2004 Annual Report

Strategic Habitat Plan Accomplishments

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

Wyoming Game and Fish Department

April 2005

2004 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 single greatest challenges facing the Wyoming Game and Fish Department in the 21st century will be our ability to maintain sustainable fish and wildlife populations. This challenge can be met by addressing habitat needs and issues that seek to maintain open spaces, quality habitats and the ability of fish and wildlife to utilize these areas. Many habitat types are imperiled or at-risk. Potential impacts to fish and wildlife habitats 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 has 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 these species one species at a time is impractical over the long-term. To effectively answer these challenges, there is a great need for the Department to be collaboratively involved in habitat-related decisions at a landscape level on public lands and to work with private landowners on private lands throughout Wyoming.

In recognition of this need, The Wyoming Game and Fish Commission adopted a strategic habitat plan in 2001. The plan has three primary goals as follows:

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 Commission lands.

Each goal is accompanied by a number of objectives and strategies designed to achieve that goal. These goals and strategies were developed by an inter-divisional, inter-disciplinary team, and were designed for implementation collaboratively across division lines, and with a multitude of partners. It is of paramount importance that habitat conservation in Wyoming be extended to the landscape/watershed level, working collaboratively across organizational lines within and outside the Department, and across political and legal boundaries on the ground.

The material addressed in this report discusses the implementation. We are approaching habitat conservation based on the land itself and the needs of all the wildlife and people who depend on it. This requires a great deal of teamwork and a broader view of our responsibilities. Plan implementation represents not a reorganization of the past, but a bold step into the future.

The purpose of this 2004 annual report is to highlight information and documentations to the Wyoming Game and Fish Commission and other interested parties about the activities of the Terrestrial Habitat, Aquatic Habitat, and the Habitat and Access Maintenance programs of the Department as well as associated portions of the Lands Administration program. The report includes actions, activities, and on-the-ground accomplishments of personnel within the four programs toward implementing the Strategic Habitat Plan. We have also included a compilation of funding sources and expenditures to accomplish the mission and vision of the Strategic Habitat Plan. This was compiled by approximating Department expenditures from the Trust Fund Account, Walk-In Area Habitat Enhancement Program, maintenance and operation budgets used for habitat development and maintenance less personnel and equipment costs, Farm Bill Program funds that include incentive payments and 10 to 15 year annual rental/lease payments from USDA/NRCS/FSA, funds from other federal or state agencies, funds from non-governmental organization, and finally funds from private landowners or managers, including in-kind services. In addition, several statewide programs related to the Strategic Habitat Plan are included in the analysis. These programs involved technical assistance and education regarding range and habitat condition and health relative to livestock and big game grazing and workshops for private landowners and managers,another program for sagebrush management including land cover information derived from

remote sensed satellite imagery, riparian management and tall forb communities, development of a GIS decision support system for the Department and an effort related to the conservation of prairie stream systems. This information is
summarized on a statewide basis below (Figures are rounded to the nearest $1,000):

Approximate Wyoming Game and Fish Department funds expended for Strategic Habitat Plan Goals 1, 2, and 3 during 2004: **$1,585,000**

Non-Department funds allocated/expended for Strategic Habitat Plan Goals 1 and 2 during 2004:

- Farm Bill Government Funds (USDA/NRCS/FSA): $193,000
- Other Federal Government Funding Sources: $1,156,000
- Other State & Local Government Funding Sources: $126,000
- Non-Government Organizations and Groups: $660,000
- Private Landowners Contribution (includes in-kind): $220,000

- Non-Department Subtotal for Goals 1 and 2: **$2,355,000**

Non-Department fund allocated/expended for Strategic Habitat Plan Goal 3 during 2004:

- Other Federal Government Funding Sources: $22,000
- Other State & Local Government Funding Sources:
- Non-Governmental Organizations and Groups: $51,000
- Private Landowners Contribution (includes in-kind) $20,000

- Non-Department Subtotal for Goal 3: $93,000

Subtotal Non-Department Funds: $2,448,000

Grand Total for Goals 1, 2, and 3: $4,033,000

We hope this Strategic Habitat Plan report provides the Commission, the general public, interested constituents, landowners, partners, and cooperators with meaningful and useful information relative to habitat projects, activities, and functions locally and on a statewide basis. Without your cooperation, input, communication, and support, wildlife conservation in Wyoming would be impossible. We believe “habitat” and “open spaces” are the keys to maintaining wild and healthy populations for aquatic and terrestrial wildlife. We greatly appreciate your assistance and support and look forward to working with you to accomplish even more next year.

Please contact any of the personnel listed for additional information. Also, please feel free to share this report or request additional reports for anyone who may be interested in the Department’s habitat efforts.

LANDS ADMINISTRATION BRANCH

Implementation of the Department's Strategic Habitat Plan (SHP) continues to be a function of a position in the Lands Administration Branch. Directed by Goals and Objectives of the SHP, the focus of the lands position is to acquire property rights by application of various strategies including fee title purchases, conservation easements, grass banks, leases and other agreements. Also required are monitoring efforts to protect Commission property rights interests, coordination with department personnel, land trust organizations, and with other agencies and entities.

Among the projects initiated by Lands Administration Branch personnel during the year was the drafting of a Land Conservation Strategy document with a Conservation Easement section.

PROJECTS

Land Conservation Strategy - The Land Conservation Strategy document was drafted to provide department personnel with information about the various options and processes available to the department to acquire and dispose of property rights. Portions of the document may be used on the Department's website or in other public information efforts. Within the document there will be discussions of the SHP, Habitat and Access Evaluation Process, Chapter 57, Commission Policy for Less Than Fee Title, conservation easements, and other property rights issues. It will detail the necessary requirements and steps to acquire or dispose of property rights. Examples of the forms needed to nominate and evaluate potential property rights proposals will be included. Property rights inventory and other information will also be incorporated in the document. The document will be distributed sometime in 2005.

Rawhide – Several projects have been initiated to acquire additional habitat and to improve recreational opportunities. A road easement was acquired from the State Land Board to provide public access to the south side of the WHMA. The Two Shot Goose Hunt donated funds to help develop the road and a parking area. Acquisition of adjacent private and federal lands was investigated, and will be pursued in the new-year.

Medicine Lodge – Regional personnel decided that administration and monitoring problems associated with a part of the WHMA could best be addressed by selling the property. The property was to be sold with a conservation easement that restricted development, and with retention of public access. The project was cancelled due to limitations of time and funds needed to comply with federal aid requirements. A more thorough examination of acquisition information revealed the property was not purchased with federal matching funds. The region will reevaluate the status and direction of the project.

Monitoring – Mexican Creek conservation easement, Breteche Creek conservation easement, Thoman lease, Flying S conservation easement, Carter/Billy Miles access area and conservation easement, Sand Mesa, and Camp Creek properties were monitored during the year.

BLM Grazing Regulation Revision – Reviewed proposed BLM grazing regulations as part of Strategic Habitat Plan Implementation Committee assignment.

Red Canyon – The Department moved closer to developing the public access road and finalizing the exchange of state leases. Job requests to develop the access road and to provide legal descriptions for the state lease exchange were submitted.

North Fork Ranch Conservation Easement – Owners of the North Fork Ranch have proposed to sell a conservation easement on their property near Lander. The property supports crucial mule deer and elk ranges, and important habitat for pronghorn, sage grouse and many other species. The proposal is to cooperatively acquire the conservation easement with The Nature Conservancy. The Department would hold and monitor the easement. Funding for the easement will be sought from numerous sources including the Farm and Ranch Protection Program, Rocky Mountain Elk Foundation, Mule Deer Foundation, Bowhunters of Wyoming, Safari Club International, Wyoming Governors Big Game License Coalition, and others.

TNC-Sunshine Property – The Nature Conservancy proposed to sell some property near the Sunshine Ranch WHMA. The Department investigated the proposal, but determined that deed restrictions to be imposed by TNC were sufficient to protect wildlife habitat resources.

Twin Creek Conservation Easement – The Department proposed donating $10,000 to The Nature Conservancy for the purchase of the Twin Creek Conservation Easement. The Twin Creek Ranch supports important habitat for numerous species including mule deer, elk, pronghorn, sage grouse and others. It also contains quality aquatic resources.

Wind River Wiles – Completed acquisition of the Wiles property along the Wind River. Fee title was secured for a parking area adjacent to the public fishing area.

Coordination – Met with National Wild Turkey Federation to discuss conservation easements; met with Anadarko Petroleum personnel; attended Cody, Sheridan, Lander, Laramie, Jackson/Pinedale Regional Coordination Team meetings; met with TNC personnel (Sunshine, Twin Creek, North Fork Ranch), BLM/Conservation Fund – (North Platte River and Scab Creek projects); attended Land Trust Alliance national meeting; attended Wildlife Society meeting.

CASPER REGION

North Natrona and Bates Hole Shrub Change Detection Project

Digital Environmental Management, Inc. (DEM) completed their contractual agreement. The final classification contains 26 different vegetative communities. The data will be used to document vegetative changes, specifically big sagebrush, over the past three decades, which is partially responsible for the downward trend we have documented in pronghorn, mule deer and sage grouse populations. It will also provide a basic landscape level wildlife habitat inventory of these mule deer herd units. These GIS-based databases will enable personnel to devise habitat improvement plans; strategies and programs for large-scale wildlife habitat restoration efforts; facilitate the development of graphics that will expedite efforts to demonstrate current habitat conditions; and provide visuals to gain public support for large-scale habitat restoration efforts. In addition, we have garnered a baseline inventory for monitoring change in landscape features, such as big sagebrush control, mineral development, and other landscape management practices.

Casper Region Shrub Steppe Change Detection Project

Earth Satellite Corporation delivered an initial landcover classification for the Rattlesnake Hills and Thunderbasin mule deer herd units. We began ground-truthing and accuracy assessing the classification during 2004. These efforts will be completed during the spring of 2005, with project completion scheduled for June 30, 2005. This project was initiated because there has been a decline in the extent, distribution and quality of big sagebrush steppe communities in Wyoming over the past 20 to 40 years. Remaining big sagebrush communities are in advanced seral stages with poor understory diversity and cover. During this timeframe, we have documented mule deer, pronghorn and sage grouse population declines. Populations following extreme climactic conditions, primarily severe winters and extended droughts, have not recovered to levels recorded in the 1960's and 1970's, which may be indicative of habitat conditions. Therefore, it is desirable to have an inventory of current land cover, vegetative condition, seral stages of big sagebrush, and understory productivity and diversity. The current land cover will be compared to the past three decades to detect changes over this timeframe. These data will provide a valuable planning tool to identify areas for habitat treatments, rehabilitation of degraded vegetative communities, developing mitigation alternatives and management recommendations on future actions proposed in these areas.

North Platte River Temperature Study: Phase II

The North Platte River habitat assessment between Gray Reef Dam and Dave Johnston power plant was expanded in 2004 to examine the sublethal effects of temperature, macroinvertebrate densities and flow on trout. Temperature data were recorded at several different flows, which will allow us to predict habitat effects on fish at flows ranging from 450 cubic feet per second (cfs) to 2200 cfs, knowing only air temperature and flow release. These data will be compared to data collected at two flow regimes last year.

South Fork Powder River – Murphy Creek Basin-wide Habitat Inventory

The Murphy Creek watershed, which is a tributary to the South Fork Powder River, was inventoried using the level I Wyoming Habitat Assessment Method (WHAM) (Figure 1). The assessment is about three-quarters complete. The lower section of the watershed is yet to be inventoried. From an aquatic standpoint, the Murphy Creek watershed ranks out as a top priority due to the presence of sensitive non-game fish species, development, and a paucity of data collected to date. Most of the streams are intermittent or ephemeral. Usually the soil is too saline to permit riparian sedge growth; a situation exacerbated by tamarisk infestation throughout the watershed. As a result, the dominant bank stabilizing vegetation is grass, so downcutting and low water tables are the norm. Native cottonwood trees are all decreasing as mature specimens die out and are not being replaced by seedlings. Uplands are characterized by cheatgrass infestations often so thick that sagebrush seedlings are precluded from germination and only decadent plants remain.

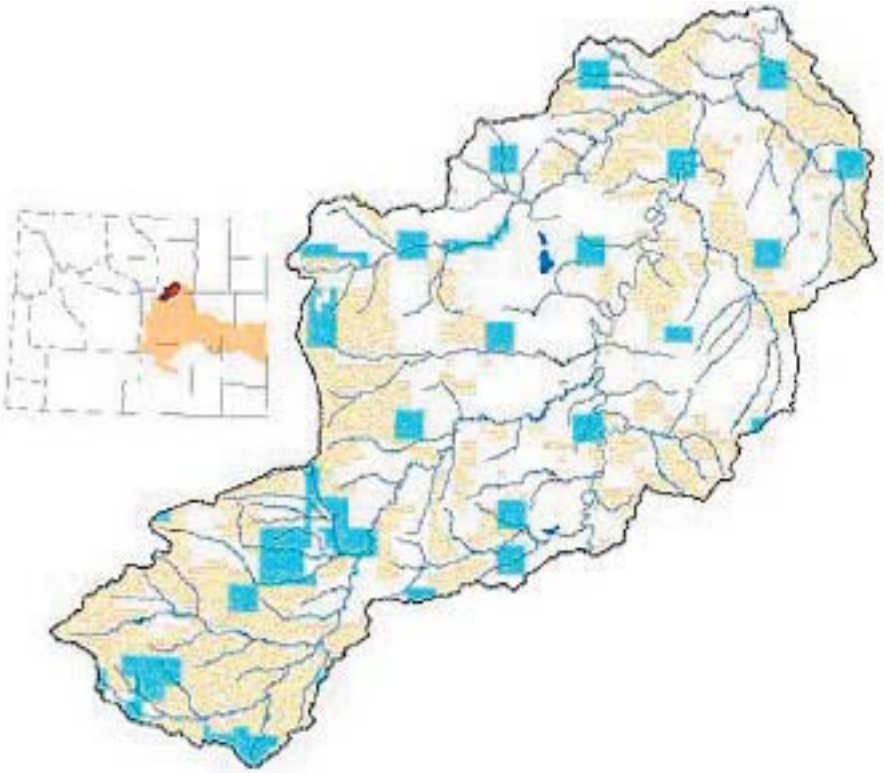


Figure 1. South Fork Powder River - Murphy Creek watershed.

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. At the end of 2004, we had cut approximately 180 acres of conifer (evergreen) trees within existing aspen stands (Figures 2-5). This phase of the project cost $42,218 or $234 per acre. The RMEF, the Mule Deer Foundation, the Wyoming Governor's Big Game License Coalition, Bowhunters of Wyoming, Colorado Interstate Gas, and the WGFD Trust Fund provided funding for the project. Moreover, this project has been coordinated with Miles Land and Livestock Company, Wyoming State Forestry, USFS, BLM, and representatives from the previously mentioned funding organizations (Figure 6).

Figure 2. Aspen stand before treatment.

Figure 3. Aspen stand after treatment.

The next phase is to implement a 700-acre prescribed burn during the spring and/or fall of 2005. We have contracted FireTrax, LLC to conduct the prescribed burn. In addition to the prescribed burn, we intend to continue cutting conifer trees 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 to restore hydrology and natural vegetative processes, which have been

Figure 4. Aspen stand before treatment.

Figure 5. Aspen stand after treatment.

Figure 6. Cooperators tour of the Bates Creek Watershed Restoriation project area.

interrupted primarily through fire suppression. We estimate it will take approximately 16 years to completely treat what we have delineated to date, not withstanding the additional areas on adjoining landowners who have indicated interest in implementing similar techniques on their property.

Casper Region fisheries biologists estimated pre-treatment fish populations within the project area. Rainbow trout (*Oncorhynchus mykiss*) were present to the confluence of Kerfoot Creek and Bates Creek at a density of 812 fish per mile, while brook trout (*Salvelinus fontinalis*) estimates were 597 fish per mile in Bates Creek and 141 fish per mile in Kerfoot Creek. Brook trout persisted wherever there was water, and appeared to survive with much less flow than rainbow trout. A project to evaluate hydrologic response of the watershed to the treatments will be initiated in 2005.

HABITAT PROJECTS

Laramie Range Habitat Initiative Project

True mountain mahogany annual production averaged 0.77 inches during 2004, with a range from 0.14 inches to 1.46 inches. The 0.14 inches were recorded at the Natural Bridge site, the worst ever documented since monitoring efforts began in 2000. Annual growth decreased 41 percent since 2003, and has decreased 79 percent since we began monitoring efforts in 2000. 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 (Figure 7). With this in mind, we intend to contact private landowners during 2005 to determine if there is interest in implementing habitat improvement projects, specifically prescribed burns, within the true mountain mahogany community.

- Overall 79 percent decrease in true mountain mahogany production since 2000.
- True mountain mahogany production declined 41 percent since 2003.
- Since 2000, annual production has declined 95 percent and 68 percent at Natural Bridge and Deer Creek, respectively.
- True mountain

Figure 7. Laramie Range true mountain mahogany stand condition.

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 increase, which indicates detrimental impacts may be occurring to the big sagebrush community (Figure 8). 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.

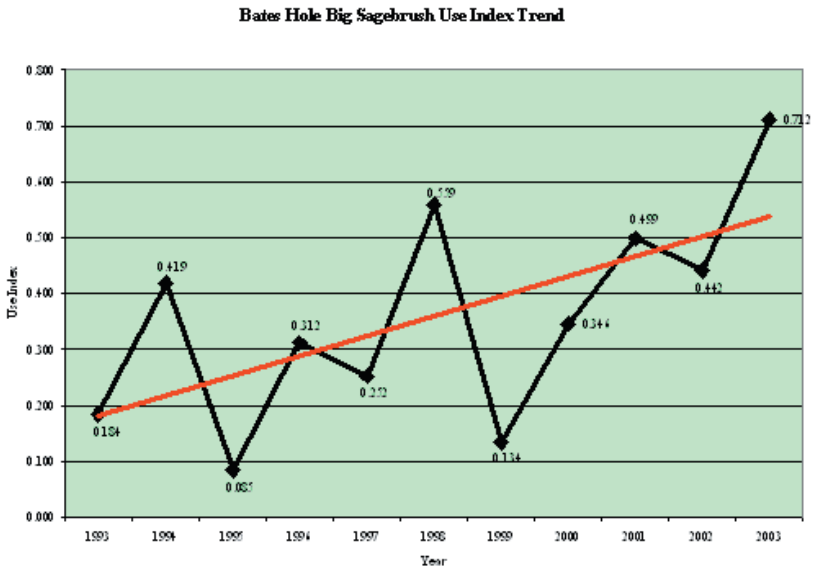


Figure 8. Bates Hole sagebrush use index with trend line.

Big sagebrush production averaged 0.51 inches in 2004, which is 4 percent lower than 2003, but 89 percent better than 2002. Since monitoring efforts began, we have documented a 62 percent decline in big sagebrush production, with 1995 having the highest level at 1.64 inches.

mahogany annual growth has declined 13 percent since 2001 at the Falkenburg site.

- Utilization levels are considered excessive at the Deer Creek site, 38.6 percent leaders browsed.
- 4 percent decrease in big sagebrush annual growth in one year.
- Overall 62 percent decrease in big sagebrush production since 1993.
- Big sagebrush utilization was severe at the Lower Lawn Creek and Schnoor sites, 47.9 percent and 61.7 percent, respectively.
- Utilization at Bolton Creek and Lower Lone Tree Creek was considered excessive at 42.4 and 40.8 percent, respectively. The levels documented at Bolton Creek and Schnoor was the highest ever recorded since 1993.
- True mountain mahogany production averaged 0.05 inches, the lowest ever recorded since 2001. This equates to an 85 percent reduction in production since 2003, and a 91 percent decline since 2001.
- 12 percent increase in big sagebrush annual growth in the Rattlesnake Hills since 2003.

Rattlesnake Hills Habitat Inventory and Evaluation Area

Big sagebrush production in the Rattlesnake Hills area averaged 1.13 inches, a 12 percent increase over 2003 (Figure 9). 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 76 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 10). We did document 38.6 percent use in the McClanahan Lake area, which we consider excessive, but this use can be attributed to domestic sheep that wintered in this pasture.

- Big sagebrush annual growth ranged from 0.79 inches to 1.54 inches.
- Big sagebrush production in the Rattlesnake Hills shows an upward trend since 1994.

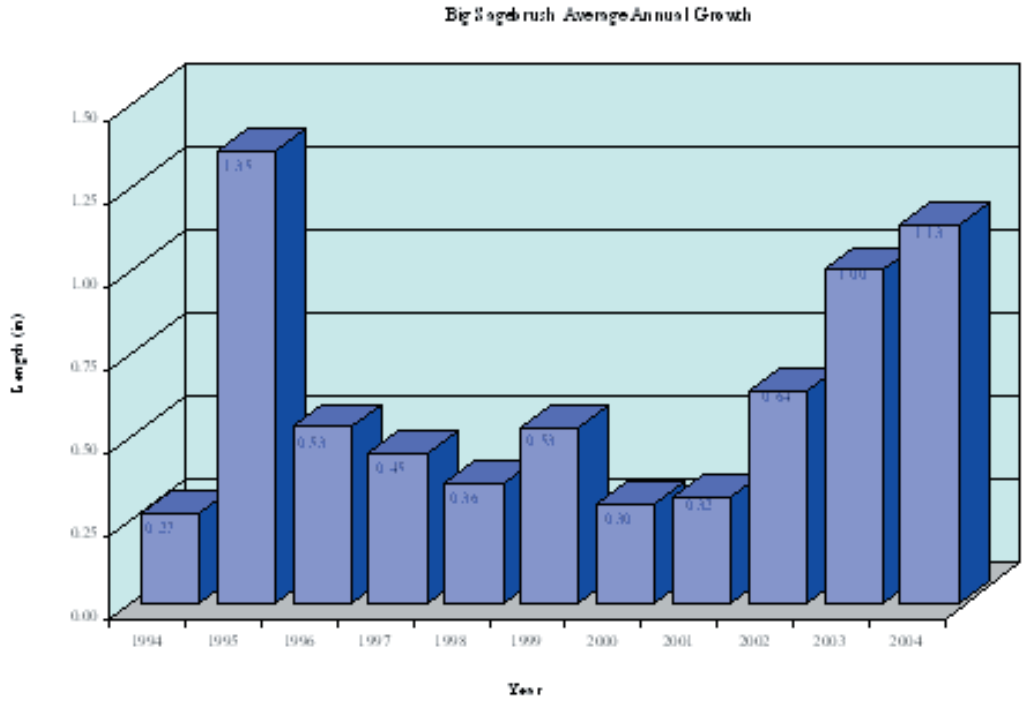


Figure 9. Rattlesnake Hills big sagebrush use index.

Figure 10. Big sagebrush community condition in the Rattlesnake Hills.

National Grassland Big Sagebrush Inventory

Big sagebrush production in the Newcastle area decreased 68 percent in 2004 as compared to 2003. The decline could be attributed in part to big sagebrush plant condition at 6-Mile Basin and Frog Creek, and the lack of spring precipitation. Ocular observations suggest the big sagebrush plants at these 2 sites are in worse condition than the plants at the Highway 85 site. Production has been in a downward trend in this area since monitoring efforts began in 2001 (Figure 11). Since 2001, we have documented a 72 percent decline in big sagebrush production. In 2004, big sagebrush annual growth measured 0.06 inches at the 6-Mile Basin site, which is the lowest ever recorded. The range was from 0.06 inches at 6-Mile Basin to 0.33 inches at Highway 85.

Figure 11. National Grassland big sagebrush production.

State Land Reservoirs Fishery Suitability Assessments

Two reservoirs were assessed with Casper fisheries biologists: Hanna Mahoney Reservoir and an unnamed former gravel pit. Both offer public access, but do not presently support sport fish. Hanna Mahoney, when full, offers sufficient depth and oxygen to overwinter trout and low enough temperatures in summer for trout survival. However the reservoir is almost completely drained at the end of the irrigation season, precluding trout. Future work will investigate the potential for a minimum pool and the capability of a beaver pond complex upstream to support fish. The second reservoir does not provide sufficient depth for trout, but is being considered for a largemouth bass fishery.

Fremont Canyon Connectivity Study

Fremont Canyon was surveyed to determine connectivity between the new Cardwell fishing easement (Annual Report 2002) and Alcova Reservoir. If Pathfinder dam can be reached from Alcova Reservoir, stocking could be reduced in the easement. Two barriers, over sixteen inches high, were found that would limit upstream migration of fish (Figure 12). Subsequently there has been interest in the barriers with respect to using Alcova Reservoir as a potential brood source for Kokanee salmon (*Oncorhynchus nerka*).

Figure 12. Upstream migration barrier to fish in Fremont Canyon. The fall is approximately 5 feet.

Miracle Mile Spawning Enhancement

The Miracle Mile section of the North Platte River between Kortes Reservoir and Pathfinder Reservoir is a very popular fishery where wild trout numbers have been in decline since 1996 (Figure 13). Spawning gravels are almost non-existent at the Miracle Mile because years of high flow releases from Kortes Dam have gradually washed away all the spawning sized substrate. Kortes and Seminoe Reservoirs stop any new gravel from replenishing the reach. A structure was designed to retain spawning gravels that were to be added to this reach. Key considerations in the design were height, to avoid dewatering the channel; size of material, to ensure permanence; shear stress to move particles smaller than gravel and oxygenate eggs; and slope of the approach to allow easy passage of all life stages of fish. The structure was installed in 2004 with financial assistance from the Bureau of Reclamation.

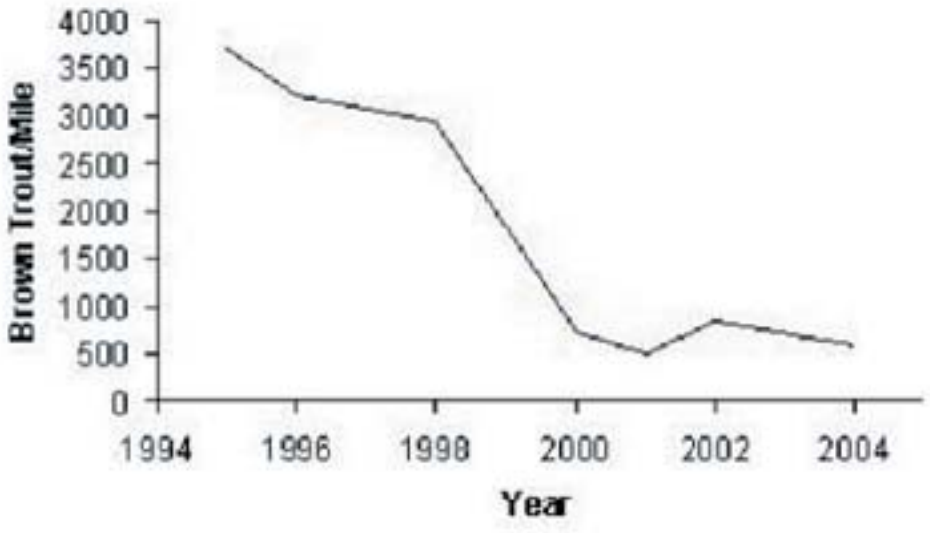


Figure 13. Time series showing the decline of brown trout per mile at the Miracle Mile.

Habitat Extension Services Projects

Riparian Restoration Projects

This year, six riparian restoration projects were implemented totaling 786 acres along 5 drainages in Crook and Weston Counties (Figure 14). All of these projects were funded through the USDA Farm Bill's Continuous Conservation Reserve Program (CCRP). These projects required the installation of fences to exclude livestock grazing for a 10 or 15-year period, and tree and/or shrub planting over a 2-year period, to re-establish woody vegetation. Water developments were also included where livestock access to water had been lost due to fencing.

Figure 14. Muleshoe Ranch Continuous CRP along the Belle Fourche River in Crook County.

Wetland Development and Enhancement Projects

One 10-acre shallow wetland was restored in Weston County with the cooperation of the NRCS, USFWS, Ducks Unlimited (DU), and Weston County Natural Resource District (WCNRD) (Figure 15). A small wetland was created and another supplemented by a pipeline in Weston County with funding provided by the USFWS Partners Program. Another wetland and reservoir are still in the planning stages with partial funding in place through the NRCS.


Figure 15. Luce Pond wetland restoration in Weston County.

Upland Habitat Enhancement Projects

Fifteen landowners have Environmental Quality Incentives Program (EQIP) Grazingland Initiative contracts with the NRCS totaling over 127,000 acres. These contracts are for 3 years and include a grazing deferment, due to drought, for the first year. Resource inventory and range mapping will result in the creation of a grazing management plan the landowners will follow for the next two years. NRCS EQIP and Wyoming Water Development Commission (WWDC) have funded water developments on some of these and other ranches in Weston County to improve grazing management, and remove livestock from fragile riparian areas. A wildlife guzzler was installed on Elk Mountain, funded by WCNRD and RMEF. Fencing and a collection apron will be built in the spring of 2005 (Figure 16). Two more guzzlers are planned specifically for sage grouse in the southern portion of Weston County funded through NRCS Wildlife Habitat Incentives Program (WHIP). An aspen regeneration project has also been partially completed on Plum Creek Divide in Weston County (planned completion is in the spring of 2005). This project involved the cutting of aspen and ponderosa pine in three areas, one is not fenced, one is fenced out from livestock, and the third will be fenced out from wildlife and livestock. This project is a cooperative effort between Wyoming State Forestry and RMEF.

MISCELLANEOUS

Workshops and In-service Training

- Wyoming Stockgrowers/ Woolgrowers annual meeting
- Chronic Wasting Disease surveillance training
- Bureau of Land Management sage grouse/big sagebrush habitat suitability workshop
- Wyoming Geographical Information Service Center remote sensing workshop
- Safe Environments workshop
- Chronic Wasting Disease forum
- Big sagebrush Ecology and Management workshop with Alma Winward
- Aspen Regeneration workshop with Alma Winward
- ArcView/Customer Service Toolkit training
- ArcGIS training
- Cultural Resources training
- Conservation Planning training
- Conservation Buffer training
- Cheatgrass tour
- Fish Passage Workshop


Figure 16. Wildlife guzzler on Elk Mountain.

Habitat Protection

- Wyoming Game and Fish Department lead contact on Casper BLM Field Office Resource Management Plan revision

Presentations and Public Contacts

- Wrote Wyoming Big sagebrush article for Wyoming Wildlife Magazine and Wyoming Wildlife News
- Developed Casper Regional Office habitat display
- Big sagebrush condition television spot with Ray Hageman

CODY REGION

HABITAT PROJECTS

Gooseberry/Cottonwood Watershed Enhancement Project

This project is a landscape scale approach to noxious weed control and riparian habitat enhancement within the Gooseberry and Cottonwood Creek watersheds. Our objectives are to: 1) Use Impazyr (Arsenal) or Triclopyr (Remedy) to chemically kill tamarisk and Russian olive in the Goosberry watershed; 2) Use mechanical methods (Dozer and/or Timber Ax) to remove dead tamarisk and Russian olive carcasses and prepare the soil for re-seeding; 3) Reseed (with desirable grasses and forbs) areas disturbed by tamarisk and Russian olive control activities and supplement native woody species recovery with bare root plantings and native cuttings; and 4) Alter grazing management practices within riparain areas to facilitate re-vegetation efforts and reduce reinvasion of tamarisk and Russian olive. Tamarisk, Russian olive and Russian knapweed are a significant vegetative component within the project area which includes approximately 200 perennial stream miles and over 400,000 acres. Numerous funding sources are helping to fund the effort, including Riparian Buffer Conservation Reserve Program (CRP), Hot Springs and Washakie County Weed and Pest, BLM, Wyoming Governors Big Game License Coalition, Washakie Conservation District, Wyoming Game and Fish, and private landowners. Landowner interest and participation is high and numerous CRP contracts were implemented in the spring, summer, and fall of 2004.

Figure 1. Gooseberry Creek before (left) and after (right) mechanical removal of Russian olive and tamarisk.

In July and early August of 2004, approximately 50 stream miles were chemically treated using horsepack sprayers, hand crews, and helicopter (Figure 1). Time lines for individual contracts will vary, but the majority of the work should be completed by 2009. All treatment efforts have started at the top of each tributary and are moving down stream. All riparian corridors enrolled in CRP are fenced to exclude livestock grazing during the contract period (15 years) which will improve success of revegetation efforts and allow better grazing management after the contracts expire. Off-site watering facilities or water gaps are also incorporated into each landowner's plan to help improve their grazing management flexibility. Permanent vegetative transects and photo points have been established at each CRP project that will allow us to track changes in vegetation over time. In spring of 2005 we also plan to install several shallow wells to monitor

changes in ground water levels as tamarisk and Russian olive are replaced with native woody species.

Absaroka Conservation Initiative

The Rocky Mountain Elk Foundation (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. An advisory group, including WGFD personnel, was formed that included key landowners and agency personnel and the group met twice to identify conservation targets, threats, sources of threats and potential strategies to address threats in the ACI area. The group identified large contiguous natural areas as the main target and rural residential development as the primary threat (Figure 2). A conservation plan that identified potential strategies for addressing threats in the ACI was drafted. The conservation plan identified focal areas and priority private land parcels to conserve. The WGFD terrestrial habitat biologist gave a presentation on the ACI effort to the Wyoming Association of Conservation Districts (WACD) state conference in Cody. A proposal to model rural residential development in the ACI area and analyze impacts was proposed and funds are being sought to implement the project.

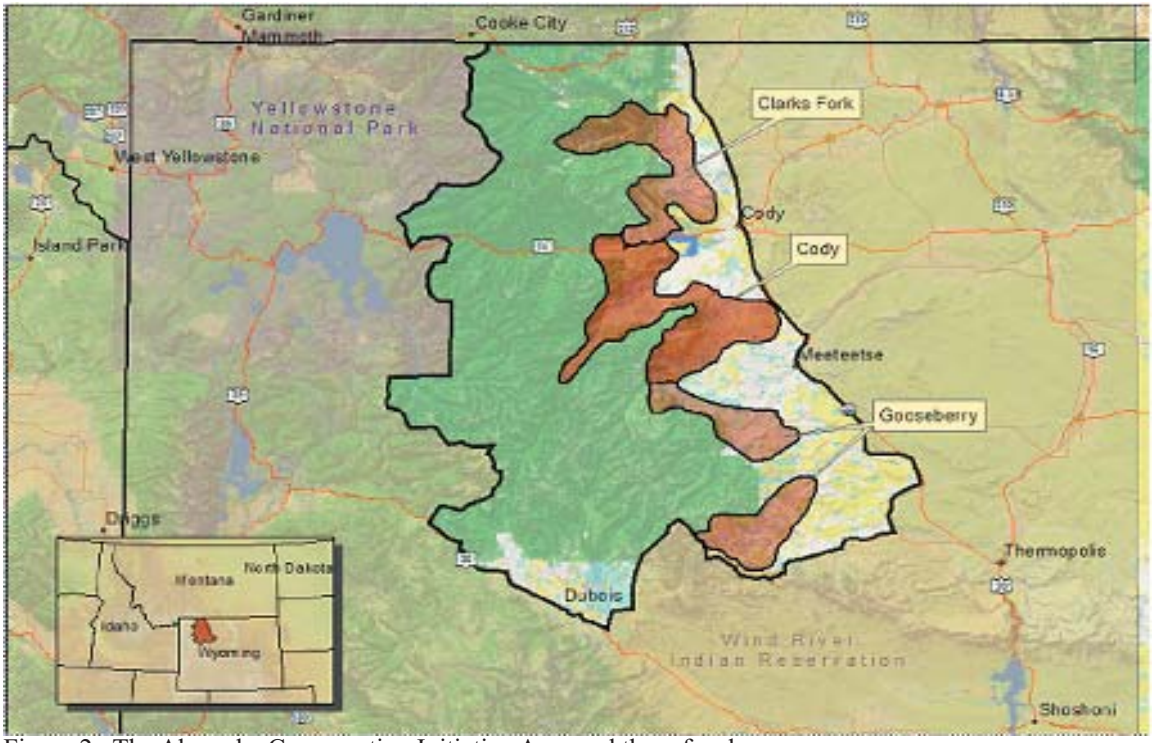


Figure 2. The Absaroka Conservation Initiative Area and three focal areas.

Kirby Creek CRM

The Kirby Creek Coordinated Resource Management (CRM) group is continuing to plan and implement projects that focus on restoring ecological functions within the watershed. Nearly $300,000 in 319 grant funds were received by the Hot Springs County Conservation District and the technical committee has recently prioritized projects within the watershed that will receive the funding. The group is still looking for the 40% non-federal funds needed to match with the 319 grant. The number one priority is a project on the upper portion of Kirby Creek that will attempt to return the creek to its historical channel and eliminate some serious erosion and water quality issues (Figure 3). This project is paired with a comprehensive effort to enroll the majority of the creek upstream of the project site into Continuous Conservation Reserve Program (CCRP). Existing CCRP projects on Kirby Creek (3-years-old) are showing a tremendous vegetative response and are providing quality habitat for beaver, mule deer, sage grouse, and migratory song birds. Beaver, in particular, are expanding throughout the system and are helping to build-up eroded channels and are significantly increasing water storage and increasing wetland and riparian acres within the watershed (Figure 4). Also in 2004 the group successfully solicited additional 319 funds for hiring a part-time project manager to coordinate the activities and projects of the Kirby Creek CRM. The project manager will start work in July 2005.

Figure 3. Erosion and water quality problems on Kirby Creek. Wooden structure in upper left is 1911 irrigation structure located in the orginal Kirby Creek main channel. Kirby Creek now flows in the old irrigation ditch.

Figure 4. New beaver activity associated with riparian enhancement projects on Kirby Creek.

Copper Mountain CRM

The Copper Mountain CRM is a new group that was organized in 2003. The main focus is vegetative management (primarily sagebrush) in the Copper Mountain area. In the spring of 2004 a sagebrush burn project on V-H Draw was initiated by the BLM on private land. The BLM is able to conduct prescribed burns on private lands using fuels reduction authority and funds. Burning on V-H draw will continue in 2005. One other burn, Antelope Creek, is planned for a spring 2005 burn as well. The Cody region terrestrial habitat personnel and the Thermopolis population biologist have all been involved in this CRM and with conducting and monitoring the burn projects.

Figure 5. A typical aspen stand in the Upper Clarks Fork showing high degree of conifer encrichment.

Upper Clarks Fork Aspen Inventory

An inventory of aspen communities in the Upper Clarks Fork watershed was undertaken during the summer and fall of 2004. Over 70 aspen stands were inventoried totaling approximately 600 acres (Figure 5). Each aspen community was delineated using a GPS and described by aspen and conifer canopy cover, aspen stems per acre by height class, intensity of browsing and predominate habitat type. The communities were then prioritized according to the risk of losing the stand to successional processes. The Shoshone National Forest will begin a fuels management project in the Upper Clarks Fork in 2006, and are cooperating with the WGFD in incorporating these priority aspen communities into the project. Aspen stands will be treated using a combination of fire and mechanical methods.

Sunlight Creek Bank Stabilization

This project was initiated as a habitat extension project when consultants, representing Mr. Earl Holding, contacted the aquatic habitat biologist concerning stream bank stabilization techniques and recommendations. During onsite review of several sites, advice was provided concerning bank stabilization techniques and potential irrigation headgate modifications. Potential rock sources and local contractor names were also provided. One of the sites of concern was immediately adjacent to the Department's Sunlight Wildlife Habitat Management Area (WHMA) (Figure 6). Mr. Holding already had personnel and machinery on site for various reasons, one of which was to stabilize these banks (Figure 7). With the opportunity at hand, a cooperative project was developed, appropriate permits were acquired by both entities,

Figure 6. Sunlight Creek bank stabilization site with Game and Fish property in the foreground and private land in the background.

Figure 7. Eroding banks and large woody debris collecting along the banks causing further eroision.

Figure 8. Sunlight Creek revetment with conifer cabled to the critical point of erosion.

Figure 9. Rock placed on top of the trees to hold them in place during high water.

and the erosion problems were addressed. The steep cut banks were sloped back and a tree revetment was installed (Figure 8). Large branchy conifers were placed at the critical edge of erosion and cabled back to drill stem deadmen. Large rock was then strategically placed on top of and behind the trees to keep them from moving in high flows (Figure 9). Once the revetment was complete, Mr. Holding had erosion matting installed along the back-sloped banks, and grass was seeded into the disturbed areas (Figure 10). Boundary fences that had been destroyed by high water were reconstructed and any fence material found in the creek was removed and hauled to the landfill.

Figure 10. Sunlight Creek cooperative bank stabilization project showing tree revetment, rock backing, and erosion mat placement.

This cooperative project accomplished several goals, including protection of private land and fences, protection of public land including a historic school house building, reduced silt loading of Sunlight Creek, improved water quality, and improved fisheries habitat. The ranch provided the dump truck, tracked backhoe, and operators, purchased and hauled large, angular boulders to the site, provided drill stem for deadmen, erosion matting, and reseeded disturbed banks. The Game and Fish provided trees from the WHMA, cable, clamps, and experience. Both landowners provided the necessary labor.

Bighorn Forest Stream Habitat PlanningCoordination

Stream habitats were reviewed with Bighorn Forest fisheries and Cody fish management personnel (Figure 11.) Habitats conditions, habitat protection, and potential improvements for Yellowstone cutthroat trout were the primary concerns. East Tensleep Creek, Mill Creek, Trapper Creek, Shell Creek, Dry Medicine Lodge Creek, and Porcupine Creek were among those streams being reviewed (Figure 12.)

Figure 11. At first glance, fish habitat is difficult to identify as East Tensleep Creek passes lazily through a high meadow.

Figure 12. Closer observation of East Tensleep Creek shows a variety of habitat in the bottom of the creek.

Fish Screening Investigation

The aquatic habitat biologist attended a tour of fish screening projects and screen shop facilities with the Idaho Department of Fish and Game in Salmon, Idaho. Various structure designs were discussed along with cost, maintenance requirements, and suitability for Wyoming systems (Figure 13.) Structures varied from large multiple rotating-drum structures to small modular structures (Figure 14.) Many of the screens were located in irrigation canals with bypass channels returning the fish to the river.

Figure 13. A large multi drum screen structure designed for flows of over 200 cfs..

Figure 14. Smaller single drum structure for flows of 10 cfs or less.

Three Forks Ranch Habitat Tour

Dave Rosgen provided a tour of the various structures that have been installed on the Three Forks property (Figure 15). Stream morphology, stream dynamics, erosion control, fisheries habitat and habitat protection, were topics discussed during the tour. Veins, cross-veins, J-hooks, W-veins, sills, and modifications of each were examined while discussing the benefits and requirements of each style structure and their potential uses in Wyoming (Figure 16). The project has produced a very stable stream with high quality fisheries that is being used to attract anglers and increase property revenues.

Figure 15. Dave Rosgen describing the installation and benefits of a modified cross-vein to protect the ranch access bridge.

Figure 16. Cross-vein in the foreground and a W-vein in the background providing grade controls for the two forks entering from the background.

Watershed Management Education

The WGFD watershed trailer was used to demonstrate watershed functions and discuss the benefits of upland and riparian vegetation, percolation, water tables, grazing management, irrigation management, natural and accelerated erosion, gradient, meander patterns, subdivisions, culverts, bridges, stream structures, fish habitat, where to fish, water safety, and more (Figure 17). Additional props including houses, culverts, and bridges were used for better visual illustrations of watershed dynamics (Figure 18).

Figure 17. Youth and adults' alike learning about watersheds, what make fisheries habitat, where to fish, and water safety at the Cody Youth Fishing Clinic.

Figure 18. Wyoming Resource Education Days (WyRED) students answered a variety of watershed questions and tested several hydrologic principles at the NWC Mickelson Science Camp north of Cody.

Devil's Canyon Bighorn Sheep Transplant

Habitat and Access, Terrestrial Habitat, and Aquatic Habitat personnel all participated in the Devil's Canyon Bighorn sheep transplant (Figure19). Oregon sheep were transported to Wyoming via trailers, radio collared, loaded into a helicopter, and transported to available habitat along Devil's canyon (Figure 20).

Jim Mountain Allotment Complex

The Jim Mountain Allotment Complex includes two Shoshone National Forest allotments and two BLM allotments for a total of 500 cattle AUMs in the North Fork Shoshone River watershed. The area is one of the last remaining livestock/wildlife forage competition areas in the North Fork and is critical for wintering bighorn sheep, elk and mule deer. Negotiations were made with the permittee regarding a voluntary allotment waiver with a financial incentive and

with The Nature Conservancy (TNC) Heart Mountain Ranch to provide replacement AUMs. The permittee did not graze the allotments on a one-year trial in 2004 and grazed the Heart Mountain Ranch to determine if the scenario would work for the long term. Iowa Foundation for North American Wild Sheep and National Foundation for North American Wild Sheep funded the one-year grazing lease charge at the Heart Mountain Ranch. Negotiations were made for a permanent waiver that is anticipated to take place in 2005.

Figure 19. Personnel unloading bighorn sheep from the trailer and attaching radio collars prior to transplant.

Figure 20. Unloading sheep from the helicopter after transporting them to the historic range on top of the mountain.

Heart Mountain Grassbank

The Heart Mountain Grassbank, operated by TNC, 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 2004. Conservation benefits included prescribed burns, brush mowing and drought relief. Department personnel serve on both the grassbank advisory council and the selection committee for grassbank participants.

Dick Creek/Sunshine Grazing Management

The Dick Creek Cattle and Horse (C&H) Allotment on the Shoshone Forest and the Sunshine Wildlife Habitat Management Area (WHMA) were merged as one grazing system and one herd of livestock with an MOU in 2003 to enable the Forest Service and WGFD to coordinate the management of the two units. The multi-pasture grazing strategy is awaiting implementation following installation of water developments and fences that will enable smaller pastures. The permittee of the adjacent Sunshine C&H Allotment, with a monetary incentive from the RMEF and the Wildlife Heritage Foundation of Wyoming, waived 409 AUM's of his term grazing permit to the Forest Service with no preference for reissue in 2004 (Figure 21) . This portion of the allotment was then absorbed as a pasture in the Dick Creek C&H Allotment with no increase in the existing permitted AUM's for that allotment. This effectively decreased the stocking rate for the combined units by 23%. The addition of this allotment to the grazing system will be critical because it provides an additional pasture, which shortens the duration of grazing in all pastures, and provides the only practical trailing route between the Sunshine WHMA and the Forest allotments. The grazing system is designed to provide optimal quantity and quality of forage for wildlife by allowing adequate opportunity for growth and re-growth of key forage plants. In addition, the system is structured to allow for livestock to be out of areas when big game hunting seasons begin. Livestock will leave the forest service allotments by October 1 when both elk and deer seasons open on the Forest. Livestock will also be off of the WHMA by the October 15 opener for deer off the forest.

Figure 21. A new livestock grazing strategy and reduction of 409 AUMs should improve forage conditions in the Sunshine Basin area.

Cooperative Prescribed Fire Projects with the Bureau of Land Management

The WGFD cooperated in planning, funding and conducting several prescribed fire and mechanical treatment projects in the Bighorn Basin including:

- VH Draw: A first year project with an objective of creating diverse structure and age classes in dense mountain big sagebrush communities in the Kirby Creek watershed. The units were blacklined in preparation for a spring burn in 2005 (Figure 22).
- Little Dry Creek: A first year project with an objective of creating diverse structure and age classes in Wyoming big sagebrush communities in the Little Dry Creek Allotment south of Cody. Approximately 100 acres were burned in 2004.
- Heart Mountain: A fourth year project with an objective of creating diverse structure and age classes in Wyoming and mountain big sagebrush communities in the Heart Mountain North and Heart Mountain South Allotments north of Cody. A total of 2,000 acres have been treated with a combination of mowing and burning. In 2004, 240 acres were burned and 220 acres were mowed.

Figure 22. Night burning on the VH Draw burn project. Ignition was done at nightfall to take advantage of higher humidity in the dense fuels.

- Sage Creek: A second year project with an objective of enhancing sagebrush communities primarily for sagegrouse and the only blacktailed prairie dog town in the Bighorn Basin. A total of 120 acres were burned and 800 acres were mowed.
- Little Mountain: A nine year project covering the Devil's Canyon Study Area northeast of Lovell. A total of 8,000 acres have been treated. In 2004, 120 acres of juniper were burned.
- YU Bench: A multi-year brush mowing project in which over 800 acres were treated in 2004. This project received $3,000 from the Marathon Oil Company Foundation.

Figure 23. Photo point (tee post) nearly inundated by beaver pond in a riparian restoration project south of Tensleep, Wyoming.

Habitat Extension

The Habitat Extension Biologist made 51 face-to-face landowner contacts in 2004. These contacts resulted in new or continued planning or follow up compliance on 31 different private land habitat enhancement projects. The projects include 15 new Riparian Buffer Conservation Reserve Program (CRP) projects proposed, planned, or implemented (1780 acres), follow up on 9 existing CRP projects (680 acres), follow up on 1 existing Wetland Reserve Program (WRP) project (16 acres), and 1 new Wildlife Habitat Incentive Program (WHIP) project implemented (20 acres) (Figure23).

Wildlife Habitat Management Areas

Sunshine WHMA

The new grazing system developed in 2003 was not implemented because of continued drought conditions, lack of water and need for fencing. The lessee cut his stocking rate by half in response to poor forage conditions and continued with the previous grazing schedule. Through Area Improvement Project Agreements (AIPA) projects, stock tank, fencing and pipeline materials were purchased and stored until these projects can be completed in 2005. Upland trend studies were established and read in the Stonewall pasture. These consisted of two nested frequency plots one placed inside and one outside of a 100' X 200' fenced exclosure Figure 24). The study will allow the evaluation of the new grazing system.

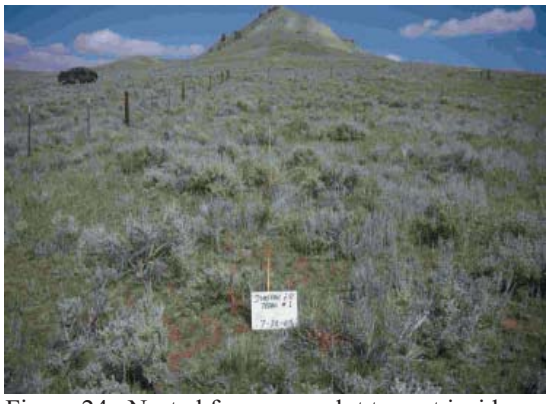


Figure 24. Nested frequency plot trasect inside a livestock exclosure.

Hi-tensile electric fence was installed along a portion of the boundary by neighboring Antler Ranch. Gates and drop sections were installed in areas identified by WGFD as areas of high wildlife movement. The existing stock fence was removed following the new construction. Unnecessary portions of old interior partition fences were removed by Habitat and Access personnel.

Yellowtail WHMA

The Yellowtail Area Coordinated Resource Management (CRM) group continues to seek solutions to managing Yellowtail's growing invasive plant program. The CRM consists of the four landmanagers on the Yellowtail WHMA (NPS, WGFD, 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 area were treated for tamarisk and Russian knapweed using backpack sprayers. The CRM group submitted another proposal to the Fish and Wildlife Foundation for a "Pulling Together Initiative" for a second year grant of $50,000. If awarded, the grant will enable the group to continue backpack spraying for tamerisk and complete a much needed weed mapping effort. Prescribed winter grazing treatments were conducted for the fourth 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. Two fuel break treatments were conducted within the Shoshone River riparian area. The treatments, consisting of hand sawing and removing shrubs and trees, primarily Russian olive, in a 100 feet wide strip, were done by the Riverton Honor Farm fire crew and Department personnel (Figure 25). A 60-acre wildfire area on the WHMA was grazed with Boer goats as a weed control experiment (Figure 26). The area was divided into three pastures and the goats were allowed to graze in each pasture until they began to forage on desired vegetation. The objective of the treatment is to concentrate browsing pressure on tamarisk and Russian olive. The treatment will be repeated for several years. A public field tour was conducted in November to highlight projects done through the CRM. Repairs were made to the structure at Pond Five (Figure 27.) Damage to the inlet pipe was caused by a crack in the concrete freezing and expanding, and the inlet pipe then broke off. The concrete structure was exposed and repaired, and a new inlet pipe installed. The Gams bat colony roosting site was rebuilt (Figure 28). Fifteen acres of Pheasant Forever funded food plots were planted (Figure 29).

Figure 25. Crew members from the Riverton Honor Farm remove Russian Olive.

Figure 26. Boer goats browsing on Russian Olive.

Figure 27. Repairs were made to Yellowtail Pond 5 water control structure. The pond overflow outlet pipe fractured due to freezing.

Figure 28. Yellowtail's Gam's bat colony roosting site was rebuilt.


Figure 29. A Truax drill is used to plant permanent cover on the Yellowtail WHMA.

Renner WHMA

Two water catchments or "guzzlers" were installed in the Lower Mountain and Upper Mountain pastures. The guzzlers will enable better livestock distribution and a more complete implementation of a grazing strategy designed in 2001 to enhance forage for wildlife. Two more water developments were planned in the lower pastures, and AIPA projects were used to purchase materials for these developments. Livestock utilization was monitored. Forage in the Lower Mountain Pasture was used heavily by grasshoppers for the second consecutive year.

Sunlight WHMA

Production on the irrigated meadows was 2,610 lbs. air-dried forage/acre. This was accomplished through using a fertilizer mix of soluble potash (15%), phosphate (18%), ammonium nitrate (35%), ammonium sulfate (31%), and zinc sulfate (1%) at 270 pounds per acre. Chemical treatment of noxious weeds, primarily Canada thistle, started in June and ended 8/27/2004.

Medicine Lodge WHMA

Approximately 150 acres of sagebrush and juniper communities were treated with prescribed fire to enhance elk forage. The spring fed water tank and inflow system in the Dry Fork of Medicine Lodge creek was repaired. This is the only source of water for three miles in the canyon.

MISCELLANEOUS

Workshops, In-Service Training, and Meetings Attended

- Rosgen Stream Morphology Level II training
- The BLM's Nuts and Bolts RMP planning class
- Amphibian training workshop presented by the Department's herptile biologist
- NWC presentation on subsurface irrigation for field crops and developed areas. Potential for more efficient water use was discussed, along with better crop production. Wildlife benefits would be more water left in the stream and less silt-laden return flows
- Shoshone Forest fisheries coordination meeting
- Bighorn Forest fisheries coordination meeting
- Interagency coordination meeting including the Cody and Worland BLM, and the Shoshone and Bighorn National Forests
- NRCS Toolkit training
- NRCS Cultural Resources training
- NRCS Security Awareness training
- BLM Proper Functioning Condition training
- Big Horn Basin Fence Clinic
- Yellowtail Weed Tour
- Bighorn County Environmental Quality Incentive Program (EQIP) Working Group
- Washakie County EQIP Working Group
- Washakie Watersheds Steering Committee
- Cody BLM coordination meeting to coordinate oil and gas topics and commenting procedures
- The WGFD wildlife coordinators meeting to discuss RMP processes

- Cody region planning meeting to gather issues and coordinate efforts for the upcoming BLM RMP and Shoshone Forest Plan
- Participated in the Cody regional coordination team meetings including a joint meeting with the Sheridan personnel
- Coordination meetings with Kevin Rompole and Nate Nibblelink (WyGISC) to discuss potential GIS projects and attempt to install working versions of the DSS on Cody computers with ArcGIS software
- Participated in fish management section meeting in Casper

Publications and Reports

- Revised Fencing Guidelines for Wildlife
- High Tensile Electric Fence: Phase 2- Liability Issues, Maintenance Costs, and Containment of Bison
- Gooseberry/Cottonwood Creek Project, National Soil and Water Conservation Society Farm Bill Report

Information and Education

- Prepared and presented information related to deer mortality issues on HWY 20 to WYDOT and area landowners
- Gave a presentation at the Resource and Conservation Development Council meeting concerning the Gooseberry/Cottonwood Riparian Enhancement Project
- Prepared and presented a ½ day training course on the use of Continuous CRP for controlling invasive weeds for the Southeast Colorado Water Conservation District, Southeast Colorado landowners, Colorado NRCS, and Colorado Farm Security Administration (FSA)
- Presented Gooseberry/Cottonwood project update at the Wyoming Weed and Pest District Regional Coordination meeting
- Discussed Gooseberry/Cottonwood project benefits on the annual KWOR Fishing Show
- Gave a presentation to Paintrock Hunter Mentor Program
- Gave a presentation on Yellowtail Area CRM to statewide Weed and Pest Conference
- Gave a presentation on Absaroka Conservation Initiative to WACD convention
- Demonstrated and discussed tamarisk and Russian olive control methods and wildlife benefits for the Hunter/Mentor Program kids in Worland

Assistance with other Endeavors

- Assisted WSGALT with developing Gooseberry Creek conservation easement
- Assisted with chronic wasting disease sampling program.
- Assisted with pheasant crow counts on Yellowtail WHMA
- Assisted with seasonal ranges revisions
- Judged Northwest District Science Fair

GREEN RIVER REGION

HABITAT PROJECTS

Little Savery Creek Streambank Stabilization and Fish Habitat Improvement

A team of regional fisheries personnel and the Laramie Aquatic Habitat Biologist constructed 18 tree revetments and vortex weirs on private lands along lower Little Savery Creek during the fall period. The project is located on the McCarry Ranch property, which is currently enrolled in the PLPW program to provide public walk-in access for angling. The ranch is situated in the downstream tail-waters reach of Savery Creek below High Savery Reservoir, and includes the confluence area of Little Savery Creek. Trout habitat limitations in these stream reaches appear to be suitable spawning and juvenile rearing habitat. Conifer tree revetment and experimental vortex weir structures were prescribed for Little Savery Creek in an effort to address juvenile trout habitat needs and enhance this nursery stream, while encouraging better streambank stability and riparian area function.

Revetments were built using 5-8 ft conifer trees wired together into chains and cabled to eroded streambank sections along the outside edge of stream meanders (Figure 1). The revetments will provide temporary submerged wood as structural cover and niches for fish, and also serve the longer-term purpose of capturing sediment for the establishment of sedges and other riparian vegetation to build stable streambanks. The vortex weirs are considered experimental because they are constructed with trees rather than rock. Each weir was constructed using 2 conifer trees fashioned so that the tips crossed in an upstream facing v-shape, which were wired and anchored to the stream channel bottom with tree butts being cabled to each streambank (Figure 2.) Vortex weirs are expected to provide the same benefits as revetments, but they also should elevate water levels upstream for a short distance to saturate streambank soils and benefit riparian vegetation. Weirs also should function to nozzle stream flows and scour a pool immediately downstream of each structure to benefit fish. The project is expected to provide much needed juvenile trout rearing habitat to benefit survival and recruitment for this segment of the Little Savery Creek trout population.

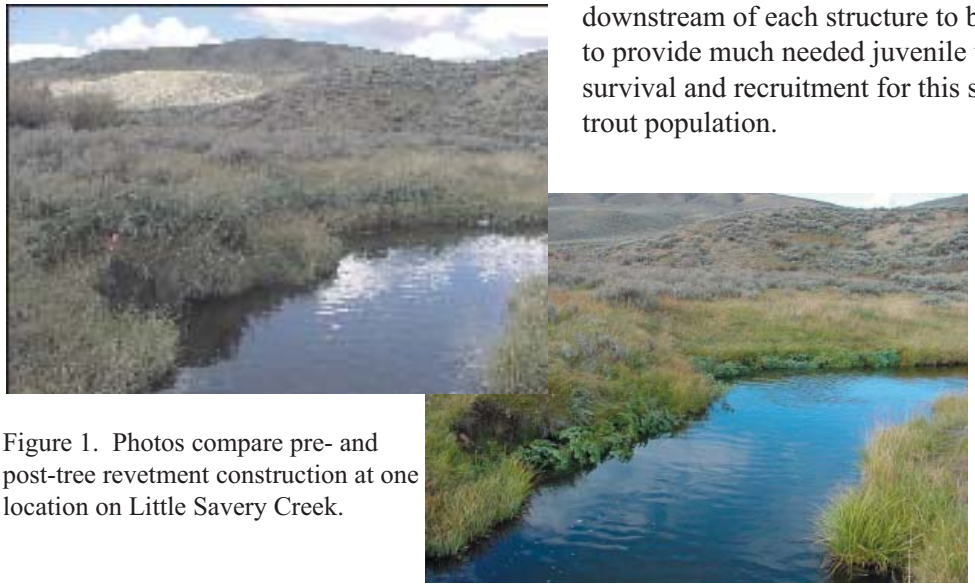


Figure 1. Photos compare pre- and post-tree revetment construction at one location on Little Savery Creek.

Vegetation Ecology Training Workshop

The Department contracted with Dr. Alma Winward again during 2004 in an advisory capacity to assist habitat biologists with various vegetation ecology and management issues statewide. The Aquatic Habitat Biologist organized two separate workshop opportunities for Department personnel to train under Dr. Winward in the Green River Region (Figure 3). The first workshop was held at the Grizzly WHMA during July, where a small group of fisheries biologists, aquatic habitat biologists, and Habitat and Access Maintenance workers gained knowledge about the ecology and management of riparian, sagebrush-grassland, aspen, and mountain shrub vegetative communities. The second workshop was a one-day tour held near Rock Springs during August, and focused on the ecology of sagebrush communities and species identification. Green River Region Game Wardens, Wildlife Biologists, I&E Specialist, as well as the statewide Sage Grouse Coordinator and a U.W. graduate student attended the sagebrush training tour.

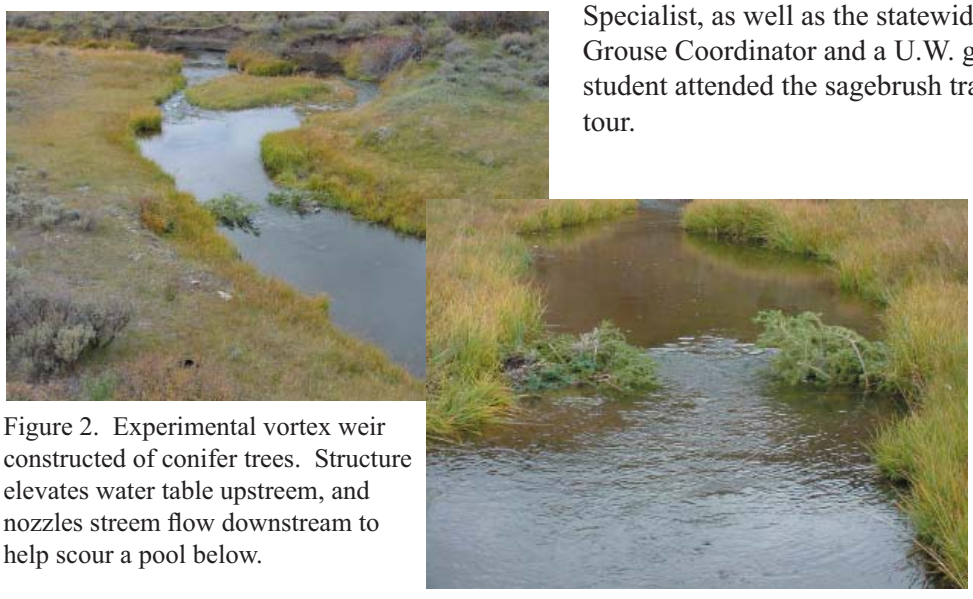


Figure 2. Experimental vortex weir constructed of conifer trees. Structure elevates water table upstreem, and nozzles streem flow downstream to help scour a pool below.

- Trout habitat improved at existing PLPW fishing WIA on Little Savery Creek.
- Constructed 13 tree revetments in lower Little Savery Creek
- Constructed 5 vortex weirs in lower Little Savery Creek.
- Two vegetation ecology training workshops were held during 2004.

Figure 3. Dr. Alma Winward shows Department personnel how to age sagebrush during a July workshop.

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 Wyoming. Production and utilization measurements have been collected since 1993 at three sites. Utilization measurements have not been collected since 2001 because of the poor production. Mean leader production increased from 0.2 inches in 2003 to 2.1 inches in 2004 (Figure 4). Production correlates strongly with spring precipitation recorded in Kemmerer. These data was previously reported in the Pinedale Section.

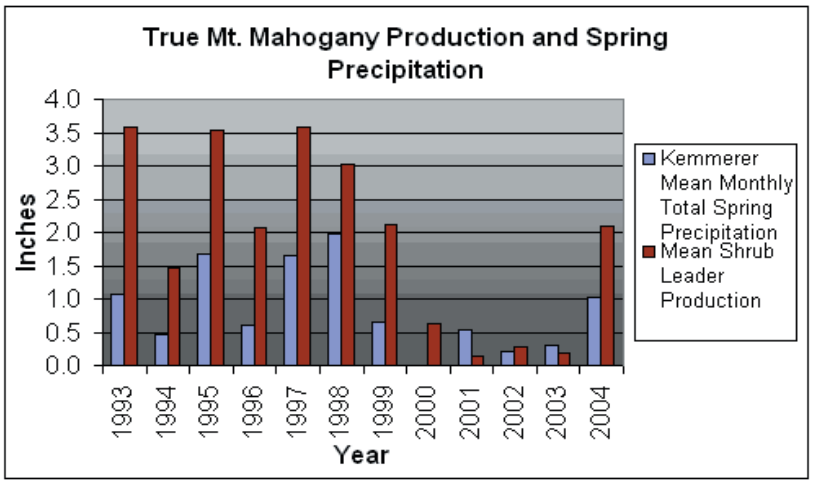


Figure 4. Rock Creek Mt. Mahogany Production and Spring Precipitation.

Big Sandy River Willow Trend Monitoring

Annual willow community trend surveys were completed at the five Big Sandy Working Group (BSWG) riparian monitoring sites during early November. The data were summarized into a 3-year trend report (2002-2004), and submitted to both the BSWG and BLM Rock Springs Field Office for their review. The report included information about mean willow heights and percent of willows by height class categories, percent relative frequency of browsed and trampled willows, the number of willows sampled in permanent transects and fenced ungulate exclosures, and ungulate fecal pellet counts within transects.

Many factors are contributing to streambank instability and dysfunction. Fluctuating water tables in the riparian zone, seasonal drying of riparian soils and accumulation of salts, and drought influences to a riparian system in less than optimal condition are effecting willow community vigor along the lower Big Sandy River. However, the fenced ungulate exclosure comparison data strongly suggests that ungulate browsing and trampling during recent years is negatively affecting willow growth. Figure 5 shows the recent two-year trend in total number of live willows observed and sampled inside the fenced exclosure at each monitoring site. The number of live willows has either increased or remained constant inside the exclosures at all five monitoring sites.

Figure 6 shows trends in the number of live willows sampled in the permanent transects at each of the five monitoring sites between 2002 and 2004. In contrast to the willow situation inside the exclosures, the number of live willows sampled outside the exclosures have steadily declined at all of the monitoring sites since 2002. The data clearly suggests that ungulate browsing and trampling is contributing to the reduction in the number of live willow plants along the lower Big Sandy River, and compromising overall willow community health and vigor.

- 2004 Annual growth of mountain mahogany increased significantly.

- Completed willow community trend surveys at five sites along the Lower Big Sandy River.

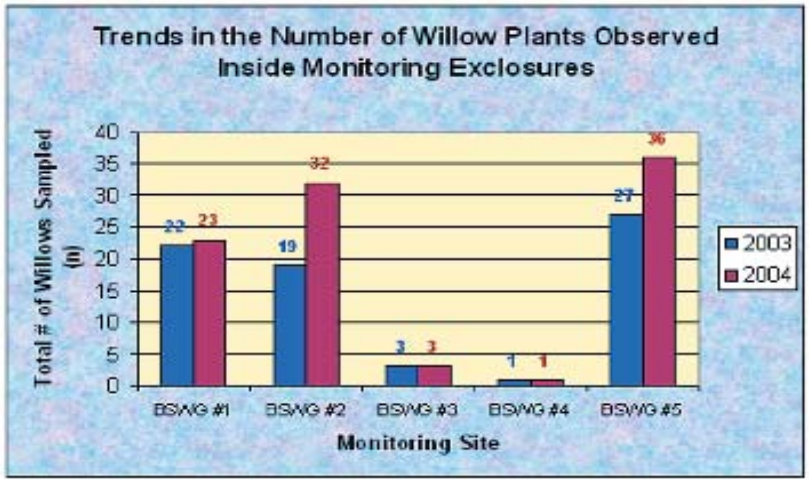


Figure 5. Trends in the number of live willow plants sampled inside fenced ungulate exclosures at the five riparian monitoring locations along the lower Big Sandy.

Currant Creek Ranch Beaver Habitat Enhancement

This project is an annual effort to restore sound riparian habitat function to a continuous reach of Currant Creek with the use of active beaver colonies. During September, a crew of Department and BLM employees, volunteers, and the landowners selectively cut several mature aspen trees from Little Mountain and transported them by truck and trailer to active beaver pond complexes on the Currant Creek Ranch (Figure 7). Beaver utilized components of the freshly cut aspen trees that were either stacked at the pond's edge near the beaver dams or set adrift in the pond as construction materials to reinforce and elevate their dams. Much of the existing riparian shrubs along Currant Creek exhibit small diameter stems, so the 2-10 inch diameter aspen provided beaver with solid building material to increase dam stability and longevity. Stable beaver dams that do not breach readily during run-off flows often promote consistently elevated water-tables to provide an optimal environment for recruitment and rapid growth of willows and other woody riparian species (Figure 8) which is the primary goal of temporarily supplementing these beaver with aspen trees.

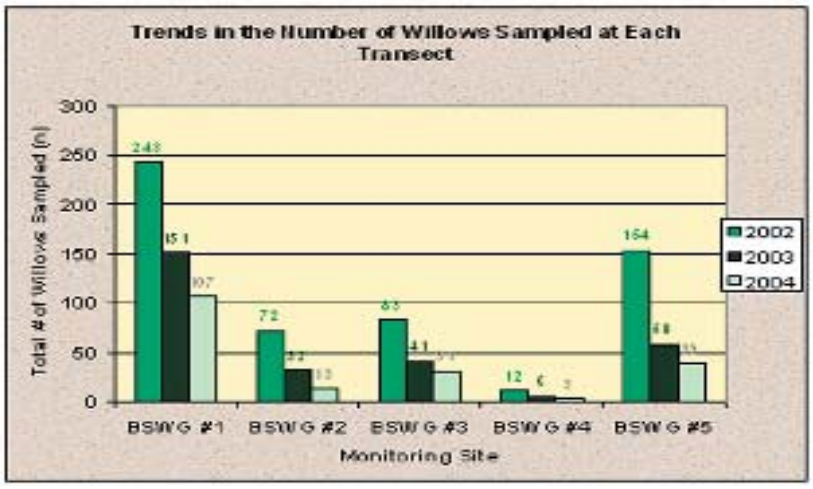


Figure 6. 2002-2004 trend in the number of live willow plants sampled within permanent trasects (outside fenced ungulate exclosures) at the five riparian monitoring locations along the lower Big Sandy.

Figure 7. Loading freshly cut aspen for transport to selected beaver colony sites at Currant Creek Ranch.

Figure 8. Stable beaver dams on Currant Creek providing optimum conditions for restoration of vigorous riparian vegetation.

Flaming Gorge Reservoir Trees for Fish Habitat Project

The Green River Region Fisheries Biologist and the Ashley National Forest Fisheries Biologist planned and initiated a project to use discarded Christmas trees to construct submerged woody structure for fish habitat in the inflow area of Flaming Gorge Reservoir. Department region team

and USFS crews collected approximately 800 Christmas trees from drop-off locations in both Rock Springs and Green River, and then together with volunteers, assembled weighted woody debris structures and arranged them on the reservoir ice during mid March (Figure 9). Sites were selected so that structures are oriented near shorelines in less than 15 ft. water depth, and once the ice receded, the woody debris structures sank to the bottom of the reservoir. The structures are intended to provide needed juvenile rearing habitat for non-game forage fish species and small mouth bass, and are located in the Lost Dog area and Blacks Fork River Arm between the Confluence and Halfway Hollow. Snorkeling surveys of structure sites conducted during the summer by the USFS revealed numerous young-of-the-year small mouth bass, Utah chubs, Bonneville redside shiners, and white suckers using the woody debris structures located in shallow water.

Figure 9. Arranging and assembling discarded Christmas trees on the ice at Flaming Gorge Reservoir to be used later by juvenile fish as structural cover.

- Cut aspen trees provided to beaver to solidify dams and elevate streamside water tables.

- 800 discarded Christmas trees used to improve fish habitat at Flaming Gorge Reservoir.

- Red Rim Daley WHMA closed to livestock grazing during 2004 due to the late winter elk die-off and the ongoing drought's effect on vegetation.

- Funded 11 miles of temporary fencing to protect prescribed burn treatment.

Red Eye Basin Prescribed Burn Fencing

Funding was provided to fence 11 miles of the Red Eye Basin Prescribed Burn with a two-strand electric wire fence. The BLM conducted the prescribed burn in the fall of 2003 and permittees of the Cumberland / Uinta grazing allotment performed construction and maintenance of the fence. The fence will be maintained for one more growing season to allow for two growing seasons of rest in the burned area. The burn objectives were to stimulate regeneration of aspen stands, mixed mountain shrub communities, and grass forage production to promote a more natural successional community. Portions of the burn area are Crucial Winter Range for Wyoming Range mule deer, Bear River moose, West Green River elk and Carter Lease pronghorn antelope.

Wildlife Habitat Management Areas

Grizzly WHMA Grazing Management

The lessee grazed approximately 1,650 head of yearling cattle on the Grizzly WHMA between early May and early September 2004 (120 days). This was about a 20-day increase in the grazing period duration at the Grizzly WHMA compared to recent years, in order to avoid undue economic hardship to the lessee for closing the Red Rim /Daley to grazing use. Spring season grazing use strategy during the month of May was instituted to absorb the increase, where plants are grazed early enough to allow adequate growing season recovery time to maintain plant health. Approximately 600 head of cattle were allowed to graze the upper Muddy Creek Riparian pasture for 10 days during May (Figure 10.) The management priority for this riparian pasture has been the recovery of the willow community, so except for trailing purposes, the pasture has been rested from grazing in recent years. The prescribed early spring grazing in the Muddy Creek pasture was successful. The combination of cool weather, and early stage plant phenology resulted in cattle utilizing the upland areas more than the riparian zone, which minimized willow browsing/trampling and avoided physical impact to streambanks. Stratton Sheep Company was granted a permanent class of livestock conversion to graze cattle on

the Grizzly WHMA by the BLM during 2004. The BLM decision permits Stratton Sheep Company to utilize about 700 AUMs of cattle use annually in the Shipping, West Rendle, and a portion of the Wild Cow Pastures.

Figure 10. Early spring season cattle grazing in the upper Muddy Creek riparian pasture during May 2004.

Miscellaneous

- Attended the National Society for Range Management meeting in Salt Lake City during January to hear sessions regarding Grassbanks

- Provided comments for the development of the Rawlins BLM Field Office RMP

- Provided comments for Kemmerer BLM Field Office RMP alternatives

- Provided comments for the Kemmerer BLM Slate Creek AMP

- Assisted the Lander Region with vegetation monitoring studies at the Red Rim/Daley WHMA

- Participated in the Southwest Wyoming Resource Rendezvous

- Provided comments to the state land office regarding coal bed methane leasing of state lands that are currently surfaced leased to the WGFC on the Grizzly WHMA

- Provided comments to DEQ for the 305d water quality monitoring report

- Toured river restoration work completed by Dave Rosgen on the Three Forks Ranch in Colorado

- Initiated construction of a Microsoft Access database for the Wildlife Division's Vegetation / Habitat monitoring data collected throughout the state by the Department. This will provide a single repository for data collected throughout the state and assist with future reporting and analysis

- Compiled potential projects identified by Regional personnel. Projects included potential activities such as fence modifications, prescribed burning, water development protection, and in stream fish habitat improvements

JACKSON REGION

HABITAT PROJECTS

Brucellosis-Feedground-Habitat Program

The Terrestrial Habitat Program continues to overlap well with the elk brucellosis related activities in Northwest Wyoming. In 2004 we worked with the Brucellosis Feedground Habitat (BFH) program cooperatively on habitat improvement projects, specifically prescribed burns on the BTNF and Grand Teton National Park. Many of the projects listed in this report are jointly worked on with the Terrestrial Habitat section and the BFH biologists. Other BFH activities include elk vaccination in the Jackson, Fall Creek and Afton Herd Unit feedgrounds, trapping and blood testing and elk feedground management to reduce the spread of the disease. Habitat biologists also monitored several outbreaks of necrotic stomatitis on elk area feedgrounds, and conducted the annual surveillance of harvested Yellowstone-Grand Teton elk for chronic wasting disease.

Monument Ridge Rx Burn

The Bridger-Teton National Forest has proposed a prescribed burn for about 8,000 acres of sagebrush/grassland, mountain shrub, and aspen-conifer mix in the Monument Ridge area located about 25 miles southeast of Jackson. This area is elk and moose winter and transitional range. Several thousand mule deer also use this area as transitional range during spring and fall migrations. We have habitat typed the entire area, using aerial photos and field verification, and developed a GIS layer of this information (Figure 1). Preliminary vegetation objectives have been developed based on inventory analysis and recommendations from Dr. Alma Winward and Dale Bartos. A field trip was held with BTFS personnel during the fall of 2004, and plans are to initiate prescribed burning during the fall of 2005.

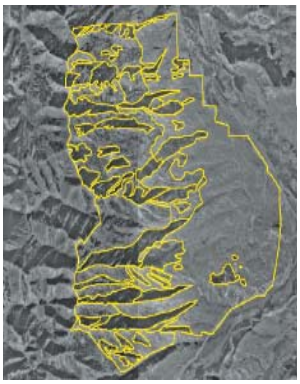


Figure 1. Monument Ridge habitat types.

Blackrock/Spread Creek Allotment Fence Removal

The Blackrock/Spread Creek allotment (87,500 ac), located southwest of Moran Junction, was closed by BTF Supervisor on August 1, 2003. As part of the closure agreement, WGFD and conservation organizations agreed to remove fencing associated with the allotment. The Jackson Hole Wildlife Foundation teamed up with the Rocky Mountain Elk Foundation and coordinate removal of over 15 miles of fence (Figure 2). Other organizations and agencies assisting with fence removal included: Wyoming Wildlife Federation, National Wildlife Federation, Greater Yellowstone Coalition, Jackson Hole Conservation Alliance, USFWS – National Elk Refuge, Jackson Hole Back Country Horsemen, BTNF. Participants celebrated by gathering for a potluck supper and live music after nine days of "wire wrestling."

Figure 2. Mounds of wire in front of the Tetons.

- BFH program provides great assistance to habitiat efforts.
- Monument Ridge Rx burn planned for fall of 2005
- 15 miles of fence removed from the Blackrock Allotment
- Rx Burn willows heights affected by browsing

Willow Exclosures in Grand Teton National Park (Spread Creek Area)

For the eighth year, habitat biologists and BFH biologists have monitored willow and aspen growth after a spring prescribed burn in 1997. There are three "treatments" to this monitoring project (Figure 3). The first treatment has a 16'x16' exclosure in place year round; the second has the 16'x16' exclosure in place only in the summer (to look at the effect of cattle grazing in the area); and the third had no exclosure (allowing cattle and wildlife access throughout the year). The data shows that the willow mean height continues to increase slightly in the year-round exclosure while in the other two treatments with wildlife use, appear to be browsed to snow level annually (Figure 4). Additionally, aspen stem height follows this same pattern.

Figure 3. Comparison of willow heights inside and outside the exclosure.

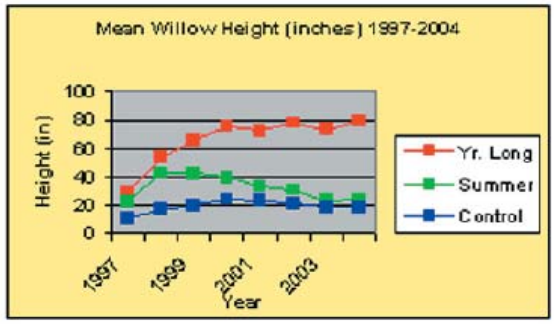


Figure 4. Comparison of willow heights by year.

Jackson Interagency Habitat Initiative

The Jackson Hole Interagency Habitat Initiative (JIHI), is a collaboration of biologists from the USFWS, WGFD, BTNF and Grand Teton National Park. The goal of JIHI is to maximize effectiveness of native winter range for ungulates and a diversity of wildlife indigenous to this region through identification of habitat management opportunities. The JIHI area of concern is essentially the herd unit boundaries of the Jackson elk herd, as identified by the WGFD.

JIHI objectives are:

1. Create a common Geographical Information System (GIS) database of the following information:
    - Known ungulate distributions during winter (December through April)
    - Potential additional winter range based upon physiographic features of the landscape and snow water equivalents
    - Plant communities on these ranges
    - Distributions and dates of past fires and other habitat treatments within these ranges and current status of the plant communities treated
    - Ungulate feeding operations, both wild and domestic
    - Summer and winter travel plan restrictions
    - Noxious weed distributions
2. Identify and map areas of opportunity for ungulate winter and transitional ranges through vegetation manipulation.
3. Identify competing land uses that limit habitat effectiveness for wildlife
4. Prioritize these areas based upon their relevance to: achieving ungulate population objectives, reduction of disease prevalence and risk among ungulates, attainment of resource management agency missions and goals, maintenance of biodiversity, and recognition of various resource management, policy, and public safety constraints.
5. Identify protocols and methods for pre- and post-treatment monitoring of habitat enhancement projects to measure response of both plant communities and wildlife.
6. Develop a protocol for continuing coordination among the state and federal agencies for evaluating achievement of the above stated goal and reporting progress to agency administrators.

- Approx. 1,200 acres of aspen targeted for Rx burn SE of Moran Jct.
- Profile and cross-section surveys established for Spring Creek
- Installed temperature logger and stream gage to develop a temperature and flow history.
- Completed Dalas Lake Restoration Project

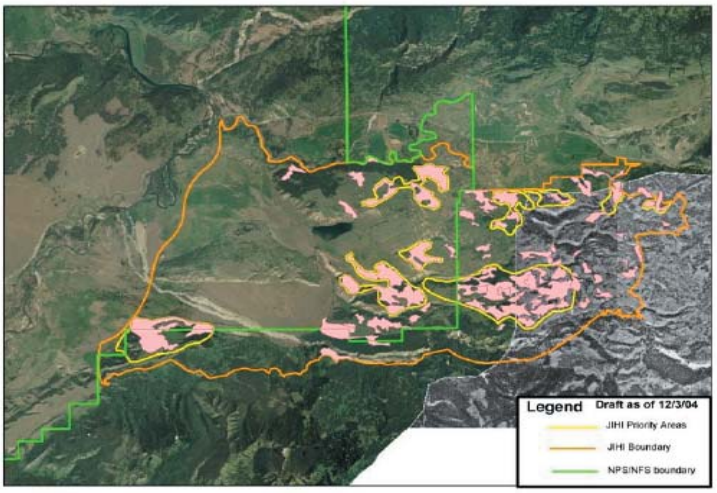


Figure 5. Location of priority aspen areas and burn unit boundaries near Moran Jct.

Agency administrators from GTNP, USFWS, USDA Animal and Plant Health Inspection Service, and the WGFD collectively encourage the BTNF to pursue habitat enhancements via a memo in October, 2003. Personnel and financial assistance was offered by the above agencies.

The focus area within Buffalo Valley has been habitat typed and vegetation treatment objectives identified (Figure 5). Pre-burn sampling plots were installed during the 2004 summer and a burn plan developed. Weather conditions in early fall 2004, prevented implementation of a prescribed burn targeting 1,200 acres of aspen for regeneration.

The potential of adding additional burn units in the Buffalo Valley is currently being explored. The JIHI group has agreed to shift habitat inventory and habitat type classification efforts to the lower reaches of the Gros Ventre River during the 2005 field season.

Flat Creek / Salt River Confluence Restoration Project

The confluence of Flat Creek and Salt River, north of Thayne, is experiencing degradation of river and stream banks. 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 will change course, which will initiate alteration and possible damage upstream and downstream.



Figure 6. Photos of construction of vortex weir on Flat Creek above the Salt River confluence.

Project objectives:

- Maintain meander pattern to preserve river and stream structure
- Maintain spawning and migration habitat for trout
- Reduce sediment contribution of eroding banks
- Enhance aquatic habitats to maximum ecological potential
- Enhance riparian habitats to maximum ecological potential
- Provide sufficient habitat and habitat diversity to increase Snake River cutthroat trout populations

The first phase of this project was completed December 2004. Installation of a vortex weir and modification on banks of both the Salt River and Flat Creek was accomplished (Figure 6). The second phase, revegetation, modify grazing and restoration of side channel, will be completed in the spring of 2005.

Snake River Spring Creeks Enhancement Project

Native Cutthroat Trout Spawning and Migration Enhancement is an ongoing watershed project for the spring creeks of the Snake River. The WGFD with cooperators, interest groups, land managers, and landowners is striving to promote watershed function and ecosystem integrity by enhancing the quality and diversity of aquatic habitats in spring creek. These areas are integral to the natural recruitment of native trout for a fishery of national importance.

Objectives:

- Enhance aquatic habitats to maximum ecological potential
- Improve structure and function of spring creeks
- Provide sufficient spawning and migration habitat to increase Snake River cutthroat trout populations
- Provide a quality fishery for anglers by enhancing the spring creeks that provide recruitment to the Snake River

Modification and manipulation of spring creek channels is needed in order to restore the function of trout migration and spawning. Currently the channels have become inundated with sediment, they are wide and shallow, and are saturated with aquatic vegetation due to lack of flushing flows. Enhancement projects will be developed to provide sustainable spawning gravels, pools, overhead cover and migration routes for native Snake River cutthroat trout. Three different spring creeks were explored for possible enhancement opportunities. These habitats are critical for maintaining wild populations of Snake River cutthroat trout, and are almost exclusively located on private lands. It is crucial to routinely restore, maintain, and ensure access to these spawning habitats adjacent to areas of extensive subdivision throughout the Jackson Hole area.

Expected Results:

- Expanded aquatic habitat and increased instream diversity
- Riparian vegetation returned to maximum ecological potential
- Decreased sediment can reduce the incidence of spawning redd loss
- Increased Snake River cutthroat trout, non-game fish, and game fish populations throughout the drainage
- Improved fishery quality for anglers on the Snake River

Blue Crane Enhancement Project

Blue Crane Creek was identified to provide valuable habitat for Snake River cutthroat trout. The headwaters of Blue Crane Creek were chosen because of the potential for spawning and juvenile habitat (Figure 7). The objectives for the first phase of the Blue Crane Spawning and Migration Enhancement Project were to remove the sediment from the headwaters and provide quality pool and riffle habitat. Seven pools were dredged, 200 cubic yards of material was removed, and 7 log and rock weirs were placed in the stream. The second phase was planting sod matting of native sedge and currant on steam banks. This vegetation assisted in narrowing of the stream channel, increasing flow velocity and enhancing stream function (Figure 8).

Figure 7. Headwaters of Blue Crane Creek before project.

Figure 8. Headwaters of Blue Crane creek after project.

MISCELLANEOUS

- Presented an aquatic habitat class for the Teton Science School during Waterfest
- Participated in Salt River Coordinated Resource Management
- Attended Trout Unlimited and Jackson One-Fly Meetings
- Contacted 9 landowners, property mangers and consulting firms associated with various spring creeks
- Attended 4 Roles of Leadership Workshop Participated at Wyoming Hunting and Fishing Heritage Exposition
- Attended Fire Effects Workshop that was put on by Grand Teton National Park and Bridger-Teton National Park
- Participated in the Afton Rendezvous with 4th graders form Star Valley and Cokeville
- Attended Wyoming Stock Growers Association meeting
- Attended Snake/Salt Rivers Basin Advisory Group meetings

LANDER REGION

HABITAT PROJECTS

South Wind River Mule Deer Herd Unit Project

Time was spent mapping and evaluating crucial winter range and yearlong winter range associated with the South Wind River Mule Deer Herd Unit (Figure 1). Maps that show specific browse plant communities such as, sagebrush/bitterbrush, silver sagebrush, three-tip sagebrush, and mixed stands that include skunkbush sumac, chockecherry, snowberry, etc. need to be digitized. Approximately 80% of the total herd unit has been mapped. In addition, several sites have been tentatively identified for potential habitat improvement projects. Currently there is potential to work with two landowners concerning conservation easements that would prevent fragmentation of winter habitat.

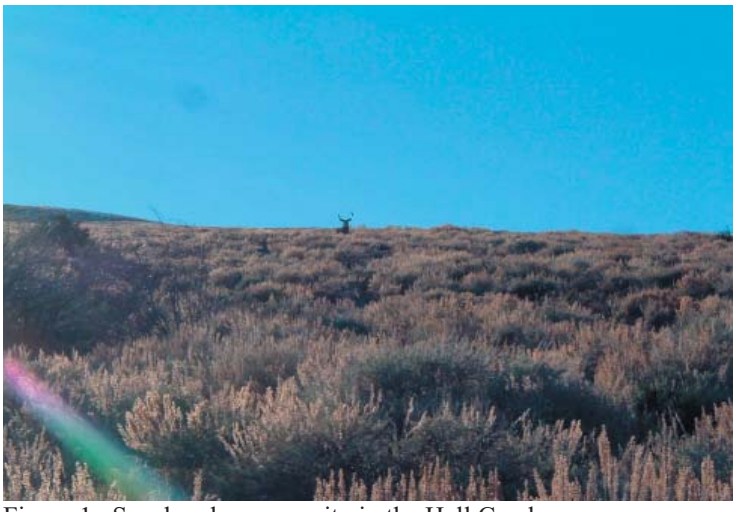


Figure 1. Sagebrush community in the Hall Creek area.

Green Mountain Common Allotment

The Green Mountain Common Allotmen encompasses approximately 517,000 acres in the Red Desert that has the Sweetwater River as its north boundary, State highway 789 as the east boundary, the Crooks Gap road as the south boundary and the Continental Divide as the west boundary. The Department has actively participated in management of the area through the Green Mountain Common Allotment working group since it's establishment in 1997. The group includes local ranchers, WGFD, BLM, various organizations and the private sector. At a meeting of the working group on February 2, 2004 the Green Mountain Common permittees presented a letter to the BLM stating that "We would like to convey that we do not intend to participate in any more meetings of the large Green Mountain working group established by your office, or smaller in size working groups that work at the direction of the larger working group or any collaborative groups that are tightly controlled by the Lander BLM." Since that date the working group has not met and the BLM has been working with individual permittees

- 80% of the entire South Wind River Mule Deer Herd Unit has been habitat mapped for browse plant species.
- Elk die off at Red Rim/Daley caused by lichen.
- Sheep grazing permitted on Chain Lakes.
- Cutthroat trout management plans completed.
- Sweetwater canyon fence and riparian pasture evaluated for resuming grazing.
- Gated pipe installed Spence/Moriarity WHMA meadows.
- Solar panel waterwell completed at Chain Lakes WHMA.

and their grazing association. It is important for the Department to continue to have input into the management of the area as many of the management decisions directly affect a variety of wildlife and fisheries.

Spence/Moriarity and Inberg/Roy WHMA's

The Spence/Moriarity and Inberg/Roy WHMA's are located north and east of Dubois Wyoming. The areas abut each other and jointly make up 58,013 acres of lands managed primarily as crucial elk winter range. It is also important habitat for many other species of wildlife and fish. The Department has been collecting herbaceous forage production utilization data on the Inberg/Roy WHMA for approximately 33 years and for the past 2 years on the Spence/Moriarity area. The average past 5 year herbaceous forage production from 11 sites on the Inberg/Roy WHMA was 284 lbs. air-dried forage per acre and two years of data from 7 plots on the Spence/Moriarity WHMA showed an average of 238 lbs. air-dried forage per acre.

Whiskey Basin WHMA

The Whiskey Basin WHMA is located south and east of Dubois Wyoming. The area totals 9,910 acres and is managed primarily for bighorn sheep, however all other species of wildlife and fish are considered when making management decisions. Department personnel have been collecting forage production/utilization data for the past 40 years. The average herbaceous forage production for the past 5 years was 261 lbs. air-dried forage per acre. Average production over the 30-year period is 396 lbs. air-dried forage per acre. Plans are being prepared to implement range pitting, herbicide application, and additional burns in the near future.

The Whiskey Mountain Bighorn Sheep Technical Committee has planned for several years to initiate burning projects on the management area to open up migration corridors and improve winter forage for bighorn sheep and other wildlife species. Approximately 2,000 acres of timber on Forest Service land and 212 acres on the WHMA are scheduled for burning by the Forest Service in the fall of 2004. In addition another 488 acres will be burned on the south face of Torrey Rim in the spring of 2005. Time was spent putting together the burn plans, NEPA work and archeological clearances for these projects.

Red Rim/Daley WHMA

During the winter of 2003-2004, approximately 320 head of elk perished on the WHMA and adjacent properties. The problem was first reported on February 8, 2004 when a coyote hunter reported seeing two crippled cow elk on the WHMA February 6th. Department personnel immediately began to search the WHMA and surrounding area and additional elk were located that exhibited the same symptoms of staggering and then eventually laying down and being unable to stand again. The cause of the problem was not forthcoming and in March of 2004 two habitat biologists were dispatched to the area. It was evident that most plants that are normally thought of as being toxic to animals, if ingested, were not available at this time of the year. It was also apparent that all available herbaceous forage had been used. Species such as saltbush, bud sagewort and rabbitbrush received heavy use (Figure 2). During field inspections, it was noticed that lichen was very abundant in the area. The lichen was collected by the habitat biologists and taken to Lander. Further text research indicated that the symptoms produced by lichen toxicity matched the symptoms present in the elk. Walt Cook, Department veterinarian, was notified of the findings. Additional lichen was collected and sent to the Department's research facility at Syblille. Lichen was fed to captive elk and it was determined to be the cause of the elk die-off.

Figure 2. Saltbrush heavily used by elk (March 2004).

In June of 2004 seven-production utilization sites were established to monitor herbaceous forage use by wildlife during winter months (Figure 3). Five of the transects, located on upland types, averaged 158 lbs. of air-dried herbaceous forage produced per acre. The other two sites are meadow types and averaged 2,610 lbs. of herbaceous forage per acre. Data will be gathered from existing browse transects that were established by the BLM.

Department representatives negotiated with BLM to close the Red Rim/Daley WHMA to livestock grazing during 2004 due to concerns with the late winter/early spring elk die-off and the


Figure 3. Production/Utilization site and cage, Red Rim/Daley WHMA.

ongoing drought conditions effecting vegetative productivity. Herbaceous vegetative production/utilization studies were initiated during the interim to evaluate potential increased demand for winter elk dependency on the Red Rim/Daley WHMA.

Chain Lakes WHMA

Sheep grazing was allowed to continue this year under a lease agreement with the Ladder Livestock Company (Figure 4.) The lease allowed for grazing 1188 AUM's between December 15, 2003 and March 15, 2004. The Lander Terrestrial Habitat Biologist toured the area monthly to determine if the lessee was meeting the agreements of the lease. During the inspection trips it was apparent that the lessee had excellent herders and that the sheep and sheep camp were being moved frequently. Browse use, primarily on sagebrush was estimated to be less than 10 percent. In lieu of cash payment the lessee continued to develop solar water pumps on existing water wells.


Figure 4. Sheep grazing on Chain Lakes, winter of 2004.

Statewide Projects

The Colorado River Cutthroat and the Bonneville Cutthroat Conservation Plans were completed this year. The Lander Aquatic Habitat Biologist was extensively involved in the creation of the GIS project. The historical and current ranges of both species were mapped. Along with the locations of fish passage barriers. All this information was then linked to databases of attributes for future planning.

The Lander Aquatic Habitat Biologist is involved in the fish habitat/species distribution maps for the Comprehensive Wildlife Conservation Strategy (CWCS). Linking the Fish Division databases on fish locations to the 5th level Hydrological Unit Codes (HUC) is creating these maps. This process was first completed by the Wyoming Geographical Information Center (WyGISC) at the University of Wyoming. There were some discrepancies in the maps; this was a two-part problem. The Fish Division database needed to be error checked and there were problems indexing the fish location information to stream reaches and lakes. The databases are being error checked by the Fish Division managers and the links to stream reaches will be continually refined by WyGISC to the 1-24,000 level.

Long Creek Watershed

Completed Level I WHAM assessments on the West Fork, Middle Fork and East Fork in the Long Creek Watershed. These streams are within the historical and current range of the Yellowstone cutthroat and there is a possibility to expand their range back into these watersheds. During the first survey in July the conditions appeared favorable for further study of the reintroduction efforts. The steams were again surveyed in early fall and due to extreme grazing pressure the possibilities seem slim for reintroduction. Due to the terrain the cows are concentrated in the stream bottoms and due to confer encroachment grazing on the uplands is limited. Further discussions with the USFS on the need to proceed are required.

Sweetwater Canyon Riparian Fence

The WGFD grant of $50,000 in 1998-1999 was used to build a riparian fence in Sweetwater Canyon completed in 2000. The project agreement stated there would be no grazing for 5 years, after which we would evaluate for limited grazing use with the Sweetwater Canyon. The evaluation began this summer with multiple tours with the BLM lessee and concerned publics. A discussion by the BLM to allow limited grazing is likely, even though due to drought the recovery with the canyon was limited.

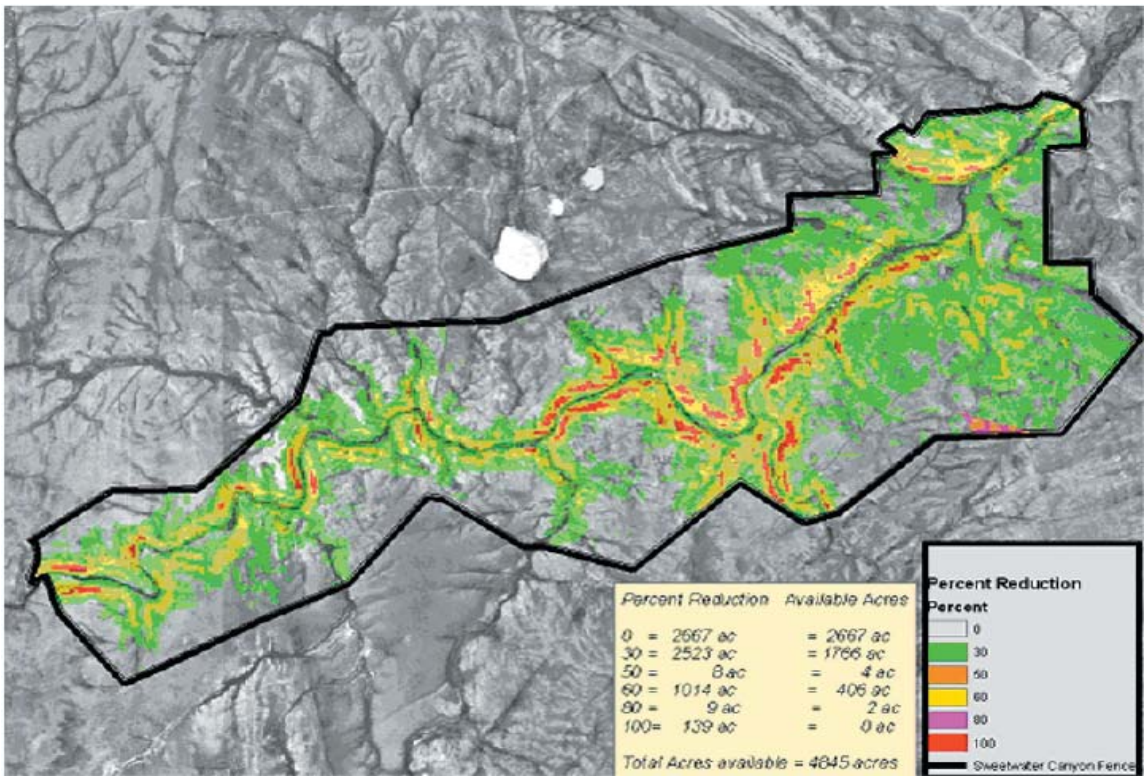


Figure 5. Map of adjustments to grazing for distance to water and slope using the J.L. Holechek Method, 1988 for the Sweetwater Canyon Riparian Fence.

Grazing suitability maps were prepared by the WGFD for the BLM (Figure 5). The grazing suitability is determined by a combination of distance from water and slope. The calculations were within the range of the BLM's current acreages. The use of this technique may be more useful with other grazing plans.

WILDLIFE HABITAT MANAGEMENT AREAS

Introduction

There are slightly over 100,000 acres of Department managed lands in the Lander Region managed by the Habitat and Access Branch, which includes three permanent people and three temporary irrigators hired during the summer. There are seven wildlife habitat management areas (WHMA), of which Sinks Canyon is managed by State Parks through a memorandum of understanding, one conservation easement, and two public access areas for fishing. Fences, irrigation systems, roads, and farming and grazing contracts are part of the management responsibilities. Habitat and Access personnel also work with the local terrestrial habitat, aquatic habitat, and wildlife biologists on projects designed to enhance wildlife or fish habitat and populations on the WHMAs.

Spence/Moriarity WHMA

The farming/haying leases of the lower Spence Moriarity meadows (Garrison, Ranch, Andy's, Bain, Pease, 21 and Long meadows) continued. There were problems with trespass cattle, but since the lessee was close, he was able to control most of it. New fences helped, and additional fences planned for next year should also help this situation. Hay was provided to the Department as specified in the lease. It is stored at Whiskey Basin WHMA for use by Department horses when they are being used in the area. The upper meadows (Sideroll, Firehouse, Thunderhead, Bear Creek and Pea Patch) were irrigated by Department personnel and left standing for use by wintering elk, deer and other wildlife. Irrigation of the upper meadows was shut down at the end of July to maintain flows in Bear Creek in order to provide as much water for fish in the creek as possible. The Thunderhead meadow was cut this year to stimulate regrowth, remove old growth and litter accumulation, as planned. Cutting one of the four Bear Creek meadows each year will help make the forage more palatable for wildlife.

Additional gated pipe was installed on the Sideroll meadow. This almost doubled the area covered. A portion of the Pivot meadow was pitted, and seeded (Figure 6.) Work was done on the Pea Patch pipeline to daylight the pipe and the "hole"

Figure 6. Pivot meadow on Spence/Moriarity WHMA.

was eliminated. A new headgate was ordered and will be installed at the Thunderhead diversion before irrigation season. This will allow us to shut down the system more efficiently, and not draw so much silt into the pipes. Annual maintenance was preformed on all pipelines.

As always, trespass livestock was a major issue. However, there seemed to be less trespass than past years. This is partly due to more moisture this year. Fences were built on the east side of the East Fork River (backside of the Thunderhead Ranch) and the west side boundary fence of Finley's property was put on line. We will put poles on top of part of this fence in the future to prevent elk damage. Routine fence maintenance was preformed, and we are looking at different ways to make a more stable river crossing for fences.
A major effort was also put into signing all open roads with white arrows.

Inberg Roy WHMA

The meadows continue to be irrigated by Department personnel and were left standing to provide forage for wintering elk. Water was shut down in late July to accommodate minimum flows in Bear Creek for fisheries.

Trespass was minimal, and livestock owners removed most of it.

The ditches and diversions were maintained, and the banks of the ditches in the Dennison Meadow were leveled and spread by a contractor to allow easier irrigation.

The fences received annual maintenance, and a "triple gate" system was installed in Horse Draw to better accommodate public access as well as alleviate trespass livestock problems (Figure 7).

The memorial site was maintained; wooden signs and fence were painted. Panels were installed to prevent winter elk damage to the conifer and aspen trees in the memorial site. This is an annual activity--panels are installed each fall and removed each spring before and after winter elk use on the area.

Open roads were signed with white arrows to designate them as open.

Figure 7. Triple Gate in Horse Draw on Inberg/Roy WHMA.

Figure 8. Trail Lake Meadow.

Whiskey Basin and Little Red Creek WHMA

Trail Lake meadow and Whiskey Basin meadow were irrigated by Department personnel. Gated pipe was installed on Trail Lake Meadow, which greatly improved the efficiency of the system (Figure 8). Plans are in the works to install some gated pipe on Whiskey Basin. Trail Lake meadow was left standing for bighorn sheep winter range as well as for mule deer. Whiskey Basin meadow was grazed by CM horses in November, in accordance with the grazing exchange agreement between CM Ranch, BLM, and WGFD. Pipelines, diversions and ditches were maintained as needed.

The Wyoming Chapter of Foundation for North American Wild Sheep (FNAWS) and the Wyoming Governor's Big Game License Coalition funded the second application of fertilizer for Trail Lake Meadow as well as gated pipe for the meadow. Plans are being made to chop this meadow on a three to four year rotation.

Fences received annual maintenance.

The irrigator cabin at Whiskey Basin is being renovated. Our goal is to have it ready to live in by the time the new irrigator is ready to start in the spring of 2005.

Ocean Lake WHMA

Ditches were maintained and irrigation started in late April on about 450 acres, by Department personnel. This year was a fair water year, with water being shut off at the end of September (two weeks to a month later than the last few drought years). Pond levels were raised, and dikes received routine maintenance. We contracted with a local farmer to plant some fields on the Abernathy and Lockhart segments. Unfortunately, the ground was too hard, and he will try to plant them next spring. Fields on the Dudley/Smith and Lindholm segments were ripped to break up root-bound sod.

The Habitat and Access crew assisted the waterfowl biologist in building a goose trap for banding and sexing geese as well as helping catch and band geese (Figure 9.) The grazing lessee on the Foster Segment maintained the boundary fence on Ocean Lake as a condition of his lease as well as purchasing $1500 of fence material and delivering it to the site.

Last year's lease was extended for another year. A second grazing lease occurred in January and February of 2004. The lessee grazed the Lockhart and Locke segments. This is in accordance with the five-year rotation scheme that allows for grazing a segment of Ocean Lake each year to remove old growth and litter to provide palatable forage for wildlife. 2004 was the third year of a five-year contract.

Parking areas for pheasant season were mowed and gates locked prior to pheasant season. Maintenance of restroom facilities and associated parking areas were maintained under contract. White arrows were installed on open roads. The aerators were checked and repaired as needed, and turned on for the winter in late November to


Figure 9. Building goose trap at Ocean Lake WHMA.

keep an ice-free area for wintering ducks and geese.

Sand Mesa WHMA

Mesa was farmed under contract again this year. Fences around Sand Mesa and the corridors along Five-Mile and Muddy Creeks were maintained under contract. Parking areas were mowed and gates locked prior to pheasant season. Maintenance of parking areas and comfort stations were maintained under contract. White arrows were installed on open roads.

The negotiation process for a new Memorandum of Understanding (MOU) between the Bureau of Reclamation and WGFD was begun for management of the Sand Mesa WHMA. The BOR owns the land and WGFD has been managing the area through an MOU with them.

Red Canyon WHMA

The remainder of the burned fence was replaced this year, and the contractor will replace a portion of the rest of the fence that is in poor shape next year to fulfill his contract. All other fences received routine maintenance.

As this was a good water year, no call was made on the Wind River. Irrigation was done under contract, and the meadows were grazed in May as part of the agreement to rest burned areas on the forest.

Red Canyon meadows were ripped to break up root-bound soil as well as aerate it. The meadows were also measured for gated pipe.

We are still awaiting the final word on the State Land trade between the Department and The Nature Conservancy.

Mexican Creek Conservation Easement

This small conservation easement has little maintenance requirements. Routine fence and parking barrier maintenance was preformed and white arrow travel signs were installed.

Sinks Canyon WHMA

State Parks has had a management agreement with the Department for the last several years. A new agreement was formulated and signed, and a new management plan for the WHMA has been initiated. This is a small area (514 acres); as a result, there is not a great deal of management activity on the part of the Department. Most has been proposed and carried out by State Parks as part of their operation.

Chain Lakes Water Well Development

During 2004, two water wells were re-established on Chain Lakes WHMA, one in the southwest and one in the southeast corner of the unit. The development of water on Chain Lakes is to help prepare the WHMA as a possible grass bank in the future. The two wells were developed through an agreement between the WGFD and Ladder Livestock Company, grazing permittee. In lieu of payment to the Department for the grazing lease, Ladder Livestock Company agreed to have the two wells tested and to install solar submersible pumps and solar panels at each site. Each well is now producing about 3,000 gallons per day in the summer and 2,400 gallons per day in the winter. The development of these wells has provided additional sources of water and riparian habitat for a number of wildlife species that utilize the WHMA (Figure 10.)


Figure 10. Chain Lakes solar well and riparian area resulting from development of the well.

MISCELLANEOUS

Two landowners/managers were assisted with wildlife habitat enhancement, development or maintenance projects. These were small pond developments and brush planting projects that involved the sharing of knowledge and literature but no Department funds were expended.

Yearly coordination meetings were attended with USFS, BLM, USFWS, NRCS, The Nature Conservancy, Midvale Irrigation District, and the Dubois/Crowheart Weed Management Association. At these meetings information is shared concerning upcoming projects, policy changes, hunting and fishing seasons, wildlife populations and habitat needs among others. Personnel served on various committees and advisory panels. Personnel attended branch meetings, interviewed and hired seasonal irrigators for WHMAs and participated at horse team meetings.

Three Access and Habitat Branch at will contract employees were upgraded to permanent status. Three seasonal irrigators were hired for Inberg/Roy and a portion of Spence/Moriarity, Whiskey Basin and Ocean Lake WHMAs. A new permanent position has been placed at Dubois and has been helpful with trespass livestock problems and improving public relations on WHMAs.

LARAMIE REGION

HABITAT PROJECTS

Production and Utilization Surveys

Moderate to severe reductions in production of winter range shrubs occurred throughout the Laramie Region in 2004. The lack of moisture during the critical growth initiation period in spring apparently could not be overcome by summer precipitation that met or exceeded area norms. Although timely summer rains continued into early fall, allowing green herbaceous forage to be maintained into October, shrub growth remained stunted. In some areas declines in leader growth approached or exceeded the extremely poor production experienced in 2002. This situation is somewhat of the reverse of the precipitation cycle of the previous year where early spring moisture resulted in good shrub leader production, despite relatively dry summer conditions. The reduction in leader production on both mule deer and pronghorn winter ranges will create a forage shortage that could put shrub dependent wintering big game at risk and cause a subsequent increase in shrub utilization that could reach damaging levels. The severity of the impacts to winter range shrubs and wintering wildlife will, of course, depend on the length and severity of the 2004/2005 winter.

A brief summary of growing season precipitation patterns and their effect on shrub communities is included with 2004 production summaries. The information was obtained from the nearest Western Region Climate Center weather station having complete data and a location expected to have weather patterns similar to that of the monitoring station.

In 2004 local population biologists and game wardens were each permanently assigned to

- Mule deer and pronghorn shrub winter range production surveys were conducted at 57 sites
- Mule deer shrub winter range utilization surveys were conducted at 23 sites
- Summer range condition surveys were conducted in the Shirley Mountains and areas of the southern Laramie Range
- Historic shrub winter range data were summarized and evaluated

annually assist with the collection of production and utilization data on three different transects (n=23). The experience was designed to help them become more familiar with the condition and use of the shrub communities that support the herds they manage. Their assistance was greatly appreciated.

Of the 23 transects monitored in 2004, only 3 (Fox Creek, Prospect and Cedar Hills) showed utilization that exceeded the suggested limits, and one, (School Creek) was high enough to warrant more intensive monitoring of future utilization and population trends. Utilization surveys are planned for the remaining monitoring stations (n=57) in 2005.
Several sites had shrub species, other than the primary forage species, that were receiving extremely heavy utilization. For instance, shadscale is a relatively minor component of the shrub communities surrounding the Medicine Bow River monitoring station, however, it is a highly preferred forage species and many plants are being destroyed by over use. Big game management strategies that will offer protection for these important shrubs should be discussed.

Utilization in most vegetation communities did not reflect the drought that persists in the Laramie Region and most of Wyoming. Remarkably well-timed precipitation in the spring of 2003 stimulated herbaceous and browse forage production that would equal or exceed what would be expected in a year of normal moisture. The precipitation, however, only served to moisten shallow root systems and had little or no effect on deep soil moisture. The increased production during the 2003 growing season should have had a direct positive effect on utilization levels in 2004, with browsing animals taking relatively less of the total forage on offer. This positive relationship cannot be confirmed, however, as no previous utilization data are available.

To further improve the vegetation monitoring efforts in the Laramie Region, three new monitoring stations were established in important areas of mule deer and pronghorn winter ranges, including: Wood Creek Ridge near Woods Landing, Oils Springs Road, north of Medicine Bow and north of Highway 34 between Highway 287 and Morton Pass.

Observations Regarding Pronghorn Habitat and Population Trends

As reported in a 2004 Game and Fish Department summary of population trends, pronghorn fawn production in the Laramie Region (Figure 1) has declined from 18 to 43 percent over the period 1979 through 2002 (Figure 2). These declines occurred in all herd units within the region and data from vegetation monitoring stations indicate that habitat conditions may be the principal cause. Wyoming big sagebrush (ArtTriW) is the primary forage species on all of the regions most important pronghorn crucial winter ranges. Transect data indicates ArtTriW plants within these stands are generally heavily hedged and contain high levels of decadent and, in some cases, dead plants. These aging and generally overutilized plants are no longer as productive as younger, healthier plants and the forage being produced is often of diminished nutritional value. The fact that these stands normally cover thousands of acres creates the illusion that ample forage is available to the animals that depend on them. However, close examination reveals that these plants are producing few if any leaders and the leaders that are being produced are often less than a centimeter in length. The nutritious portions of the plants are therefore difficult to find and are being produced in such low quantity (lbs./acre) as to be inadequate to support large numbers of pronghorn during severe winter weather when energy requirements are high.

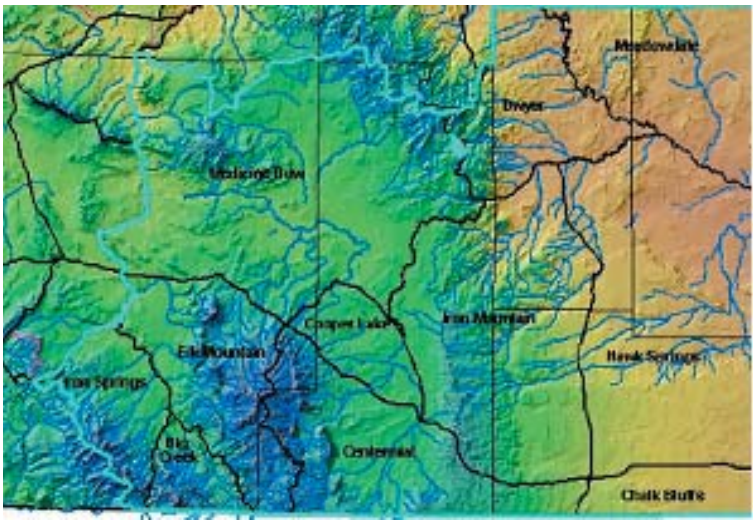


Figure 1. Laramie Region pronghorn herd units

The production and utilization surveys conducted by regional personnel are providing an index to annual changes in forage production within a stand and how much of that production is being taken. The production surveys do not, however, provide an estimate of total forage production, but only reflect the reactions of the vegetation to changes in precipitation and therefore will not produce the data needed to estimate appropriate stocking rates. For instance, during production surveys, the examiner is required to measure ten

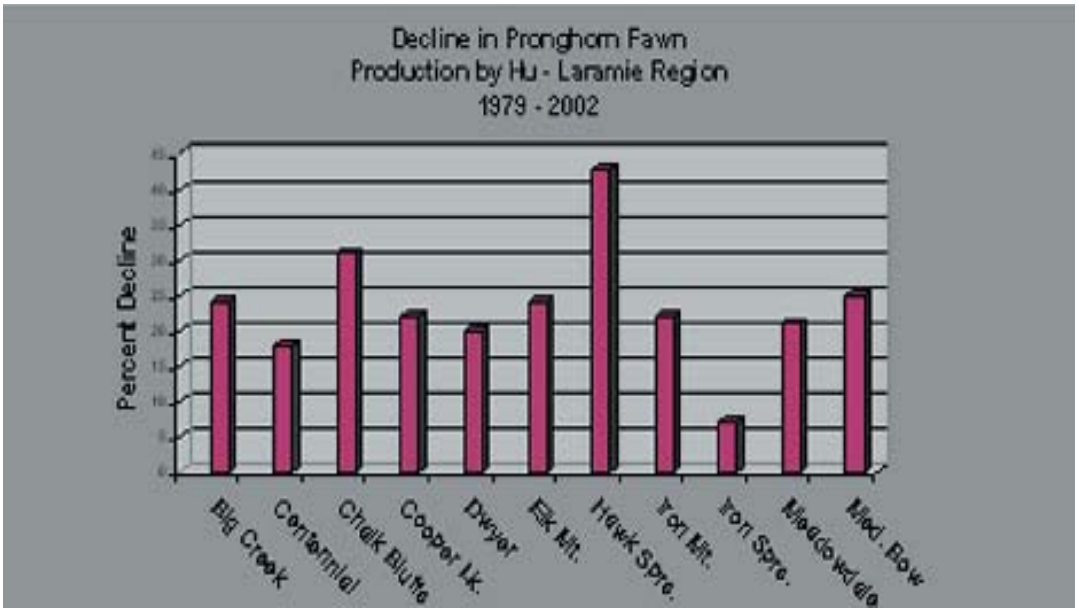


Figure 2. All pronghorn herd units have experienced declines in fawn production during the 21 year period, 1979 through 2002. Average decline equals 23%.

leaders from 10 different plants (n=100). While conducting these surveys, it often becomes apparent that most ArtTriW plants are not only not producing leaders of any substantial length, but are producing so few leaders that it becomes very difficult to find the 10 leaders needed to completely sample each plant. A winter range in this condition could conceivably experience a dramatic increase in leader length, as per the annual survey, and still not produce the volume of forage needed to sustain wintering big game. When the condition in ArtTriW communities decline to this point the plants begin to develop a dense, compact surface that resembles a scrub brush with occasional longer bristles (leaders) extending above the surface. This situation is occurring in all the ArtTriW stands being monitored on Laramie Region pronghorn winter ranges. The percent of these non productive plants that is utilized will almost always be high, because there is so little forage. Utilization is a function of production and therefore when utilization is high, it may not only indicate a situation where too much of the plants current annual growth (CAG) is being taken, but also where too little CAG is being produced. Ultimately, this means there are too many animals using the stand and forage production is not keeping up with utilization.

There has been a tendency to attribute the poor condition of pronghorn winter ranges to over use by cattle. However, fecal analysis from cattle samples collected at pronghorn winter range monitoring stations showed no use on ArtTriW and with only one exception (Gardner's saltbush from Shirley Basin) was there any significant amounts of a preferred winter range shrub material in any cattle fecal samples. The indication is that past and present big game use and the continuing drought are responsible for the decline in winter range conditions. Historic domestic sheep grazing may have played a part in reducing the health and vigor of sagebrush stands. Although sheep grazing may have contributed to the decline in condition in the region's pronghorn winter ranges, sheep grazing was largely discontinued in the Laramie Region in the early 1990s and the sagebrush communities have yet to recover.

The lingering drought appears to have all but eliminated most soil moisture available to even the deepest shrub root systems. Shrubs continue to respond to minor fluctuations in precipitation by taking advantage of superficial moisture, but do not have the ability to produce the forage that once was possible when soil moisture was plentiful and rain storms were common. The drought tends to magnify a utilization level that appears already to be too high.

In the past, severe winters tended to "reset" the balance between animals and their habitat by reducing populations to within carrying capacity. Relatively mild winters since 1993 have

- A sage grouse habitat improvement project was initiated on the Heward Ranch in northern Shirley Basin

- A multi agency cheatgrass control initiative was started

- Plans were formulated for an aspen retention initiative

- The USFS was provided with assistance in planning shrub treatments on mule deer winter range in the Sheep Mountain/ Woods Landing area

- WGFD and USFS examined the Sherman Mountain area to evaluate the areas suitability for aspen treatment

- The effects of a recent wildfire on wildlife habitat in the Ashenfelder Creek area were evaluated

- The BLM and USFS were assisted in conducting a burn of approximately 1900 acres of mixed mountain shrub habitat, including 400 acres on the Pennock WHMA

Post Season Population Estimates and 2003 Population Objective

	1979	1984	1989	1994	1999	2003	03 OBJ
Elk Mountain	9124	5033	5353	5170	4750	4549	4600
Medicine Bow	26400	37969	29998	22945	31542	56804	60000
Dwyer	1700	2250	2035	3066	4636	4439	4000
Iron Mountain	6780	6131	8395	14651	19417	14288	13000
Meadowdale	5200	5323	4487	3527	6900	6900	6000
Hawk Springs	1760	4909	3210	5372	6252	5165	7000
Cooper lake	2274	1781	3120	2956	5782	5837	3000
Centennial	4820	7751	8648	9211	11174	27437	14000
Chalk Bluffs	*	350	944	848	**	**	450
Big Creek	290	419	571	1121	364***	*	600

Figure 3. Population trends in Laramie Region pronghorn herds.

* No record available.

** Modeling discontinued in 1996. Population management decisions being made according to landowner tolerance.

*** Interstate migrations may have effected accuracy.

allowed an increased number of adults to survive and reproduce and despite the fact that fawn production and habitat condition are in decline, productivity remains high enough to allow several pronghorn populations, most notably the Medicine Bow and Centennial herd units, to build (See Figure 3). The ongoing drought continues to stress sagebrush communities but the subsequent loss of productivity has not been great enough to reduce recruitment or winter survival to the point it halts production. The result is ever increasing populations that are trying to survive on plants that are declining in health and productivity because of over use and drought stress. If the situation continues, one would expect that the imbalance would become so severe that loss of recruitment and starvation would occur regardless of winter weather conditions. As herd numbers approach the point at which habitat will no longer support population increases, the accompanying habitat damage will become extreme.

An example of this type of incremental habitat loss appears to be occurring in the area surrounding the monitoring station near the Oil Springs Road north of Medicine Bow. Sampling in 2004 revealed that the majority of the ArtTriW plants were in a form class referred to as clubbed, indicating long term intensive browsing. In addition, 27% of these sagebrush plants were dead and 26% of the living plants were classified as decadent. It was also discovered that the community had become infested with scale insects of the Coccidiae family which are defoliating infected sagebrush. According to a University of Wyoming entomologist the rate of spread of this infestation may be being accelerated by the poor condition of the plants. Stands in this condition will obviously only support a fraction of the animals that could be supported by a similar healthy community and may at some point lose the primary forage species (ArtTriW) in favor of a less palatable and nutritious shrub.

As the drought decreases production in grass/forb communities livestock grazing begins to take a proportionately greater amount of the forage on offer, which may also be having a significant effect on fawn recruitment. Losing significant quantities of this nutritious spring and early summer forage would have an adverse effect on doe pronghorn and their fawns during late gestation and lactation and could also negatively effect fawns as they are weaned away from milk and onto vegetation. The result could be low birth weight fawns, does with inadequate milk production and weaned fawns lacking the nutritious forage needed to support growth prior to winter. These conditions could easily be creating low fawn survival, even during relatively mild winters.

The five herd units that encompass the region's eastern plains (Figure 1) have all experienced significant declines in fawn production. Pronghorn in these herds are generally residing on somewhat non-typical habitats comprised of agricultural lands and grass rangelands with low density shrub components. There is no intensive pronghorn habitat monitoring being conducted in these areas, largely due to the lesser relative importance of the herds and the general inability to manage the herds or their habitats because of private land issues (Figure 4). In similar private land grassland communities in the Laramie Basin, livestock and pronghorn browsing is destroying the shrub component, largely due to the fact that

Figure 4. Pronghorn monitoring station locations.

landowners refuse to allow the harvest needed to control populations and the added influence of dual use on important shrubs such as winterfat by cows and pronghorn. If this situation is occurring on the remaining rangelands of the eastern herd units, wintering pronghorn in these areas will be faced with surviving on herbaceous rangeland and severely overutilized shrubs, or making increased use of winter wheat, which appears to already have become the mainstay for the majority of the animals in these herds. Monitoring of these areas needs to be increased in order to gain a better understanding of seasonal range use and conditions.

COMMENTS

As a general statement, most pronghorn winter range in the Laramie Region is in poor condition and no longer capable of supporting the existing herds through even a moderately difficult winter. It is not a situation that is peculiar to the Laramie Region, or even to pronghorn. Big game habitats throughout the state are suffering from historic mistakes related, in large part, to two fundamental flaws - management without objective, and more recently, management without a habitat related objective. Until relatively recently, Department personnel have been reliant on the federal land management agencies for information on the effects wildlife were having on their habitats. It has become apparent that the necessary data were not being collected and consequently population mangers have been ignorant of the adverse changes that have been occurring on crucial big game shrub winter ranges. With the establishment of the Department's habitat section this information has begun to become available internally. Only recently has enough data been amassed to allow broad scale analysis of habitat conditions.

Documented declines in fawn production, the loss of health and vigor in winter range shrub communities and the incredibly slow population recovery following the relatively moderate winter of 1992/93 are ample warning to the need for changes in habitat and population management. We are faced with two choices, either bring the herds into carrying capacity through active management or wait for "mother nature" to do it for us.

The obvious disadvantage to letting a severe winter reduce the herds is that population losses will be catastrophic, recovery will be protracted and the animals will no doubt destroy their remaining habitat while they die on the winter ranges. Effects to the Department could be equally devastating, as revenues from pronghorn license sales would plummet and would not recover for many years.

The other natural method of population reduction appears to be in progress. Wyoming has been experiencing a long series of mild, dry winters which may be the beginning of a long term trend brought on by natural climate change or global warming. During this period, pronghorn populations have managed to maintain or increase, despite continued declines in fawn production. The dry conditions have stressed winter range shrubs reducing their productivity and subsequently increasing the relative degree of use they receive from the ever expanding pronghorn herds. It is logical to expect that eventually these habitats will be depleted to the point that pronghorn mortality, even in mild winters, will increase and fawn production will continue to decline to the point that population growth will stagnate or begin to decrease.

The only positive "non management" resolution to the problem would be for the drought to break and be followed by an extended period of high precipitation, with the hope that winter range shrubs will become healthy and vigorous again and begin to provide for the needs of wintering big game. This is not management, however, but merely hoping for advantageous natural intervention. In any case, climate change may not occur in time to prevent irreparable damage to winter ranges and it is unlikely that improvements in precipitation will be adequate to allow forage production to stay ahead of the needs of the herds, which would expand in response to the increased habitat capability.

The only logical course of action is to begin trying to reduce herds to within carrying capacity. Carrying capacity is

generally considered to be a nebulous concept which in most cases can not be specifically quantified because it is based on factors that often can be extremely variable, e.g. seasonal big game stocking rates and precipitation. Estimating a stocking rate that is within the carrying capacity should be possible, however, if it is described within a range. This population range would need to be broad enough that browsing animals would normally leave forage standing during years of high precipitation and adequate stubble height to maintain plant health during drought. The process would be complicated but would generally involve monitoring habitat while manipulating populations. A stocking rate estimate could be developed, and then refined, by evaluating plant response to the variations in browsing pressure. This forage based population range should eventually define the population objective. The population objective would therefore be a function of a plant health objective, which would be based on stand health which would be evaluated using parameters such as form class, condition (decadent and dead), recruitment and production and utilization. Stocking rates based on estimates of pounds of forage per acre would be very useful, but difficult to attain, as pronghorn ranges may cover several hundred square miles and vary in productivity and availability and period and duration of use by pronghorn can not be precisely calculated. At the outset this would be far from an exact science, but would offer an informed approach to population management, with improved predictions to come as the process is refined.

It appears likely that a severe winter could intervene before any planned adjustments to habitat or populations could be implemented. In that event the Department needs to be ready to take advantage of the herd reductions and set seasons that will ensure that populations only increase as warranted by improvements in habitat capability. To ensure minimal public dissatisfaction with the management approach, justification for habitat based objectives and progress towards those objectives should be reported to the public through a strong I&E effort.

Cheatgrass Control Initiative

Plans were initiated by department personnel to create a multi-agency working group to begin addressing cheatgrass problems in southeast Wyoming. The need for this type of broad scale, intensive effort was evidenced following the explosive expansion of cheatgrass infestations as drought conditions peaked around 2002. The working group will consist of representative from USFS, BLM, County Weed and Pest districts, conservation commissions and the WGFD. The group will be charged with identifying, mapping and prioritizing infestations and soliciting funding to hire herbicide applicators. The group will attempt to locate the perennial funding sources needed to treat several thousand acres annually. The first meeting of the group will be conducted in January of 2005. Depending on the success of planning and funding efforts, treatments could begin as early as spring of 2006.

Summer Range Surveys

A qualitative analysis of important mule deer and elk summer ranges was initiated in 2004. The body fat and condition monitoring being conducted at hunter check stations has given no indication that animals are entering transition and winter ranges in poor condition. However, these surveys are not of adequate intensity or scope to ensure that summer ranges are in good condition and use is appropriate. To better understand the potential needs of these important seasonal ranges a region wide evaluation was begun in the Shirley Mountains and southern Laramie Range. Although some minor livestock grazing problems and weed infestations were encountered, there was no indication of summer range damage or deficiencies that would affect the health or survival of adult or juvenile big game. These surveys will continue in 2005 and will be extended into the northern Laramie Range and Snowy and Sierra Madre Mountains.

Aspen Retention Initiative

The Laramie Region is experiencing the same dramatic loss of aspen habitat as is being witnessed in much of the Rocky Mountain west. In most cases the problem stems from conifer encroachment occurring as a result of decades of fire suppression. In 2004 the regional habitat biologist began plans to develop a working group comprised of Department and land management agency personnel. The group will begin mapping areas where aspen habitat is being lost and determine how best to recover the stands. Unfortunately, in many cases, the use of prescribed fire to regenerate stands is not an option due to the danger of igniting adjacent conifer forests. Therefore, mechanical removal of the encroaching trees will often have to be the method of choice. Once the working group has been established, mapping of threatened aspen stands, formulation of long-term treatment plans and the acquisition of funding will be addressed.

Fox Creek Burns

Department personnel are providing input into a burn program designed to increase the vigor and productivity of important big game winter ranges west of Laramie, using fire to return these stands to an earlier seral stage. The burns

will take place on mule deer winter range on the west face of Sheep Mountain and in foothill areas between Fox Creek and Highway 230, near Woods Landing. Habitat types include encroaching conifer stands on Sheep Mountain and mixed mountain shrub communities (mountain big sagebrush and antelope bitterbrush) at lower elevations. Due to the importance of the area to wintering mule deer, the Department would like to see the forage potential of the area recovered as quickly as possible to avoid adversely impacting mule deer survival or causing long term redistribution of the herd. Toward that end, post burn livestock grazing and reseeding are being discussed as methods for speeding sagebrush recovery. The burns are slated to take place over a 5-year period and will involve approximately 3400 acres. Some burning may be conducted during the spring of 2005, but it is more likely that the project will begin in the spring of 2006.

Historic Habitat Data Summarization

The summer intern hired in the previous segment used her analysis of historic WGFD, BLM and USFS mule deer winter range shrub monitoring data to develop a Plan B paper in partial fulfillment of her masters degree. The data, which had been stored at the Rawlins BLM office and in files at the Laramie Region office dated back to the 1970s and was collected on the east and west sides of the Snowy Range. The expectation was that once the historic transects locations had been mapped and the historic data summarized that transects could be reread and the recent findings compared to the baseline data to facilitate long-term vegetation trend evaluation. Unfortunately the analysis revealed that the data appeared to be plagued with inaccuracy and was collected in ways that rendered it virtually unusable in most cases. A limited number of transects, with the strongest data, may be of some use as baseline if the transects can be relocated.

Sherman Mountain Examination with USFS

In September of 2004 Department and USFS personnel examined the Sherman Mountains east of Laramie to determine if prescribed fire could be used as a treatment to promote aspen regeneration. Earlier examinations by the Department habitat biologist revealed that the majority of the mountain contained an understory of aspen that had been nearly completely encroached by conifers. At the advice of the Department, USFS field personnel submitted the project for consideration by their administration. Although the project has been listed as a potential treatment, it received a low priority due to perceived conflicts with recreation interests in the area. There are no immediate plans to treat the area at this time.

Ashenfelder Habitat Assessment

In August the regional habitat biologist and habitat section supervisor, along with the Wheatland warden and population biologist, examined the area affected by the 2002 wildfire, which took place in the Ashenfelder Creek area near Laramie Peak. The burn took place during a period of warm weather, extreme drought and poor soil moisture. Vegetative response to the fire was relatively poor. The large flush of herbaceous vegetation that often accompanies a burn was not evident and perhaps most striking was the large infestations of Canada thistle that have established in several areas of the burn. The primary benefit of the wildfire may be that it improved age class diversity in the forest while creating a natural firebreak that may help to control future wildfires.

Burns and Buxton Prescribed Burns

This project was discontinued after the landowner with the largest potential treatment site reconsidered and decided to withdraw from the project. He expressed concerns relative to the potential of the fire escaping or burning non-target areas of conifer woodlands. Losing one of the cooperators resulted in the remaining landowner being responsible for all of the burn contractors mobilization and transport costs, which made his share of the project too expensive and he also withdrew.

Large Scale / Watershed

- Assist in development of Conservation Security Program with NRCS for Lower Laramie River and Lodgepole Creek watersheds, to be implemented in 2005.
- Assist with delivery of Farm Bill programs in Platte, Goshen, Niobrara, Laramie, and Albany counties (WHIP, EQIP, WRP, CRP, and others).
- Complete draft of Richeau Hills Environmental Assessment (EA) for the BLM – Casper Field Office, so that prescribed burns can be conducted in 2005 – 2007 on private and federal lands.
- Continued shrub monitoring in Richeau Hills and Goshen Rim, annual production / nutritional analysis.

Heward Ranch Project

In 2004 a sage grouse habitat improvement project was initiated on the Heward Ranch, located in northeast Shirley Basin.

The project focuses on improving livestock use as a means to increase residual cover for sage grouse nesting and brood rearing habitat. Fencing and water developments will be constructed to facilitate creation of a six pasture, rotational grazing system. Sagebrush treatments (burning or mechanical) are also being considered to create foraging areas near nesting sites. Depending on the availability of funding, the project could begin as early as the summer of 2005.

Habitat Enhancements / Habitat Extension

- 36 individual landowner contacts made in 2004
- Stripper Header Wheat Harvest Trial
  Platte County 1,500 acres of wheat / dryland oats harvested
  weeds, soil moisture, wildlife use monitored post-harvest (Figures 5 and 6)
- CRP Enhancements
  Disking, Legume Inter seeding on 1,500 acres
  Prescribed Burn plans developed for 3,000 acres
  Prescribed Burning conducted on 1,200 acres
- Guzzler Installation
  15 guzzlers installed in Platte, Goshen, and Laramie Counties
  Sites selected, agreements signed for additional 10 guzzlers for 2005
- Prescribed Burns in Mixed Mountain Shrubs 2,500 acres planned for and treated / blackened in Richeau Hills (Figures 7 and 8) preliminary development / planning for 12,600 acre prescribed burn to be conducted in 2005 in Richeau Hills

Figure 5. Harvesting wheat with stripper header-removes heads only.

Figure 6. Remaining wheat straw-2 to 3 times taller to provide upland game bird cover.

Figure 7. Richeau Hills prescribed burn-True Mountain Mahogany.

Figure 8. Post burn regeneration-True Mountain Mahogany.

- Wetlands - 25 acres of shallow water wetlands constructed
- Grazing Management - Plans developed/ implemented on more than 30,000 acres (includes riparian areas, wetlands, and upland habitats)

Big Creek Watershed Assessment

The Level-1Wyoming Habitat Assessment Methodology (WHAM-1) was used in 2002 to begin a watershed assessment of Big Creek. The fieldwork was completed in FY04, and an administrative report was completed in spring of 2004. The Big Creek watershed is located in southeast Carbon County, Wyoming and north-central Jackson County, Colorado and is a tributary of the upper North Platte River. The Big Creek watershed contains 200 square miles and was subdivided into seven sub-watersheds. The average elevation of the watershed is 8,632 feet. Riparian and upland vegetation was similar over the entire area. Coniferous forest covers the upper portions of the watershed, especially north aspects. Mountain parks in valley bottoms were largely sagebrush, grasses, and other herbaceous vegetation. Many south aspects were covered with mixed mountain shrubs and aspen. Lower portions (below elevation 8,000 feet) were mainly sagebrush grasslands and one relatively large area of irrigated hay meadows (Figure 9). The primary conclusions were: (a) evaluate potential benefits of enhancing pool habitat and woody riparian vegetation in Big Creek on public land downstream from the Highway 230 crossing and improve riparian conditions generally, (b) collaborate with the BLM and USFS on allotment management plan reviews, (c) in most sagebrush stands ground cover and herbaceous understory needs improvement, (d) the apparent trend of conifer invasion of aspen stands should be reversed, (e) cheatgrass expansion throughout the watershed should be controlled, (f) willow recruitment needs to be addressed on private land riparian areas that are important winter pastures, and (g) aquatic habitat conditions would improve on some reaches of Spring Creek and lower Bear Creek on private land if grazing pressure were reduced or modified.

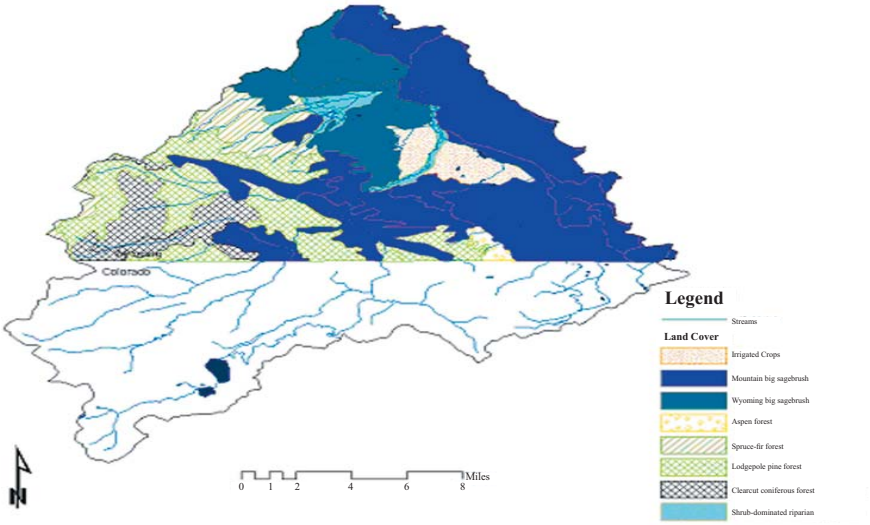


Figure 9. Land cover types for the Wyoming portion of the Big Creek watershed.

Conservation of Prairie Streams

The "Conservation of Prairie Stream Systems" State Wildlife Grant project was initiated in fall 2003 to assess prairie streams throughout eastern Wyoming. Most of the land encompassing prairie streams in eastern Wyoming is privately owned with few federal and state owned sections. A valuable opportunity exists to expand baseline data on native warmwater species, utilize the newly developed Warmwater Stream Assessment (WSA), and work with private landowners on efforts to conserve Wyoming's prairie stream systems. The purpose of this project was to gain information regarding native fish distributions and their habitat in eastern Wyoming prairie streams to help provide insight into future management and conservation of native fish species. The objective was to utilize the WSA to assess habitat conditions and native species presence for prairie stream systems in eastern Wyoming. The project focused on watersheds identified as habitat priorities in the Casper, Laramie, and Sheridan regions.

In 2004, assessments were applied to 32 sites in the Niobrara, Cheyenne, Little Missouri, and Little Powder drainages. Nine of these sites were assessed twice for seasonal information in the summer and the fall (Figure 10). A total of 25,773 fish were captured in the surveys representing six families. Fathead minnow, sand shiner, and green sunfish were the most abundant species. Stream habitat surveyed varied from clear pools to intermittent reaches with only turbid pool habitat.

Natural disturbances, such as floods and droughts, are important in structuring fish communities and stream habitat. Though droughts are part of the habitat variability of streams, the drought conditions Wyoming has been under have likely impacted the native fish community in prairie streams. The ongoing drought is affecting these watersheds by limiting the availability and connectivity of habitats for fish.

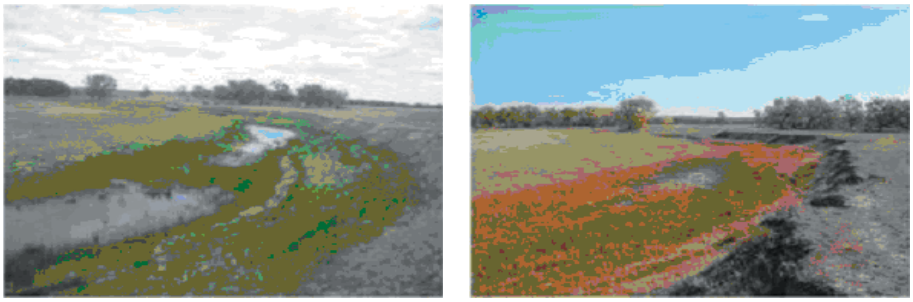


Figure 10. Cheyenne River drainage seasonal surveys at a site in Antelope creek in May (left) and September (right).

In 2005, the project will focus in the Laramie Region priority watersheds including the Lower Laramie/North Laramie Rivers, Horse Creek, and Chugwater Creek. Habitats in these watersheds have been impacted by irrigation practices, sedimentation, and fragmentation. The project will be completed by the end of 2005.

WILDLIFE HABITAT MANAGEMENT AREAS

Springer/Table Mountain Burn Preparations

Currently the burns conducted on the Springer and Table Mountain WHMAs have required a number of documents and clearances, many of which required frequent, if not annual renewal. Renewing or revising these documents in a timely fashion had become problematic and in some cases had caused burns to be postponed after learning that a particular

clearance was outdated and no longer valid. To alleviate this problem long-term clearances were obtained from all agencies that had previously required annual renewal. Having the long-term clearances will ensure that annual habitat maintenance burns can be conducted in a timely manner and that the harvest and nesting habitat on the two WHMAs can be preserved in optimal condition.

Pennock Mountain WHMA

Irrigation of the hay meadows was completed once before the State Engineers Office regulated WGFD water rights on May 13th, for a senior water right holder downstream of the WHMA. A private sector contractor repaired the Kelly ditch irrigation system that had been damaged by a flash flood. The repairs included the installation of a new drop structure, cutoff wall and headgate at the point of diversion on Lake Creek as well as 900 feet of pipeline and relocation of the Parshall flume. The U.S.F.S. boundary fence that was damaged by the prescribed burn in April was cooperatively repaired with the WGFD supplying some materials and the USFS supplying materials and contracted labor.

Pennock Mountain Burn

This project was a joint venture involving the BLM and USFS. The project was generally well received, because the federal agencies involved the WGFD early in the planning stage which ensured that any concerns were addressed prior to project scoping. The burn was conducted in March and involved ground and heli-torch ignition of approximately 1900 acres (1500 Federal and 400 acres WGFD) of primarily mountain big sagebrush/antelope bitterbrush habitat (Figure 11). General impressions by all agency personnel are that the burns went well and for the most part achieved the desired effect of rejuvenating the senescing mule deer winter range.

Figure 11. Pennock Mountain burn - second day. Previous day's burning at right of photo.

Wick WHMA

The second year of irrigation system repairs and improvements were completed, including installation of new headgates, checkboxes and 1100 feet of pipeline. Irrigation of the hay meadows was started in order to preserve existing water rights and to enhance late fall and early spring hay meadow forage production for wildlife. From May 10th through June 20th the Laramie Habitat & Access crew irrigated the meadows utilizing water rights from Carlson Creek and Wagonhound Creek. "Those irrigated acres produced additional forage, which would not have been available without the irrigation." On June 20th the S.E.O. placed a priority call on the Rock Creek/Carlson Creek water rights, which ended the irrigation season for the WGFD junior water right on Carlson Creek. The Laramie crew completed a 40 acre hay meadow inter-seeding of grasses, forbs and legumes on the Johnson Oleson meadow to enhance elk usage of the meadow during late fall / early spring and to reduce noxious weed invasion. Noxious weed control efforts continued with the application of herbicides and biological controls by a private contractor. The WGFD also began participation in the newly formed Rock Creek noxious weed control CRM group. This CRM will address noxious weed problems within and adjacent to the WHMA. Coordination, planning, implementation and monitoring of the contract livestock grazing treatment with the Habitat Extension Biologist was also a significant management strategy for 2004.

- Developed and implemented short duration / high intensity grazing system for Wick WHMA for Summer 2004, grazed 500 acres of upland and meadow habitats with 300 cow/calf pairs for 20 days (June 1 – June 20), utilizing electric fence to create small, temporary pastures (i.e. 20 acres per pasture)
- Broadcast seeding on 40 acres of meadows with a mixture of grasses and legume, seed incorporated by hoof action of livestock (Figure 12)
- Monitored vegetative response to livestock grazing treatment, measured production, re-growth, nutritive content of herbaceous community, and big game usage post-treatment on Wick WHMA (Figure 13)


Figure 12. Cattle grazing - electric fencing in foreground.


Figure 13. Vegetation response - right grazed vs. left un-grazed.

• Planning for 2005 Wick WHMA grazing treatment on another 500+ acres, planning for Spike herbicide application on 300 acres, seeding on 80 acres

Johnson Creek WHMA

WGFD and BLM personnel continued to monitor plant response to 450 acre herbicide application on Johnson Creek WHMA. After 2 years post-treatment, we are still getting 97% control of cheatgrass in wildfire area

Goshen County Coordinated Resource Weed Management Project

Springer, Bump Sullivan, Mac's 40 Acres, Table Mountain and Rawhide Wildlife Habitat Management Areas (WHMA's) are included within the Goshen County Coordinated Resource Weed Management Project. A contract was renewed with the Goshen County Weed and Pest District to utilize an integrated pest management (IPM) approach. The IPM approach utilizes education/communication, biological, cultural, mechanical and chemical methods to manage, control and eradicate the noxious weeds within our boundaries. An additional grant of $5,000 for weed control was obtained for use on Department lands from the National Fish and Wildlife Foundation.

MISCELLANEOUS

Participation in Groups
- Mule Deer Working Group
- Strategic Habitat Plan Group
- State Forestry's Forest Land Enhancement Program / Living Snow Fence Advisory Committee
- Water For Wildlife Foundation
- Non-profit Conservation Organizations

Pheasants Forever
Foundation for North American Wild Sheep (WY Chapter)
Goshen Rooster Boosters
Water For Wildlife Foundation
- Local Conservation Districts

Attend local board meetings
Participated in WACD state convention in Cody
- WGFD - Bighorn Sheep Working Group
- WGFD Liaison with Pheasants Forever

Trust Fund Proposals
- Heward Ranch Sage Grouse Habitat Improvement Project
- Extension to the Southeast Wyoming Cumulative Impacts Analysis to Improve the Existing
- Vegetation Impacts GIS Layer

Hunter Harvest and Game Population Surveys
- Chronic wasting disease and other game check stations
- Springer special pheasant hunt check station
- Assisted with sage grouse lek surveys
- Assisted with big game classifications

Land Management Agency Planning Documents
- The regional habitat biologist spent several days reviewing and commenting on the proposed revisions for the Rawlins BLM, Resource Management Plan

Information and Education Efforts

- Article for Wyoming Wildlife Magazine relative to mountain big sagebrush
- Participation at the Wildlife Heritage Exposition
- Conducted 3 indoor / outdoor classroom activities throughout the school year for total of 300 elementary school children from Platte County
- Participated in cheatgrass task force sponsored field tour of Plateau herbicide application areas in Platte & Albany County, including Johnson Creek WHMA, gave presentation on project to 60+ people
- Gave presentation on the Wick WHMA livestock grazing treatment and Sims Ranch habitat enhancement accomplishments at the 2004 WSGA Stewardship Tour for 150+ people
- Worked at Fish Division displays at the EXPO
- Helped with the display booth at the joint annual winter meeting of the Wyoming Stockgrowers and Woolgrowers Associations

Training

- National Wildlife Federation Symposium on Western Public Lands – Estes Park, Colorado.
- Completed training in use of GIS, Fire Safety and Pack Test
- Three Forks Ranch Tour led by Dave Rosgen

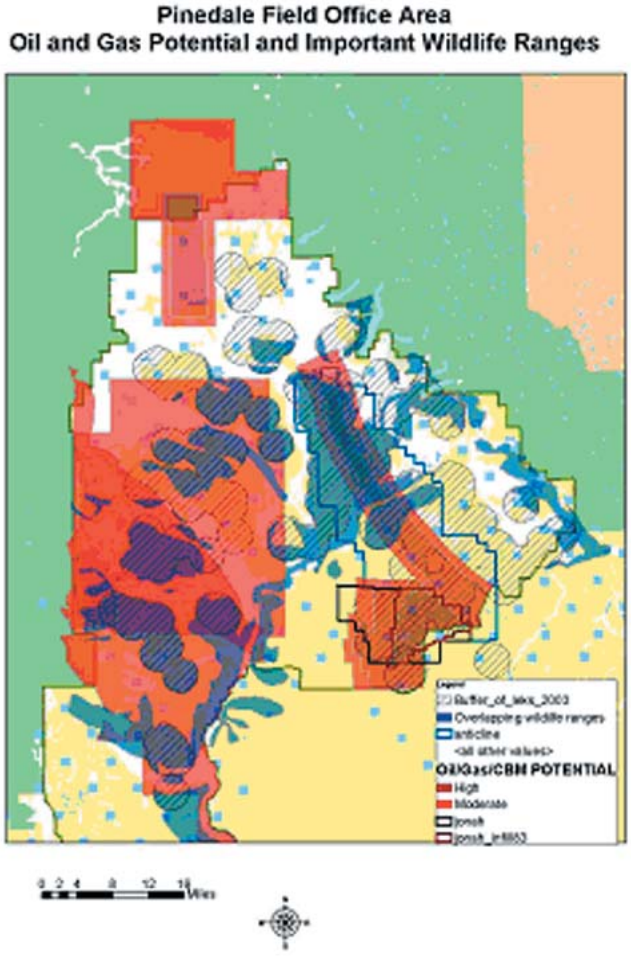
Other

- Laramie habitat biologist employed summer volunteer intern from the University of Wyoming wildlife management curriculum
- An annual meeting was developed between field personnel from the Department and the Rawlins BLM Field Office to discus upcoming vegetation management projects and explore opportunities for the two agencies to cooperate on project development and implementation. Future meetings will include the U.S. Forest Service
- Habitat Extension Biologist missed 2 months of work due to injuries sustained in a mule riding accident that occurred while surveying bighorn sheep and sheep habitat on Split Rock on July 13, 2004
- Assisted Cheyenne Board of Public Utilities with habitat mitigation planning in Middle Crow Creek between Crystal and Granite Reservoirs

HABITAT PROJECTS

BLM Resource Management Plan (RMP) and related Environment Impact Statements

The majority of time spent by the Terrestrial Habitat Biologist was related to the RMP Revision, Jonah Gas Field Mitigation and EIS and the Pinedale Anticline EIS (refer to map). Various aspects of this work included 1) Direct coordination with BLM and other cooperating agencies on the RMP and other planning efforts, 2) Member of the Reclamation Task Group associated with the Pinedale Anticline Working Group (PAWG), 3) Planning for off-site mitigation for the Jonah and Jonah In-fill Projects (EIS's), 4) Planning for Questar winter drilling mitigation, 5) Assisting with WGF Commission Field Tour, part of which examined the drilling operations on the Pinedale Anticline, and 6) Serving with other biologists from WGF on a "mitigation" working group and preparing an associated report. The Pinedale Aquatic Habitat Biologist provided comments on various planning documents at several stages of this process and participated in several meetings and discussions.



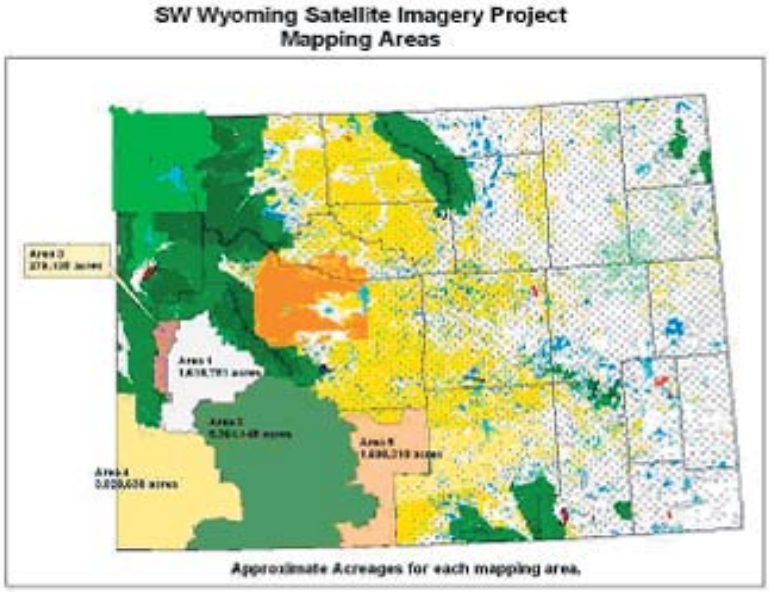
The map illustrates areas of moderate to high potential for oil and gas development in the BLM Pinedale Filed Office Area. Overlapping big game crucial ranges (incl. 2 mile buffers form sage grouse leks) and other grouse lek buffer areas are also illustrated. The Jonah and Jonah Infill, and Pinedale Anticline Project Boundaries are also illustrated.

Kemmerer BLM Resource Management Plan Revision

The Pinedale Aquatic Habitat Biologist was selected as the agency's representative on this BLM planning effort. Considerable time was spent in meetings, reviewing planning documents, commenting and coordinating this effort. Recommendations were made to the BLM pertaining to habitat management, mitigation needs and vegetation management. All regional comments were consolidated and sent to Habitat Protection.

Southwest Wyoming Imagery Project

A contract was awarded to the University of Wyoming Geographic Information Center for the mapping of vegetation and land cover types across SW Wyoming. This project will be similar to the Southeast Wyoming Cumulative Impacts Assessment Project, also contracted to UW. Cover types will be standardized for these two areas.



Wyoming Range Allotment Complex (Big Piney Ranger District Forest Service)

The Pinedale Aquatic Habitat Biologist and the Terrestrial Habitat Biologists from both Pinedale and Jackson coordinated extensively with the Forest Service and other affected interests, including the Foundation for North American Wild Sheep (FNAWS) and Trout Unlimited (TU), to develop a resolution to the problems identified in this Allotment Complex. Watershed health problems identified throughout the analysis area created a difficult challenge for the Forest Service to adequately address the needs of the permittee, bighorn sheep, Colorado River cutthroat trout, and other wildlife.

The northern most domestic sheep allotments in this analysis area fall within a boundary identified by the Statewide Bighorn/Domestic Sheep Interaction Working Group. The boundary separates core, native bighorn sheep herds with an area that is a non-emphasis area. The core, native herds are one of the highest priorities for eliminating commingling between domestic and bighorn sheep.

Furthermore, the Horse Creek watersheds and associated tributaries, which fall within this allotment complex, support over 25 percent of the known Colorado River cutthroat trout population within the Green River drainage. Genetic tests have indicated that the cutthroat trout within these streams are genetically pure. In addition, these streams are some of the few streams located within the Wyoming Mountain Range that still allow migration and interaction between cutthroat populations within each watershed. Surveys in these drainages and the FS analysis both indicate that aquatic habitat conditions have degraded due to excess sediment loading and a decline in bank stabilizing vegetation, which has resulted in increased bank erosion. This is negatively affecting the Colorado River cutthroat trout.

Existing Forest Service nested frequency vegetation data for this area was reviewed and evaluated. To better represent tall forb communities in need of improvement, a new monitoring site was established on North Horse Creek with support and direction provided by Dr. Alma Winward.

These efforts culminated in the signing of an agreement on October 12, 2004 under which the permittee waived his permit back to the Bridger-Teton National Forest. This affects 7 allotments, totaling 69,755 acres and removes 6 bands of sheep, or approximately 4550 AUMs.

The Forest Service has agreed to permanently close approximately 63% (42,500 acres) of the allotment complex. The remaining 37% (25,000 acres) will be held as an emergency forage reserve, once the specific criteria are reached and the tall forb communities reach a productive state with greater than (or equal to) 80% ground cover. The Forest Service outlines

additional criterin that must be met in the September 2004 Record of Decision. This includes "at least one 'key plant species' within the tall forb communities is 5% or greater percent canopy cover on the existing transects". Furthermore, the southern allotments, will only be grazed a maximum of 3 out of 10 years and only in the case of a wild or prescribed fire on another existing sheep allotment.

The Pinedale Aquatic and Terrestrial Habitat Biologists reviewed and provided comments on a draft 319 funding proposal prepared by Western Watersheds Projects. The proposal, focused primarily on sediment monitoring relative to DEQ impairment standards, was discussed with other Regional Department Personnel, the Forest Service Fisheries Biologist, and WWP.

Strategic Habitat Planning

Both the Pinedale Aquatic and Terrestrial Habitat Biologists participated in an overview of the GIS based "Decision Support System" being developed by UW-WGISC. Strategic Habitat Plan information and other data in this system can be used for environmental commenting and other needs.

The Pinedale Aquatic Habitat Biologist Prepared a draft HAEP form for property listed for sale on North Cottonwood Creek, and sent the form to other Regional Department personnel. Another buyer later purchased the property.

Habitat Grant Projects: Several Trust Fund and Habitat Grant Project proposals were coordinated and discussed with regional personnel and project Sponsors.

Bench Corral Vegetation Inventory

In preparation for mowing treatments proposed by the BLM in the Bench Corral area characteristics of sagebrush/grassland vegetation collected at 27 permanently established monitoring sites from 1993 to 2004 were compiled. Species richness, cover of sagebrush and bare ground, demography of sagebrush, and production of grasses and forbs in untreated sites and sites treated by herbicide (i.e., tebuthiuron, "Spike"), pitting, and ripping were quantified. Data from all sites were compared to understand effects of past treatments and assist prioritization of potential treatment areas and alternatives to proposed treatments in the Bench Corral area.

Wyoming big sagebrush, low sagebrush, and mountain big sagebrush were the dominant sagebrush types found at monitoring sites in low, mid, and high elevation sites, respectively. On untreated sites, species richness increased from Wyoming big to low and mountain big sagebrush sites. Percent aerial cover of sagebrush at Wyoming big, low, and mountain big sagebrush sites was similar. Bare ground was highest in Wyoming big sagebrush sites and lowest in mountain big sagebrush sites. Within all sagebrush types, sagebrush tended to be in the mature and decadent age-classes (Figure 1). Production of herbaceous vegetation among sagebrush types was variable.

Figure 1. Mean percent of wyoming big, low, and mountaint big sagebrush plants in various age class categories from untreated sagebrush types in the Bench Corral area.

Species richness of all species, grasses, forbs, and shrubs within Wyoming big sagebrush treated with Spike and low sagebrush sites treated by pitting and ripping was nearly identical to respective categories of species richness on control plots suggesting no effect of treatment. Cover of sagebrush and bare ground at treated (i.e., Spike, pitting) sites was variable. Sites treated with Spike, pitting, and ripping had percentages of plants within all age class categories similar to untreated

and control sites. However, treated sites had higher and lower percentages of plants in the young and decadent age classes, respectively, than on respective control sites, suggesting positive effects of treatments on diversity of sagebrush demography in the Bench Corral area. Production of grasses and forbs on treated sites was higher than on respective control sites and is probably related to decreased competition of herbaceous species with sagebrush and other shrub species for sunlight, water, and nutrients.

Based on compiled vegetation characteristics in the Bench Corral area, overall ecological health of sagebrush/grassland habitat is "poor" but can be increased with appropriate vegetation treatments. Although vegetation treatments appear to have no influence on species richness (i.e., diversity), they do appear to increase age diversity of sagebrush and production of grasses and forbs. Ultimately, species diversity and productivity of wildlife (particularly sagebrush obligates) will likely increase with respect to various treatments in the sagebrush/grassland habitat of Bench Corral.

Brodie Draw Burn Vegetation Monitoring

In autumn of 1999, approximately 1800 acres of Wyoming big sagebrush/grassland habitat were treated with prescribed fire in the Brodie Draw area along the east slope of the Wyoming Range Mountains. Objectives of the burn were to increase vegetation species diversity, shrub age diversity and quality, and herbaceous quality and quantity, and decrease sagebrush cover 40% to 60%, ultimately improving habitat for wildlife. Vegetation species richness, aerial cover, shrub demography, and production of grasses and forbs were sampled at treatment (burned) and control (unburned) sites in 1999, 2000, 2002, and 2004.

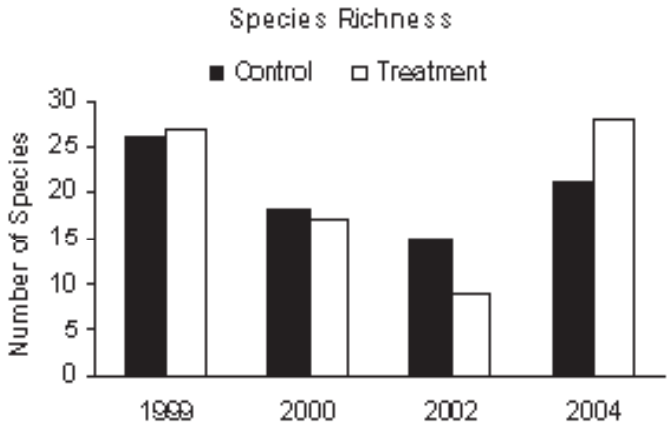
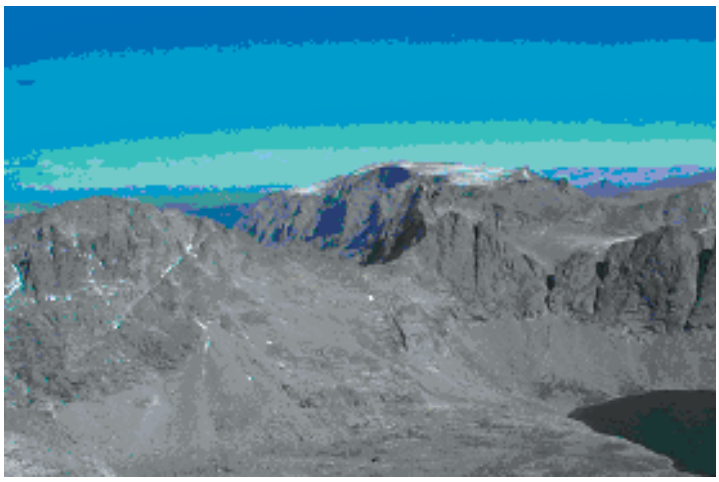


Figure 2. . Total vegetation species richness among years on burned and unburned sagebrush/grassland habitat at Brodie Draw.

Total species richness on treated and untreated sites declined from 1999 to 2002 but increased in 2004 (Figure 1), presumably from increased precipitation during the growing season. Species richness of grasses and forbs was variable between treated and control sites, but higher for shrubs on the control than treated site. Aerial cover and production of grasses and forbs were greater on the treated than control site, probably from decreased competition with sagebrush. Within the treated site, grasses had greater cover and production than forbs. Aerial cover and age-diversity of shrubs were greater on the control than treated site due to 100% removal of sagebrush on the treated site. Sagebrush plants on the control site remain primarily in the mature and decadent age-class categories. Cover of green rabbitbrush has been increasing on the treated site since 1999, likely from reduced competition with sagebrush.

Wind River Sheep

Bighorn sheep were an integral part of all of the Wind River Mountains in the late 1800's. Population declines have been attributed to various factors such as disease transmission from domestic sheep, competition for habitat by livestock and wildlife, and unregulated hunting on the Wind River Indian Reservation. Sheep have slowly declined despite efforts to reintroduce them, both on the reservation and in Sinks Canyon and other areas. Recently, because of the fear of contact between domestic sheep and bighorn sheep, the Wyoming Chapter of the Foundation for North American Wild Sheep paid willing permittees to waive

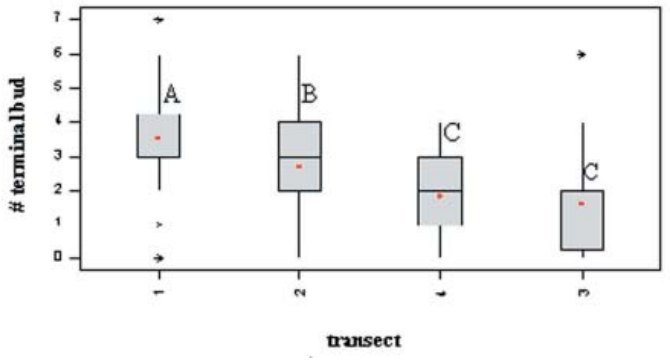


A portion of the Wind River Range which was flown in September, 2004.

their domestic sheep grazing permits back to the Forest Service. This action affected 9 allotments, and after boundary and permit changes were made, essentially moved domestic sheep grazing away from the continental divide in the Wind Rivers. This provides greater separation between bighorn sheep occupied habitat and domestic sheep distribution, which helps to reduce or eliminate potential interaction between the two. Recently a permittee, whose previous allotments were part of this retirement, made a request to the USFS to allow some domestic sheep grazing north of Raid Lake, a portion of the original area that was retired (waived back to the Forest Service). The WGFD was asked to comment on this action. Limited recent bighorn sheep summer distribution information made it difficult to make any recommendations on this, or other future requests. In addition, little bighorn sheep summer distribution in the Wind Rivers has been documented, and observations in the Departments' Wildlife Observation System indicates little use in the central portion of the Wind Rivers. Also, observations on the south end are mostly older observations related to reintroduction efforts (collared sheep) on the Lander side of the Divide. Funding proposals were submitted to fly the Wind River Range to obtain distribution information on summer bighorn sheep use. A total of $6207.50 was obtained ($3103.75 from the Goveror's License Coalition and the other $3103.75 from Wyoming FNAWS) for flying approximately 160,000 acres to gain sheep summer distribution information. No sheep were observed during the flight, illustrating little summer sheep use in the majority of the Wind River Range. Additional flights may be done in the future concentrating on the northern end of the range where sheep are known to occur.

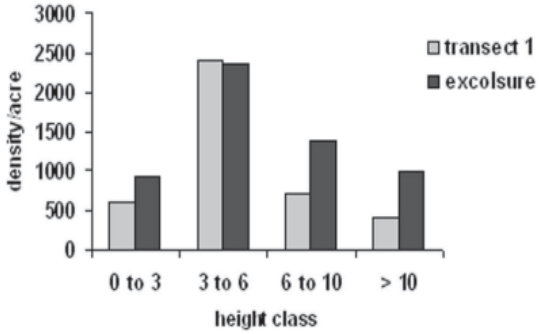
Fremont Project

Prescribed burn treatments were conducted from 1989-1991 in aspen and sagebrush communities on the Soda Lake WHMA and neighboring National Forest totaling 2,098 acres. Over-utilization of aspen by large congregations of ungulates from the nearby Soda Lake elk feedground may limit aspen regeneration and long-term success. Aspen ecologists consider an aspen reestablishment successful when a density of >1,000 stems/acre, >10 ft in height within 10 years post-treatment is achieved. An ungulate exclosure ½ acre in size was constructed shortly after the prescribed fires to assist in monitoring effects of browsing on aspen recovery. Additionally, during May 2003-04, data were collected from four transects, approximately ½ mile in length, established in different aspen stands where elk were observed. Transects 1 through 4 were approximately 2.3, 2.6, 3.0, and 3.3 miles from the feedground respectively. Intensity of browsing was estimated by counting the number of terminal bud changes in the life of sucker <10ft for a total of 100 aspen suckers observed along each transect.



Box plot of number of terminal bud changes for aspen suckers in the four transects. Boxes with differing letters have statistically significant differences.

Aspen density of four height classes 13 years post treatment in ungulate exclosure and browse-transect 1, which had the most aspen utilization by ungulates (closest to feedground).



Fremont II Project

Fremont II is proposed to use both prescribed fire and mechanical treatment to enhance approximately 2,000 acres of aspen/conifer and sagebrush communities. The mechanical treatment portion of the project was completed in 2002. In 2004, it was decided to include 404 acres of adjacent Soda Lake WHMA in this burn. NEPA for this inclusion has been completed. Project objectives include: increase the quantity and quality of big game and livestock forage, increase vegetative diversity and age structure, reduce conifer encroachment in aspen stands, diversify seral stages of aspen and sagebrush, and increase natural fuel breaks by expanding the aspen component. This project was scheduled for completion in the past field season, but appropriate climatic factors for prescribed burning were not obtained. The project is planned for completion during the coming field season. RMEF funding for this project expires in June, therefore a grant proposal has been resubmitted.

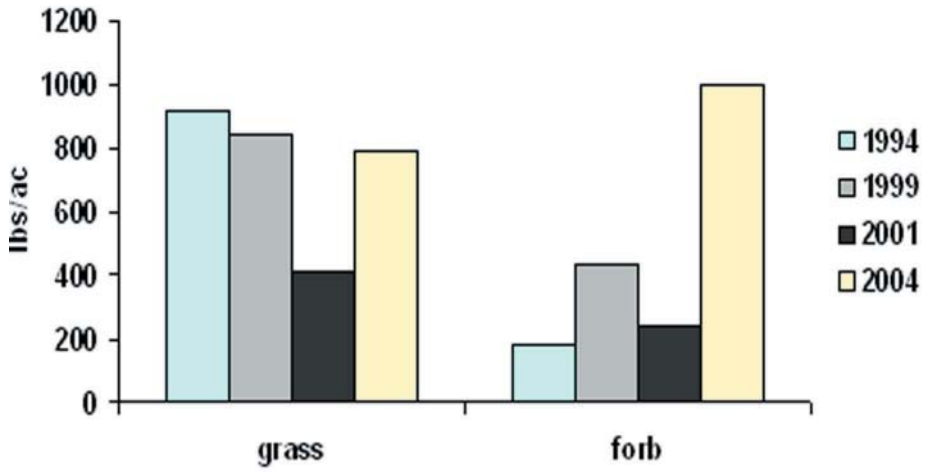
New Fork-Boulder Project

New Fork-Boulder Prescribed Burn, Spring 2004

This project is designed to treat approximately 2,677 acres of sagebrush and aspen using prescribed fire. In addition to four pre-treatment macroplots established in 2003, four pre-treatment aspen circular plots were established in four different stands in 2004. In spring 2004 approximately 1,260 acres of mostly sagebrush communities were treated. The objective of the treatment is to set back plant succession and create a mosaic of vegetative communities across the landscape. In the aspen communities, it is expected to obtain a sucker density of 20,000 stems/acre 2-3 years post burn, obtain 1,000 stems/acre >10 ft within 10 years post burn, obtain total ground cover of 95% in 5 years post burn, increase herbaceous production by 100% in 3-5 years post burn, and have no net loss of species diversity in 5 years post burn. This project was scheduled for completion in fall 2004, but appropriate climatic factors for prescribed burning were not obtained. This project is now scheduled for the coming field season. RMEF funding for this project expires in June, therefore a grant proposal has been resubmitted.

Fayette Ranch/Halfmoon Mountain Project

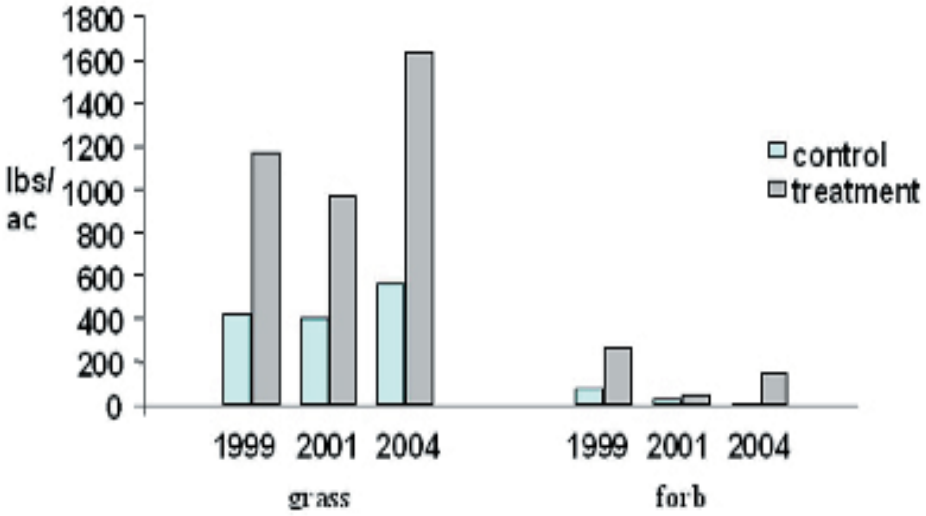
In 1996, a prescribed burn was conducted to improve existing habitat conditions by reducing shrub cover and increasing herbaceous production on 2,000 acres of the Fayette Ranch (private land). The prescribed fire escaped and burned additional acreage of the Halfmoon WHMA and adjacent Forest, totaling approximately 5,000 acres. Vegetation plots were established one year post-treatment on Halfmoon Mountain to monitor the effects of the fire. Control plots were not established. A large percentage of the shrub component was removed and shrub density has remained low. Forb production increased dramatically in 2004.



Herbaceous production (pounds per acre) at a treated site on Halfmoon Mountain pre treatment (1994) and three, five, and eight years post treatment.

Boulder Lake Project

In 1997, a prescribed burn was implemented on 1,400 acres of Boulder Ridge in a sagebrush/bitterbrush community type. The objective was to improve existing conditions by reducing decadent shrubs and promote regeneration while increasing grass and forb vigor and productivity. A post-treatment plot was established in the treatment area with the control plot in an adjacent, unburned area. Shrub density has steadily increased among years in the treatment area, but remains lower than the control. Mature and decadent plants dominated the age structure of shrubs in the control plot. Productivity data were collected from both sites during 1999, 2001, and 2004. Herbaceous productivity remains higher in the treatment than control plot.



Herbaceous production (pounds per acre) at a treated and control site on Boulder Ridge three, five, and eight years post treatment.

Lower Bear River Watershed Projects

Smithsfork Allotment: The Pinedale Aquatic Habitat Biologist reviewed and commented on a proposed decision, a "Final Decision," and other management actions in the allotment. A letter to the BLM regarding management in the Raymond watershed and exclosure maintenance relative to G&F grant agreements was drafted, but was not sent pending efforts to negotiate solutions with the new Area Manager. Livestock use in the South Fork of Raymond was evaluated in September, and was encouragingly lower than in recent years. Unfortunately, livestock impacts in most of the remainder of the allotment appeared to be similar to the past. Monitoring on willows near Huff Lake in late September indicated approximately 72% of leaders were browsed. This and the results of the BLM's utilization monitoring efforts as well as the draft AMP were discussed with the BLM Range Specialist with no resolution to habitat concerns. Trespass livestock observed on Little Muddy Creek in October were also reported to the BLM.

Klein Creek Head-Cut Control Project: The Klein Creek head cut control project was installed in October of 2003. Minor maintenance work was implemented in May. In October an exclosure was completed to protect this stabilization project with assistance from the Casper Regional Aquatic Habitat Biologist, our seasonal, and a volunteer. Also, at that time habitat conditions and current year's utilization was evaluated on Klein Creek and a similar tributary to the south. Use throughout these drainages was heavy preventing recovery of the degraded habitats.

Huff Creek Head-Cut Control Project: Approval from the state and private landowners is needed to proceed with the Huff Creek head-cut control projects. Efforts were made to contact both the private landowner and state land lessee. However, a scheduled site visit to the private land site was cancelled due to inclement weather. Stream channel cross-sections and profiles were measured at both sites. Rocks were delivered to these two sites in 2003. Final approval for fencing both projects is also pending. Once landowner approval has been gained, the Notice of Intent (NOI) for a 404 permit needs to be sent to the COE office. Effort to implement this project will continue in 2005.

Raymond Watershed Fence Extension Project: In September, the fencing needs for Raymond / Mill Creek divide were evaluated in with Bob McDowell and George Kamats. Two potential sites were identified on Mill Creek where approxi-

mately 200 to 300 feet of fencing across the main drainage would prevent livestock movement further up the drainage to the divide. Plans are to construct this fence in 2005 pending approval from the State Land Board, and commitments from the BLM and permittees to cooperate with maintenance and management needs.

Coal (Howland) Creek / Smiths Fork Road Culvert Project: Efforts to seek supporting funding and coordinate this project with the BLM Fisheries Biologist have continued. Data collected at this culvert in 2003 indicate it is likely limiting the movement of BRC as well as native non-game aquatic species. This portion of this BLM road was originally scheduled for reconstruction in 2004 so the Regional AHAB aggressively pursued replacement of the culvert. Additional site evaluations were conducted in May with the Regional Fisheries Biologist, and the BLM Fisheries Biologist, Engineer, and Hydrologist. Reconstruction has been delayed until 2005. The BLM has $17,000.00 budgeted and planned to request additional funding through a Department Grant. A Project Proposal was drafted and circulated for internal review, then discussed further with BLM. However, after the BLM's contractor indicted that the project could be completed with the $17,000 available, additional funding was not pursued. However, construction oversight when the culvert is replaced may be desirable to assure satisfactory results.

Sawmill Creek Projects: The BLM Wildlife Biologist, who proposed construction of an exclosure on Sawmill Creek, has transferred to another BLM Office. Therefore, the status of this opportunity is uncertain.

Hobble Creek Project: In October 2003 the Forest Service successfully completed implementation of the first phase of this erosion control / sediment reduction project associated with the road on Hobble Creek. However, the Forest Service did not complete the paperwork needed for reimbursement of approved Department funding. Therefore, Department funding in FY05 to complete the second and final phase of this project in the fall of 2004 was not approved. The status of this second phase is unknown at the time of this reporting.

Monitoring of CRP Project on the Smith's Fork River: Monitoring efforts were coordinated with the landowner (Jerry Kirk) & NRCS. In August the Pinedale Fisheries Biologist and AHAB collected Level II & III riparian (greenline) and morphological data (e.g. hydrological cross sections and longitudinal profiles). This information will be used to better evaluate factors limiting habitat conditions and to properly design potential enhancement projects, while monitoring long term (10 + years) riparian and stream characteristic changes resulting from management under CRP.

Proposed Smiths Fork River Dam: Concerns regarding potential impacts to fisheries and riparian habitats resulting from this proposed project were discussed at length with a landowner, Jerry Kirk, who has relatively large landholdings along this river.

Cokeville Meadows Wildlife Refuge Area: A draft North American Waterfowl Conservation Act (NAWCA) Grant proposal to improve water management structures to improve and maintain wetland habitats was reviewed and discussed with Audubon representative and other Department personnel.

LaBarge Creek Habitat Restoration, Inventory and Administrative Report

LaBarge Watershed Administrative Report: The Pinedale Aquatic Habitat Biologist reviewed and edited notes from the workshop on LaBarge Creek with Dr. Alma Winward and incorporated Alma's comments into the report. The greenline summaries and recommendations were also revised. After several futile attempts to retrieve data, which had previously been entered into the database on more than one occasion, it was decided that Level 1 WHAM data would be added to this report once a functioning database is operating.

BLM - Rock Creek Cooperative Projects: In August the Pinedale Aquatic Habitat Biologist and several Seasonals cooperated with the BLM to begin reconstruction of the five exclosures on Rock Creek. The BLM plans to complete this effort in 2005.

Nameless Creek Riparian Exclosure Maintenance Project: Annual repairs were completed in June on this exclosure with assistance from Seasonals. Long-term maintenance / reconstruction needs were discussed with the Forest Service Range Specialist, but this concern has not been resolved.
Nameless Creek Fish Migration Barrier Maintenance: The Pinedale Aquatic Habitat Biologist coordinated maintenance

needs for the Nameless Creek fish migration barrier with Fish Management and Forest Service personnel. Necessary maintenance was cooperatively completed in September. The Pinedale Aquatic Habitat Biologist assisted Fisheries Management with electrofishing above and below the Nameless barrier to evaluate potential movement of non-natives above the barrier. Fortunately none were found.

Coordination With Forest Service: The Pinedale Aquatic Habitat Biologist evaluated and discussed habitat conditions, management needs, and potential projects throughout the LaBarge Watershed with the new Forest Service Fisheries Biologist and Regional Fisheries Biologist. Also, the need for a LaBarge Creek Allotment Management Plan and improved livestock management was discussed with the Forest Service Range Specialist.

LaBarge Creek CRC Restoration: The Pinedale Aquatic Habitat Biologist Annual assisted Fisheries Management personnel with the LaBarge treatment project in August.

Upper Green (above Warren Bridge) River Projects

"Upper Green River Special Recreation Management Area" BLM Project:

The Pinedale Aquatic Habitat Biologist provided extensive review as well as internal and external coordination on this project to develop numerous "improved" camping sites, roads and road re-routes, boat ramps, and restroom facilities throughout this 14-mile section of the Green River. Coordination included an on-site tour with the BLM in May to better understand the proposal and resolve concerns with over development of the area. The BLM is apparently in the process of reevaluating the original proposal at the time of this report.

Forest Service - Upper Green River Rangeland Project DEIS: The Pinedale Aquatic Habitat Biologist reviewed and commented extensively on this project. Comments on this proposal were coordinated with other Department personnel.

Little Twin Creek (Chris James) Property: The Pinedale Aquatic Habitat Biologist evaluated opportunities to restore CRC on a portion of this creek with Fisheries Management personnel and the landowner's consultants. Successful implementation, and therefore further progress on this opportunity is pending acceptance and approval from upstream neighboring landowners.

Huston Public Fishing Access Area

Primary development of this 30-acre acquisition, which provides for public hunting/ fishing and enhancement of riparian habitat, was completed in 2002. A project update / summary (including a "Stream Habitat Improvement Construction Report") for the Huston Access / Moore Property project was completed in 2003. The Pinedale Aquatic Habitat Biologist and the HAMS crew cooperatively completed the fence tie-in needed at river crossings in April and necessary annual fence repairs at the river and side channel crossings again in September.

Jerry Moore Riparian Habitat Improvement Projects:

The Pinedale Aquatic Habitat Biologist continued efforts to cooperatively develop a grazing and monitoring plan for the Huston Access Area / Moore property with the landowner (Jerry Moore) and his consultant (Dahlke). Current plans are to test a riparian grazing management strategy on Moore's 120-acre riparian pasture in the spring of 2005 or 2006.

Longitudinal profile and cross section data for the "J-Hook" cut-off channel on Moore's was analyzed. Development of a structural solution to stabilize the river channels to remain in the current approximate form, pattern, and profile that is both affordable and with a high level of confidence that it would be successful proved challenging. Because this project is not the Departments' or the landowner's highest priority, it may be indefinitely postponed. Consequently the $15,000 of funding from Audubon, which was ear-marked for this project is being redirected to augmenting the water supply to the pond constructed in 2002.

Both the Pinedale Aquatic and Terrestrial Habitat Biologists assisted Dahlke with constructing four exclosures using big game proof fencing to protect young cottonwood stands.

Moore's property was cooperatively evaluated for potential sites to develop wetlands suitable to support Trumpeter Swans

with Dave Lockman, who was contracted to survey potential waterfowl habitats.
Swains' Bridge Access Project: Evaluated Swain's Bridge Access opportunities and needs with BLM, County Road & Bridge, and Department personnel. The County is considering opportunities to improve this access site.

New Fork River Corridor Cooperative Projects

Browse Use Monitoring of Woody Riparian Species: With the cooperation of the landowner and NRCS, two riparian exclosures, one protecting cottonwoods and the other protecting aspen, were constructed in the spring of 2003 on property owned by Jerry Kirk. Livestock browsing on woody regeneration outside the exclosures appeared very heavy in the fall of 2003. In 2004 browse (aspen, cottonwood, & willow) production and summer use was monitored inside and outside the exclosures to differentiate use between summering wildlife and livestock. Preliminary analysis of these data indicates that summer use by wildlife is higher than desirable, and when combined with fall livestock use appears to be limiting regeneration. Assuming continued landowner support and NRCS assistance, this monitoring effort will be continued through 2005.

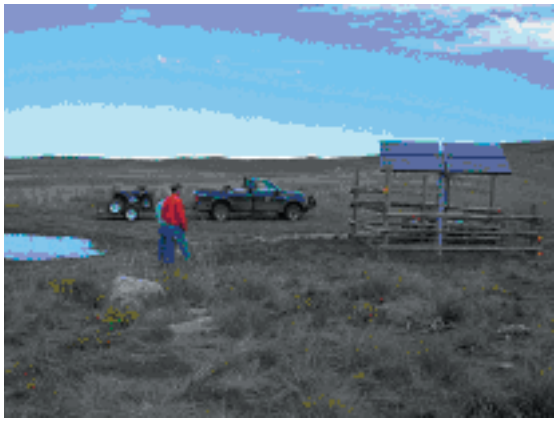
Future opportunities to develop large-scale woody species regeneration projects with emphasis on cottonwoods were also discussed with a large acreage landowner (Sullivan). Pursuit of this opportunity will depend to some degree on the results of the on-going monitoring effort.

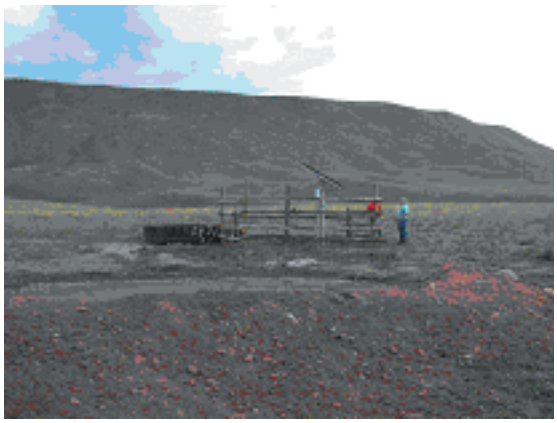
WILDLIFE HABITAT MANAGEMENT AREAS

Halfmoon WHMA Grassbank Project

The purposes of this project is to develop Halfmoon WHMA to use as a grass bank while resting other habitat project sites and potentially utilize livestock to meet wildlife objectives on the WHMA.Objectives are to enhance nutrition of forage (late summer regrowth) and encourage shrub establishment and production. Benefits include better capabilities for habitat projects on federal lands where rest isn't currently feasible. The Halfmoon WHMA east of Pinedale provides winter and transition range for mule deer and elk.

Funding was acquired from Wyoming Governor's Big Game License Coalition ($10,000), and Bowhunters of Wyoming (BOW) ($1,125), and from WGF to develop a permanent water source. During the summer of 2004, Weber Drilling of Jackson drilled a 200-foot well and installed a solar powered pump. The static water level in the well is at 70 feet deep and was tested at 30 gallons per minute. The solar pump flows approximately 10 gallons per minute. Funding received from BOW was utilized to provide three 12-foot diameter tanks. These tanks are constructed by cutting large construction/mining equipment tires in half, are very durable and are self sealing when shot by vandals. The tanks were hauled from Lusk and the first of the three was installed at the well site by the Pinedale Habitat and Access crew. A small reservoir was constructed adjacent to the tank overflow for use by wildlife that are unable to, or prefer not to use the tank.





The solar powered well, tire tank and small reservoir below Halfmoon Mountain will benefit several wildlife species and will help disperse livestock when the area is utilized as a grass bank when resting grazing allotments that have undergone habitat treatments.

MISCELLANEOUS

- Assistance/Attendance with the Sheep Working Group.
- Worked at the EXPO – Habitat Booth.
- Moose-Gyp Plan – USFS
- New Fork Prescribed Burn and data collection.
- Half Moon Water Well – grass bank planning
- Assisted in the planning/organization and implementation of a WGF Commissioner Tour in Pinedale Area
- Bighorn Sheep Working Group Efforts – Final report/Second sheep summit.
- Shrub Monitoring – protocol and assistance to biologists and wardens.
- July Commissioners Meeting and Tour in Pinedale Region:
  In July the Pinedale Aquatic and Terrestrial Habitat Biologists cooperated with other regional personnel to plan a tour of key locations in the region for the Commissioners. The Huston Access Project summary was revised as a handout for the tour with the Commissioners.
- Inter Agency Coordination:
  - Reviewed and discussed Big Piney Forest Service Cottonwood Vegetation Treatment Project scooping and discussed with other Department personnel for scooping comments.
  - Reviewed and provided comments on numerous BLM grazing permit renewal EAs from both the Pinedale and Kemmerer BLM offices.
- Cooperative Habitat Extension Projects:
  Evaluated property owned by Mary Lamy on Silver Creek that is under a conservation easement. Recommended better use of the existing riparian corridor fence to improve habitat conditions.
- In Service Training:
  Participated in the Dave Rosgen led the tour of the 3-Forks Ranch, southeast of Baggs. The primary take home message was that our streams and rivers should be managed properly so they do not require a $4.5 million invest ment on 22 miles to sustain a fishery that is worth $11,000.00 for two people for a week.
- Other: A gill net was set in Jim Lake in the East Fork River watershed in an effort to confirm the suspected lack of fish.

SHERIDAN REGION

HABITAT PROJECTS

Antelope Creek Watershed Survey

Fisheries assessment, fisheries management, aquatic habitat, and Thunder Basin National Grassland personnel completed warm-water stream assessment surveys on Antelope Creek during spring. The objective was to gain baseline information on the aquatic species assemblage and aquatic habitat availability within the watershed.

Bighorn National Forest Beaver Transplant Project

The Wyoming Game and Fish Department (WGFD) conducted six beaver cache surveys on the Bighorn National Forest (BNF) between 1986 and 2002. A seventh beaver cache survey was conducted in 2003 with funding provided by the BNF. These data indicate that beaver populations on the BNF are declining. Drainages that contain beaver generally have lower populations, while many previously occupied habitats are no longer populated. We failed to detect evidence of beaver activity in ten sixth-order watersheds, which were historically occupied. As shown in Figure 1, the long-term decline of beaver numbers may be much more acute. Forest rangers documented a growing population from 1914 through 1941 in response to beaver restoration efforts. By the 1940s the beaver population was estimated at 1,200. If these data are correct, populations have experienced dramatic declines since that time period.

The WGFD and BNF recognize the value of beaver to the ecosystem. For instance, the agencies are proposing that beaver serve as a Management Indicator Species (MIS) in the revised Forest Plan. An MIS serves as a barometer for species viability. The BNF contains approximately 10,537 acres of potential beaver habitat based on our habitat suitability model. Of those, 1,126 acres are occupied and another 1,633 have historic evidence of beaver (see Figure 2 for an example of the predictive model's outputs). Many habitats identified by the model are unsuitable, however, due to patch size and the lack of connectivity.

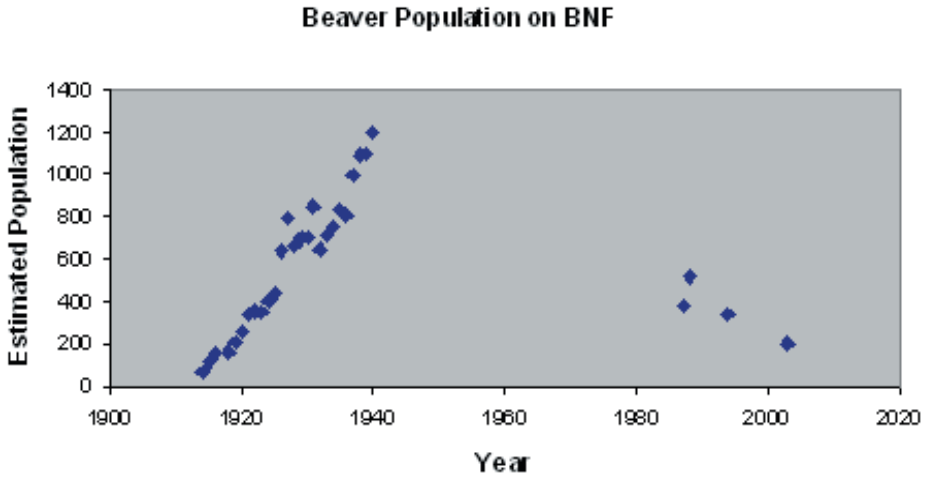


Figure 1. Graph depicting the USFS ranger data from 1914-1940 and WGFD beaver index data from 1986-2003.

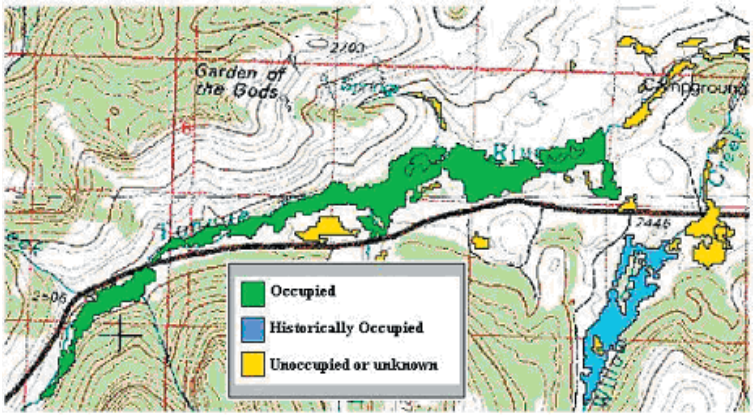


Figure 2. This map shows the results of the habitat suitability model. The location is the North Tongue River near Burgess Junction.

Others are deficient of quality food and dam building materials or adequate flows to maintain water levels. Nevertheless, it's clear that beaver could occupy substantially more area on the Forest. In response to declining populations and the absence of this keystone species in some drainages, the agencies collaborated with the Rocky Mountain Elk Foundation, Wyoming Governor's Big Game License Coalition and Bow Hunters of Wyoming to fund the transplant of beaver to previously occupied habitats. We prioritized release sites by considering model outputs such as patch size and connectivity. We also considered historic activity, hydrology and suitable habitat conditions. Based on our analysis, we recommend that beaver be transplanted to at least fourteen sites. More should be considered once


Figure 3. Beaver deceiver constructed on Highway 14 where it crosses Owen Creek.

these sites are occupied.

Four trappers were contracted and permitted to transplant "problem" beaver from private lands to unoccupied watersheds on the BNF. Fifty beaver were transplanted to three watersheds. They were Owen Creek (19), Prospect Creek (16), and Marcum Creek (15). All three watersheds flow into the South Tongue. Prior to winter, beaver had successfully constructed dams and built caches in all watersheds including the South Tongue. The primary trapper had difficulty gaining access to an adequate quantity of beaver to satisfy transplant goals in a timely and cost-effective manner. Hence, he initiated landowner contacts in Montana, which confirmed the availability of a relatively large source of beaver. In turn, a cooperative agreement was executed with the Montana Fish Wildlife and Parks Department that provided for the removal of beaver for transplant efforts within Wyoming. About 20 beaver were live-trapped and removed from the Littlehorn Unit of the Sunlight Ranch within Montana.

As might be expected, transplanted beaver created a few problems. On Owen Creek, they began plugging a culvert under State Highway 14. In response, BNF and WGFD personnel, in cooperation with the Wyoming Department of Transportation, constructed a beaver deceiver. The deceiver is simply a fenced in area that excludes beaver. As shown in Figure 3, the beavers were able to re-build a dam in front of the deceiver prior to winter.

Bighorn National Forest Land and Resource Management Plan Revision

The revision of the USFS Bighorn National Forest (BNF) Land and Resource Management Plan (Plan) continues to be one of the most important issues concerning wildlife and their habitats within the Sheridan Region. Involvement started during the initial scoping process in January of 2001 and has continued to date. At this time, the analysis of the effects of implementing each Alternative has been published in a Draft Environmental Impact Statement (DEIS). The DEIS is accompanied by the release of the Draft Revised Forest Plan (DRFP), which identifies the BNF preferred alternative. A 90 day public comment period followed the release of the DEIS and the DRFP. The Final EIS and the Final Revised Forest Plan will be published by the summer of 2005 with the Record of Decision. The FEIS is similar to DEIS but incorporates additional information based on the review of the DEIS.

Black Hill National Forest Beaver Transplant Project

Beaver, which were live-trapped in the Sheridan area by a contract trapper, were transplanted to the Bear Lodge Ranger District (BLRD) during April and May. Five beaver were released on the North Fork of Cole Canyon Creek, which is a tributary of the South Fork of Redwater Creek, and 15 beaver were released on the North Fork of Cow Creek, which is a tributary of the Middle Fork of Redwater Creek (Figure 4). BLRD personnel assisted with the transplants. The goal of the work was to elevate water tables, increase riparian water detention (store water on the land longer), and enhance habitats for riparian-dependent and aquatic wildlife.


Figure 4. Translocated beaver after their release on the NOrth Fork of Cow Creek.

Segments of the drainages below and including the two release sites were walked during September to look for evidence that mated pairs had established colonies. No evidence was found that beaver had established a colony in the upper segments of North Cole Canyon Creek or North Cow Creek. Cut aspen were found about one half mile down drainage from the release site at Turtle Lake. One or more beaver established a bank den and a small cache in the back waters of Hemler Reservoir, which occurs about two miles down stream from the release site on North Cow Creek. No other evidence of dam construction or cache development was observed.

Dayton Meadows Instream Habitat Improvement on the Upper Little Bighorn River

Maintenance of in-stream structures at Dayton Meadows, which were constructed in the early 1990's to enhance trout

habitat, was discussed with BNF personnel. The Army Corp of Engineers permit for the in-stream improvement project originated with the BNF, though the WGFD completed the improvement project. Hence, necessary maintenance is the responsibility of the BNF. The WGFD will assist with maintenance efforts as needs are identified and expressed by the BNF.

The options of actively maintaining in-stream structures, removing failing or failed structures, or rehabilitating the existing structures with a restoration-oriented design, which are maintained by natural stream flows at the bank-full stage and thought to require no active maintenance, remain available. No rehabilitation project will be initiated, and instead, maintenance or removal of existing structures would be addressed as maintenance needs become apparent.

Dead Swede Campground Stream Rehabilitation Project on the South Tongue River

A photographic record of the stream work was compiled to ascertain how the stream rehabilitation project faired during spring runoff conditions. A contractor hired by the BNF completed the project in fall 2003. The goals were to rehabilitate channel dimension, pattern and profile, and enhance fisheries habitat. All cross vane and J-hook vane structures were intact, though some minimal scouring of the point bars associated with the J-hook vane structures was apparent (Figure 5). Sodded areas and transplanted willows appeared healthy. The initial success of reseeding at the constructed bank full bench areas appeared marginal, but the benches remained stable (Figure 6).

Figure 5. Bankfull bench designed to narrow the stream channel and provide access to the floodplain during high flow events.

Figure 6. A J-hook vane structure located within the Dead Swede reach of the South Tongue River.

Extension Service Contacts and Technical Assistance

The WGFD habitat extension service program has diminished somewhat in recent years and fewer activities now occur on private lands. This is primarily due to the postponement of WGFD habitat grants in 2003 and the dwindling effect of going several years without a WGFD extension service biologist presence in NRCS offices. This interruption in funding and staffing has resulted in lost opportunities to leverage Farm Bill funding and advance the agencies Strategic Habitat Plan. It's apparent that placement of a WGFD biologist in NRCS offices allows the agency to find hidden opportunities and to build the trust and acceptance needed for an effective program with private landowners.

This year, 21 landholders and consultants that work with private landowners were assisted with their wildlife habitat enhancement and protection projects. This consisted of brief verbal or written recommendations for coal-bed natural gas mitigation and seed mixtures for disturbed sites, planting fish species or altering stream channel roughness for mosquito control, strategies to alleviate problem beaver activities, developing springs and ponds, planting vegetation, WGFD cost-share opportunities and US Army Corp of Engineers permits.

One habitat project was completed on private lands due to WGFD input. WGFD grant dollars were not expended on any projects.

Specific projects include:

- **BLM 60 Bar Ranch/Burnt Hollow Land Exchange** – Information was provided to the BLM concerning wildlife habitat enhancement opportunities and the use of the WGFD's Dixie harrow.
- **Goose Creek Watershed Plan** – Comments were provided on a watershed plan, which was developed by a volunteer working group, for the private land-dominated segments of the Goose Creek watershed. The plan provides voluntary best management practices to address water quality impairments identified on segments of the Goose Creek watershed. Information regarding the potential for cost-share assistance from the WGFD, which could be utilized to help implement segments of the plan, was provided to the working group.
- **Hanna Creek Retention Pond Enhancement** – Advice and extension materials were provided to a landowner interested in deepening and refurbishing retention ponds on Hanna Creek. No opportunity for sportsperson benefits was available.
- **Jones Ranch Livestock Grazing Plan** – The Jones Ranch was toured with Natural Resource Conservation (NRCS)

District personnel to make recommendation concerning sagebrush control and livestock grazing strategies. A plan is being developed by the NRCS.

- **P&M Mining BLM Land Exchange** – WGFD personnel toured the BLM's recent land acquisition. Tour participants gathered ideas for a proposed long-term habitat plan for the property.
- **Piney Creek In-Stream Flow Needs** – Several landowners along Piney Creek have been concerned about declining fish populations. Although the drought is a big factor, previous WGFD in-stream flow studies indicate that winter flow diversions into Lake DeSmet probably exasperbate the problem. In-stream flow opportunities were discussed with the WGFD's Water Management Section Supervisor and relayed to several landowners.
- **Sage-Grouse Habitat Preservation** – Sheridan College professors, an intern, and WGFD biologists are collaborating on a project that will use a geographic information system to identify private landowners with private mineral ownership within critical sage-grouse habitats. If sage-grouse leks and/or nesting habitats occur on these lands, a letter will be sent that outlines how to conserve their habitats by imposing protective measures in surface use agreements with coal-bed natural gas companies.
- **Sand Creek LLC Housing Development** – Input relative to areas requiring protection for wildlife and enhancement opportunities to mitigate a housing development were provided. This development is designed to maintain open-spaces and the integrity of the land.
- **Soldier Creek Wooded Draw and Rangeland Restoration Project** – The Rocky Mountain Elk Foundation and the ranch owner funded a project to enhance crucial elk winter habitats and restore the health of wooded draws for sharp-tailed grouse and song birds. Approximately 40% of an 860-acre burn-block was treated. The burn targeted wind-swept ridges used by elk during the winter and numerous wooded draws consisting of aspen, chokecherry, hawthorn and other shrubs (Figure 7). Assistance was also provided to develop and implement a plan for controlling cheatgrass with a combination of fire and the herbicide (Plateau). Over 145 acres were treated.

Figure 7. Wooded draws and wind swept ridges were burned on the Soldier Creek property.

- **TTT Ranch** – The TTT Ranch was toured with the Kaycee Game Warden. Management and habitat enhancement opportunities were identified and communicated to the absentee landowner.

Fish Passage and Diversion Screening Investigations

Several fish passage related projects, which included the following, were investigated during the year. The goal of these efforts is to restore fish movements to unavailable habitats.

Figure 8. New stepped cross vane structure, which was designed and constructed by a contractor, at the Frank Hopkins diversion.

- Site tours were completed at the Frank Hopkins diversion rehabilitation project on Clear Creek during and after construction. A stepped cross-vein and sluice gate structure was build (Figure 8) to replace the previous push-up dam. The new structure will allow passage for mature trout. The step pool structures constructed, which create plunging flow rather than streaming flow, will not allow passage of non-game species within the assemblage, which are predominately bottom-oriented swimmers that don't jump. No opportunity for input into the design of the structure was provided prior to its construction.
- A letter was submitted to the Wyoming Department of Transportation (WYDOT) requesting they initiate and oversee a channel rehabilitation project on Clear Creek to restore fish passage at Interstate-25. No formal response was received, though contact was made with a WYDOT representative regarding the status of our request. Later, a follow-up letter was sent to WYDOT via Habitat Protection Services requesting a reply to our request. Ultimately, WYDOT responded indicating they would investigate stream rehabilitation to restore passage when reconnaissance activities were initiated for an interstate rehabilitation project. The interstate rehabilitation is anticipated to begin in 2009, though reconnaissance and planning will commence sooner.
- Information was provided to a local angler who has been promoting passage restoration efforts along Clear Creek at Interstate-25 with WYDOT. We suggested the individual redirect his attention to other issues on Clear Creek through

Buffalo, because of the long time frame expected before a viable rehabilitation project comes on-line at Interstate-25.

- A tour of ongoing and potential fish passage projects along Clear Creek – Kendrick Diversion, Frank Hopkins Diversion, Healy Diversion, and Interstate-25 grade control barrier – was completed with the Yellowstone River Coordinator for the USFWS.
- Physical, geographic, and preliminary cost estimates for fish passage rehabilitation efforts at the Interstate (Welsh Ranch) Diversion on the Tongue River, which was identified as a regional priority for native species passage restoration, was prepared and forwarded to the USFWS Yellowstone River Coordinator for incorporation into their funding request process. Subsequently, a tour of the P&M (Welsh Ranch) property and the Interstate Diversion structure located on the property was completed with Fisheries Management, Wildlife Division, and BLM Buffalo Field Office personnel.
- A site investigation was completed on a property along Clear Creek with the USFWS Private Lands Coordinator to discuss the potential for stream rehabilitation and irrigation system upgrades. Two diversions are involved on the property. One is located on the property, which diverts water for an adjacent landowner, and the other on the upstream landowner, which delivers water to the ranch. Rehabilitation of existing push-up dams with fish-friendly structures was desired at both diversions. In addition, screening was of interest within the ditch serving the property. The landowner also desired additional upgrades to his irrigation system. We recommended the NRCS be enlisted as the lead in the project in order to address the desired system upgrades. Cost-share funding opportunities available through the WGFD and USFWS were presented.
- A sight investigation was completed on Clear Creek above Buffalo with Fisheries Management personnel and a Hydrographer from the State Engineers Office to ascertain the location of and relative condition of irrigation diversions. A GIS map of diversion points was compiled to guide future rehabilitation plans on upper Clear Creek.
- WYDOT contracted a project to repair and modify the step pool structures below the highway culvert on the North Fork of Clear Creek. The modification included increasing the armoring at selected areas along the banks, adding several additional rock steps, and resealing the structures that were subbing flow beneath the step. A photographic record of the project was compiled to provide a basis for assessing the durability of the step pool structures over time.

Kendrick Dam Fish Passage and Screening Evaluation on Lower Clear Creek

The request for proposals process was completed and a contractor selected to complete feasibility assessments and develop concept designs for fish passage and diversion screening alternatives at Kendrick Dam (Figure 9). HabiTech, INC. of Laramie was selected to implement the project from six proposing firms. The feasibility assessments (phase-1) were completed, and the concept design process started in 2004. A final report, which is due in 2005, will assimilate all information compiled during both phases.

A cooperative agreement was completed to secure $78,000 from the USFWS Fish Passage program for the project. The funds will partially provide for the final design and construction of upstream passage. Additional funding will be necessary to implement the upstream passage and screening phase of the project. Complete engineering cost estimates are not yet available.

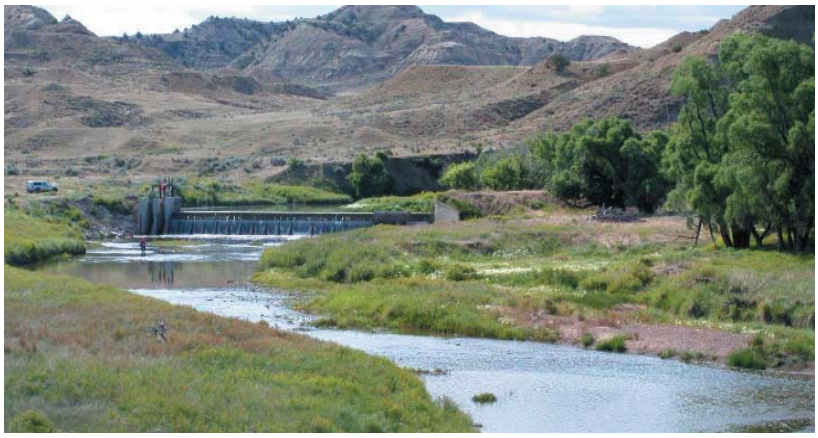


Figure 9. Kendrick Dam is a barrier to fish migrating to upper segments of Clear Creek.

Lake DeSmet Conservation District Sage Grouse Restoration Pilot Project

Collaborative efforts have been underway between the Lake DeSmet Conservation District, NRCS, BLM, USFWS, WGFD and Northeast Wyoming Sage Grouse Working Group to establish a pilot project for sage-grouse (SG) habitat restoration. The pilot project will be located within the boundaries of the Lake DeSmet Conservation District, which is found in northern Johnson County.

The paper Sage Grouse Ecology and Management in Northern Utah Sagebrush-Steppe, a Deseret Land and Livestock Wildlife Research Report, 2002 by R. E. Danvir provides documentation of benefits to SG from their ranch management operations. Deseret has experienced a six-fold increase in male lek attendance by implementing timed livestock grazing,

forb plantings, mechanical treatments, breaking up old stands of sagebrush, modifying fences, installing ramps in water troughs and identifying sagebrush stands for protection. Because Deseret succeeded at increasing SG populations while maintaining a working ranch, this collaborative effort was initiated to replicate the Deseret management model in northern Johnson County.

A small portion of Johnson County (approximately 100,000 acres) was initially considered desirable for a pilot project because several ranchers were interested in managing for SG and an adjacent grass-bank opportunity existed. Although this area has a high potential for success, the Conservation District had concerns about providing program dollars to select operators with little justification for restricting others. Consequently, it was decided to work through the Lake DeSmet Conservation District with all interested and qualifying ranchers. It's hoped that their successes will encourage others to participate and that eventually a much larger block of continuous habitat will be enhanced.

The 1.4 million acre Lake DeSmet Conservation District (see Figure 10) contains over 200,000 acres of SG habitat that are predicted to be highly suitable for the species. Of these, 47 percent are BLM lands, 10 percent are State of Wyoming lands and 43 percent are privately owned. This program will target these habitats.

BLM-administered permitting for coal-bed natural gas exploration and development affects most of the landscape. The following strategies are designed to enhance sage-grouse habitats while hopefully safeguarding the species from one of the nation's largest energy plays. They are:

- Expand partnerships to support development and implementation of SG habitat restoration by preparing cooperative agreements (CA) between the Lake DeSmet Conservation District, NRCS, BLM, USFWS and WGFD.
- Work with the agencies and Northeast Wyoming SG Group to develop a booklet that outlines best management practices (BMPs) for sagebrush steppe/sagebrush mixed grass communities. Another document should address BMPs for energy development.
- Continue to improve the development of mapping systems that assist with inventorying suitable and priority SG habitats. Currently, project areas are determined by buffering SG leks (with a two-mile radius) and using WGFD/BLM GIS-based databases (maps of sagebrush distribution and suitable terrain) to predict superior habitats. Sagebrush maps, however, need additional work in this area to improve accuracies. The resulting map (see Figure 10) would determine who qualifies for program dollars. Operators will be required to have a working grazing management plan that meets BMPs prior to qualification.
- Funding is being sought to hire an image analyst to improve the accuracy of sagebrush maps in the Lake DeSmet Conservation District (project area). The previous analyst used Landsat 5 data to discriminate and map various landcover

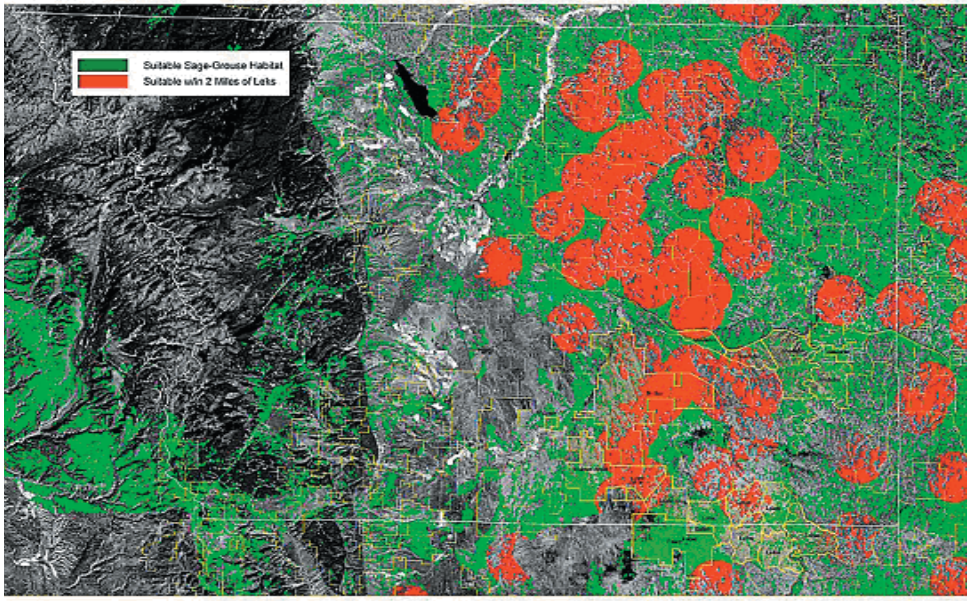


Figure 10. The white boundary is the Lake DeSmet Conservation District, or northern Johnson County. Areas delineated in red are predicted sagegrouse habitats that should be highly suitable. Green areas are suitable but not within 2 miles of a lek. The predictive model variables included sagebrush availability, suitable terrain and proximity to SG leks. Grazing allotment boundaries (yellow polygons) illustrate which operators control livestock grazing.

types. The accuracy of sagebrush-dominated sites was determined to be 68.6 percent, which was somewhat below needed standards. The mapping effort also utilized satellite data from 1993 and 1994. Consequently the data are no longer current.

- Wildlife contractual services are also being requested to ground-validate the remotely sensed data and associated predictive models. The contractor will locate SG and their sign to verify utilization and determine when the habitats are being used. SG 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, there are specifically different sagebrush canopy cover levels, plant diversity and forb abundance requirements for the various specialized habitat needs that should be identified and subsequently developed with different manipulation techniques.
- Using mapping products and field data, the consultant will also consider the proportional representation of these specific habitat needs across the landscape, and subsequently, the juxtaposition or location of where these specialized habitats should be located.
- The consultant and agency personnel will determine shrub community condition. A scorecard was developed that considers the age, vitality and hedging of sagebrush communities, as well as the abundance of annual exotic plants. This information is essential for prescribing manipulation techniques.
- Flight time for agency personnel has also been requested to supplement on-the-ground surveys. Aerial surveys will be used to document important winter habitats and search for new SG leks. The WGFD and BLM will also intensify SG lek surveys in the area to improve the accuracy of population indices, which is the most cost effective means of measuring the effects of prescribed management actions on the species.
- Based on BMPs and the Deseret management model, it is recommended that we purchase needed equipment. For instance, obtain a Lawson aerator/seeder for planting forb strips and rangeland restoration efforts (see Figure 11). This piece of equipment costs approximately $42,000. The Lawson (meadow) aerator, although not designed specifically for treating sagebrush, has shown promise in rejuvenating sagebrush stands. It tends to eliminate larger, older, decadent plants while limiting harm to younger plants. It may also leave protective litter in place and create little soil disturbance. Preliminary data collected on a research project at Deseret Land and Livestock in a decadent stand of Wyoming big sagebrush in Rich County, Utah, indicates that density of decadent sagebrush was reduced by 45%. Another piece of equipment that could be used, depending on management objectives, is the Dixie harrow. The WGFD owns two Dixie harrows that are available for this project.
- Other mechanical methods, fire and/or other treatments would not be considered until livestock grazing plans are in place and the treated pastures could be deferred from livestock grazing for two years. Appropriate and timed livestock grazing will be a prerequisite.
- Seek project dollars to implement a sagebrush restoration program within the mix of private, BLM and State lands.
- Gain additional flexibility by creating a grass bank.
- Work with the Lake DeSmet Conservation District and their local working group for program oversight. Trust and acceptance is needed to be successful with private landowners. The Conservation District has a history of working with landowners and provides the credibility necessary for success.
- A program-based approach using BMPs could be delivered to private landowners.
- BLM consolidated lands could also be targeted for restoration work. BLM focus areas could be identified and strategies developed for an interagency effort to implement BMPs. This could be achieved by utilizing BLM Standards and Guidelines Policy to insure proper livestock grazing techniques to improve SG habitat.

Figure 11. Lawson Aerator with drop seeder.

- In addition, a commitment from the State of Wyoming could be pursued to implement BMPs on their State Trust lands.
- Develop strategies and education opportunities that promote success stories, to gain broad-based support for the program. Educators such as Dr. Roy Roath, Range Extension Professor at Colorado State University, will be used to promote BMPs and encourage cooperation and involvement.
- Monitoring of results will be an important component of this program. Agency personnel will evaluate mechanical treatments on the Wyoming big sagebrush community.

Lake DeSmet Conservation District Wildlife Habitat Incentive Program Stream Project

A contractor completed stream assessment and rehabilitation design efforts along reach 1 of Clear Creek, which is a 1.7-mile stream segment that includes the Buffalo city park and greenbelt. These efforts identified potential stream rehabilitation and fish habitat improvement options within publicly accessible segments along Clear Creek. A 404-permit application covering stream rehabilitation and improvement work proposed within reach 1 (Figure 12) was approved by the Buffalo City Council and is pending with the US Army Corps of Engineers.

Figure 12. Aerial photograph of Clear Creek above Buffalo WY, which depicts the reach 1 stream rehabilitation and habitat improvement reaches outlined in blue.

The objectives of the proposed stream work within reach 1 are to: 1) rehabilitate channel dimension, pattern, profile, and floodplain connectivity via structural and vegetative applications, and the redistribution of channel bed materials; 2) enhance physical habitat (cover and potential spawning glides) available for trout; and 3) concentrate flows to increase physical habitat available during low flow periods (nested low flow channel concept). A $10,000 WGFD wildlife trust fund grant was secured to cost share on implementation efforts within reach 1. Project implementation is anticipated in fall 2005, provided adequate cost-share funding can be secured. Other cost-share funding or in-kind contributions have either been secured, or are being requested from the City of Buffalo, Lake DeSmet Conservation District, USFWS Partners for Wildlife Program, Wyoming Game and Fish Commissioners license, and the Hazel Patterson Foundation. The estimated cost of the proposed work within reach 1, which includes construction supervision from a consultant, equipment and labor from a contractor, channel dimension rehabilitation along selected reaches, and the delivery and placement of rock for 23 in-stream structures and 3 scattered boulder placements is $169,140, or $47.54/linear foot ($251,011/mile).

The assessment and design phase for reach 2, which is the 1.0-mile segment of Clear Creek within the urban area of Buffalo, was completed in winter 2004, though some additional assessments may be necessary in the future. An urban working group has been proposed to address varied goals, utilities, flood flow concerns, bridges inhibiting flood flows, and limited channel connectivity with floodplain areas. Hence, decisions are pending on how to proceed with rehabilitation and improvement practices within reach 2. A reach 2 implementation phase is anticipated in the future.

Mule Deer and Elk Habitat Restoration

Sheridan Region biologists have been assisting the BLM with ponderosa pine prescribe burning activities (see Figure 13). Another portion of Gardner Mountain, located west of Kaycee, was burned. These forests typically have too many pine trees and encroaching junipers. The junipers are a hazard to maintaining healthy ponderosa pine communities because of their flammability. The burns reduce young pine and juniper competition as well as removing pine duff, which hinders grass and forb growth.


Figure 13. Ponderosa pine communities are burned to thin the stand and encourage forb and grass growth.

The USFS has also re-initiated their ponderosa pine restoration efforts. WGFD biologists have been advising the agency for several years that burning these valuable transitional habitats is needed to restore habitats for mule deer and elk. Both agencies did an excellent job this spring. USFS burned in excess of 860 acres.
To determine mule deer food preferences during winter months, fecal samples were collected and analyzed from three concentration areas along the east slope of the Bighorn Mountains. These data allow biologists to determine what plants are important and if prescribed burning and other treatments are a benefit or detriment to their diet and overall health.

North Tongue River Watershed Working Group

A steering committee consisting of representatives from the Bighorn National Forest (BNF), NRCS's Sheridan County Field Office, Sheridan County Conservation District, Department of Environmental Quality (DEQ) Water Quality Division, Department of Agriculture, grazing allotment permittees, and WGFD was formed to guide the development of a watershed management plan. The plan is mandated by the DEQ to address an E-coli impaired segment of the North Tongue River on the BNF. The stream reach was added to the DEQ 303d listing in 2003.

Information on big game populations and distributions, and angler use levels within the North Tongue watershed was presented to the committee. Bacteria sampling by the BNF was expanded in 2004. The results confirmed the cause of the impairment to be concentrated cattle grazing. The committee is exploring options to control the problem. Options generally include limiting or reducing cattle access to the stream or increasing the ability of the riparian zone to filter the bacteria. Actions to address the cause of the problem have yet to be decided. Efforts to devise the plan will continue in 2005.

Powder River Watershed Survey

Fisheries management, fisheries assessment, and aquatic habitat personnel refined goals and objectives for inventory efforts along the Powder River and Crazy Woman Creek. Subsequently, aquatic habitat personnel helped identify and map inventory reaches on the Lower Powder River. Recording thermometers were launched within each reach to provide baseline temperature data. These thermometers will be retrieved in 2005. Additional assistance was provided to survey fish inventory stations within each reach.

Level-II morphology assessments, which included riffle cross-sections, longitudinal profiles, and pebble counts, were completed at two inventory reaches to gain baseline information. The goal of these assessments was to establish a baseline for future monitoring efforts. Summaries of these assessments are on file at the Sheridan Regional office. These summaries will be used to refine our assessment protocol before assessing baseline geomorphic conditions at other reaches in the future.

Sage-Grouse Habitat Research and Habitat Monitoring Projects

The trend in the sage-grouse population for the Sheridan Region suggests about a 10-year cycle with periodic highs and lows. Of concern, however, is that each subsequent peak in the population is usually lower than the previous one. This suggests a steadily declining sage-grouse population. Much of this decline is likely due to habitat degradation from agriculture activities and coal mines. Currently, however, there's a new threat to remaining sage-grouse habitats in northeastern Wyoming. Coal-bed natural gas (CBNG) development is continuing at an unprecedented scale and rate. The BLM's proposed action includes drilling, completing, operating and reclaiming almost 39,400 new wells and constructing, operating, and reclaiming various ancillary facilities needed to support them. These developments will occur in a project area of almost 8,000,000 acres (mostly within the WGFD Sheridan Region). Drilling is expected to continue for a minimum of ten years.

The unprecedented scale and rate of this development sent local WGFD and BLM biologists scrambling for useful information. For the most part, they found little. It quickly became apparent that new research would be needed to determine how thousands of small industrial disturbances, hundreds of new roads and associated activities and new noise, air and water pollution would impact sage-grouse. This research would also need to evaluate these changes within an already modified environment. Extensive sagebrush conversion from agricultural activities and surface coal mines are commonplace. This monumental task would require large sums of money to conduct complex research. It was also needed to employ new technologies, such as space-borne sensors and geographic information systems, to measure and analyze landscapes and deal with voluminous databases.

To date, contributions from the U.S. Department of Energy (DOE), BLM offices in Wyoming and Montana, Montana Fish Wildlife and Parks, National Fish and Wildlife Foundation, a coalition of private oil and gas companies, Budweiser, Wolf Creek Foundation, Eyas Foundation and USGS EROS Data Center have exceeded $500,000. The WGFD continues to work with these partners to initiate conservation planning for sage grouse in the Powder River Basin of SE Montana and NE Wyoming. The vision is to develop planning tools that provide partners with the information necessary to support the National Environmental Policy Act by providing information on sage-grouse habitats and populations and how to mitigate CBNG effects. This project tests actual CBNG impacts and the sufficiency of current BLM protective measures enabling better management of sage-grouse and their habitats.

Thanks to the above contributors, University of Montana researchers have expanded the current sage-grouse nest study to quantify sage-grouse habitat requirements during all seasons of the year. They also propose to link sage-grouse habitat and population data with habitat inventories (using satellite sensor data) to create planning maps that prioritize landscapes for sage grouse conservation in the entire Powder River Basin. Linking bird-habitat relationships with spatial data will provide managers with the maps they need to plan for natural gas extraction while assuring effective environmental protection through research, development and technology transfer.

WGFD biologists developed a predictive model that uses sagebrush distribution and topographic texture analysis to map potential sage-grouse habitats. Biologists also used a helicopter to collect sage-grouse locations during the winter months. These locations will be use to make improvements in the predictive capability of the model. University of Montana researchers will assist with validating the model and quantifying its accuracy.

Additional work is being completed by the WGFD to determine what risks pose the greatest threats to sage grouse in northeastern Wyoming. Roads, agriculture, CBNG developments and other activities are being mapped and compared to the WGFD sagebrush map, which was developed using 1993 Landsat satellite data. In addition, these maps will be compared to a 2003 satellite image to assess changes on the landscape over the last decade.

Figure 14. Riparian and steam habitats associated with one of the riparian cross-section transects on the lower Shutts Flat riparian greenline monitoring site. Note the hedged appearance of willows, which is indicative of persistently heavy browsing.

Shutts Flat Instream Habitat Improvement Project on the South Tongue River

One additional riparian greenline monitoring site was established at lower Shutts Flat. This site supplements the monitoring study site established at upper Shutts Flat in 2003. Both sites occur within the Shutts Flat Stream Habitat Improvement reach, which was completed by the BNF and WGFD in the mid 1990's.
Riparian greenline, cross-section, and woody species regeneration transects were completed at the lower Shutts Flat site. Ecological status along the riparian greenline was rated as late seral (68% similar to the potential natural community composition), bank stability was rated relatively high (7.47 units of a possible 10.0 units), and mesic-dominated plant communities comprised 84 percent of the greenline community composition. Ecological status across riparian cross-section transects, which included only the communities within the flood prone zone immediately adjacent to the stream channel (2 times the channel bankfull depth), was rated as mid seral (46% similar to the potential natural community composition). Late seral communities comprised 56 percent of the cross-sectional community composition. Mesic–dominated riparian communities comprised 92 percent of the cross-sectional community composition. Herbivory of willows was intense (Figure 14). The woody species regeneration transects indicated seedlings were very limited in the complex, but young or re-spouting plants were almost equal to mature and dead plants in the riparian complex.

West Weston Pond Habitat Grant Project
The BLM Buffalo Field Office equipped the water well with a submersible pump and timer system, and completed the pipeline system to the reservoir. The reservoir was completed in 2002 with cost-share assistance from a WGFD wildlife trust fund grant. The intent of the reservoir was to provide a public fishery. The Thunder Basin National Grassland is paying the electricity bills. The BLM indicated the pipeline system was operational by summer, and the reservoir was about half full by fall. Fencing the reservoir is expected in the future when the BLM secures adequate funding.

WILDLIFE HABITAT MANAGEMENT AREAS AND PUBLIC ACCESS

Important goals for all habitat personnel are to increase or maintain wildlife habitat and associated recreation on Wyoming Game and Fish Commission lands. The principal objective is to provide for the long-term needs of wildlife by restoring or maintaining ecosystem functions and processes, while providing reasonable public access, were feasible, to Commission lands. Wildlife Habitat Management Areas (WHMA) in the Sheridan Region includes the Kerns, Amsden Creek, Bud Love and Ed O. Taylor. The Sand Creek WHMA occurs in the Sheridan Aquatic Region. Specific projects and activities accomplished in 2004 included:

- **Bud Love WHMA Water Rights and Reservoir Rehabilitation** -- A prioritized course of action for the rehabilitation of reservoirs and irrigation infrastructure at the Bud Love WHMA was prepared by the regional team and submitted to the water rights management team in Cheyenne. The Habitat and Access Supervisor has taken the lead on irrigation system rehabilitation efforts to expedite efforts to re-exert existing water rights. Subsequently, reservoir rehabilitation efforts will be explored further.

Figure 15. Ponderosa pine communities were burned in October of 2004 to restore the natural fire frequency that kept these communities fire tolerant and healthy.

- **Ed O. Taylor WHMA Prescribe Burn** – This October, U.S. BLM crews from Buffalo and Casper, with assistance from the WGFD, burned approximately 1,200 acres of pine forests and three-tip sagebrush rangelands southwest of Kaycee along the Middle Fork Powder River Canyon on the Ed O. Taylor WHMA. The area is managed by the WGFD in cooperation with the BLM to provide winter habitat for elk and mule deer. Financial help came from the Rock Mountain Elk Foundation and the Southern Johnson County Fire District provided support. In addition, the Hole In The Wall Ranch, which is the adjacent ranch, provided access to burn sites via their lands.

The goal is to reduce the density of small pines and juniper while preserving the mature fire-tolerant ponderosa pines. In addition, three-tip sagebrush is burned. It's a low-growing sagebrush that has little use to wildlife. Fall burns are more successful at controlling the species and allowing grasses to get a foothold and compete with it.

In the winter, biologists can count up to 800 elk on the WHMA. Mule deer usually winter lower on the slopes, but use the area extensively in the fall and spring months. It's important that elk and deer have nutritious diets just prior to winter. These burns increase the crude protein of their forage, thus helping them to replenish fat reserves that have been overdrawn by suckling fawns and the rut.

WGFD investigations have shown that there's a 70 percent increase in grass production and a 100 percent increase in forb production when three-tip sagebrush communities are burned. Forbs, which are broad-leafed plants, have very high crude protein content. Not only are they more nutritious, but the burned areas green up earlier in the spring and stay green later into the fall. Prescribed burns also set back conifer encroachment into grasslands. The previous spring, WGFD and BLM crews burned more than 200 acres of crucial elk winter range. Mule deer normally flock to these new burns during the spring months.

- **Ed O Taylor WHMA/BLM Middle Fork Powder Habitat Management Plan Area Vegetation Management Meeting** – A tour of the Ed O Taylor WHMA and BLM's Middle Fork Powder Habitat Management Plan area was attended with BLM personnel and the livestock grazing permittee. The intent was to review livestock grazing and road management initiatives for the area. A preliminary road management proposal was developed and agreed to. Time constraints limited progress in the review of grazing management. It appeared, however, that the grazing response index approach has not yet been successfully implemented on the private and BLM lands adjacent to the WHMA. Grazing

management initiatives such as use as a grass bank or for preconditioning treatments can be supported within the WHMA until the operator can demonstrate adequate grazing management outside the WHMA.

- **Kerns WHMA Fire Line Maintenance** – Encroaching conifers were removed from fire-lines that were installed approximately 20 years ago on the Kerns WHMA.
- **Kerns, Amsden, Bud Love and Ed O. Taylor WHMA Biological and Physical Inventories** – Volunteers used a geographic information system to map biological and physical features found on the four WHMAs. WGFD personnel checked the databases for accuracy and corrected problems. The final product was organized, packaged and copied to a CD for viewing by wardens and biologists.
- **Sand Creek Access Area Cattle Grazing** – Cattle grazing use at the Sand Creek AA was managed similar to past years. Three hundred twenty four pairs, plus some bulls, were turned-in on May 19 and all were removed by May 31. This resulted in a maximum actual use of about 130 animal unit months (AUM). The Habitat and Access Supervisor inspected the area following the completion of the grazing period. Riparian habitat conditions and stream bank stability appeared good.
- **Department Land Management Summaries** – Regional personnel reviewed a draft of the "Department Land Management Summaries" for all the WHMAs located within the Sheridan Region. The draft will be discussed and finalized during a future regional team meeting. The intent of the summaries is to provide the department administration and commission with a short and quick summary of the goals, objectives, and pertinent information for each WHMA. In addition, they provide a management summary that's flexible, provides a consistent statewide philosophy and define management expectations.

MISCELLANEOUS

Workshops and In-service Training:

- A fish screen facilities tour in Salmon, Idaho conducted by the Idaho Fish and Game Department Fish Screen Shop.
- Fire-refresher training conducted by the BLM Buffalo field office.
- The River Morphology and Applications short-course in Bend, Oregon, which was conducted by Dr. Dave Rosgen.
- A tour of stream rehabilitation and improvement projects on the 3-Forks Ranch in Colorado, which was lead by Dr. Dave Rosgen.
- A vegetation community ecology tour on the Grizzly WHMA conducted by Dr. Alma Winward.
- An education seminar focusing on water conservation and water law sponsored by the Wyoming Water Association.
- The terrestrial habitat biologist attended the University of Wyoming's workshop on range livestock nutrition.

Assistance with other WGFD Endeavors:

- Participating as a field representative on the strategic habitat plan implementation committee implementation team. The team began to develop a comprehensive manual on land conservation strategies, discussed work schedule integration at the regional level, reviewed options for a grants coordinator position, reviewed existing horse use of WGFD Wildlife Habitat Management Areas with a mind toward recommending policy change and generated ideas for the Governor's habitat fund proposal. Additional emphasis was placed on bringing regional planning and implementation efforts in line with the regional priorities identified under the Strategic Habitat Plan.
- Assisting with Chronic wasting disease surveillance at the Dayton check-station.
- Helping Wildlife Division and BLM Buffalo Field Office personnel complete prescribed burn projects at the Ed O Taylor WHMA and Gardner Mountain.
- Helping Wildlife Division personnel establish big sagebrush production and utilization transects on big game winter ranges, and helped conduct a mule deer classification flight.
- Commenting on the Draft Environmental Impact Statement for the Bighorn National Forest Tongue River Watershed Allotment Management Plan.

The terrestrial habitat biologist activities included:

- Assisting with chronic wasting disease surveillance at processing plants.
- Helping Wildlife Division personnel establish big sagebrush production and utilization transects on big game winter ranges.
- Developing plans and request for proposals concerning using remote sensing to map landcover types in different portions of the state.
- Helping WGFD district biologist improve the delineation of big game seasonal ranges.
- Assisting the WGFD's short grass prairie ecosystem biologist with information for an ecosystem-planning document.

- Assisting WGFD's non-game program with developing a method of using Landsat data to monitor prairie dog town activity.
- Assisting BLM remote sensing experts with a process to map cheatgrass.
- Assisting the Fish Division with transplanting beaver to the Black Hills National Forest for riparian habitat restoration efforts.
- Assisting the BLM with the development of a plover habitat suitability predictive model.
- Helping the WGFD sage-grouse program with running a texture analysis model to measure landscapes. This is one of three variables in the sage grouse model and may be used statewide.
- Assisting Brian Jensen, Wyoming Cooperative F&W Research Unit graduate student with running terrain models to determine if nesting sage-grouse are selecting for certain types of topography. The results will be used to develop predictive models to delineate important nesting habitats.

Information and Education Efforts

- Led a second grade class on a tour of the visitor center and through an educational program.
- Reacted to concerns expressed about beaver activity, and its effect on the angling experience, along the North Tongue River. The benefits of beaver activity in terms of increased bank storage and enhanced over winter fish habitat were emphasized with the concerned angler.
- Wrote an article on chokecherry and a second involving serviceberry and wooded draws. Both articles were printed in Wyoming Wildlife News and Magazines.
- Gave several presentations to the Northeast Wyoming Sage-Grouse Working Group concerning habitat issues affecting sage-grouse and habitat monitoring and restoration efforts underway. Images were taken that compare coal-bed natural gas reclamation that occurred where top-soils were replaced versus where top-soils were buried. The dramatic difference in vegetative responses prompted the Working Group to initiate an effort to improve reclamation standards on State of Wyoming lands.
- Gave a presentation at the coal-bed natural gas fair in Gillette.
- Assisted with the Wyoming Hunting and Fishing Heritage Expo.
- Provided a presentation concerning the Lake DeSmet Conservation District Sage-Grouse Habitat Restoration Project to the Wyoming Association of Conservation District's Wildlife Committee.
- Prepared a news release describing burning activities on the Ed O. Taylor WHMA. The news release was edited and appeared in Wyoming Wildlife Magazine.
- Worked with the Sheridan Press and a WGFD staff writer to prepare articles on recent beaver transplant efforts on the Bighorn National Forest.
- Gave a presentation to the Wyoming Chapter of the North American Grouse Partnership concerning sage-grouse habitat issues in northeastern Wyoming.
- Attended the TNC Bighorns Program advisory Board meeting.