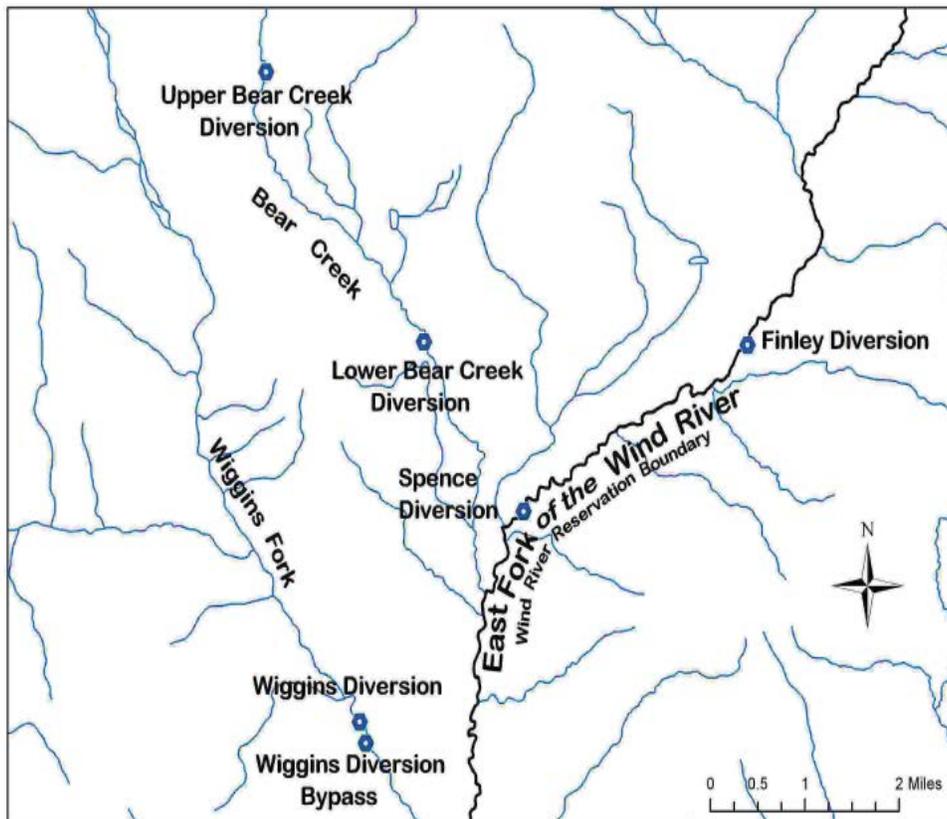


Figure 6. Locations of diversions investigated.

Spence/Moriarity WHMA

Habitat & Access Development Crew personnel range-pitted (Figure 7 and 8) and seeded approximately 250 acres of former meadows with an upland seed mix. Another 200 acres were pitted on adjacent meadows. Fremont County Weed & Pest provided the seed through grant monies. The seeding and pitting combined with herbicide applications was an effort to improve water retention, help grasses reestablish, and will help reduce noxious weed densities on the former meadow areas.



Figure 7. Range-pitting Spence/Moriarity WHMA.



Figure 8. Range-pitted meadows Spence/Moriarity WHMA.

Red Canyon WHMA

Lander Habitat & Access personnel replaced flood irrigation ditches with gated pipe on the Red Canyon meadows (Figures 9 and 10). This project was implemented to more evenly and efficiently distribute the limited quantity of water used to irrigate these meadows.



Figures 9. Flood irrigation ditches Red Canyon Meaows.



Figures 10. Gated pipe on Red Canyon Meaows.

LARAMIE REGION

HABITAT PROJECTS

Summary of Laramie Region Mule Deer Habitat Monitoring and Management

The estimated 92,000 mule deer in the Laramie Region have been classified to five herd units (HUs): Goshen Rim, Laramie Peak, Sheep Mountain, Shirley Mountain and Platte Valley. For management purposes, these populations have been further divided into 22 hunt areas.

Intensive management of all seasonal mule deer habitats in this broad area is not possible with the current staffing and consequently work efforts have been directed to priority areas. Preliminary ocular examinations of mule deer seasonal habitats indicated that many crucial shrub winter ranges in the region were in poor condition and were the habitat type most likely to be effecting mule deer survival and productivity. Therefore, these habitats have become the focus of the majority of the mule deer related monitoring efforts in the Laramie Region. Mule deer shrub winter ranges in the Laramie Region are generally comprised of mountain big sagebrush, antelope bitterbrush, true mountain mahogany and skunkbush sumac with incidental occurrences of other forage species such as Saskatoon serviceberry and waxed current. These species can be found alone or in combination as dictated by environmental conditions such as soil type, elevation and aspect.

In 2000 a region wide mule deer winter range-monitoring program was begun. Currently thirty-five monitoring stations have been established on mule deer shrub winter ranges across the region. The monitoring stations are installed at sites that appear to represent the habitat types and conditions of the larger winter range complexes of the surrounding area. A wide variety of biological and physical baseline data is gathered at these stations and pertinent information shared with population managers to aid in herd management decisions. Short-term changes in these shrub communities are monitored with annual production and utilization surveys. Trend surveys, potentially involving all or the original survey techniques, are scheduled once a site has been in existence for over 5 years. These surveys will be used to determine how the communities are responding to recent climate conditions and population management.

Summer Range Evaluations

Laramie Region personnel conduct indirect assessments of the quality and quantity of summer and transition range forage conditions by examining fat deposition and overall body condition of mule deer observed at hunter check stations. Body condition scores in the Laramie Region, even during periods of low precipitation, have remained high enough to allay any fears that summer range conditions are affecting mule deer productivity or winter range survival.

Direct qualitative (ocular) evaluations of mule deer summer range conditions were initiated in 2004. These evaluations are designed to allow the observer an opportunity to locate obvious habitat degradation, and if necessary, initiate specific monitoring to provide the information needed to direct management changes. To date the Shirley Mountains, the southern end of the Laramie Range (south of Highway 34) and parts of the northern end of the Snowy Range have been examined.

In the Snowy Range, conifer succession appears to be occurring in many of the older parks and meadows. A case in point would be Stud Creek Meadows, which was a natural

- Multi-agency group established to address cheatgrass infestations 300 acres of cheatgrass treated.
- GIS cumulative impact tool developed.
- Project to improve aspen and meadows on 27,000 acres on Red Mountain.
- Plans developed to improve wildlife habitat on the 48,000 acre Carlin Ranch.
- Production and utilization at 23 of 55 shrub winter range transects Drought has caused production to decrease and utilization to increase.
- Migration corridor plans for the Douglas Creek bighorn sheep herd.
- 300 acres RX burn on the Springer WHMA.
- Past habitat structures in Hog Park Ck and East Fork Encampment River are slated for maintenance.

opening for decades and is now a stand of 10 to 15 year old lodgepole pine. Sawmill and Stanley Parks are also experiencing conifer encroachment, but at a slower pace. Loss of soil moisture as a result of drought and/or soil compaction caused by livestock grazing may be providing the conditions needed for conifer establishment in these historic forest openings. Any loss of these important habitats would have a significant effect on a variety of wildlife species, including mule deer, and consequently successional changes should be closely monitored and when possible, actions taken to reverse the trend.

Many of the parks, meadows and riparian systems observed in the 2005 examinations were being impacted by cattle grazing. The effects of livestock grazing were often compounded by additional impacts from elk and moose. Trailing and heavy use of willows and herbaceous vegetation was apparent in many drainages. Increases in the number of elk and moose need to be factored into the AUM calculations of the Forest Service to avoid further damaging vegetation in these forest openings. This years findings will be discussed with appropriate Forest Service officials to determine if management changes can be implemented to decrease the impacts of ungulate use and successional changes on these montane parks and meadows.

Another striking change observed during summer range evaluations was the increasing spread of bark beetle infestations. Beetle infestations were found primarily in limber and lodgepole pine stands and were occurring in all mountain ranges in the region. Many infestations are extensive enough to create some of the more beneficial effects to understory vegetation found in the aftermath of prescribed and natural fires (e.g. increased production of understory herbaceous vegetation as a result of reduced competition for nutrients, moisture and sunlight). Beetle infestations are natural processes that create forest openings without the anthropogenic damage normally associated with logging or the invasive control tactics needed during prescribed and natural burns. As aggressive fire control programs, instituted by the federal land management agencies, continue to eliminate the beneficial effects once realized from natural fire, it may become necessary to consider natural events such as beetle infestations as an acceptable substitute to burning.

Beetle infestation may also serve to mitigate another serious problem occurring on many areas of mule deer habitat. Thousands of acres of aspens in the Laramie Region are being lost to conifer encroachment, primarily as a result of fire suppression. The use of prescribed or prescribed natural ignition fire is generally not an acceptable means of recovering these stands as most of the larger communities occur at the edge of very large contiguous areas of conifer forest. Controlling an aspen burn in a clone that is immediately adjacent or intermixed with a large conifer stand is too difficult and dangerous and consequently many of these stands are being encroached out of existence. Beetle infestations could provide a means to “surgically” remove encroaching conifer without disturbing the aspen stand, allowing it to recover through natural regeneration. Insect infestations are generally maligned as indicators of poor forest health, however, it may be more appropriate to view infestations and their aftermath as just another natural successional process, no more esthetically offensive than burns or clear cuts and as beneficial to mule deer and other wildlife, and much less harmful to the land.

Winter Range Monitoring and Conditions

Historic and current over use of the forage shrubs by wild ungulates continues to be the primary cause for low production and poor health in many mule deer crucial shrub winter ranges in the Laramie Region. Drought continues to be a compounding factor or the direct cause for some of the loss in winter range shrub production and subsequent high use levels. Over use is not confined to particular habitat types, but is occurring in all winter range forage types and appears to simply be a function of high ungulate numbers as opposed to differential selection for topographic areas or particular forage species. The clubbed appearance of plants found on heavily used mule deer winter ranges indicates that numbers in those areas have been high for many years.

- Sediment loading from the Salt River watershed is being addressed with better land management practices.
- Laramie River Stream restoration in the greenbelt area being discussed with City of Laramie.
- WHAM surveys completed on upper Crow Creek in the Pole Mtn. area.
- Horneyhead chub (SGCN 1 species) documented in the Laramie River on the Laramie Peak WHMA.

Often a key indicator of declining habitat condition is a long-term decrease in fawn production. These data have not been compiled for the Laramie Region, however, it has been noted that mule deer population recovery throughout the Region following the somewhat harsh winter of 1992/93 has been extremely slow and in some cases is still taking place. The indication from this trend is that winter range fawn mortality has been high and/or birth rates low despite the fact that the area has been in a prolonged period of mild winters.

Although livestock occasionally contribute to the browse removal in these large shrub stands, fecal analysis has not shown shrub use by domestic animals to be a significant factor in overall utilization. Elk, and occasionally pronghorn, appear to be significant forage competitors on certain areas of mule deer winter range. In 2005 fecal samples were taken at select monitoring stations where it appeared other wild ungulates could be competing for forage on mule deer winter range. The results of this analysis was not available at the time of this report.

The only effective method to recover condition in these large shrub stands is to provide rest for the plants by reducing utilization and that can only be accomplished by reducing the size or changing the distribution of the herds. The Bureau of Land Management and the U.S Forest Service are using the poor condition in many of the sagebrush and mixed mountain shrub communities to justify vegetation treatments. However, the primary objective for the treatments often appears to be the attainment of federally mandated fuel reduction targets purported to be necessary to protect private property at the wildland/urban interface. Vegetation treatments can be beneficial in areas where plant regeneration is needed to overcome decadence in over mature stands, however, in many cases the declining condition of the vegetation to be treated is a function of over use by big game and removing any segment of the forage base only tends to exacerbate the existing problem. One of the most common shrubs on mule deer winter range is mountain big sagebrush, occurring alone or in combination with antelope bitterbrush. Fire kills mountain big sagebrush and releases understory herbaceous vegetation, which tend to out compete sagebrush seedlings. The result is the creation of a grassland area that will potentially benefit species such as elk, but may not return to the mixed mountain shrub stand needed by deer for decades. During that time the deer herd is forced to put even heavier pressure on the remaining habitat or use marginal areas adjacent to the primary winter range. If the wintering herd is not able to find adequate forage in the surrounding area it will be forced to seek other winter range or starve. When considering treatments in mule deer winter range, managers need to ensure that they are not trying to use fire to correct a problem that is being created by over population of wild ungulates. Before a decision to treat is made, managers need to know that adequate forage will remain to support the existing herd. If the treatment justification is faulty or if the loss of forage is going to create unacceptable increases in use on remaining plants or a harmful decrease in winter range forage availability, the proposal should be rejected.

Some areas of over use involve relatively small segments of a herd which may have migrated onto a winter range from a broad area of summer range. Targeting the segment of the herd that needs to be reduced may be difficult or impossible if they are still with a larger herd on summer and transition range. One strategy for concentrating hunting pressure on these small herd segments would be to extend hunting seasons late enough to be able to remove animals once they have reached the winter range.

CWD is now found throughout the Laramie Region and may begin to effect mule deer productivity in some areas. It appears to be having a significant dampening effect on production in much of the Laramie Range. CWD may be the reason that habitat conditions in the Laramie Range are relatively good. The disease appears to have reduced mule deer numbers here to within some range of carrying capacity.

Natural population controls such as disease and harsh winters can be effective in controlling mule deer numbers, however, these events are not only unreliable but are also uncontrolled. Harvest remains the only proactive means of bringing herds into balance with their habitat. Convincing the public that increasing doe harvest to reduce population has not been an easy sell and more education is needed to inform our constituents of the need to maintain herds within the capability of the habitat. The first step is to formulate supportable population objectives that are based on range carrying capacity and follow that effort with the development of harvest

strategies that will allow managers to achieve those objectives. Once these scientifically based objectives and strategies have been developed, they can be taken to the public and supported based on sound range and wildlife management principals. Using so called social/political population objectives, while ignoring the vegetation and population data being collected by Department biologists will ensure that habitat conditions and mule deer fawn production continue to decline.

DISCUSSION BY HERD UNIT

Laramie Mountains HU

Laramie Mountains is the only HU with no monitoring stations showing reduced plant community health as a result of long-term heavy use and/or old age. The Laramie Range is the endemic area for chronic wasting disease and is experiencing an average 17.5% incidence of this fatal brain disease. The healthier condition of the shrub communities in this area may be the result of the negative effects chronic wasting disease has had on the productivity of the herd and the positive effects reduced herd numbers has had on plant utilization and subsequent condition of forage shrubs. The Laramie Mountain Herd Unit has been very slow to respond to efforts to increase the herd towards objective, despite the fact that mule deer habitat in the Laramie Range is in relatively good condition. Prescribed burns conducted by the Department have resulted in large increases in leader and protein production in true mountain mahogany on mule deer winter range in the Richeau Hills. These habitat improvements have resulted in a subsequent increase in mule deer use on the treated sites. The current population of this herd is estimated at 27,500 with an objective of 29,000. Fawn production since 1999 has been relatively stable, giving no indication that habitat conditions are effecting production negatively. Hunters and landowners have indicated that they would like the Department to increase the size of this herd. This is the only mule deer HU in the Laramie Region with habitat conditions that would justify continuing to increase mule deer numbers towards the objective. However, habitat conditions should be closely monitored as mule deer numbers increase to ensure that the population objective is realistic relative to the capability of the habitat.

Platte Valley HU

The Platte Valley HU is approximately 25% above the current population objective of 20,000 and appears to be above the carrying capacity of the winter range in many areas. The Platte Valley HU has the highest number of monitoring stations where long term heavy use has been found to be adversely effecting the structural characteristics of the plants and creating high levels of plant mortality and decadence. Problems of controlling this large deer herd have been exacerbated by seasonal migrations of mule deer from North Park, Colorado into the upper end of the Platte Valley in Wyoming. This migration often occurs before the Colorado mule deer hunting season, further reducing opportunities to control the herd before it moves into Wyoming. Areas of over use, however, are located throughout the Platte River Valley, extending as far north as Dana Ridge. Attempts to decrease the herd have met with differing opinions with certain segments of the public opposed to female harvest and others in favor. Fawn production has generally declined since 1999 and is approaching levels that could cause herd productivity to stagnate. This trend in declining fawn production may be a function of decreasing habitat condition. Recent mild open winters should have resulted in high birth rates, however, pregnant does on drought stressed and over utilized winter ranges may not be producing fawns or producing weak fawns that are unable to survive through their first year. The Department has cooperated with the Bureau of Land Management and U.S. Forest Service in planning and implementing several prescribed burns designed, in part, to improve mule deer habitat condition. These treatments, however, have only affected a relatively small area of this large HU.

The heavy use levels encountered on many of the mule deer winter ranges throughout the HU are evidence that numbers are too high. Reducing populations to the objective would be an advisable initial step. Further reductions may be necessary if winter range shrubs do not respond after the objective is achieved.

Shirley Mountains HU

Over use on mule deer winter range is occurring along the western and southern sides of the Shirley Mountains. Evidence of historic heavy use was found at the Medicine Bow River, Miracle Mile and Bow Arm monitoring stations. Recent surveys, however, show utilization levels are within suggested limits, which may be due to the fact that the Shirley Mountain herd is only slightly more than half of the suggested population objective. Mule deer numbers declined following the 1992/93 winter and have failed to rebound. Fawn production, which is at 67/100, is only marginally high enough to generate population increases. Landowners who control much of the hunting access have expressed strong resistance to harvesting females, however, based on current utilization surveys, it appears the reduction in the herd has been beneficial to the recovery of the shrub winter range and consequently promotion of a strong doe harvest is still advisable. The current population figure appears to be more in line with carrying capacity and may be a more appropriate population objective. Natural mortality has relieved managers of the need to face the controversies that could arise from trying to reduce the herd with large increases in permits or long season extensions. Managers should take advantage of this situation and begin to implement seasons that will maintain the herd at the current level while monitoring to see if reduced utilization results in a positive response in habitat condition and subsequent increase in fawn production.

Sheep Mountain HU

The Sheep Mountain herd is currently estimated at 10,600 animals with an objective of 15,000. Population managers report that concerns over the condition of the winter range is taking precedence over increasing the herd towards the objective. The two most heavily used areas in the Sheep Mountain HU, the Highway 230 corridor near Woods Landing and the 3rd Sand Creek area north of the town of Elk Mountain, are widely separated and are comprised of very dissimilar habitats. The mule deer habitat near Highway 230 is largely made up of a mix of mountain big sagebrush and antelope bitterbrush, while the 3rd Sand Creek area is a relatively monotypic stand of Wyoming big sagebrush. Department personnel have been cooperating with the U.S. Forest Service planning prescribed burns in the Fox Creek/Squirrel Creek area in an attempt to regenerate the aging shrub stands. The burns, however, will result in the elimination of the sagebrush community within the treated area, perhaps for decades, creating concerns that this long term loss of forage may displace deer into areas where they are not wanted, increase over use in the remaining areas, exacerbate forage shortages during a severe winter or some combination of all three scenarios. The most logical approach to the over use situation would be to reduce the number of deer on the over used segment of winter range, but it can be difficult to target the animals that winter in this area as many of these deer are dispersed across a large area of the Snowy Range during much of the hunting season. One option may be to design a harvest strategy that allows a late season hunt in the area where excessive use is occurring. Maintaining the population near the current levels and not attempting to achieve the objective would be advisable. Forage production in the area where prescribed burns have been conducted will be decreased for the foreseeable future, which may make increasing deer numbers very difficult and potentially very damaging to regenerating plants at the treatment sites. Managing the deer on 3rd Sand Creek is complicated by the fact the deer are sharing their winter range with portions of the Medicine Bow pronghorn herd. The Medicine Bow herd is well above carrying capacity in many areas and may be responsible for most of the sagebrush utilization on the mule deer winter range. Further observations of winter use should be conducted to determine whether pronghorn harvest could be used to improve the mule deer winter habitat.

Goshen Rim HU

The only observed over utilization on shrub winter range within the Goshen Rim HU was found at the Goshen Rim monitoring station (Figure 1). The Goshen Rim herd was projected to reach 19,500 animals in 2006, 6000 below the objective of 25,000. Landowners and sportsman are asking for more deer, however, habitat conditions do not indicate that population increases at this time can be justified. Access in this predominantly private land HU is becoming increasingly more restricted, limiting or negating opportunities for harvest and population management. The dominant shrub on most winter ranges in this HU is true mountain mahogany, often with significant inclusions of skunkbush sumac. True mountain mahogany loses productivity and nutrient value as it matures and according to the literature tends to become primarily a summer and transitional range

forage species with most browse use by mule deer confined to the leaf matter. This appears to be the situation in the Goshen Rim HU where leader production, forage nutrient value and plant use has been shown to be very low. Skunkbush sumac and other species that occur incidentally in and around the mahogany stands (e.g. rabbitbrush and silver sagebrush) appear to be the primary forage shrubs in many of these areas and probably should receive increased monitoring attention. Department led prescribed burns in mahogany communities have produced good results relative to leader production and nutrient outputs and appear to produce a short term recovery of the winter range potential of these stands. However, options for treatments in the Goshen Rim area are limited due to factors such as soils and the presence of cheatgrass. This herd is largely supported and dependent on agricultural crops. This relatively constant food source allows this population to maintain better fawn production and winter range survival. Fawn production since 1999, with the exception of a spike in 2003, appears to be declining and should be monitored as a potential indicator of a change in forage availability and habitat condition. Although population management opportunities are very limited in this HU, habitat conditions indicate a need to maintain this herd at or below the objective.

Sage Creek Watershed

Sage Creek is an aquatic habitat priority watershed and is listed on the Wyoming Department of Environmental Quality's 303(d) list. It is considered a significant contributor of sediment to the North Platte River. The Saratoga-Encampment-Rawlins Conservation District supervisor, Mr. Glen Leavengood, provided a tour of the habitat improvements that have been conducted in cooperation with the BLM and private landowners in the watershed to address the sediment problems. Grazing management, rebuilding irrigation structures, fencing, and spring developments were some of the best management practices that were implemented across the watershed. Visually, stream and riparian habitat appeared to be improving. Sage Creek in Section 1 has an incised channel that seems to be evolving from an F channel into a more stable C channel in some locations. The development of riparian vegetation, i.e. willows, is helping to stabilize streambanks. Additionally, beaver activity has increased within the watershed.

Production and Utilization Surveys

Again this year game wardens and population biologists assisted with collecting production and utilization information at approximately 23 of the Region's 55 pronghorn and mule deer shrub winter range monitoring stations. The remaining 32 transects were read by the regional habitat biologist. Once again persistent drought conditions resulted in a general decline in leader production and a corresponding increase in shrub utilization.

Hog Park and East Fork Encampment Habitat Enhancement Structures

Medicine Bow-Routt National Forest Service and WGFD personnel evaluated past habitat enhancement projects in Hog Park Creek and East Fork Encampment River in early fall 2006. The USFS is proposing some maintenance on these projects. In

Hog Park Creek, streamflow is cutting around some of the rock structures and increased erosion is occurring (Figure 1). In the East Fork Encampment River, visible fenceposts and cables are creating a safety hazard. Also, little to no willow recruitment was observed in the project area of East Fork Encampment River, suggesting grazing management needs to be addressed. It is anticipated that maintenance work will be conducted within the next few years to address some of the issues.



Figure 1. Erosion in Hog Park Creek below Hog Park Reservoir associated with past instream enhancement project.

Large Scale Wildfires

Several large-scale wildfires (lightning or human-caused) burned in southeast Wyoming in Summer 2006, including the Chicago Mine Fire and Tracer Fire at Guernsey, and Halleck Canyon Fire and Trailer Fire west of Wheatland (Figure 2). These fires resulted in over 60,000 acres being blackened. Ponderosa pine / juniper stands were burned near Guernsey, and mixed mountain shrub habitats were blackened west of Wheatland. Assessments of these fires and rehabilitation recommendations were prepared for landowner and land management agencies.



Figure 2. Trailer Fire, 8,500 acre wildfire in August 2006

HABITAT EXTENSION SERVICES

Habitat Enhancements

In 2006, over 50 individual landowner contacts / field visits were made. Technical and cost share assistance was provided to private landowners who implemented projects including: guzzlers (Figure 3) noxious weed management, seedling tree plantings, CRP Dense Nesting Cover enhancements, livestock / wildlife water developments, cropland stubble management, prescribed burning in mountain shrub (Figure 4 and 5) and CRP grassland habitats, range inventories / rotational grazing system plans and brush mower treatments (Figure 6).



Figure 3. Guzzlers shipment arriving in Wheatland.



Figure 4. Prescribed fire in Richeau Hills, Spring 2006.



Figure 5. True mountain mahogany resprouting post-prescribed fire.



Figure 6. Brush mower treatments in mixed shrub habitats.

In 2006, continued extreme drought conditions, summer wildfires, change in federal Farm Bill programs and policy (i.e. CRP management), and lack of funding were all contributing factors affecting overall acres treated, number of projects implemented, and landowner interest and involvement in on-the-ground habitat enhancements.

The Habitat Extension Biologist assisted with statewide efforts to complete and distribute 10 educational roadside signs explaining the benefits of fire, wild and prescribed, to wildlife. Two of those signs were erected in the Laramie Range, describing the habitat benefits of the Reese Fire of 2002 (Figure 7).



Figure 7. Fire I&E Sign installed on Palmer Canyon Road west of Wheatland.

Laramie River Greenbelt Enhancement

Recently, \$18,000 was donated to WGFD to address aquatic habitat issues in the upper Laramie River. Several habitat concerns have been identified in the Laramie River through Laramie including bank erosion, low summer flows, and lack of deep pools and cover. The Laramie River through town supports a wild brown trout fishery and several native, non-game species including brassy minnow and common shiner. During recent spring run-off events, bank erosion has become increasingly evident and threatens portions of the greenbelt pathway (Figure 8). In 2006, discussions began with the City of Laramie to use the money to develop a channel stabilization and fish habitat enhancement project. WGFD personnel will continue to work closely with the city to develop this project and to seek additional funding sources for project implementation.

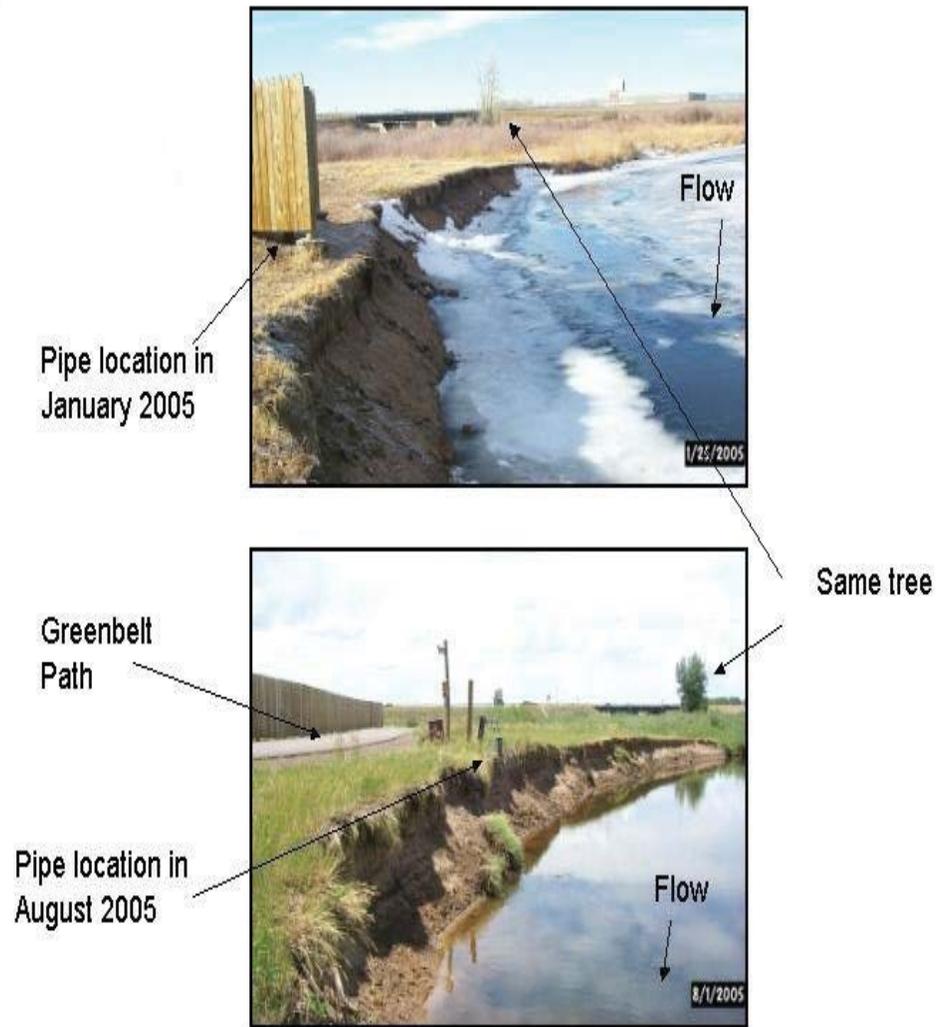


Figure 8. Before and after spring run-off bank erosion of Laramie River Greenbelt Area.

South French Creek Bighorn Sheep Migration Corridor

In 2006 initial investigations were begun to determine the feasibility of creating a migration corridor that would allow the Douglas Creek bighorn sheep herd to move from their current yearlong range along the North Platte River to alpine areas on and near Medicine Bow Peak. The plan will involve the use of silvicultural treatments to create forest openings between existing areas of rocky escape cover along a route that will skirt the north side of South French Creek (Figure 9).

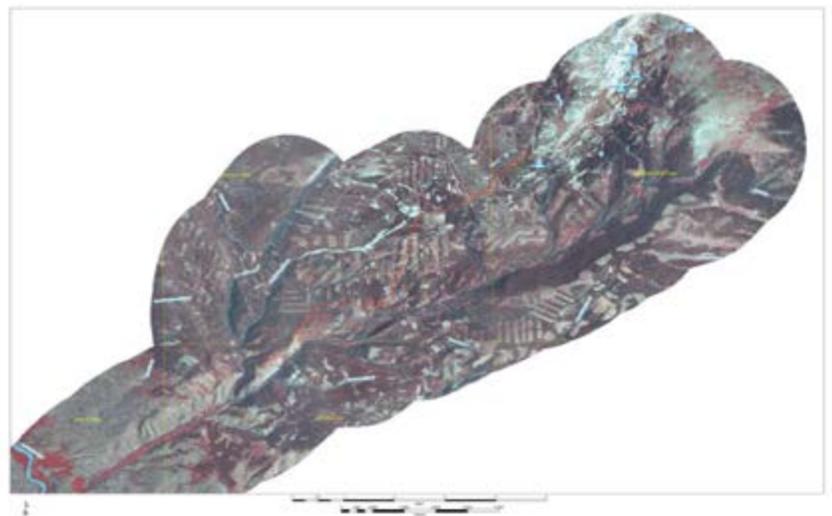


Figure 9. Proposed location of the South French Creek bighorn sheep migration corridor.

The Douglas Creek herd has been plagued with disease and consistently poor lamb production that researchers have tied to the lack of adequate forage quantity and quality.

The entire area being examined for corridor development is in various stages of regeneration following past timbering activities and consequently already contains the necessary road network to support the proposed logging operation. Numerous large rock piles are scattered at intervals throughout the proposed treatment area, providing the escape cover required by bighorns. USFS regulations allow the creation of this type of large opening when, as in this case, it can be shown that the activity will result in significant wildlife or natural resource benefits. A detailed proposal describing the project is being developed and will be submitted to the Saratoga Office of the USFS in late spring of 2007.

Watershed Habitat Assessment Method (WHAM) on Pole Mountain and Beaver Pond Surveys

WHAM Level-1 assessments and beaver pond surveys were continued in the Upper Crow Creek watershed in the Pole Mountain area of the Medicine Bow National Forest (Figure 10). With persisting drought conditions, the most active beaver pond habitat appeared to be downstream of the Cheyenne Stage II water release point in Middle Crow Creek, where there is a consistent flow of water. Above this point, drought impacts were apparent with abandoned beaver ponds and intermittent flow. Ungulate impacts were also observed including bank erosion, hummocking, and heavy willow utilization. An administrative report will be written in 2007 summarizing the WHAM Level-1 assessments conducted throughout the Pole Mountain Area. Opportunities to work with the USFS on habitat issues, including the exclosures in South Fork Middle Crow Creek will be addressed.



Figure 10. Beaver activity in the Middle Crow Creek watershed within the Pole Mountain Area.

Additionally, members of the Travelle Chapter of the Izaak Walton League of America collected beaver pond data in the South Branch North Fork Crow Creek. In 2007 they will repeat their survey of the North Branch of Middle Lodgepole Creek that they conducted in 2003.

Red Mountain Ranch Habitat improvement Program

The Red Mountain project is located in the foothills of the Snowy Range approximately 25 miles southwest of Laramie (Figure 11). It straddles the Colorado-Wyoming border and is managed by BLM offices from both states. Department personnel began working in the area in 2004 and joined with BLM, NRCS and conservation district representatives who initiated work in the allotment around the same time period. Department personnel have been involved in all aspects of the project, including document development and project planning. Habitat



Figure 11. Red Mountain reservoir dam construction as it nears completion.

treatments will include livestock management improvements, meadow restorations, water developments, sagebrush chopping and aspen rejuvenation. Although the various treatments are expected to benefit livestock, elk and mule deer, the primary focus is the recovery of a struggling sage grouse population. In 2006 Water for Wildlife and conservation district funds were used to conduct major repairs on the Red Mountain Reservoir. NRCS and conservation district installed pipe lines and six tire tanks to improve water distribution and reduce use on important meadow complexes. In 2006 proposals were submitted to the Sage Grouse Conservation Fund, Wyoming Game and Fish Trust Fund and the Wildlife and Natural Resource Trust Fund to acquire the money needed to conduct 150 acres of sagebrush chopping, fence three meadows away from livestock and remove encroaching limber pines from important sagebrush stands.

Carlin Ranch Habitat Improvement Program

One of the owners of the Carlin Ranch contacted Department personnel and expressed interest in using habitat treatments to improve his land for wildlife and livestock. The ranch is located six miles east and north of the town of Medicine Bow and encompasses approximately 75 square miles of important habitat for mule deer, pronghorn and sage grouse. Department personnel joined with conservation district and NRCS personnel to develop a ranch management plan that will focus on improving wildlife habitat by using water developments and fencing to improve the existing livestock grazing system.

Current drought conditions are complicating plans to conduct range rehabilitations and planting, however, some of the water developments and fencing designed to improve livestock distribution and reduce riparian grazing pressure are expected to be implemented in 2007.

Southeast Wyoming Shrubland Cumulative Impacts Analysis

The Southeast Wyoming Cumulative Impacts Analysis (SWCIA) was a two-year GIS based project completed in September of 2004. The primary focus of the project was to employ satellite image interpretation to identify current and historic impacts to important winter range shrublands. The information was to be used in evaluating the condition of existing shrublands and the effects newly proposed projects might have in areas where other natural and anthropogenic impacts had occurred. Unfortunately, many of the impacts could not be detected by examining the satellite images. The only other option for obtaining the necessary information was to conduct a search of the computer and hard copy files of the land management agencies. In July of 2005 a technician was hired and directed to contact the BLM, USFS and NRCS offices in the project area and locate and compile all available records and add this information to the original GIS. This process was completed in May of 2006. The technician had good success at the USFS and BLM offices and was able to compile a relatively comprehensive record of shrubland impacts dating back as far as the 1970s. However, private lands rights issues kept her from obtaining treatment records from the files of the NRCS.

A contract to maintain and manage the GIS has been established with the Wyoming Geographic Information Science Center (WyGISC). WyGISC personnel are in the process of completing a tool that will allow cooperating agencies to access the data using GIS to gain current impact information as well as input new project data.

Southeast Wyoming Cheatgrass Partnership

This multi agency working group was formed in 2004 and officially adopted the name Southeast Wyoming Cheatgrass Partnership early in 2005. Current membership includes representatives from the WGFD, USFS, BLM, University of Wyoming, Colorado State University, NRCS, Albany and Carbon Count Weed and Pest Districts, Wyoming Department of Agriculture and the Medicine Bow, Laramie Rivers and the Saratoga, Encampment and Rawlins conservation districts. The primary mission of the partnership is to locate, map and treat cheatgrass infestations in Laramie, Goshen, Platte, Albany and Carbon counties. In 2006 researchers from CSU became involved in Partnership activities and will begin conducting a variety of research and monitoring activities in conjunction with the treatments being conducted by the Partnership. The first Partnership treatments were conducted on USFS land in the fall of 2006. A 300-acre cheatgrass infestation was treated with ground applied plateau herbicide. The project was funded by WGFD, USFS and the Laramie Rivers

Conservation District.

Current prohibitions on aerial application of cheatgrass effective herbicides on USFS and BLM lands has meant that many infestations in steep, rocky terrain can not be treated because these areas are inaccessible to ground application equipment. The BLM is circulating an EIS needed to allow aerial cheatgrass control following comments expects the document to be ratified by the summer of 2007. The USFS is only in the initial stages of formulating a plan, but expects that the use of existing related documents will speed the development process. Until the federal agencies obtain the necessary authorizations for aerial application, much of the control efforts will fall to private landowners and the county weed and pest districts.

WILDLIFE HABITAT MANAGEMENT AREAS

Springer Prescribed Burns

Approximately 300 acres of decadent cover plantings were prescribe burned to increase plant productivity and vigor. The burns are part of the routine maintenance of these cultivated grass stands and are conducted annually on various areas of the WHMA to ensure that the fields continue to provide effective nesting, thermal and harvest cover. The burns generally take place between the first of January and the end of March, dependent on moisture conditions.

Hornyhead Chub Natural Barrier on Laramie Peak WHMA

With assistance from the Rawlins BLM fisheries crew, investigations of a natural barrier for the upstream distribution of hornyhead chub, SGCN 1, in the Laramie River on the Laramie Peak WHMA was initiated. A potential natural boulder barrier was identified within the narrow, steep canyon, but additional work is needed to confirm the upstream distribution of this species in the Laramie River for any future management activities on the WHMA (Figure 12). The Laramie River within the Laramie Peak WHMA is one of only two locations where hornyhead chub can be found in Wyoming. Hornyhead chub can also be found in portions of the North Laramie River in Platte County, but within the last two decades, no individuals have been surveyed in the lower portions of these streams. Surveys will be conducted in 2007 directly above the potential barrier in order to document the presence/absence of this species.



Figure 12. Potential natural barrier for hornyhead chub in the Laramie River on the Laramie Peak WHMA.

Johnson Creek WHMA

The Habitat Extension Biologist continued to monitor cheatgrass control post-herbicide application (August 2002) on the Johnson Creek WHMA with assistance from Rawlins BLM personnel. Cheatgrass control tapered off significantly in 2006, with the invasive plant beginning to re-invade treatment sites. Native perennial vegetation is well established throughout the treatment sites, but stand longevity is threatened by re-invasion of cheatgrass and continued extreme drought conditions.

Wick WHMA

2006 was the fourth year of improvements to the hay meadow irrigation system on the Wick WHMA. The irrigation system was improved with the completion of the water diversion structure for the 206-acre Oleson and Wick hay meadow and installation of six rock sill structures in the Tom's and Upper 18 meadow ditch systems. The snow pack and spring runoff during 2006 was sufficient to irrigate the entire 751-acre hay meadow system twice this year. The State Engineers Office irrigation-mapping technician recorded this irrigated acreage; therefore the water rights usage for the hay meadows has been recorded for compliance with the Tri-state agreement for Wyoming, Colorado and Nebraska on the North Platte River. The fourth year of the noxious weed control plan included the contract herbicide application on 110 acres of meadows, ditches, roads and upland sites with the release of 2350 insects for biological control in riparian areas along Wagonhound Creek and Foote Creek (Figure 13).



Figure 13. Wick WHMA, black sagebrush herbicide treatment 1 year post-application.



Figure 14. Prescribed grazing on Wick WHMA meadows with Sims Cattle Company.

The fourth year of using an experimental cattle-grazing treatment on the hay meadows was performed during June. The high intensity short duration grazing plan used 302 cow/calf pairs to treat the vegetation on 380 acres of grass hay meadows (Figure 14). The Sims Cattle Company provided the personnel, livestock, electric fences, monitoring and herding of the cattle 24 hours per day during the twenty-day grazing treatment. The cattle are contained with electric fencing on treatment paddocks of twenty to eighty acres in size. The grazing effectiveness is monitored against predetermined goals. When the vegetative treatment goal is reached the cattle and fences are moved from paddock to paddock. The grazing treatment focus is to remove ground litter, old growth, and specific noxious weeds and to stimulate higher quality regrowth of standing forage for big game, particularly elk.

The Upper 18 and Wick meadows were also improved by interseeding eighty acres with a cool season grass, legume and forbs mix. The goal of the interseeding is to improve forage quality and production for wintering elk, and reduce the potential of noxious weed invasion on the hay meadows.

Annual Aquatic Habitat Workshop

The Laramie Aquatic Habitat Biologist hosted the annual aquatic habitat summer workshop. Workshop activities included a warmwater stream assessment field day on Poison Spider Creek in the Casper Region. The group was broken into teams to collect data and provide feedback on the process. Participants also toured three locations along the Laramie River for a potential habitat improvement project. Areas toured included the Jelm PAA, Monolith PAA, and Laramie River greenbelt area. Habitat issues and concerns were addressed at each location and project ideas were discussed. On the final day, South Fork Middle Crow Creek in the Pole Mountain area was visited. Six riparian exclosures were installed in the early 1980s for wildlife mitigation for Cheyenne Stage II water development. A constant water flow of approximately 2 cfs is supplied to this stream. Two exclosures were removed in 2005, prior to the grazing season. The group observed and discussed conditions within intact exclosures, removed exclosures, water gaps, and upland aspen habitats (Figures 15 and 16).



Figure 15. South Fork Middle Crow Creek flowing through one of the intact exclosures.



Figure 16. A headcut within a water gap on South Fork Middle Crow Creek between a downstream intact exclosure and upstream removed exclosure. The headcut started prior to the removal of the upstream exclosure.

PINEDALE REGION

HABITAT PROJECTS

Wyoming Range Front Aspen Treatments (WYFAT)

In 1990, the BLM completed a landscape survey along the eastern slopes of the Wyoming Range and concluded that 9,000 acres of aspen were in need of management. Specifically, the BLM found conifers were encroaching 3,000 acres of aspen that were in severe risk of being lost while an additional 6,000 acres of aspen were also at risk of dying due to old age and lack of disturbance. As a result, the WYFAT project was developed recently between BLM, RMEF, and WGFD to increase the health of aspen stands and adjacent vegetation communities for wildlife benefit (Figure 1).

On December 15, 2006, BLM and RMEF signed a stewardship contract to improve 9,000 acres of aspen over 10 years with use of mechanical methods and/or prescribed fire. The goals are to reduce conifer and sagebrush encroachment, increase stem density and forage production of aspen, diversify the vegetative composition in key areas, and reduce elk dependency on supplemental forage. Approximately 900 acres within the Maki and Red Canyon allotments have been scheduled for mechanical treatments in 2007 (Figure 2).

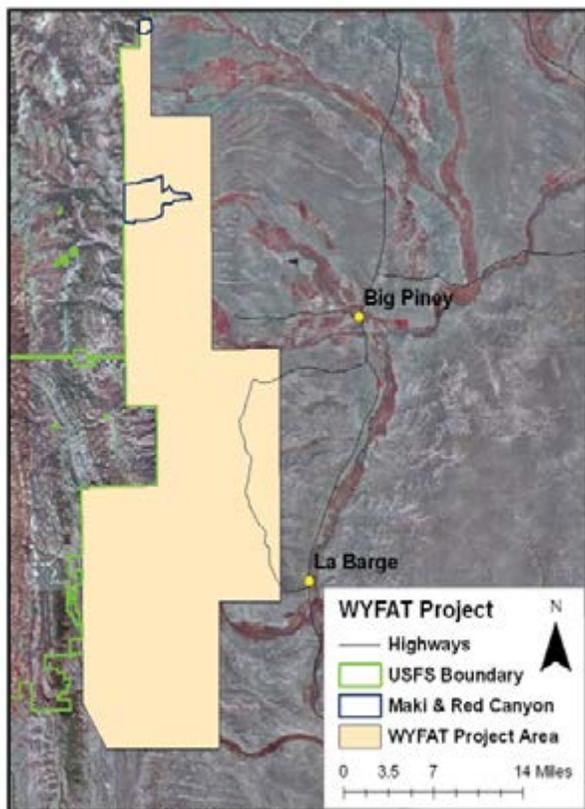


Figure 1. Map of the WYFAT project area and work sites for 2007.



Figure 2. Conifer encroachment of aspen stands in the Red Canyon allotment.

- 9 different treatments were applied to 30-acre plots.
- 1000 acres Monument Ridge RX Burn.
- 114 adult female elk were captured on Scab Creek, Soda Lake, and Bench Corral feedgrounds.
- Data from old habitat treatments can provide excellent information.
- JIO established in Pinedale.
- 300-acre treatment with the Lawson Aerator.
- Final phase of imagery project between BLM, WGFD, and the University of Wyoming Geographic Information Science Center was completed.
- WYFAT project was developed.
- WHAM surveys conducted in the Maki Creek drainage.

Maki Creek Aspen Regeneration

This project is in cooperation with the USFS and aims to improve the North Cottonwood grazing allotment by:

1. Enhancing aspen regeneration on 1,100 acres of aspen stands.
2. Increasing vigor and production of adjacent vegetation communities.
3. Reducing dependency of elk on Jewett feedground, and the risk of intraspecific transmission of brucellosis and CWD within elk on and adjacent to the feedground.

Fieldwork began in 2005 with the felling and limbing of approximately 100 acres of conifers that had encroached on the aspen. Funding was secured from WWNRT (\$60,000) and WGFD Trust Fund (\$25,000) in 2006 to treat another 1,000 acres in 2007 (Figure 3). A prescribed burn is planned to follow these mechanical treatments in spring of 2008 to remove standing and downed fuel and rejuvenate aspen. Pre-burn data of aspen was collected in 2006 to quantify regeneration, and browse use relative to distance from Jewett feedground (Table 1).



Figure 3. One year after conifer cutting.

Table 1. Aspen pre-treatment data within the Maki Creek project area. Aspen regeneration in these stands is low and very few plants are growing into the canopy.

Maki Creek Aspen Regeneration (N = 189, 1/100 ac plots)	
Height Class (ft)	Mean Relative %
0 to 1	17.8
1 to 3	64.5
3 to 6	15.4
6 to 10	1.4
>10	0.8

Monument Ridge Prescribed Burn

The Monument Ridge prescribed burn project comprises approximately 11,000 acres of mixed aspen-conifer and sagebrush vegetation types that are in late successional stages on the Bridger-Teton National Forest (BTNF). Monument Ridge provides important spring-summer forage and parturition habitat for mule deer, elk, moose, and several other wildlife species. Burning will improve the vigor and production of these vegetative communities to maintain healthy wildlife that use this area.

The first of six units (approx. 1000 acres) was burned in late September of 2006, which was primarily sagebrush with a few stringers of aspen-conifer mix throughout. Cattle grazing operations were temporarily modified to rest this burn unit in 2005 to increase fine fuels for carrying fire and two more years post-burn to allow for rest. A good mosaic was accomplished in the sagebrush areas, but moisture reduced the fire's effectiveness on the aspen stands (Figure 4). Burn severity monitoring was conducted a couple weeks after implementation and post-burn monitoring will be completed in the summer of 2007.



Figure 4. The prescribed burn created a mosaic pattern in the sagebrush community.

Cottonwood Watershed Projects

Triple Peak Forage Reserve Project

A grazing permittee in the Cottonwood, North Piney and Greys River watersheds has agreed to waive his grazing permits on 5 allotments for 2,726 AUMs of domestic sheep use back to the BTNF. Department personnel provided information to Trout Unlimited, other NGOs, the USFS, and the grazing permittee on the importance of these watersheds for aquatic and terrestrial wildlife. Cooperative efforts with the NGOs to raise funding for this project and coordination with the USFS are on-going. The project will provide long-term protection to important native cutthroat habitat, as well as habitat for numerous other wildlife species. Extensive coordination efforts resulted in a management agreement mutually acceptable to the USFS, permittee, and NGOs.

The down payment of \$104,952, which is one-half of the total cost, was made in September 2006. Balance of payment and project completion are anticipated in June 2007, pending available funding. USFS will then close the 5,115 acre cutthroat trout area (North Piney Lake and Lake Creek drainage) to livestock grazing and place about 53,560 acres into Emergency Forage Reserve (i.e. grassbank) status, with strict language/terms/conditions under which this portion of the allotment complex could be grazed by domestic sheep. The acres below 9,700 feet may be available by 2008 for grazing 3 out of every 10 years pending data collection to evaluate the existing vegetative condition and ground cover. To complete the action the USFS will adopt a management plan for the forage reserve. The final vegetative criteria and monitoring methods, time frames, and locations will be cooperatively developed with TU, WGFD, the USFS, and other project proponents once the final payment is made.

Snake River cutthroat trout (SRC) habitat will be improved in 63 stream miles of portions of the Greys River drainage within the Snake River Watershed. Colorado River Cutthroat (CRC) will benefit from improved conditions in 99 miles of historical stream habitat.

Maki Creek Watershed WHAM surveys and Aspen Treatment Projects

The Aquatic Habitat Biologist coordinated with BFH personnel, USFS, and the Regional Fisheries Biologist to assess watershed and aspen community conditions in portions of this drainage. WHAM assessments and evaluations of specific aspen stands were conducted in July. Examples of several key aspen stands in need of regeneration and important from a watershed health perspective were delineated on a map and presented to the USFS for consideration to add to their treatment plans (Figure 5).



Figure 5. Conifer encroached aspen stand adjacent to Maki Creek – high priority for regeneration.

LaBarge Creek Watershed Projects

Nameless Creek Riparian Exclosure

Maintenance needs were completed on both the upper and lower portions of the Nameless Creek exclosure in June and July. Once again, the need for long-term maintenance, reconstruction, or improved management was discussed with the USFS. A meeting and site visit to evaluate this situation and other management concerns in this watershed was scheduled in June. However, the USFS cancelled and a follow up meeting was never rescheduled.

Presentation of WHAM method and LaBarge Example at AFS Meeting

The Aquatic Habitat Biologist prepared and presented an overview of the WHAM assessment method with examples of results from the 2000-2002 surveys in the LaBarge watershed at CO/WY AFS Meeting in March.

LaBarge Watershed and Habitat Report

Level 1 WHAM data for LaBarge tributaries collected in 2001 and 2002 was manually summarized into a word document. This information was then summarized into a more brief report. Numerous USFS documents, including the current and original AMP, Landscape Area Assessments, and stream surveys were reviewed and various relevant information referenced in this report. Completion of this report is anticipated in June 2007.

Green River Corridor Projects

Jerry Moore Cooperative Habitat Projects

The Aquatic Habitat biologist continued to work closely with Moore, his consultant (John Dahlke), and lessee, to implement a successful grazing strategy on Moore's 120-acre riparian pasture in May. A stocking rate similar to 2005 had no noticeable impact on woody riparian vegetation. However, once again use by wildlife, presumably mostly moose, appeared very heavy. The cottonwood suckers in the four big game proof exclosures constructed in 2004 continued to show gains in height while unprotected suckers and seedlings remained suppressed from repeated browsing.

BLM / JIO Alkali Creek Watershed Assessment / Restoration Project

The BLM proposed a potential restoration / Jonah Field mitigation project on Alkali Creek. This small, warm-water stream flows into the Green River approximately 2 miles below its confluence with the New Fork River. Assuming good permittee support and cooperation the project area and allotment has potential to become a forage reserve. Potential benefits from restoration of the riparian habitats and watershed function are high.

40-Rod Creek – Daniel hatchery Project

In August a potential habitat improvement project on 40-Rod Creek above the Daniel Hatchery unit was evaluated with Hatchery and HAMS personnel.

Anselmi Property Project

A proposed habitat improvement project on Anselmi property located in the upper Green River (adjacent to the Warren Bridge PAA) was discussed with a consultant and local contractor, who had been contacted by the landowners. A letter of consent was sent to the COE regarding the Nationwide permit.

New Fork River Corridor Projects

Riparian Browse Use and Recruitment Monitoring

Ungulate use on aspen, cottonwood and willow inside and outside of big game and wildlife proof exclosures was measured again in May and June 2006. Results are being summarized and will be discussed with the landowner and the NRCS. Future management recommendations and browse use monitoring will be addressed at that time.

Wyoming 3 Bar Ranch Conservation and Enhancement Opportunity

Habitat improvement and conservation opportunities as well as fisheries management issues were discussed with a representative (Mr. John Bove) for the new owners of the former Pete Olsen (“3 Bar”) Ranch located at the confluence of the Green & New Fork Rivers. A follow up letter summarizing our discussions with Mr. Bove was prepared and sent to him in December. Grazing permits in the Blue Rim Desert and Mesa common Allotments are associated with this ranch. The concept of placing these AUMs into “forage reserve” status was discussed with Mr. Bove.

East Fork River (Wheeler Ranch) Habitat Enhancement Project

Riparian and fisheries habitat improvement opportunities on the Gosar Family’s “Wheeler Ranch” located on the East Fork River were evaluated and discussed with the landowners (Pete & Kevin Gosar) and Tom Wesche (HabiTech, Inc.). Mr. Wesche worked with Gosar’s to prepare a detailed project proposal and specific plans for various opportunities discussed on site with them in September. A letter of support for this project was prepared and sent to the ACOE.

Little Flattop Prescribed Burn

Approximately 945 acres of aspen and aspen-conifer were burned in May of 2006 on the BTNF14 miles north of Pinedale as a collaborative project between USFS and WGFD (Figure 6). Another 880 acres will be treated within the Wood Draw unit in the spring of 2007. This area provides parturition habitat and summer range for elk, mule deer, moose, as well as habitat for grouse and other bird species (Figure 7).



Figure 6. Fire burns through aspen in the Willow Rim burn unit in 2006.

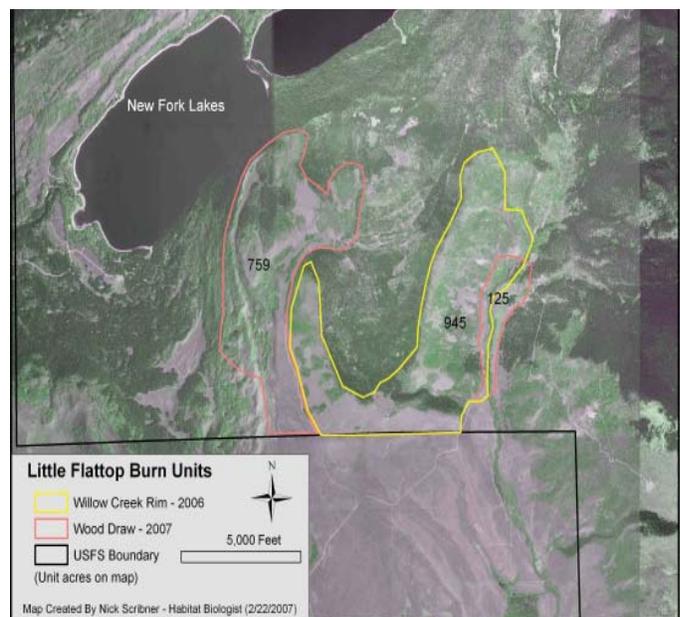


Figure 7. Map of the Little Flattop project area.

Mesa Sagebrush Enhancement Project

A cooperative research/mitigation project with BLM and Questar that began in 2005, continued in 2006 with additional data collection by a University of Idaho graduate student and the implementation phase. Goals for this project include increasing age class diversity of sagebrush, increase cover and production of existing perennial grass and forb species, and determine which treatment type is the most effective at producing such results in Wyoming big sagebrush communities.

In August and September, 9 different treatments were applied to 30-acre plots. The treatments included low mowing (6 in.), high mowing (12 in.), mowing with forb seeding, Lawson Aerator, Dixie harrow, chaining, light Spike 20P (0.1 lbs/ac), heavy Spike 20P (0.2 lbs/ac), and a prescribed burn (Figure 8). In 2007, each plot will be split in half and fenced to exclude cattle grazing, and then have post-treatment data collected by the graduate student. Monitoring will continue years 2, 3, 5, and 10 after the treatment.



Figure 8A. Lawson Aerator treatment.



Figure 8B. Before the aerator treatment (right side of picture), and immediately after (left side of picture).

Ryegrass Mowing Project

In partnership between the WGFD and BLM, approximately 1,100 acres of the Ryegrass Individual and James Ryegrass allotment complex (3,200 ac) are to be mowed from 2005-2009. The goal is to increase sagebrush age diversity and increase herbaceous production by mowing in a mosaic pattern to provide a variety of habitats for various needs of wildlife such as sage grouse, mule deer, antelope, elk, and other species. A total of 300 acres of sagebrush was mowed in 2005 by the BLM with another 400 acres planned for each 2007 and 2009. Each treatment will receive 2 years of rest post-treatment from cattle grazing. Data will be collected year 1, 2, and 5 post-treatment on both a control and treated plot to determine if objectives are being met. Several types of data were collected in 2005 (pre-treatment) and 2006 (1-yr post-treatment) from control and treatment sites and differences were observed (Figure 9). The percentage of mountain big sagebrush within various growth form categories was altered substantially by mowing; suggesting that mowing successfully altered the age diversity of sagebrush throughout the treatment area.

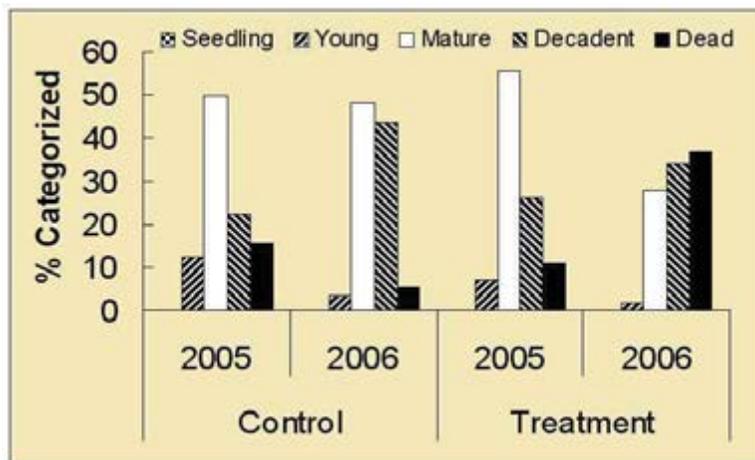


Figure 9. Percentage of mountain big sagebrush categorized on control and treatment sites in the Ryegrass Individual allotment.

Estimates of herbaceous production declined substantially on control and treatment sites in 2006, likely reflecting lack of significant precipitation during the growing season (Table 2). Species richness, particularly forbs, on both sites declined in 2006, and estimates of percent basal cover remained nearly constant with the exception of “litter” (increase) and “plant” (decrease), further emphasizing effects of drought.

Table 2. Estimates of herbaceous production (lb/ac) on control and mowed sites in the Ryegrass Individual allotment.

Year	Yr Post Trt	Production (lb/ac)			
		Mow		Control	
		Forb	Grass	Forb	Grass
2005	0	133.5	185.3	139.5	166.6
2006	1	45.9	70.9	43.4	101.5

Kemmerer BLM Resource Management Plan Revision

The BLM released a draft “Final Preferred Alternative” to the cooperating agencies in January. Numerous regional comments and recommendations pertaining to a wide variety of on-going concerns were prepared, consolidated, and then sent to Habitat Protection. Significant portions of this effort both directly and indirectly involved other RMP revisions so have implications on a statewide basis. Examples of some of these efforts include: reviewing and disseminating information from various BLM policy manuals, reviewing and commenting on the Department’s “Mitigation Strategy” document, and reviewing, discussing and disseminating information related to various stream classification methods.

Kemmerer BLM notified cooperating agencies on February 23, 2007 that they were instructed to fast track this RMP process. The next opportunity for cooperator review on the Preliminary Draft Environmental Impact Statement (PDEIS) is scheduled for late March and early April 2007. The BLM anticipates publishing the PDEIS for public review in late June 2007.

Strategic Habitat Plan Implementation

The Pinedale Aquatic Habitat Biologist continued to aggressively promote development of forage reserves and creation of additional WHMAs and other large-scale conservation opportunities in the region. These efforts are being pursued to help increase opportunities to implement landscape and watershed scale projects in the Region as promoted in the Strategic Habitat Plan. The primary opportunity pursued was the Triple Peak Forage Reserve Project, reported on under the Cottonwood Watershed Projects. Another opportunity consisted of completing HAEP forms for two adjacent properties located in the upper Green River and submitting these to the property rights team for review. One property owner is primarily only interested in a conservation easement. The second, related landowners, have their property listed for sale on the open market, but indicated an interest in a wide variety of conservation opportunities.

Lower Bear River Watershed Projects

Smithsfork Allotment

The Pinedale Aquatic Habitat biologist participated in the BLM’s scheduled fall monitoring tour on September 13, 2006. Livestock impacts in portions of the allotment visited during the tour appeared to be similar to the past year’s, or slightly lower. However, upper Coal and East Coal Creeks, in the Coal/Dipper pasture, were

used very heavily. Numerous cattle were not removed after the planned use period so regrowth was kept grazed off. Use on willows in these areas was also very high, but was not measured. Also, utilization levels were very high near an upland water development at a spring source located between Coal and East Coal Creeks (Figure 10). The enclosure fence protecting the spring and tank valve had not been properly maintained. Therefore, the spring source area was severely trampled as well as the area where the tank had overflowed. The Little Muddy Creek riparian enclosure fence appeared to have been intentionally cut at the northwest corner. Repairs were made following the tour.



Figure 10. Improperly Maintained Spring Development Between Coal and East Coal Creeks.



Figure 11. Downstream end of Coal Creek Enclosure, July 2006.

Data collected on September 13, 2006 in cooperation with the BLM and permittees is available in the BLM's Annual Smithsfork Allotment Monitoring Report for 2006. Results of this monitoring effort documented that use levels on willows exceeded the 40% use criteria in the AMP.

The enclosures on Coal and Huff Creeks were both maintained and functioned properly in 2006 (Figure 11).

The results of these evaluations, monitoring methods used, and the need to better maintain fences and enclosures as well as other issues and concerns were discussed with the BLM Assistant Manager following the tour. While current BLM management has demonstrated a commitment to resolving these on-going concerns, numerous problems remain in this important area.

Klein Creek Project

Numerous willow and cottonwood cuttings were planted inside the Klein Creek head cut control project enclosure on May 17, 2006. A very high number of these cuttings showed good preliminary indications of successful establishment on September 12, 2006. Assuming good winter survival rates they should become well established in 2007. Although the primary head cut control structure will require some minor maintenance, the enclosure fence remained in excellent condition.

Raymond Watershed

For the second year in a row very little evidence of livestock use was observed in the Raymond watershed when the area was visited on September 12, 2007. Livestock management and use levels in this watershed will continue to be monitored to evaluate if additional fencing is necessary and evaluate long-term recovery of this important watershed.

Huff Creek Head Cut Control Project

Following numerous attempts to schedule a visit with the private landowners on Huff Creek where the lower of two head cuts are active (Figure 12), verbal permission was gained in October to stabilize the head cut site and construct an enclosure to protect the area from cattle grazing. With assistance from the Casper regional Aquatic Habitat Biologist, a preliminary project plan has been prepared and will be presented to the landowner for final approval before submitting it to the COE for a 404 permit.

Assuming permit approval and availability of an adequate labor force, stabilization work and enclosure construction are expected to be completed on both Huff Creek head cuts in 2007.

Giraffe Creek Prestige Pond Project

Investment oriented landowners submitted a pond development project on Salt Basin Creek (a tributary of Giraffe Creek) for 404 permit approval (Figure 13). Preliminary concerns that the pond could impede movement of Bear River cutthroat (BRC) in this tributary were confirmed when several BRC were found above the proposed dam site on November 8, 2006. Additional preliminary evaluations on this property revealed that habitat conditions in this tributary, as well as Giraffe Creek, are highly degraded due to a wide variety of past and present human caused disturbances. Concerns and options were reiterated with the project proponent. Unfortunately, we have heard informally that the landowners went ahead with construction of this pond during the winter of 2006-2007.

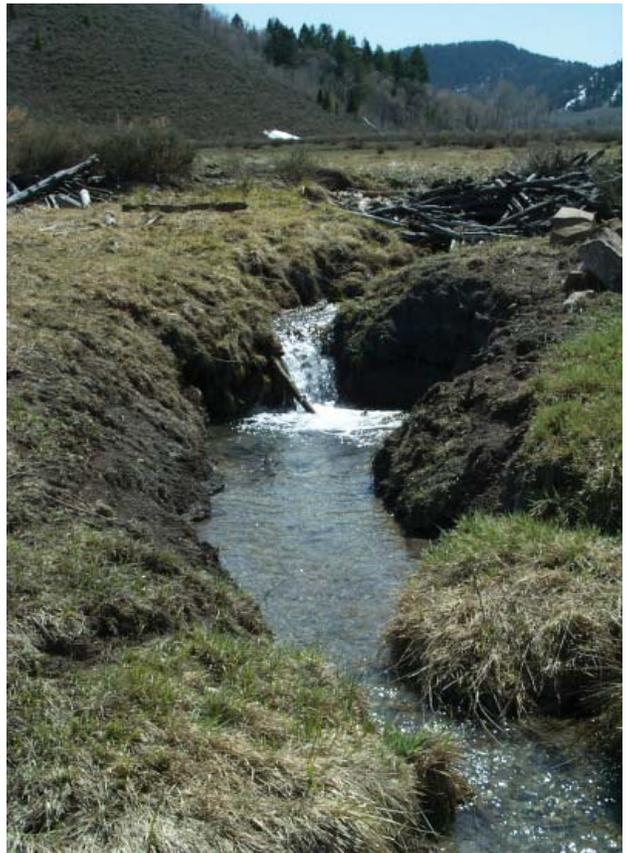


Figure 12. Active head cut on state land parcel of Huff Creek



Figure 13. Overview of Giraffe Creek below the confluence with Salt Basin Creek tributary

Habitat Mitigation Biologist

Habitat Projects

The Record of Decision for the Jonah Infill Drilling Project (March 14, 2006) was responsible for the establishment of the Jonah Interagency Office (JIO) in Pinedale. The 4 personnel hired for the JIO are from the Department of Environmental Quality, Bureau of Land Management, Department of Agriculture and Wyoming Game and Fish Department. The objective for the JIO is “to evaluate the effectiveness of guidelines, mitigation, BMP’s and monitoring.” The Charter established for the office contains the following:

PURPOSE – “The Jonah Interagency Office (Project Office) will provide the services necessary to execute plans, monitoring, and other activities necessary to assure the effectiveness of land management recommendations, reclamation actions, and mitigation in the vicinity of the Jonah natural Gas Field in accordance with the Record of Decision (ROD) for the Jonah Infill Drilling Project. In addition the Project Office will provide oversight of funds available for reclamation monitoring and mitigation (offsite and onsite).” Wildlife mitigation efforts focus on those species impacted in the Jonah Field, which are primarily sagebrush obligates and dependents. Emphasis is being placed on sagegrouse and pronghorn.

The Charter also lists the scope of work for the Project Office to include the following:

- Oversee the selection and effectiveness of 30,000 – 90,000 acres of offsite mitigation
- Inspect and verify compliance on up to 15,000 acres of surface reclamation
- Inspect and monitor reclamation on up to 3100 new well locations
- Insure compliance with the Wyoming DEQ Air Quality and Water Quality rules and regulations
- Monitor big game and sage grouse populations
- Assure habitat restoration
- Monitor livestock utilization of existing permits
- Validate, coordinate, and oversee research
- Coordinate transportation planning
- Assure vegetation surveys/Invasive species control
- Provide information to the respective agencies and public regarding impacts, monitoring data, and mitigation success

The duties and activities of the Project Office are managed and oversight provided by the Managers’ Committee, which is made up of the agency heads or representative from each of the Agencies involved (Figure 14).

In conjunction with the establishment of the JIO, Operators provided funding for both the operation of the office as well as off-site mitigation. The Operators provided a total of \$24.5 million, with \$8 million for funding the office and “other” mitigation and monitoring needs, and \$16.5 million for off-site wildlife mitigation projects.

Highlights for the past year include the following:

- Receiving, reviewing and ranking 19 project proposals submitted for funding consideration for wildlife and “other” mitigation.
- Preparation of “reclamation criteria” for both “rollover” and final reclamation.
- Oversight of Air and Water regulations; including field evaluations of facilities related to development.

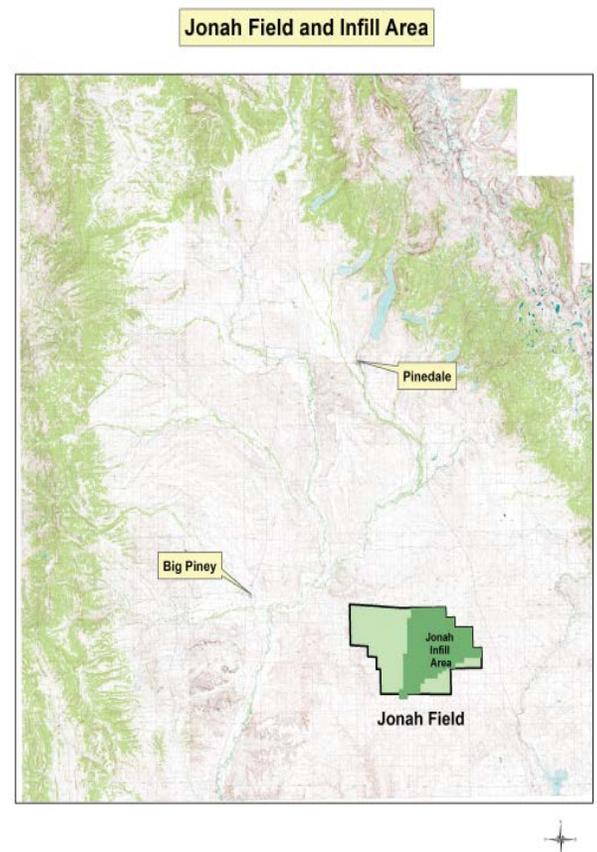


Figure 14. Jonah Infill Area

- Coordination/communication with agencies, private landowners and publics pertaining to goals and mission of JIO.
- Preparation of off-site mitigation goals and strategies relating to wildlife, air quality, land use/recreation, land use/livestock grazing, and cultural/historic resources.
- Working with The Nature Conservancy on issues related to the prioritization of key areas for wildlife mitigation.

Project Proposals

When the JIO was established, mitigation guidelines for the office primarily involved operating the office similarly to the Governor’s Wildlife and Natural Resource Trust, with project proposals being submitted by outside interests for addressing mitigation needs.

In the spring of 2006, nineteen project proposals were submitted to JIO for funding. JIO developed ranking criteria and used it to rank projects relative to their merit of meeting mitigation needs. Site visits also occurred on many of the projects, along with proponents of those projects. Of the nineteen submissions, 6 were either funded or partially funded (refer to Table 3). Those not funded were either not “on-the-ground” improvement projects, or were projects that required added research to determine some of the various needs, and how they may relate to the mitigation needs.

Table 3. JIO -- July 2006 Project Proposals Evaluation Results

Jonah Interagency Office -- July 2006 Project Proposals Evaluation Results

Project Name	Contact	Amount Requested	Description of Project	Evaluation Results	Amount Approved
Lander Trail Well Wildlife and Stockwater Development	Square Top Grazing Assn.	\$19,500	Improvement of existing well and conversion to solar. New storage tank with fencing for watering area for wildlife and offsite livestock watering.	Approved with minor modifications	\$19,500
Muddy Creek Water Well	Square Top Grazing Assn.	\$11,500	Repair and improve existing well; replace windmill with generator, overflow pit and fencing for wildlife watering.	Approved with minor modifications	\$11,500
Square Top Water Well #1	Square Top Grazing Assn.	\$25,500	Drill new well; equip with solar pump and storage and stock watering tank, water overflow pit with fencing for wildlife watering.	Approved with minor modifications	\$25,500
Sand Draw Water Well #1, 2 and 3	Rendezvous Ranch	\$76,500	Drill 3 new water wells, with solar pumping system, storage and stock water tanks, and drinking facilities for wildlife.	Approved with minor modifications	\$76,500
Sand Draw water well #4	Rendezvous Ranch	\$25,700	Drill new water well with solar pump, storage and stock tank and drinking facilities for wildlife	Approved with minor modifications	\$25,700
Jonah Raptor Nest Platform Project	BLM – Pinedale Field Office	\$5,025	Construction and placement of nesting platforms for ferruginous hawks.	Partially approved - for platforms outside the JIDPA boundary	\$2,153
Jonah Integrated Resource Management and Mitigation Program: Data Gap Evaluation and Recommendations	North Wind, Inc.	\$96,750	Development of GIS based strategy for assessing cumulative effects on Anticline and Jonah. Development of a comprehensive database and incorporation of all relevant GIS info from various entities.	Disapproved - 1) redundant to current effort fully funded by BP and 2) not mitigation	\$0
Double Bar E Ranch	Green River Valley Land Trust	\$1,000,000	Conservation easement for maintaining open space and agricultural values with associated wildlife benefits.	Deferred to next cycle - need more info on mineral rights, potential to maintain some habitat types	\$0

Funded projects, other than the raptor perch, were primarily water development projects for both livestock and wildlife and involve either drilling a new well, or modifying an existing well. All of these included an area

fenced off for wildlife that will also have water applied to it. This water will provide an area for wildlife water, as well as provide additional benefits related to the development of “riparian areas” and the associated benefits to sagegrouse brood-rearing, and other animals, which will benefit from these.

The raptor perch proposal was submitted by the BLM and the perches for off-site areas were approved for funding. These will provide moveable perches primarily for Ferruginous Hawks, to replace some of those where development is disrupting the normal nesting activities.

Reclamation Criteria

The Record of Decision for the Jonah Infill Project caps total disturbance for the field at 14,030 acres, or approximately 46% of the area. In addition, when reclaimed areas meet certain criteria (rollover criteria) they will be credited back against the total disturbed acres, up to 6,304 acres. The JIO drafted both “rollover” criteria as well as final criteria. The intent was to incorporate a diversity of species and vegetative forms into the criteria in order to provide for shrubs and forbs, as well as graminoid species which may duplicate an earlier successional stage of the existing communities, and hopefully, which will succeed to a similar community that currently exists in the field (Figures 15 and 16).



Figure 15. Jonah field reclamation illustrating the use of water for establishing vegetation.



Figure 16. Reclamation illustrating both grass and shrub response.

Rollover reclamation objectives included:

1. Rollover reclamation credit requires establishment of viable site-stabilizing plant growth (e.g., resistant to wind and water erosion) and a plant community that approximates surrounding or ecologically comparable vegetative composition to the maximum extent possible.
2. Final reclamation requires a range of species composition, diversity, cover and production equal to pre-disturbance levels.

Specifics of the Rollover Criteria are as follows:

Erosion Control:

- The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). The percentage of bare ground must be equal to or less than the reference site.

Vegetative Criteria:

1. Native Forbs: The average density or frequency of forbs must be a minimum of 75% of the reference site. Diversity of forbs on a reclaimed site must be equal to or greater than the reference site.
2. Native Shrubs: The average density or frequency of the shrub component must be at least 50% of the reference site. This includes both shrubs and half shrubs (e.g. winterfat, fringed sage, etc.), but rabbitbrush

cannot account for more than 10% density or frequency of total shrub composition used to meet criteria. At least 15% density or frequency of the shrub component must be the dominant species from reference site. The diversity of shrubs must be equal to or greater than the reference site. Individual shrub plants younger than 3 years old will not count towards roll-over.

3. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species present, 2 of which must be bunch grass species.
4. Non-Native Weeds: Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass and other weedy brome grasses are also prohibited.
5. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences. A minimum of 1 growing season without external influences (irrigation, mat pads, fences, etc.) may satisfy this requirement.

Final criteria are similar, but express the needs from the perspective of a more advanced vegetative community (successionally), and a greater percentage of both forbs and shrubs compared to the reference site.

Off-site Mitigation Goals and Objectives

As a part of the JIO efforts to better describe and relate to others the types of projects that we are interested in funding, a plan with goals and objectives for various resources was compiled. For wildlife, the following goals and objectives were included:

Goal

Maintain, preserve and/or enhance up to 90,000 acres of sagebrush-steppe habitat for native wildlife, with emphasis on sage grouse, antelope, and Species of Greatest Conservation Need (SGCN) species.

Objectives

1. Achieve a landscape mosaic of native vegetation species diversity and successional stages capable of supporting all native wildlife species.
2. Provide a variety of habitat block sizes designed to support sustainable populations of native wildlife.
3. Provide water sources sufficient to support a high distribution of wildlife species across the landscape.
4. Maintain migration corridors sufficient to allow unimpeded seasonal movements of migratory wildlife.
5. Work with various partners to solicit/develop projects that accomplish goals via project proposal submissions.
6. Work with landowners, agencies and other potential partners (permittees, livestock groups, Natural Resource Conservation Service, Soil Conservation Districts, Ducks Unlimited, Rocky Mountain Elk Foundation, various conservation organizations, etc.) to implement various practices to enhance/improve/protect sagebrush habitats and habitat needs for sagebrush dependent/obligate species. Refer to later sections for examples of desirable projects.
7. Specific strategies were also included in the planning effort, as well as project ideas and all were posted on the JIO website (http://www.wy.blm.gov/jonah_office/index.htm).

TNC Habitat Prioritization

As part of the efforts targeted at off-site mitigation, British Petroleum (BP) funded The Nature Conservancy to use their modeling expertise for examining areas that would be best suited for off-site mitigation for those species impacted by the Jonah Infill drilling. Figure 17 illustrates the results of these efforts, which combine species needs/habitats, oil and gas (development) potential, and landscape integrity modeling. Species included for the modeling and prioritization effort on the first draft included: burrowing owl, cedar rim thistle, mountain plover, pronghorn (migration), pygmy rabbit, sage grouse (occupied leks, winter/nesting/early brood-rearing habitat), sage sparrow, white-tailed prairie dogs and Wyoming big sagebrush. Minimum viable sizes of habitat were also included in the analysis. After discussion, it was suggested that TNC reduce the size of some of their minimum viable habitat requirements, and also run a model specifically for sagegrouse and pronghorn, to compliment what they have done so far, and “loosen” up the sideboards for potential mitigation purposes.

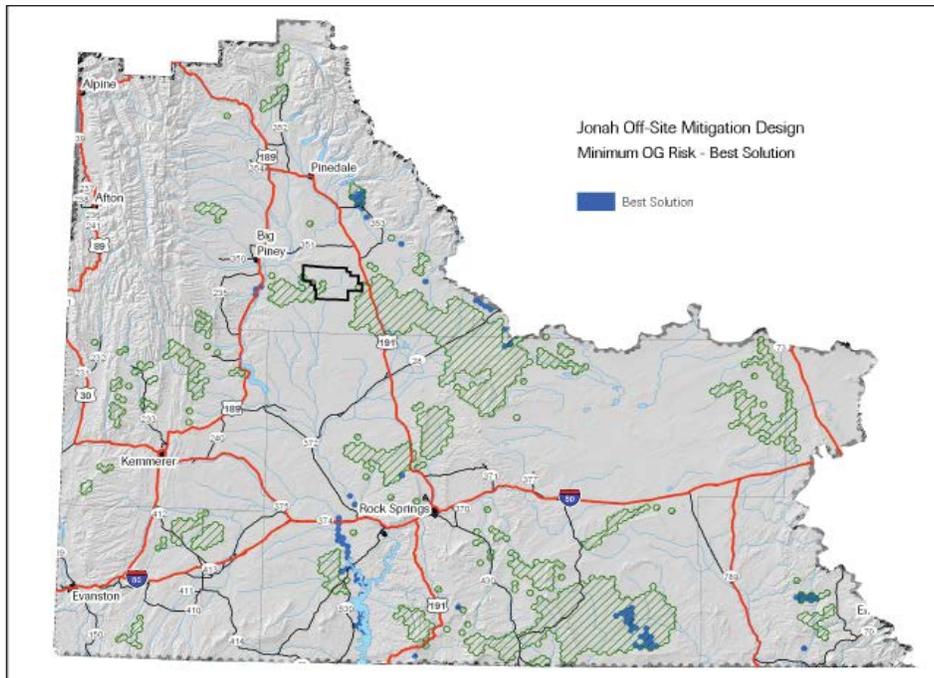


Figure 17. TNC draft analysis illustrating “best solution” and areas for secondary consideration in mitigation planning.

Future models will be provided by late March, and will be utilized as another tool for aiding in the mitigation process.

Monitoring Planning

Part of the JIO duties relate to the establishment of monitoring criteria for the Jonah Field. These relate mostly to wildlife and reclamation, and plans were developed which are in a draft stage at this point. Once completed, they will be available on the JIO website.

Southwest Wyoming Imagery Project

The final phase of this collaborative imagery project between BLM, WGFD, and the University of Wyoming Geographic Information Science Center was completed in 2006. A WGFD habitat intern spent the summer ground truthing nearly 100 points on the draft landcover map. The BLM GIS specialist used the ground truthing points to improve the classification accuracy of the landcover map before finalizing. In addition, other imagery items were completed and made available for use including snow depth and change detection analyses that can detect changes in vegetation over the past 20 years.

Cooperative Seeding Trials (2)

Two seeding trials have been initiated over the past couple years to test various seed mixtures, seeding rates, and planting methods to determine the best reclamation practices for oil and gas associated disturbances. In October 2006, personnel from the BLM, NRCS, WGFD, Questar, and the Sublette County Conservation District planted 25 different shrub and 3 grass species on .70 acres of disturbed ground (Figure 18). A fence was constructed around the site prior to seeding to eliminate big game and cattle. The planting methods included an aerial broadcaster and cone planters that deposited seed at specific depths in randomized rows or plots. Data on germination, survival, vigor, canopy cover, and palatability will be collected for up to 15 years beginning in 2007.



Figure 18. A belt seeder is used to plant a row of shrubs for the Questar shrub trial.

In October 2005, a similar seeding trial was implemented on a Shell lease to test 72 (32 grass, 24 forbs, 16 shrubs) seed varieties (Table 4). Four seeding methods were used: cone seeder, broadcast, Truax drill, and hydro-seeding. The first of 5 years of monitoring was conducted in June 2006 to evaluate the various seeding methods and seed species. Success after year 1 was limited since the site had only received 1.8 inches of precipitation from October 2005 to July 2006.

Table 4. Germination rates for the Shell seeding trial.

2006 Shell seeding trial evaluation (N = 72 plots)		
Plant Type	Germination Rate %	Range %
Grass (N = 32)	16	2 to 31
Forbs (N = 24)	4	.04 to 12
Shrubs (N = 16)	1	.04 to 5

Evaluation of Old BLM Treatments

Data from old habitat treatments can provide excellent information on what we can expect for future conditions of treatments implemented today. However, data collection efforts were not consistently performed prior to the 1990s and BLM biologists conducted several habitat treatments prior to that time. Most of them occurred between 1960-1980, primarily as sagebrush eradication treatments (i.e., 2-4D) to increase forage for grazing operations. As a result, a collaborative effort to locate and collect data on these treatments was initiated in 2006.

Personnel from the BLM, WGFD, and Wyoming Wildlife Consultants began an effort in 2006 to locate old treatments on the ground, map them, and start to collect vegetation data. To assist with this effort, we requested retired BLM biologist Jack Welch who worked in Pinedale from 1965-1972 to assist with locating treatment sites from a list of all known habitat treatments in Sublette County. Pictures, anecdotal data, and GPS points were recorded for 16 treatment sites that were located (Figure 19). This effort will continue in 2007 with additional mapping, searching for historical data, and prioritization and collection of field data.

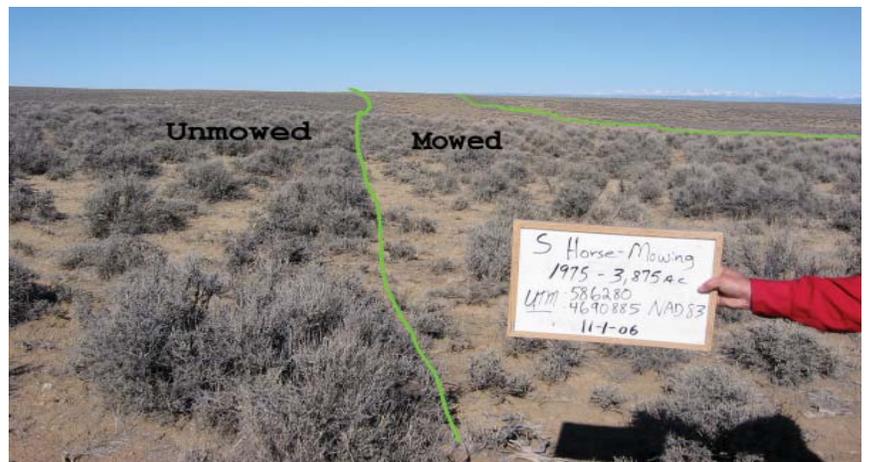


Figure 19. A treatment from 1975 mowed 2,500 + acres in 60-100' strips. Mowed areas appeared to have better herbaceous and sagebrush production than unmowed areas.

Elk VIT Research

In January of 2006, a 2-yr cooperative research project was initiated among the WGFD, University of Wyoming (UW), Iowa State University (ISU), and USFS with financial assistance from the WGFD, ISU, and the Wildlife/Livestock Disease Partnership. The goals of this project were to determine 1) abortion, birth, and seroprevalence rates, and 2) abortion and parturition locations and associated habitat conditions in elk from a spectrum of winter foraging opportunities.

From January to March of 2006, 114 adult female elk were captured on Scab Creek, Soda Lake, and Bench Corral feedgrounds and the Buffalo Valley area north of Jackson, WY. Ninety-six of 114 (84%) female elk were determined to be pregnant and subsequently fitted with vaginal radio transmitters (VIT). VITs were used to facilitate location of parturition sites in these animals. At each parturition site and 2 randomly located sites within 200m of the parturition site, we quantified macro- and microhabitat vegetation attributes for comparison to assess selectivity of parturition sites. Macrohabitat variables were derived from GIS coverages and included vegetation cover type, distance to edge, elevation, aspect, land ownership (USFS, BLM, state, private), distance to nearest cattle operation, and distance to water. Microhabitat variables included canopy cover; concealment cover; shrub species and density; tree species, age, and distance to VIT; and nutritional content of various forage species.

Throughout the project area, parturition sites occurred in a wide variety of habitat types (Table 5 and Figure 20). These values will be compared to availability of these habitat types on a landscape scale to determine selection. Only 6 of 80 (8%) parturition sites occurred in WGFD delineated parturition areas. Further analysis of all other macrohabitat variables is pending. Microhabitat variables that differed significantly between parturition and reference sites were primarily canopy and concealment cover. Additional analysis of all microhabitat variables using a conditional logistic regression model will occur following data collection in 2007 and may elucidate significant associations of microhabitat variables to parturition sites.

Table 5. Habitat types associated with elk parturition sites in western Wyoming.

	Aspen	Conifer	Sage	Willow	Aspen/ Conifer	Aspen/ Willow	Conifer/ Sage	Other
Bench Corral	14	18	9	18	27	5	4	5
Scab Creek	0	50	50	0	0	0	0	0
Soda Lake	38	52	0	0	10	0	0	0
Buffalo Valley ^a	10	24	19	19	14	0	0	14

^aThe sample size for this analysis combines 11 free ranging and 9 feedline animals.



Figure 20. A stereotypical elk parturition site in the Wyoming Range, western Wyoming.

O Bar Y Aerator Project

Project planning began with this private landowner in fall of 2006 to implement a 300-acre treatment with the Lawson Aerator. Project implementation is anticipated for fall of 2007. The landowner's goals are to reduce the density of decadent sagebrush cover and increase the production of forbs to attract wildlife such as mule deer and sage grouse to the property. The project area lies in the Upper Green River Valley, which is a critical migration corridor for antelope, moose, and other wildlife species.

Voorhees Wetland Project, LaBarge WY

Habitat & Access Development Crew personnel installed an Agri-drain inline water control structure and 60 feet of pipe (Figure 21). This project was implemented to eliminate a carp infestation and thus increase the water quality to encourage nesting trumpeter swans to return to the wetlands. Agri-drain and pipe were provided by non-game.

Mesa Sagebrush Enhancement, Pinedale Anticline

Habitat & Access Development Crew personnel treated 30 acres each with the Lawson aerator and Dixie harrow (Figure 22 and 23). This was a project to study various treatment types for mitigation purposes along the Pinedale anticline and was performed in cooperation with the BLM, UW, UI, and Questar.



Figure 21. Agri-drain installation.



Figure 22. Lawson aerator treatment.



Figure 23. Dixie harrow treatment.

WILDLIFE HABITAT MANAGEMENT AREAS

Huston Public Access Area Projects

Primary development of this 30-acre acquisition, which provides for public hunting/ fishing and enhancement of riparian habitat, was completed in 2002.

Although maintenance work is still needed on the lower grade control sill in the developing channel, we determined that this work could be postponed until a more comprehensive habitat / restoration plan can be developed for this 1.5 mile reach of river. Mobilization of equipment would cost more than the actual maintenance work. Future opportunities involving other landowners include stabilization of additional cut-off channels and eroding banks, and construction of a more functional irrigation diversion structure for the Ada Ditch.

Half Moon WHMA Forage Reserve

Half moon WHMA was used again in 2006 as a forage reserve to provide rest on USFS land that was burned to improve forage opportunities for elk and other wildlife near the Soda Lake WHMA. That treatment (i.e., Fremont II prescribed burn) was conducted in September of 2005 and burned 1,330 acres including 400 acres on the Soda Lake WHMA. A total of 120 cow/calf pairs and 5 bulls were allowed to graze from July 1 to September 15, and this was the final year that treatment would need rest.

SHERIDAN REGION

HABITAT PROJECTS

Lake DeSmet Conservation District Sagebrush/Grassland Habitat Restoration Program

The Lake DeSmet Conservation District (LDCD) has partnered with private landowners, Natural Resource Conservation Service (NRCS), Wyoming Game and Fish Department (WGFD), oil and gas industry, conservation groups and federal and state governments to restore the productivity of sagebrush/grassland communities in northern Johnson County. This community-based program has had tremendous success. So far, 234,661 acres are enrolled to enhance important habitats for sagebrush obligates, mule deer, pronghorn antelope, other wildlife, as well as livestock (Figure 1).

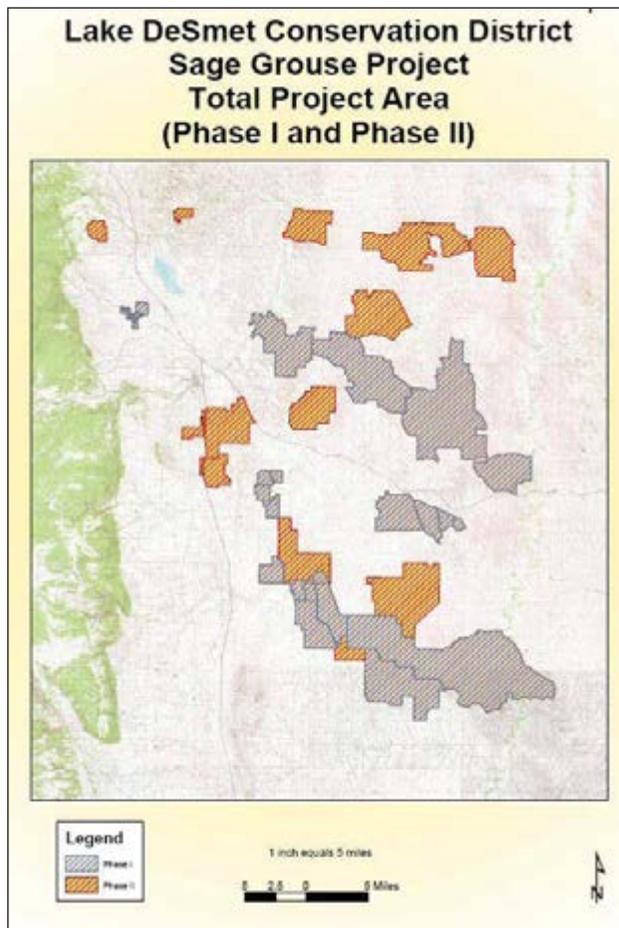


Figure 1. The first ranches to sign up for the program involves 143,501 acres (Phase 1). The second enrollment (Phase 2) added 91,160 acres to the program. A third signup period is presently underway. If all are approved, the total project area will exceed 320,000 acres.

The first phase of this program involved seven landowners comprising 143,501 acres. Ranch management plans have been prepared for these livestock producers, which includes; resource inventories, conservation strategies, infrastructure needs (to implement conservation strategies), grazing procedures and monitoring needs. Dr. Roy Roath, a Colorado State University range extension specialist, and other experts in the field have been employed to assist with progressive plans that will benefit both livestock and wildlife.

- 234,661 acres are enrolled to enhance important habitats for sagebrush obligates, mule deer, pronghorn antelope, other wildlife, as well as livestock.
- 4,950 acres have been treated with the Lawson Pasture Aerator.
- Interns spent much of the summer mapping sage grouse.
- Range Pitter used to treat 300 acres on the Kerns WHMA.
- 200 acres of grassland, ninebark and chokecherry shrubs were burned on the Kerns WHMA.
- Escape ramps are being installed in troughs to reduce sagegrouse deaths.
- Twelve riparian buffer strips are being monitored.
- Baseline aquatic habitat conditions are being assessed in the lower Powder River drainage - a high priority native fish and amphibian watershed.

In addition, 4,950 acres have been treated with the Lawson Pasture Aerator (Figure 2). This implement aerates the clay-dominated soils and favors rizominous grasses, silver sagebrush, winter fat and fourwing saltbush. It also drops seed. The aerator is being used to enhance overflow and riparian sites for sagegrouse brood rearing. On these sites, dryland alfalfas and other forbs are being planted. The BLM purchased replacement drums and teeth for the Lawson aerator. Two sets of teeth have been worn off the aerator so far. The new teeth are eight inches and “hardened” (rather than 6 inches and not surfaced with hardened steel).



Figure 2. Almost 5,000 acres were treated with the Lawson Pasture Aerator. This implement aerates the clay-dominated soils and favors rizominous grasses, silver sagebrush, winter fat and fourwing saltbush. It can also drop seed.

The aerator is also used to reclaim go-back lands (previously farmed) to restore the structure and productivity of these lands for livestock, mule deer and antelope. In addition to interseeding forbs (Figure 3) and select grasses, we’re also planting fourwing saltbush to improve the structure of rangelands and browse for wild ungulates. By improving herbaceous production and maintaining conservative livestock stocking rates, we expect to reserve more forage and cover for wildlife. These changes are also expected to improve nesting habitat for sagegrouse.



Figure 3. Falcata alfalfa (shown above) and other dryland alfalfas have been used on most sites treated by the aerator. These forbs are expected to enhance brood rearing habitats for grouse.

Phase two involves another seven landowners comprising an additional 91,160 acres (for a total of 234,661 acres). The ranch conservation plans have been initiated and we’re beginning to seek funding for their implementation. Presently, the NRCS/LDCD has received applications for another six ranches that control more than 90,000 acres of sagebrush/grassland communities. If all are approved, the total project area will exceed 320,000 acres, a huge geographic area!

The foundation of this program is to use the Deseret Land & Livestock and Parker Mountain studies to achieve enhanced benefits for livestock and wildlife. The papers *Sage-Grouse Ecology and Management in Northern Utah Sagebrush-Steppe*, a *Deseret Land and Livestock Wildlife Research Report, 2002* by R. E. Danvir, and the *Parker Mountain Adaptive Resource Management Plan*

- 155 beaver have been transplanted since 2000 in a collaborative effort to restore declining populations of this keystone riparian species.
- Restoring stream stability and fish passage is being addressed through irrigation diversion rehab projects in the Clear Creek watershed while a cooperative effort to assess fish passage through the similar restored structures continues.
- Stream restoration structures in Clear Creek through Buffalo add interest to this urban fishery.
- Monitoring of E-coli concentrations in the North Tongue River and identifying cause and effect continues.

provide documentation of benefits to sagegrouse and other sagebrush obligates, as well as mule deer, pronghorn antelope and other wildlife from their ranch management operations. Increases in wildlife populations associated with sagebrush/grassland communities have been documented and are the result of their innovative ranch conservation technologies and approaches. These include, timed livestock grazing, forb plantings and mechanical and fire treatments. Due to Deseret’s success at increasing wildlife populations while maintaining a working ranch, the LDCD and collaborators initiated this program to replicate and test this “win-win” management model on private and public lands in northern Johnson County.

Specific objectives of the program include:

- Implementing and testing methods to rapidly produce inventories and information for livestock producers. From this, producers and collaborators can develop land management plans that benefit livestock, sagegrouse and other wildlife. All resource information, including soil, range, wildlife distribution, improvements and water inventories will be managed in a GIS database to supply a rapid decision-making tool for producers. A Wyoming NRCS conservation incentive program called the Grazing Lands Initiative is the basis of this work.
- Replicating and testing Deseret Ranch and Parker Mountain conservation technologies and approaches within a different set of environmental conditions. Promising ranch conservation technologies and approaches will be promoted by providing education opportunities to gain broad-based support throughout the Powder River Basin and the Conservation Districts within it. Best management practices for sagebrush obligates will also be developed and evaluated.
- Monitoring and quantifying improvements to rangeland production and biodiversity that result from improved grazing systems, mechanical treatments and forb plantings. The WGFD will quantify changes in sage-grouse populations by comparing male grouse attendance at leks within and outside the program area.

The Federal government has contributed considerable funding for this restoration effort. So far, the total exceeds \$1.76 million. The bulk of these funds need a non-federal match. Although livestock producers will shoulder much of this match (\$281,073 so far), conservation practices having specific benefits for sagegrouse need “outside” matching dollars to make this work. To date, producers, state agencies, non-government organizations, and industry have provided \$607,785 to match these federal dollars, most of which have 50/50 to 75/50 match ratios. See Table 1 for the list of contributors and the dollars they granted.

Table 1. Contributors to the LDCD’s sagebrush/grassland restoration effort (as of 12/31/06).

NRCS (Wyoming) EQIP, WHIP, etc.	\$1,425,136.00
NRCS (National) Conservation Innovation Grant	\$240,500.00
US Fish and Wildlife Service, Private Lands Program	\$40,000.00
BLM	\$64,278.00
Private Landowners Enrolled in Program	\$281,073.00
Oil and Gas Industry (Anadarko Petroleum, Lance O&G, Kennedy Oil).	\$75,762.00
Wyo. Governor's Sage-Grouse Fund- Northeast Wyo. Sage-Grouse Local Working Group.	\$90,000.00
Wyoming Wildlife and Natural Resource Trust Account	\$60,000.00
Wyoming Game and Fish Department	\$47,950.00
Sheridan/Johnson County Chapter of Pheasants Forever	\$15,000.00
Wyoming Governor's Big Game License Coalition	\$10,000.00
Eyas Foundation	\$10,000.00
Lake DeSmet Conservation District- Science Summit workshops	\$10,000.00
Wyoming Private Lands Grazing Team	\$3,000.00
Bighorn Environmental Consultants	\$3,000.00
Water for Wildlife Foundation	\$2,000.00
GRAND TOTAL	\$2,377,699.00



Figure 4. Escape ramps are being installed in troughs to reduce sagegrouse deaths due to drowning. Note the dead sagegrouse behind the pickup truck that were pulled from the tank.

Other achievements this year include the purchase of 100 escape ramps for small animals, which will be placed in existing and newly developed water troughs (Figure 4). The cost of these pre-fabricated ramps was split between The One-Shot Antelope Hunt Foundation's Water for Wildlife Program and the WGFD. The goal is to reduce sagegrouse drowning mortalities (Figure 5). A side benefit will be improved water quality for large animals that use the facilities, such as livestock, pronghorn antelope and mule deer.



Figure 5. Sage Grouse watering from rubber-tire water trough (Photo courtesy of Tom Maechtle).

Interns with the NRCS and WGFD spent much of the summer mapping sage grouse habitats and determining the ecological condition of sagebrush communities (Figure 6). Sage grouse sign, such as pellets and nest locations were mapped to allow seasonal ranges to be determined. Data were installed in a GIS to produce inventories and information for livestock producers. From this, producers and collaborators can develop land management plans that benefit both livestock and sage grouse.



Figure 6. The NRCS and State of Wyoming have provided interns during the summer months to help collect data.

In order to map and delineate sage grouse winter habitats, a local sage grouse specialist and his trained dogs are hired to search enrolled properties. These English setters are trained to search large areas (Figure 7). Because they range long distances, the dogs are fitted with radio collars that transmit their location and activity, or lack thereof. When it's determined that the setter is on point (no activity), triangulation is used to locate it. The consultant can then flush and classify the sage grouse.



Figure 7. A contractor uses specially trained dogs and transmitters to search large expanses of sage grouse habitat. This information is used to delineate and map important winter habitats.

These locations are collected by a global positioning system (GPS) and installed in a geographic information system (GIS). At that time, the sagebrush patch is searched and sage grouse pellets are examined to verify the level and season of use (pellets containing mostly sagebrush are from wintering sage grouse). These efforts are needed because sage grouse have specialized habitat requirements (e.g., nesting cover, brood-rearing cover, winter cover, etc.) that should be taken into consideration when planning grazing systems and mechanical treatments. For instance, sage grouse will select different habitats based on sagebrush canopy cover, plant diversity and forb abundance. Although it's not practical to measure and map all enrolled lands, it is possible to collect these data within occupied grouse habitats. It's expected that the bird dog survey technique will help provide this information.

MONITORING PRAIRIE STREAM RIPARIAN BUFFER STRIPS

Twelve riparian buffer strips are being monitored via “before and after” images in Sheridan and Johnson Counties. These projects are the result of the NRCS, Conservation Districts and WGFD working with landowners to enroll riparian habitats in the Farm Service Agency's Conservation Reserve Program. Many of these projects are half way through their 15-year exclusion of livestock. Phenomenal changes have occurred (Figure 8-11). Because the pictures communicate an important message concerning the importance of managing livestock in riparian areas, we are preparing a report that can be posted on the WGFD web site. We are also developing an MS PowerPoint presentation that can be shown at workshops, public affairs and conferences. Computer technology is being used to rectify the images so the “before and after” images are almost perfectly aligned. This eliminates any shifting of the image while viewing. Monitoring riparian buffer strips in the prairie ecosystem have taught us that any exposed point-bars are generally the result of inappropriate livestock grazing. Once rested from livestock grazing, plants invade and occupy every hydrologic condition, thus protecting and holding the soil profile.



Figure 8. These pictures were taken on Clear Creek, near Clearmont. The 2001 “before” picture is on the left-hand side. This year’s photo demonstrates how vegetation is becoming established on the point bars. In addition, leafy spurge (yellow flowered plant) has almost been eliminated. No chemicals have been sprayed to control this invasive species. This is entirely the result of the rancher releasing and distributing flea beetles, a biological control agent.



Figure 9. These pictures were taken on Columbus Creek, near Dayton. They demonstrate the effects of drought on riparian trees and shrubs. The picture to the left was taken in 2000, the first year of the current drought. The picture to its right was taken on the same day, six years later. Close inspection shows substantial reductions in shrub and tree canopy closure. Entire shrub patches have died and many of the boxelder trees have become decadent. We found that most of the riparian buffer strips being monitored are equally drought stressed.



Figure 10. These two pictures on Muddy Creek show what excluding livestock and restoring a stream to its original channel can accomplish.... and yes it’s the same spot. In six years, the 13-foot down-cut stream channel has been healed. This project was a collaborative effort between the NRCS, Lake DeSmet Conservation District and WGFD. Basin wildrye is now providing eyeball-level cover for wildlife.



Figure 11. These pictures were taken on Clear Creek near Buffalo. The picture on the left was taken in 2000, the first year of the drought. The picture to its right was taken on the same date, six years later. Even the cut-bank on the outside of the oxbow has stabilized.

Kendrick Dam Fish Passage and Screening Project

Negotiations continued with the Pee Gee Ranch relative to advancing the Kendrick Dam fish passage and screening project to a final design and implementation phase (Figure 12). Current plans entail negotiating a water management and maintenance agreement that satisfies the operational and maintenance requirements of the ranch. If acceptable to the ranch, the Department will then secure engineering assistance to develop final designs and consult with the ranch to determine if the designs meet the requirements that the proposed passage and screening infrastructure not impede diversion operations.

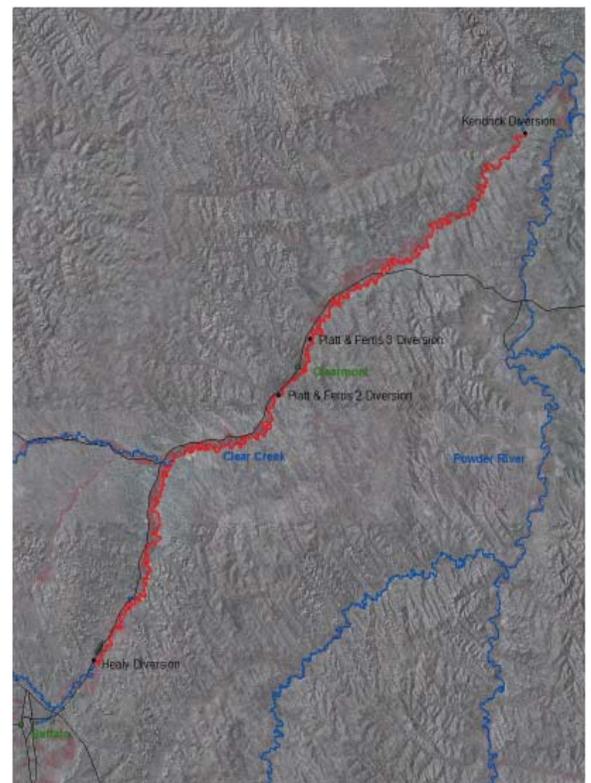


Figure 12. Fish passage at Kendrick Dam would open access to stream habitats for seven native fishes including sauger that are currently isolated below the dam. Up to 81-miles of Clear Creek (segment outlined in red) could be made available as habitat. The next irrigation occurs about 36-miles upstream of Kendrick Dam.

Substantial funding was previously secured from the United States Fish and Wildlife Services (USFWS) fisheries program for the project. The funding agreement was considered inactive, because no expenditures had been charged to the agreement. The USFWS Yellowstone River Coordinator requested an expenditure be incurred against the agreement or it would not be possible to extend the agreement beyond the initial agreement length. In turn, a portion of the available funds was used to help implement a screening project at Beck Lake near Cody. The Cody Aquatic Habitat Biologist oversaw the project and funding arrangements. This activity provided the opportunity to extend the available funding another two years.



Figure 13. Collecting wetted width, depth, substrate size, and habitat type information at one of 30- transects completed at the below Clear Creek study reach of the Powder River.

Powder River Baseline Habitat Surveys

Mapping Surveys: In 2005, fisheries and aquatic habitat personnel collaborated with United States Geological Survey personnel to map aquatic habitats along 10 2-mile long study reaches on the Powder River and Crazy Woman Creek using global positioning systems (GPS). The intent was to estimate the proportions and distribution of habitat units over a range of flows. In 2006, the GPS mapping protocol was dropped and a transect based approach modeled after the Environmental Protection Agency’s Environmental Monitoring and Assessment Program protocol was adopted to reduce the effort required to monitor habitat availability at the established reaches and gain a more repeatable protocol. About 30 transects were established at each study reach. Wetted width, depth, and substrate size was measured, and habitat type was observed at systematically sampled points along each transect (Figure 13). A detailed report on the 2005 and 2006 assessments are on file at the Sheridan Regional office.

Geomorphic Surveys: Geomorphic assessments, which included riffle cross-sections, longitudinal profiles, and pebble counts, were completed at the Above Pumpkin Creek reach of the Powder River to quantify the baseline condition (Figure 14). This complemented the geomorphic assessments completed at the Below Clear Creek and Above Clear Creek reaches of the Powder River in 2004, and the Lower Crazy Woman Creek reach in 2005. The goal of these assessments was to provide a comparison condition for future monitoring efforts. Summaries of these assessments are on file at the Sheridan Regional office.



Figure 14. The riffle cross section transect at the Above Pumpkin Creek study reach of the Powder River. Assessments occurred when no surface flow occurred in the river.

Lower Clear Creek Culvert Removal

Hydraulic characteristics at a new culvert crossing on lower Clear Creek were assessed near the confluence with the Powder River that was impeding the migrations of sauger, channel catfish, goldeye, and other game and nongame fish. Subsequently, the culvert was removed and future passage restored.

Powder River Tamarisk Mapping Proposal

A research proposal was developed to map tamarisk along the floodplains of the Powder River and selected tributaries. An objective of the research is to assess if, and by how much tamarisk may proliferate with the discharge of CBM-produced water in ephemeral tributaries.

North Tongue River Watershed Plan Development

The interagency working group continued efforts to develop a watershed management plan addressing the E-coli-impaired segment of the North Tongue River on the Bighorn National Forest. The affected grazing permittees requested a technical review team (TRT) review the current management situations in two of the North Tongue grazing allotments. The TRT was very complimentary of ongoing grazing management efforts by the Forest and permittees. Most recommendations involved applying grazing management infrastructure improvements and some prescribed burns that are already being considered by the Forest, applying greater flexibility in how the permittees are allowed to graze the allotments provided the existing standards can be maintained, and applying some additional process to gain clear and broad acceptance of the E-coli sampling protocol. Also, the TRT questioned the relevance of applying the primary contact standards to a high elevation, cold water stream where fishing is the primary recreational use (Figure 15).



Figure 15. Photograph of the North Tongue River, which depicts the general character of stream and riparian habitats common within the E-coli impaired segment of river.

Monitoring completed by the Forest in 2006 again identified E-coli concentrations in the North Tongue River were above the primary contact standard when domestic sheep were present along ridge tops and cattle were present within valley areas. The apparent correlation between observed E-coli concentrations and the intensity of livestock grazing use broke down. E-coli concentrations spiked while actual stocking rates were the lightest of the 3-year data record. However, a correlation with the presence or absence of livestock, though perhaps weakened, appears to persist. None-the-less, other unidentified factors may be contributing to the situation. The Forest plans to expand sampling efforts in 2007 to help identify unknown factors. The interagency working group will continue meeting periodically until a watershed management plan capable of resolving the impairment situation is complete.

Willow And Aspen Retention On The Bighorn National Forest Using Transplanted Beaver



Figure 16. 155 beaver have been transplanted to habitats on the Bighorn National Forest. This picture shows a moose watering in a beaver pond on Prospect Creek, the result of our 2004 transplant efforts.

The WGF D has conducted seven beaver cache surveys on the Bighorn National Forest (BNF) since 1986. These data indicate that beaver populations on the BNF are declining. Drainages that contain beaver generally have lower populations today, while many previously occupied habitats are no longer populated. The most recent survey failed to detect evidence of beaver activity in ten sixth-order watersheds, which were historically occupied.

In response to declining populations and the absence of this keystone species in some drainages, the WGF D and BNF have collaborated with the RMEF, Wyoming Governor's Big Game License Coalition and Bow Hunters of Wyoming to provide a continuous stream of funds for transplanting beaver to previously occupied habitats. Habitats have been prioritized based on patch size and connectivity of willow and aspen resources, as well as historic activity, hydrology and suitable habitat conditions. Based on our analysis,

we recommended that beaver be transplanted to at least fourteen sites. More should be considered once these habitats are occupied. Since the year 2000, 155 beaver have been transplanted. Twenty-one of those were released this year in the Muddy Creek watershed, just off State Highway 16 (Figure 16).

Another retention project involves the BNF's efforts to remove conifers from aspen patches to stimulate re-sprouting and more vigorous growth. This year, 220 acres were treated.

USFS Bighorn National Forest Mule Deer And Elk Transition Habitat Enhancement Projects

The USFS Bighorn National Forest continues to support the WGFD's objective of enhancing transition range habitats for mule deer along the east slope of the Big Horn Mountains. The Forest burned 390 acres of grass and ponderosa pine communities last spring to invigorate forage for big game (Figure 17). Fire causes plants to green-up earlier during a time period when animals are desperately trying to regain their winter weight loss. This weight gain boosts milk production for offspring, thus resulting in heavier and healthier fawns and calves. When big game return to these transition habitats during the late-fall months, improved conditions allow the males to recover from the rut and females to recuperate after weaning their young.



Figure 17. Bighorn National Forest personnel burned 390 acres of mule deer and elk transition habitats last spring. These burns also reduce hazardous fuels and the intensity of wildfires.

Beaver Dam Creek Watershed Beaver Transplants

A contract trapper began efforts to live trap beaver in June, but was unable to find evidence of recent beaver activity on ranches he had trapped in previous years. Landowners were contacted that had previously reported beaver concerns to the Sundance Game Warden. Only one of the contacts seemed promising. All other landowners reported their beaver damage concerns had previously been controlled either through recent trapping, dewatering due to drought, or the suspected occurrence of tularemia. Follow-up assessment of the promising site by the contract trapper found it to be depleted of beaver. In turn, live-trapping efforts were suspended in August due to our inability to obtain beaver for transplant stock.

Bighorn National Forest Stream Rehabilitation Projects

Boy Scout Reach of the South Tongue River

A Bighorn National Forest sponsored cost-share proposal was unsuccessful in 2006. The proposal sought funding from the Department's wildlife trust fund for the proposed stream rehabilitation project at the Boy Scout reach of the South Tongue River (Figure 18). The project was resubmitted for wildlife trust fund funding consideration in 2007. Initial funding recommendations appear more favorable for providing cost-share assistance to the project in 2007.

Dead Swede Reach of the South Tongue River: Photographs originally taken in 2003 at the Bighorn National Forest's Dead Swede rehabilitation reach were retaken in 2006. The project was originally undertaken to narrow the over-widened channel, expand a tight, eroding meander bend, stabilize eroding stream banks, and enhance fisheries habitat. All flow-retard structures, which were intended to reduce erosive forces on banks, appeared to be functioning as intended. Monitoring will be necessary to determine if any structures continue adjusting, and, in turn, widen the stream beyond desired conditions. Stream width,

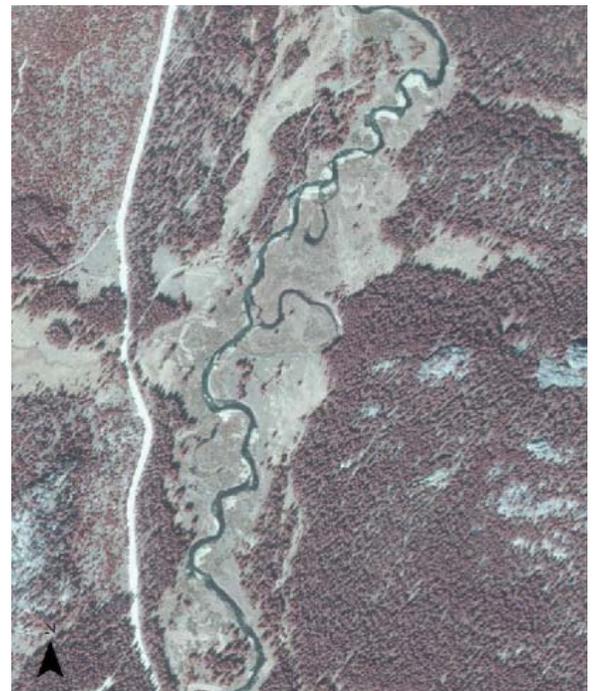


Figure 18. Aerial overview of the South Tongue River depicting the stream reach proposed for rehabilitation efforts during the Boy Scout stream rehabilitation project.

depth, depositional processes, and geometry within the rehabilitated reach appeared to remain within the natural range of variability for the watershed. Some lateral erosion was apparent at the realigned oxbow (Figure 19). Additional monitoring will be necessary to determine if the bank adjustment processes progress further, or if adequate root mass develops to impede the adjustment process. The relatively steep slopes of the banks may limit vegetation development. It is also possible the meander radius could widen, which may lead to increased bank stability.



Figure 19. Bank conditions at a segment of the realigned oxbow bend at the Dead Swede rehabilitation reach on the South Tongue River. The photo on left was taken shortly after realignment in 2003 and on right in 2006.

Upper North Tongue Stream Improvement: In 2006, some stream adjustment occurred in a cooperative stream improvement project reach on the North Tongue River the Department and Bighorn National Forest completed in 1983. An avulsion created a new channel segment along an area that was previously floodplain (Figure 20). The abandoned channel contained several plunge pool structures. Initial coordination with Forest personnel indicated additional monitoring would be desirable to assess if the adjustment warrants corrective measures since streams adjust naturally. Some adjustment is necessary to rejuvenate some riparian plants and sustain healthy and diverse riparian habitats over time. Hence, no immediate plans exist to rehabilitate the avulsion. Rather, the Department will work with the Forest to determine if removing the abandoned structures or other rehabilitation efforts (e.g., placing grade control in the new channel) will be necessary.



Figure 20. The new channel created by an avulsion in a segment of the upper North Tongue stream improvement project reach. The abandoned channel appears in front of the new channel.

Welch Ranch (Interstate) Diversion on the Tongue River

Discussions were initiated with representatives of the Interstate Ditch Company relative to pursuing a fish passage project at the Interstate Diversion Dam on the Welch Ranch property. The president of the ditch company was receptive to investigating a passage project provided the Department could protect all members' interests in the diversion. Other members appeared more reluctant. More trust building will be necessary.

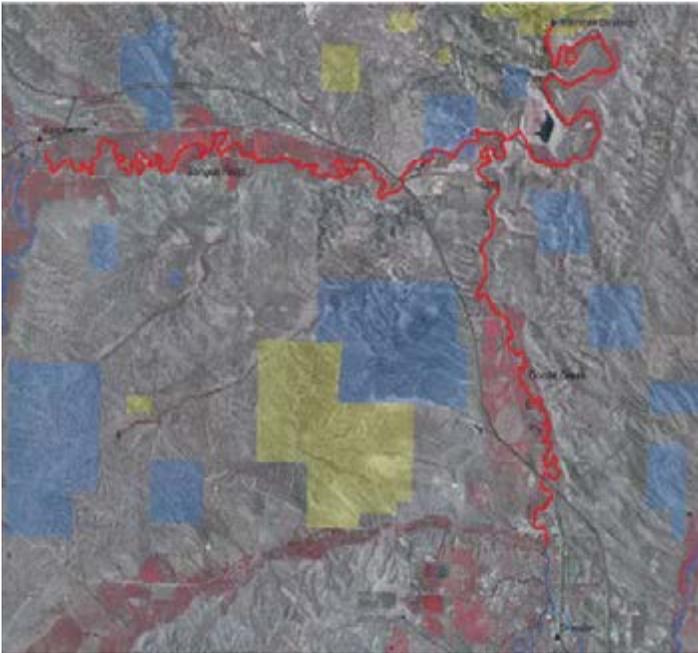


Figure 21. Portions of the stream segments on the Tongue River and Goose Creek depicted in red could be made available to sauger and channel catfish by implementing a passage project at the Interstate Diversion Dam.

Questioning persists among fisheries personnel relative to establishing fish passage at the dam. Conceptually, 26-miles of the Tongue River (to Ranchester) and 12-miles of Goose Creek (to Sheridan) could be made available above the dam for use by migratory sauger, channel catfish, and perhaps other species (Figure 21). But, it is unknown how much of the 38 total miles of stream may provide suitable habitat for these species. Further, the current situation may isolate a resident sauger population above the dam from walleye or potentially walleye-introgressed sauger populations within the lower Tongue River and Tongue River Reservoir. Establishing passage to upper segments of the Tongue River may not be prudent if the potential for competition or hybridization increases. Although no sauger were found above the dam during minimal sampling efforts in 2006, it is conceivable some sauger may pass the dam during some flow conditions. Additional surveys will occur in the future to assess the status of existing sauger and walleye populations above and below the dam and the timing of spawning.

Sage Grouse Winter Habitat Selection And Coal Bed Natural Gas Development

Assistance was provided to University of Montana researchers, Dr. Dave Naugle, Kevin Doherty and Brett Walker, to spatially depict sage grouse winter habitat suitability in a GIS format to assess if these habitats are limited. The researchers also generated a robust statistical model for sage grouse winter habitat selection while determining the importance of scale; and assessed if sage grouse winter habitat selection is being effected by the introduction of coal-bed natural gas (CBNG) development.

In a paper produced by the researchers, they justified the research because relatively little emphasis has been placed on wintering habitat selection for sage grouse. Many studies have shown sage grouse to have high over-winter survival rates, thus assumptions were made that wintering habitat was not limiting. However, recent land use change in the form of CBNG gas has caused drastic changes to sagebrush habitats within the Powder River Basin, thus prompting the study into sage grouse wintering habitat use.

Preliminary results show that a large portion of the Powder River Basin has a low probability of use for wintering sage grouse, thus the area of suitable wintering habitat may be limiting to sage grouse (Figure 22). Habitat analysis also showed that sage grouse wintering areas are currently undeveloped by CBNG. Given that high quality wintering habitats are a small proportion of the total landscape and that many of these areas are in direct proximity to CBNG development, the researchers recommended that land managers should exercise caution in development until effects of CBNG on winter habitat use are understood. Assistance was also provided to the researchers in ground-validating a land cover/habitat map (used in the above model) derived from SPOT satellite sensors.



Figure 22. University of Montana researchers have shown that a large portion of the Powder River Basin has a low probability of use for wintering sage grouse, thus the area of suitable wintering habitat may be limiting to sage grouse.

A presentation was given to participants of the Lake DeSmet Conservation District's Science Summit. This year the theme of the conference focused on what local communities can do to preserve and enhance sage grouse habitats.

Burn Hollow Management Area Sagebrush And Club Moss Treatment

The WGFD provided their Dixie harrow to the BLM to treat sagebrush and club moss-dominated rangelands on their Burnt Hollow Management Area (BHMA). The BHMA is located in Campbell County about 17 miles north of Gillette. Approximately 150 acres were treated with the objective of improving rangeland conditions while reducing fuels (Figure 23). The mechanical treatment was also used to create fuel breaks at the perimeter and within selected sagebrush stands to reduce the potential for catastrophic loss from wild land fires.



Figure 23. The Dixie harrow was used to reduce the canopy cover of club moss (shown above) to increase herbaceous production and create opportunity for sagebrush seedling establishment. The club moss mat seals the soil surface and inhibits perennial vegetation establishment and production.

Shrub Monitoring In The WGFD Sheridan Region

Shrub monitoring was initiated in the Sheridan Region in 2004 so district biologists and wardens could collect baseline habitat trend data to monitor “key” or “indicator” areas that appear to reflect what’s occurring within the larger area and where the vegetation community may show reactions or changes to population management. These data are used to justify season recommendations and population objectives.

Nine Wyoming big sagebrush transects and one curl-leaf mountain mahogany transect were established (Figure 24). In addition, 10 willow transects are monitored by the U.S. Forest Service on the BNF with occasional assistance from WGFD district and habitat biologists.

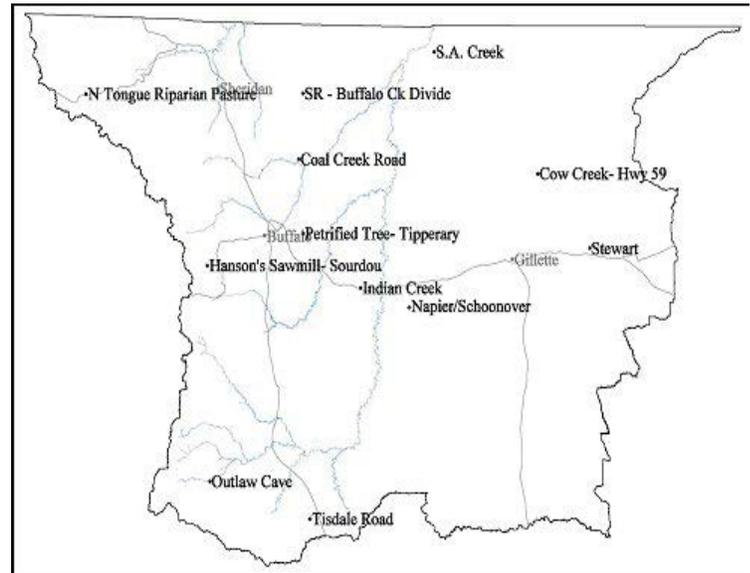


Figure 24. Location of Sheridan Region 2004-05 Shrub Transects.

Results of big sagebrush monitoring in 2006 (Table 2) shows that leader production averaged 2.22 cm (range 1.77 – 2.71 cm). While production was much better than the drought year 2004 (average of 0.50 cm), production fell well short of the 2005 average of 6.35 cm... a year when significant moisture fell during the early growing season.

Table 2. Sheridan Shrub Transect Summaries

<i>Transect</i>	<i>Production Year</i>	<i>Shrub Species</i>	<i>Average Leader Production (cm)</i>	<i>Average Leader Production (in)</i>	<i>Average Percent Leaders Browsed</i>	<i>Average Stand Age</i>	<i>Average Hedging Score</i>
Coal Creek	2004	Wyoming Big Sagebrush	1.17	0.46	2.0	2.92	1.02
Coal Creek	2005	Wyoming Big Sagebrush	6.99	2.75	1.0		1.76
Coal Creek	2006	Wyoming Big Sagebrush	2.13	0.84		2.30	1.92
Cow Creek	2004	Wyoming Big Sagebrush	0.20	0.08	2.0	2.42	2.00
Cow Creek	2005	Wyoming Big Sagebrush	3.29	1.29	1.0		1.51
Cow Creek	2006	Wyoming Big Sagebrush	3.11	1.23		2.04	1.24
Indian Creek	2004	Wyoming Big Sagebrush	0.03	0.01	0.0	2.10	1.00
Indian Creek	2005	Wyoming Big Sagebrush	19.66	7.74	5.0		
Indian Creek	2006	Wyoming Big Sagebrush	1.77	0.70			1.76
Napier/Schoonover	2004	Wyoming Big Sagebrush	0.38	0.15	11.0	2.70	2.00
Napier/Schoonover	2005	Wyoming Big Sagebrush	3.53	1.39	17.0	2.15	1.76
Outlaw Cave	2004	Curleaf Mountain Mahogany	0.55	0.22	5.0	2.11	2.06
Outlaw Cave	2006	Curleaf Mountain Mahogany	1.54	0.60		2.16	2.04
SA Creek	2004	Wyoming Big Sagebrush	0.36	0.14	0.0	2.77	2.00
SA Creek	2005	Wyoming Big Sagebrush	3.83	1.51	3.0		
SR-Bufferlo Divide	2004	Wyoming Big Sagebrush	0.68	0.27	4.0	2.40	1.00
SR-Bufferlo Divide	2005	Wyoming Big Sagebrush	3.71	1.46	9.0	1.94	1.62
SR-Bufferlo Divide	2006	Wyoming Big Sagebrush	2.71	1.07		2.24	1.74
Stewart	2004	Wyoming Big Sagebrush	0.48	0.19	20.0	2.29	2.04
Stewart	2005	Wyoming Big Sagebrush	3.44	1.36	15.0		1.59
Stewart	2006	Wyoming Big Sagebrush	1.87	0.74			
Tisdale	2004	Wyoming Big Sagebrush	0.70	0.28	9.0	2.77	2.12
Tisdale	2006	Wyoming Big Sagebrush	1.78	0.70			2.38

Age Class
 1 = young
 2 = mature
 3 = decadent
 4 = dead

Hedging Class
 1 = light or no hedging.
 2 = moderate hedging.
 3 = heavy hedging.

Data indicates that these stands of sagebrush are mature and receive light use by big game (average of 6.6 percent with a range between 0 – 20 percent of the leaders browsed). One curl-leaf mountain mahogany stand is monitored near Outlaw Cave on the Middle Fork Powder River west of Kaycee. Monitoring indicated that average leader production was 1.54 cm, reflecting similar effects of moisture on the plant’s growth potential.

Pellet group counts in 2005 (Table 3) complemented utilization data showing similar results that supported light use in all transect areas. Pellet groups attributed to wildlife included mule deer, pronghorn and sage grouse. Livestock groups were limited to cattle. Overall, the data demonstrates there are no overuse issues associated with big game (at least where transects were established) and that big game hunting seasons should not be influenced by these results.

Table 3. Pellet Group Count Summaries

<i>Transect ID</i>	<i>Date</i>	<i>Species</i>	<i>Average Pellet Groups per Acre</i>
Coal Creek	4/25/2005	DEER, MULE	60
	4/26/2005	COW, DOMESTIC	100
	5/ 2/2006	COW, DOMESTIC	240
	5/ 2/2006	DEER, MULE	10
	5/ 2/2006	PRONGHORN	30
Cow Creek	4/26/2005	COW, DOMESTIC	80
	5/12/2006	COW, DOMESTIC	40
Indian Creek	4/19/2005	PRONGHORN	10
	5/17/2006	DEER, MULE	40
	5/17/2006	PRONGHORN	40
Napier/Schoonover	5/17/2006	sage grouse	
	3/ 5/2005	COW, DOMESTIC	90
	5/ 3/2005	DEER, MULE	80
	5/11/2006	COW, DOMESTIC	260
	5/11/2006	DEER, MULE	160
Outlaw Cave	5/11/2006	PRONGHORN	40
	4/18/2005	COW, DOMESTIC	30
	4/18/2005	DEER, MULE	80
Petrified Tree	5/18/2006	DEER, MULE	240
	4/19/2005	COW, DOMESTIC	100
	4/19/2005	DEER, MULE	70
	5/ 2/2006	COW, DOMESTIC	30
	5/ 2/2006	PRONGHORN	40
SA Creek	5/ 2/2006	RABBIT	60
	5/ 3/2005	COW, DOMESTIC	80
	5/19/2006	COW, DOMESTIC	70
	5/19/2006	DEER, MULE	10
SR-Buffer Divide	5/19/2006	ELK	0
	4/25/2005	COW, DOMESTIC	30
	4/25/2005	DEER, MULE	80
Stewart	5/ 2/2006	DEER, MULE	10
	5/ 2/2006	PRONGHORN	140
	5/ 2/2006	RABBIT	20
	4/25/2005	COW, DOMESTIC	30
	4/25/2005	PRONGHORN	60
Tisdale	5/12/2006	COW, DOMESTIC	60
	5/12/2006	DEER, MULE	160
	4/18/2005	COW, DOMESTIC	50
	4/18/2005	GROUSE, SAGE	40
Tisdale	4/18/2005	PRONGHORN	50
	5/17/2006	DEER, MULE	100
	5/17/2006	PRONGHORN	100

HABITAT EXTENSION SERVICES

This year, 17 landholders and consultants (that work with private landholders) were assisted with their wildlife habitat enhancement and protection projects. These included helping ranchers mitigate the detrimental effects of coal-bed natural gas development and making reclamation recommendations such as seed mixes, livestock grazing strategies for enhancing wildlife habitats, pheasant management plans and food plot establishment, and seed mix recommendations for wildlife habitat enhancement. Specific projects include:

Falxa Ranch Management Planning And Prescribe Burns

The Falxa Ranch, WGFD, NRCS and Rocky Mountain Elk Foundation (RMEF) are cooperatively developing plans and funding habitat enhancement projects on the 2,139-acre mountain property of the Falxa Ranch. So far the group has cross-fenced the property to create three separate pastures. This enabled the owner to establish a three-pasture rotation, where he strives to achieve positive Grazing Response Index (GRI) values. The GRI was developed by the Colorado State University Range Extension Program to achieve the recovery of plants after grazing. Previously, summer-long grazing practices had allowed mountain big sagebrush to dominate the site (crown closures of approximately 30-40%), thus restricting grass/forb abundance and diversity. Current grazing management has improved rangeland conditions and enhanced riparian and wet meadow habitats.

In May of 2001 (after the grazing program was in place), the RMEF and WGFD funded a prescribed burn within one of the three pastures, with the objective of burning a different pasture every 5-7 years. This summer the burned pasture was examined with Rick Pallister, the RMEF's Wyoming Field Director, to determine if the area is ready for additional burns. As shown in Figure 25, mountain big sagebrush plants have re-occupied the site. We also found that forb diversity greatly exceeds adjacent un-treated sites. We are now ready to treat the second pasture. Grant proposals were submitted to the RMEF and Wyoming Governor's Big Game License Coalition (WGBGLC) to fund this second phase.



Figure 25. This picture shows how previous burns are recovering. After just five years, mountain big sagebrush plants are re-occupying the site and forb diversity is much better than un-treated sites.

The Falxa mountain pasture is within 1/3 mile of crucial elk winter ranges and provides yearlong habitat for mule deer. The site also provides important brood-rearing habitat for migrant sagegrouse. Consequently, treatment prescriptions will be carefully designed and tailored to these species. The objective is to open small patches within the sagebrush-dominated landscape by creating a mosaic of early-seral conditions. Wildlife use, especially elk and deer have increased due to management changes and burning. The Falxa family also requires that the outfitter allow free access for cow elk hunting.

Habitat Extension Service Contacts and Technical Assistance

Technical assistance was requested from Natural Resource Conservation Service (NRCS) personnel on several projects. Three requests involved reviewing landowner-sponsored projects designed by NRCS, which, among other goals, were intended to provide fish passage at existing irrigation diversions. These included diversions on upper Prairie Dog, Stockade Beaver, and South Piney creeks. Also, the Buffalo NRCS requested information on aquatic resources and the Department's habitat priorities within the Clear Creek watershed for consideration during the development of a watershed assessment project.

A reservoir rehabilitation project proposed at the Hansen walk-in fishing area was postponed because the Weston County NRCS was unsuccessful in securing cost-share funding to match available Private Lands Public Wildlife program habitat funds. The NRCS will pursue funding again in 2007.

A project led by the Newcastle Wildlife Biologist and other interests was initiated to explore options to rehabilitate two reservoirs on upper Plumb Creek. Additional assistance with the preparation of cost-share funding proposals is anticipated in the future once rehabilitation plans are available.

Advice and informational materials were provided to three other landowners or managers regarding potential projects on Piney, Big Goose, and McCormick creeks. Follow-up requests for cost-share assistance are not expected due to the limited scale of their requests, or reluctance to provide opportunities for sportsperson benefits in return for cost-share assistance.

A tour was completed of segments of the Fiddleback allotment on the Thunder Basin National Grasslands with Casper habitat personnel, a Thunder Basin National Grasslands representative, and the allotment permittee. The intent was to discuss options for future habitat restoration efforts. Two restoration strategies – controlling cheat grass infestations and fencing riparian habitats to provide prescribed grazing management and gain passive restoration – appeared to warrant further investigation. Overcoming some grazing management challenges will be necessary before these restoration strategies can be pursued further.

Fish Passage at Low-Head Diversion Dams

A cooperative research project was initiated with the United States Bureau of Reclamation (USBR) and Natural Resources Conservation Service (NRCS) to assess passage by various fish species at some commonly constructed low head diversion dam designs. The goal was to develop guidance for diversion dam designs that accommodate both game and nongame fish movements past the dams. A stepped boulder structure at the Frank Hopkins diversion on Clear Creek (Figure 26), which was constructed recently to reduce the annual maintenance necessary of a former push-up dam, was selected for evaluation during the project. A stepped sheet-piling structure is also being assessed in the Green River region as part of the statewide project.



Figure 26. The stepped cross vane diversion structure at the Frank Hopkins diversion on Clear Creek.

Fish movement assessments using mark and recapture techniques were initiated in spring during the spawning migrations of various species to determine if fish were currently passing the stepped rock structure. Twelve species were captured above and below the structure. These assessments will be concluded in 2007.

In fall, USBR and NRCS personnel initiated a series of flow and topographic assessments at the structure. Additional surveys will be completed in 2007 at different flow conditions to calibrate hydraulic models of the structure. In turn, various design modifications will be tested in the laboratory to assess their effectiveness at allowing passage by various fish species over a range of flow conditions. In the end, guidelines will be developed and made available to landowners regarding options to rehabilitate small diversions that will meet their water delivery needs while accommodating the natural movement requirements of fish to spawn or seek thermal refuges during low flow conditions.

OUTLAW CAVE WILDFIRE EFFECTS ON CRUCIAL MULE DEER WINTER RANGES

Gretchen Meyer, Natural Resource Specialist with the BLM, analyzed Landsat satellite sensor data to delineate what had burned in the Outlaw Cave wildfire. WGFD personnel used these data to calculate what vegetation actually burned (using a Landsat-derived land cover map). Biologists were concerned that the wildfire had removed a substantial amount of curl-leaf mountain mahogany, a valuable winter-browse species.

We estimated the fire burned 11,574 acres, of which 815 acres were curl-leaf mountain mahogany within crucial mule deer winter ranges (Herd Unit 322). This amounted to a 7 percent loss during this single event (Figure 27). In 1996, we found mahogany to be crucial to mule deer within the Middle Fork Powder River area. While comprising only 5.4 percent of the landscape, curl-leaf mountain mahogany accounted for 75 percent of the discerned fragments from mule deer fecal samples. The density of mule deer pellet groups within this type affirmed this preference. Average pellet groups per acre approximated 427.0, for an average days use per acre of 32.8.



Figure 27. Over 7 percent of the curl-leaf mountain mahogany occurring on crucial mule deer winter ranges in Herd Unit 322 burned this summer. In some areas (as shown in this picture), it was entirely removed.

Lake DeSmet Conservation District Clear Creek Stream Rehabilitation Project

Cost share assistance was provided to the Lake DeSmet Conservation District to implement phase-2 of stream rehabilitation efforts on Clear Creek along the Buffalo pathway system. The work, which was completed by a contractor during the fall (Figure 28), included in-stream alterations to:

- increase pools
- stabilize point bars
- protect streambanks with flow-retarding structural configurations that direct shear forces away from banks
- increase floodplain connectivity with bankfull benches at strategic locations,
- narrow the channel
- restore bedload movement dynamics (e.g., focus flow to maintain sediment transport through pool habitats, increase substrate sorting to create potential spawning glides),
- concentrate flows in strategic locations to increase physical habitats available for trout during low flow periods (multistage channel)

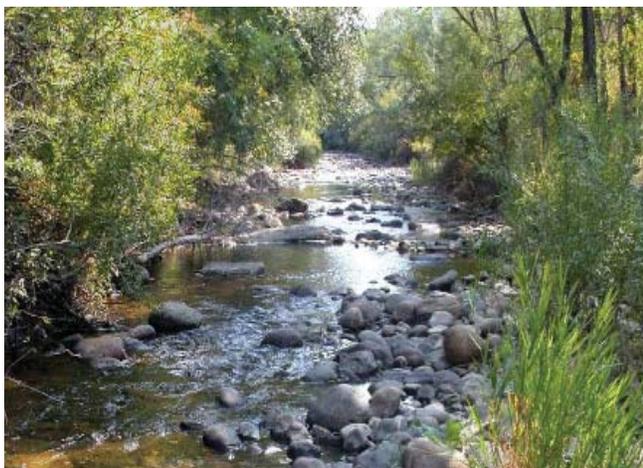


Figure 28. Clear Creek within the phase-2 stream rehabilitation reach before (left) and after (right) the implementation of rehabilitation work.

Other contributors included the Lake DeSmet Conservation District, who provided funding and in-kind cost-share contributions through funding administration, and the City of Buffalo, which contributed funding for contractual services and the boulders used to construct the flow-retard structures included in the project. Additional monitoring is being completed by the Department to assess the response of the fishery. These monitoring efforts will continue in 2007.

Lake DeSmet Conservation District Diversion Rehabilitation Project

Work was completed in fall to rehabilitate three diversion structures on Clear and Rock creeks near Buffalo (Figure 29). The Department provided cost-share assistance to implement the rehabilitation projects through a grant from the wildlife trust fund, and helped secure additional funding from the Wyoming Governor's Big Game License Coalition. Additional funding came from the Wildlife Habitat Incentive Program administered by the Natural Resources Conservation Service (NRCS) and the diversion operators. Rehabilitation entailed replacing push-up dams with a series of stepped, permanent structures considered to be less obstructive to the movements of aquatic species, and less detrimental to streambank stability at the diversion site. The Lake DeSmet Conservation District administered funding for the projects and the Buffalo NRCS led all landowner contacts associated with the efforts. A private contractor implemented the diversion rehabilitation projects. Through the demonstration value of the completed rehabilitation projects, the hope exists that additional landowners will participate in the program to alleviate the annual maintenance associated with push-up dams. The Department's objectives to restore fish passage and stream stability would be addressed concurrently.



Figure 29. The rehabilitated Clear Creek Land and Ditch Company diversion structure (top) and Redman diversion structure (middle) on Clear Creek, and the Prince Albert and Ono diversion structure (bottom) on Rock Creek.

Army National Guard Sheridan Local Training Area

Assistance was provided to Tim Thomas, the WGFD Sheridan District Biologist, with providing comments concerning the Army National Guard's Integrated Natural Resources Management Plan (INRMP) for the Sheridan Local Training Area (LTA).

Comments focused on our concerns about the environmental effects of inappropriate livestock grazing on the Sheridan LTA. In 1995, the NRCS conducted a range survey at the request of the grazing permittee. The survey results showed that 73 percent of the Sheridan training facility had a range condition of only "fair". Twenty-six percent of the area was in "poor" condition, while only 1 percent was determined to be in "good" condition. None of the range sites on the 3,960-acre Sheridan LTA were in "excellent" condition. In view of this, it's understandable why neighbors, some publics and natural resource agencies are disappointed with historic livestock management on this area (Figure 30).



Figure 30. This picture shows livestock overgrazing that's occurring adjacent to water sources on the Sheridan LTA.

We hope to work with the Army Guard to improve wildlife habitats and to enhance recreation opportunities on this WGFD Hunter Management Area. Dr. Roy Roath, a range extension specialist from Colorado State University, was given a tour of the area. Dr. Roath will be available to provide assistance with developing a grazing management program.

Black Hills National Forest - North Bear Lodge Watershed Inventory

Reconnaissance efforts were completed in the Deep, East, Pine, and Beaver Dam creek watersheds within the Bear Lodge Ranger District of the Black Hills National Forest to assess the suitability of riparian resources to support beaver populations. These efforts were shared with Bear Lodge Ranger District personnel to hasten the assessments. Four criteria were used to prioritize watersheds for beaver transplant consideration. These included relative availability of water (e.g., persistent flow, stream area), availability of suitable vegetation resources within or in close proximity to riparian zones, availability of potential refuges (e.g., existing ponds) that might facilitate beaver remaining in the watershed, and proximity of the suitable watershed segments to private lands where damage situations might develop. The Beaver Dam Creek watershed was ranked the highest priority for transplant consideration, followed by the upper reaches of the Pine Creek watershed (Figure 31). East and Deep creeks were found unsuitable for beaver transplants at this time due to limited woody riparian vegetation.

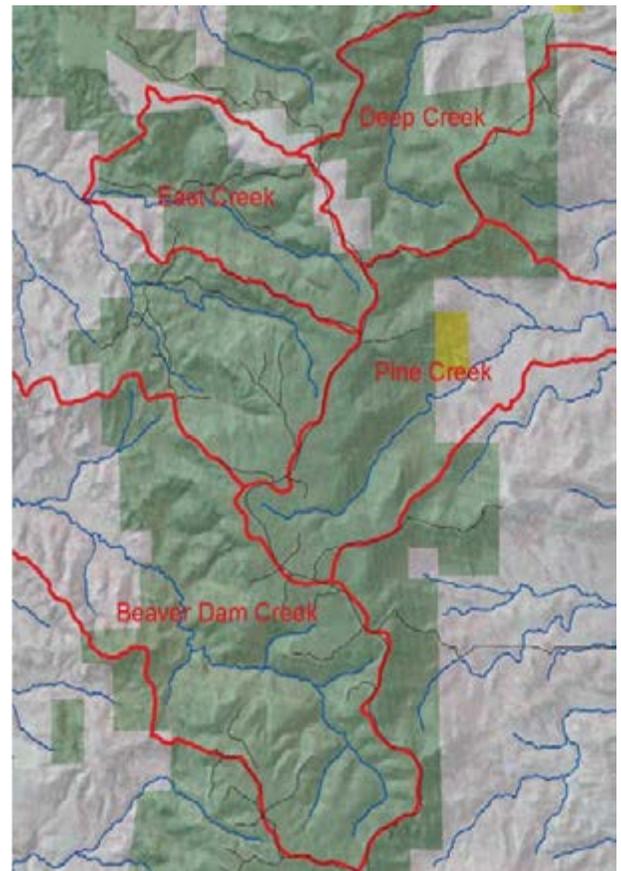


Figure 31. Location of watersheds considered for beaver transplant projects on the north end of the Bear Lodge Ranger District of the Black Hills National Forest.

BLM And WAFWA Livestock Grazing Bmp Technical Group Participation

The Western Association of Fish and Wildlife Agencies (WAFWA) requested development of Best Management Practices (BMPs) for livestock grazing in sagebrush steppe and other habitats used by sage grouse at the July 2004 WAFWA meeting. WAFWA's goal of developing livestock grazing BMPs was conveyed to the BLM at the 2004 WAFWA winter meeting. At approximately the same time (November 2004), the BLM issued its National Sage Grouse Habitat Conservation Strategy that included a specific action (Action 1.4.3) to "Develop and issue livestock grazing BMPs to restore, maintain and enhance the quality of sage grouse and sagebrush habitat."

The WAFWA and BLM decided to commence the development of BMPs by creating a technical committee of experts. They also decided that BMPs must consider local conditions and the Wyoming Basins ecoregion was selected as the pilot site. Considerable time was spent serving on this technical committee to develop a synthesis of literature to create science-based BMPs. The synthesis used the BLM National Science and Technology Center's literature review of livestock grazing impacts on sagebrush ecosystems. The resulting synthesis contained vegetation and grazing objectives grouped by seasonal habitat components for sagegrouse.

WILDLIFE HABITAT MANAGEMENT AREAS

Kerns, Amsden Creek, Bud Love and Ed O. Taylor WHMA's

A considerable number of habitat enhancement projects occurred on the WHMA's within the WGFD Sheridan Region.

The Habitat and Access Section used a range pitter to treat 300 acres on the Kerns WHMA (see Figure 32). This implement creates large divots that capture moisture and stimulates forage production by breaking up sod-bound grasses. The treatment occurred on the TR Bench portion of the habitat area, which is the preferred winter foraging area for 650 elk. This habitat area has always been precariously close to having inadequate food supplies.



Figure 32. Approximately 300 acres were treated with a range pitter on the Kerns WHMA.

Two hundred acres of grassland, ninebark and chokecherry shrubs were also burned on the Kerns WHMA. The fire treated an area directly above TR Bench. That same spring, 300 acres of grasslands were burned on the Bud Love WHMA, which winters approximately 500 elk (see Figure 33). The WGBGLC, RMEF and WGFD Trust Fund provided the dollars to hire a contractor to conduct the burns.



Figure 33. Over 300 acres were burned on the Bud Love WHMA in the spring of 2006.

Wildfires occurred on both the Kerns and Ed O. Taylor WHMAs this year. The man-caused fire on the Kerns WHMA had minor consequences and was quickly extinguished. Some damage occurred to a portion of the elk-fence however.

A lightning strike caused an 11,574-acre wildfire that started on the Ed O. Taylor WHMA (see Figure 27 and 34). This wildfire burned 2,980 acres of the 10,158-acre habitat area. Most of these acres had previously been prescribe-burned and/or burned in another wildfire, which have occurred since 1999.

Bow Hunters of Wyoming and the WGBGLC provided funding to purchase a solar array and pump to provide water to the southern portion of the Bud Love WHMA (see Figure 35). Mike Brogan from the Casper BLM office provided the technical assistance to our Habitat and Access Maintenance supervisor to install the unit. This well will intermittently produce one gallon per minute of water during the warmer months for deer, antelope and other wildlife.



Figure 35. A solar array and pump were installed on the Bud Love WHMA to provide water for mule deer, pronghorn antelope and other wildlife.

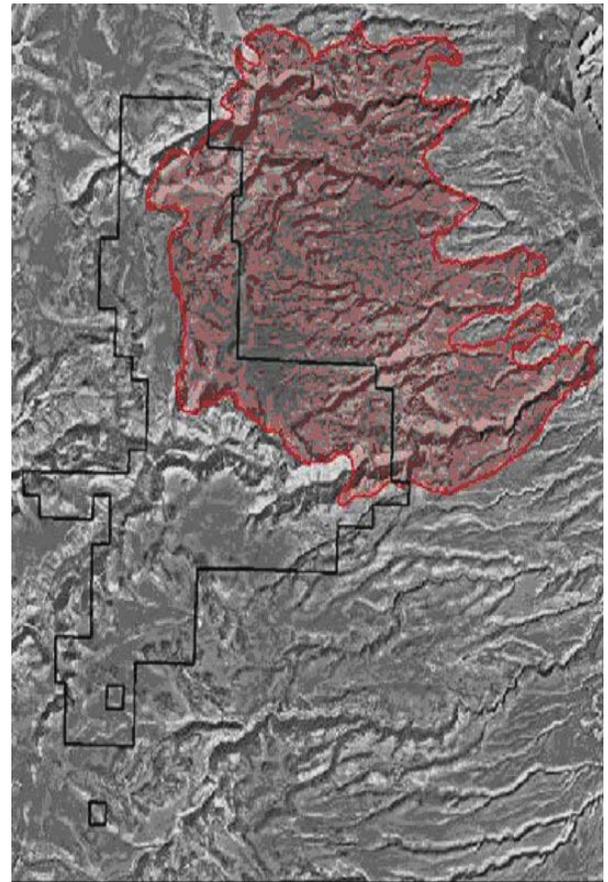


Figure 34. The 11,574-acre Outlaw Cave wildfire (shown in Red) burned 2,980 acres of the Ed O. Taylor WHMA (black polygon) this year.

Sand Creek Public Fishing Area Management

The Aquatic Habitat Biologist coordinated plans for livestock turn-in on the Sand Creek Access Area with the grazing lessee. Three hundred twenty pairs were grazed May 21 to June 2. Actual use was about 138 animal unit months (AUM) using a direct one pair per animal unit conversion. As per the request of Habitat and Access personnel, the rationale for the current grazing management regime was documented for the purpose of keeping records.

Reedem Report

A report was prepared and distributed that details the success of using the herbicide Reedem in controlling Canada thistle in cool-season grasses and riparian habitats. After removing thistle, native warm season grasses and forbs were capable of re-establishing.

WHAM Surveys

Completed WHAM level-1 assessments along the West Fork of the Little Bighorn River from the mouth to Deer Park, and along Wolf Creek above Wolf, WY while accompanying fisheries management personnel documenting potential natural barriers to the upstream movements of fish.