

Annual Report 2014

Strategic Habitat Plan



Wyoming Game and Fish Department
April 2015

*Conserving Wildlife
Serving People*

Aquatic Habitat
Terrestrial Habitat
Statewide Wildlife and
Habitat Management
Habitat and Access Branch
Lands Administration
Information, Education and
Publications Programs
Wyoming Landscape
Conservation Initiative

Message from the Director

Hello friends,

Thank you for your interest in the Wyoming Game and Fish Department's Strategic Habitat Plan. This is a deeply collaborative effort with people from all across the state pitching in to make this report possible, but also in making the projects outlined on the following pages a reality.

The importance of habitat to wildlife, both terrestrial and aquatic, cannot be overstated. To gauge the health of any population one does not need to look past that species' habitat. Those in fish and wildlife management examine the amount and quality of habitat and then go to work in conserving and improving that habitat to benefit the animal in question. This is exactly the effort underway right now, in the national spotlight, for sage grouse. Wyoming has led the way with an approach identifying core habitat, and then to protect and improve it. Other states have taken Wyoming's lead and are implementing similar plans. This is all being done to conserve the bird and keep it from ever going on the endangered species list. But, again habitat is the central focus of conservation efforts.

Outside of the national spotlight, but equally challenging are Wyoming's work with cutthroat trout and mule deer. Our approach in the Cowboy State to help restore populations of both species is again to put an emphasis on habitat.

The sage grouse, cutthroat trout and mule deer plans are long-term efforts, which is another hallmark of habitat efforts, but the statewide commitment creates optimism that we are on the right path.

Much was done for both species in 2014. You can read more about that in the coming pages. But, the habitat work done for all species was impressive. Thousands of acres were improved by reducing invasive species and noxious weeds; stream habitats were enhanced and connected benefiting fish and other aquatic species; thousands of trees were planted to the benefit of the entire ecosystem. These are just a few of the highlights and I would like to recognize and say thanks on behalf of Game and Fish. We realize we cannot do this alone and the partners who support habitat efforts are numerous and come from all sectors including landowners, non-profit sportsman and wildlife organization, local governments, and state and federal agencies. It is a heavy lift, but together we have done a lot and leave Wyoming a better place.

Best,

Scott Talbott
Director Wyoming Game and Fish Department

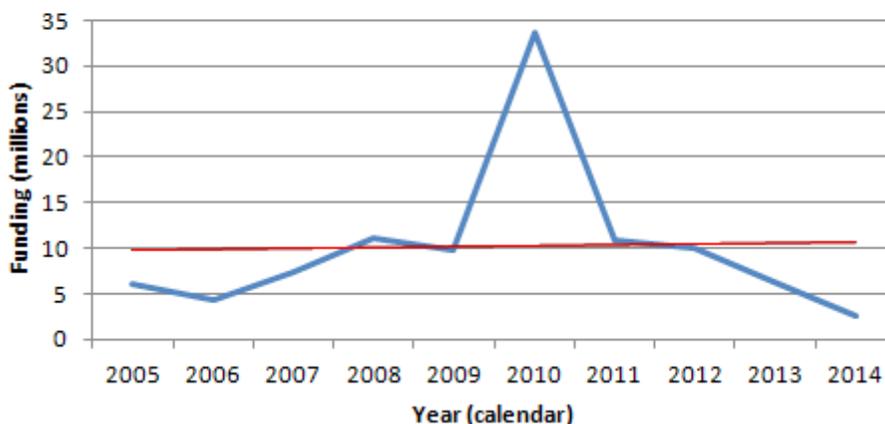


Executive Summary

In 2014 the Wyoming Game and Fish Department continued to address challenges identified in our Wyoming Game and Fish Commission approved Strategic Habitat Plan (SHP). This annual report highlights many of these achievements. Despite a downturn in available WGFD funds in 2013 and 2014, the Department, with assistance from our many great partners, has managed to continue implementing meaningful projects aimed at protecting and enhancing a wide range of habitat types across Wyoming. In streams and riparian areas, 38 projects involving significant funds were underway to manage watershed vegetation, restore functioning stream channels, reduce stream bank erosion, and provide fish habitat. Restoring passage and creating connectivity among tributary streams continues to be a focus to ensure fish populations persist. Work on 54 terrestrial habitat projects occurred throughout the year to improve habitat conditions through the removal of invasive species, prescribed burns, forb and food plot seeding, mechanical tree removal, mowing, chopping, and lawson aerator treatments. Fence conversions, water developments, and pipelines continue to dominate efforts on Commission-owned lands. A large portion of the Lands Branch maintenance and operating budget is for habitat and access property rights, including permits, lease payments, property taxes, and personnel management.

The graph below illustrates total funding that goes toward addressing on-the-ground Strategic Habitat Plan goals. Although the trend line is stable, funding levels in 2014 were the lowest of the preceding 10 years. This is the result of a decrease in available funding from the WGFD's Habitat Trust Fund and the associated loss of matching dollars from partners that these funds typically generate. There were also fewer WGFD field personnel in 2014 which further limited on-the-ground implementation of SHP projects. The large spike observed in 2010 can be attributed, in part, to an increase in conservation easements completed in 2010.

10 Year WGFD Funding for the Strategic Habitat Plan



WGFD applied for funding from outside sources amounting to approximately \$1.72 for each WGFD dollar expended for on-the-ground fish and wildlife habitat activities.

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Habitat Vision

The Wyoming Game and Fish Department (WGFD) is the steward of all 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. The WGFD promote a holistic approach to habitat management, integrating management and various land uses through collaborative efforts with the general public, conservation partners, private landowners and land management agencies. The WGFD will increase public awareness of the need for managing for quality wildlife habitat today to ensure healthy and abundant wildlife populations in the future. Wyoming Game and Fish Commission lands will be managed to emphasize and maintain wildlife habitat and public access values for which they were obtained.

Mission

Promote and maintain the availability of high quality habitat to sustain and enhance wildlife populations in the future.

Goals

- Goal 1. Conserve and manage wildlife habitats that are crucial for maintaining terrestrial and aquatic wildlife populations for the present and future.
- Goal 2. Enhance, improve and manage priority wildlife habitats that have been degraded.
- Goal 3. Increase wildlife-based recreation through habitat enhancements that maintain or increase productivity of wildlife.
- Goal 4. Increase public awareness of wildlife habitat issues and the critical connection between healthy habitat and abundant wildlife populations.
- Goal 5. Promote collaborative habitat management efforts with the general public, conservation partners, private landowners and land management agencies.

Habitat Program Expenditures

- I. Approximate WGFD trust, fish passage and non-recurring funds (figures rounded to the nearest \$1,000) expended for on-the-ground projects primarily directed at implementation of SHP goals and management on Wyoming Game and Fish Commission (WGFC) lands during calendar year 2014 (these figures do not include personnel salaries, supplies, materials, and equipment used for routine WGFD maintenance and operation and WGFC property tax and lease payments):

WGFD Funds Expended on SHP Goals:

\$930,000

- II. Non-WGFD funds expended for implementation of SHP goals for calendar year 2014 from or in collaboration with various sources including: 1) Wyoming Wildlife and Natural Resources Trust Fund (WWNRT), 2) USDA Farm Bill federal government funds, 3) other federal government funding programs, 4) other state and local government funding sources, 5) nongovernmental organizations, 6) Wyoming Governors Big Game License Coalition (WGBGLC), 7) private landowner contributions (including in-kind), 8) corporations and businesses, 9) private donors, and Wyoming State Legislative Capitol Construction funds:

Non-WGFD Funds Expended on SHP Goals:

\$1,601,000

Grand Total for SHP Goals:

\$2,531,000

WGFD applied funding from outside sources amounting to approximately **\$1.72** for each WGFD dollar expended for on-the-ground fish and wildlife habitat activities. This outside funding is critical for implementing the SHP and conserving our wildlife resources. Overall, personnel directly involved in implementing SHP goals oversaw spending of approximately **\$7,082,000** of WGFD regular maintenance and operating funds, State Wildlife Grants from US Fish and Wildlife Service and WGFD Trust Fund monies. This figure includes wages, benefits, equipment operation expenses, supplies and on-the-ground improvement material expenses allocated as follows: approximately **57%** for personnel, which includes habitat inventories, monitoring, project contract oversight, project design and implementation and promoting collaborative habitat management efforts with the general public, conservation partners, private landowners and land management agencies. Without the dedication and passion of field personnel, none of these habitat projects would happen. The remainder of the funding was allocated as follows: **5%** for vehicles and heavy equipment and **38%** for materials and supplies.

Personnel overseeing the WGFD Education, Information and Publications Programs spent approximately 12.5% of their time in 2014 on SHP goal 4 “habitat” activities totaling approximately **\$235,000** of regular WGFD maintenance and operating funds. Information and education efforts are critical for maintaining current and future, social, political and financial support for wildlife habitat program related efforts.

Lastly, personnel within the Lands Administration Branch conduct annual WGFC property rights monitoring, property right acquisition and disposal, payment of WGFC property taxes in each county and lease payments to the Office of State Lands and Investments (OSLI). Property taxes paid to counties by

the WGFD in 2014 totaled approximately **\$509,000**. These taxes include WGFC owned state offices, fish hatcheries, bird farms, houses and Wildlife Habitat Management Areas (WHMA) and Public Access Areas (PAA). During 2014, WGFD costs for leases totaled approximately **\$131,000**. The majority of lease payments were made to the OS LI involving State Land leases associated with WHMAs and PAAs.

Habitat Program Accomplishments: The Numbers

Those activities resulting in on-the-ground accomplishments, promotion of collaborative habitat efforts and information and education efforts directed towards the habitat program during calendar year 2014 are summarized below, these accomplishments are shared with our many partners:

Activity	2014 Accomplishments	5 Year Average Accomplishments
Detailed stream assessments	12 streams totaling 17,833 ft	8 streams totaling 12,730 ft
Watershed stream assessments	10 on 24 miles	19 on 68 miles
Stream bank enhancements	10 totaling 10,682 ft	17 totaling 8,552 ft
Instream structures	18 installed	65 installed
Instream flow segments	6 on 24.2 stream miles	5 on 19 stream miles
Fish screens installed	5	3
Fish passage structures installed	1	6
Fish passage upstream miles	4.5 miles connected	146 miles connected
Fish passage structures monitored, maintained	9 monitored, 5 maintained	10 monitored, 6 maintained
Fish tracking or entrainment investigations	4	5
Project monitoring - detailed stream channel	7 totaling 4,600 ft	4 totaling 8,278 ft
Management monitoring - detailed riparian	7 totaling 3,518 ft	22 totaling 7,718 ft
Stream habitat monitoring sites	72	62
Project monitoring - photo, other (sites/streams/segments)	44 on 43 sites or stream miles	34 on 20 sites or stream miles
Aspen/cottonwood browse monitoring	48 sites	39 sites
Beaver transplanted	6	10
Riparian assessment	2 on 1.5 miles	8 on 45 miles
Riparian protection, enhancement, management	14 on 309 acres	18 on 763 acres
Private landowner contacts	324 yielding 93 projects	278 yielding 108 projects
Technical assistance requests	85	222
Conservation easements in process and coordinated with partners	7 easements totaling 26,245 acres	14 easements totaling 35,258 acres
BLM RMP or USFS Cooperator Status	3	6
Trees or shrubs planted	5,595	8,220
Herbicide weed treatments	26,143 acres	33,296 acres
Herbicide vegetation to thin sagebrush	1,500 acres	1,900 acres

Activity	2014 Accomplishments	5 Year Average Accomplishments
Mechanical tree removal	3,235 acres	4,005 acres
Mowing, chopping, and Lawson aerator treatments	4,526 acres	1,705 acres
Upland grass, forb and food plot seeding	1,419 acres	1,822 acres
Water wells drilled	1	4
Water guzzlers or water tanks installed	8	15
Water pipelines installed	22,000 ft	32,263 ft
Spring developments	1	4
Water wells converted to solar pumps	0	1
Fences installed	75 miles	52 miles
Wetland development or major renovation	6 totaling 29 acres	7 totaling 55 acres
Prescribed burns	783 acres	5,805 acres
USDA Farm Bill contract involvement	2 contracts	181 contracts
Livestock Grazing Management Plans	5 plans, 20,525 acres	13 plans, 223,239 acres
Wildlife Habitat Stewardship Plans	1 plan	3 plans
Upland habitat inventory, landscape evaluation scale	249,842 acres	901,458 acres
Upland and rangeland inventories, intensive scale	9 acres	103,554 acres
Upland vegetation/habitat treatment monitoring sites	229	147
Annual vegetation production/utilization sites	116	129
Field cooperative research projects	2	8
WGFC managed lands intensive livestock/forage reserve/meadow rejuvenation and grazing administered	12 on 44,146 acres	11 on 48,703 acres
WGFC managed lands fence maintained	586 miles	619 miles
WGFC managed lands irrigated	4,757 acres	4,167 acres
WGFC managed lands noxious weed control	1,542 acres	1,782 acres
WGFC managed lands meadow mowed/farmed	1,782 acres	797 acres
WGFC managed lands farming contracts	2,931 acres	2,383 acres
Public Fish Access projects	9 projects on 1.5 miles	11 projects on 8 miles
Public Hunting Access projects	3 projects	4 projects on 1,250 acres
WGFC property right monitoring	128 on 167,045 acres	116 on 117,365 acres
Funding sources/contracts/grants administered	97	129
Funding applications prepared for other entities	42	42
Tree material placed in headcuts	79,680 lbs	
Yellowtail fire mitigation	1	
Fontenelle Wildfire rested from grazing	64,000 acres	
Fence removed or modified on Anadarko for migration	10 miles	
Points of diversion inventoried for passage	122	
Public land permittees contacted	31	

Kudos to Our Partners!

WGFD believes habitat is one of the keys to maintaining and sustaining wild and healthy populations of aquatic and terrestrial wildlife. Without the support and partnerships from private landowners, public land managers, conservation groups, elected officials and the public, these habitat management and enhancement projects would not be possible. WGFD greatly appreciates this financial assistance and project support and looks forward to continuing to work with partners to ‘Conserve Wildlife and Serve People’ in the years ahead.

The following lists major funding partners and approximate amounts the WGFD received in 2014. Additionally, habitat projects where WGFD personnel were heavily involved or provided oversight or verification of expenditures are also listed. This is not a complete list, and may not reflect all partner contributions, we apologize for any partners who may have been inadvertently missed.

Funding Partner	Approximate amount for 2014 (rounded to nearest \$100)
Access Midstream	\$8,800
Bighorn County Weed and Pest District	\$5,000
Bowhunters of Wyoming	\$3,000
Bureau of Land Management	\$32,000
Bureau of Reclamation	\$17,500
Central Utah Project	\$5,000
Denbury Mitigation	\$1,100
Federal USDA Farm Bill Program Funds (NRCS and FSA)	\$79,000
Hot Springs County Weed and Pest District	\$13,700
Jonah Interagency Office	\$4,900
Lower Wind River Conservation District	\$5,700
Mule Deer Foundation	\$11,400
National Fish and Wildlife Foundation	\$12,700
National Wild Turkey Federation	\$5,000
Pinedale Anticline Project Office (BLM)	\$31,200
Private Landowners	\$109,500
Rocky Mountain Elk Foundation	\$79,000

Funding Partner	Approximate amount for 2014 (rounded to nearest \$100)
Sage Grouse Local Working Group – State of Wyoming Funds	\$74,500
Saratoga-Encampment-Rawlins Conservation District	\$4,500
Teton County Conservation District	\$7,500
Trout Unlimited	\$20,100
US Fish and Wildlife Service - Fish Passage	\$7,600
US Forest Service	\$76,200
Washakie County Weed and Pest District	\$18,700
Wyoming DEQ 319 Funds from EPA	\$40,000
Wyoming Governor’s Big Game Coalition	\$74,500
Wyoming Landscape Conservation Initiative	\$251,900
Wyoming Wild Sheep Foundation	\$6,000
Wyoming Wildlife and Natural Resources Trust Board	\$580,300
Weston County Weed and Pest	\$13,100
WY Department of Agriculture Water Quality	\$1,200
Grand Total	\$1,600,700

For additional information please contact any of the personnel listed at the end of this document. Also, please share this report with anyone who may be interested in the WGFD and the Commission’s habitat efforts.

This report can be viewed on the WGFD website at: <https://wgfd.wyo.gov/web2011/wildlife-1000651.aspx>.

Aquatic Habitat Program

The aquatic habitat program works to protect, restore and enhance Wyoming's water, watersheds, and waterways. The program consists of 12 permanent full-time employees: six regional Aquatic Habitat Biologists (AHABs), a Statewide Fish Passage Coordinator, a Wyoming Landscape Conservation Initiative (WLCI) Coordinator, an Aquatic Habitat Supervisor, an Aquatic Habitat Program Manager, a Water Management Supervisor and a Water Management Instream Flow Biologist. Two At-Will-Contract Employees worked for the section in 2014: one in Cody assisted the Fish Passage Coordinator primarily collecting and compiling information about passage obstructions; and one in Casper addressed channel head cuts in the Bates Hole area southwest of Casper. Finally, seasonal biologist technicians assisted the Water Management Crew and biologists in the Laramie and Jackson regions.

During calendar year 2014, the aquatic habitat section was involved in 38 projects involving funding from the Game and Fish Trust Fund, WGFD fish passage budget, the Wyoming Wildlife Natural Resource Trust (WWNRT), USFWS, Landowner Incentive Program (LIP), Wyoming Landscape Conservation Initiative (WLCI) and other sources. These partners provided over \$627,000 toward aquatic projects. WGFD aquatic habitat dollars spent on contracts or grants in calendar year 2014 totaled over \$196,000. The various partners and their contributions toward these projects are highlighted in the regional sections of this report.

Section personnel spend tremendous time planning, coordinating and developing habitat project funding applications throughout the year for efforts that may be led by the WGFD or by a partner. Regional AHABs and statewide personnel also work on SHP actions not directly related to funded projects including habitat protection, inventory and assessment, monitoring project function and habitat response, and providing habitat education and training.

The number of on-going aquatic habitat projects involving significant funding (38) was the same in 2014 and 2013 and higher in 2012 (50). The reduction can be attributed to reduced funding in FY14-15 combined with an ongoing lack of personnel capacity in Casper and Cody. Renewed funding from the WGFD Trust Fund in FY16 is anticipated and will translate into more aquatic habitat achievements on the ground.

Water Management

Instream Flow Water Rights (Goal 1) - Mike Robertson and Tom Annear

Six new filings for instream flow water rights were made in 2014 on streams in the Bighorn Mountains. Applications were prepared using data collected from study sites on Buckskin Ed Creek (3.9 miles), Cedar Creek (4.3 miles), Lodge Grass Creek (3.3 miles), the West Fork Little Bighorn River (4.4 miles), Soldier Creek (5.4 miles), and Trout Creek (2.9 miles). All six filings have a priority date of October 16, 2014.



Figure 1. *Instream flow study site on Muddy Creek.*

Three new instream flow studies were focused on native Yellowstone cutthroat trout habitat in the Clarks Fork River drainage in Sunlight basin including Muddy Creek (Figure 1), Dead Indian Creek and Crandall Creek.

Water Management (Goal 1) - Tom Annear

Actions were taken to help manage water rights associated with recently leased and purchased water rights in Bump Sullivan Reservoir near Yoder. Two stream gauges were installed in the Hughes and Goshen ditches per order of the State Engineer and data were provided to the Board of Control. A final agreement was signed with Johnson County commissioners for a 99-year lease of 66,024 acre feet of storage water in DeSmet Reservoir for fisheries and recreation. The Water Rights Management Team met twice in 2014 to discuss the status of various water right related issues. A draft letter was written for the Director's Office to proceed with removing the dam at Douglas Fishing Lake near Douglas but no action was taken by the end of the year. Programmatic flow monitoring was done for the third year in a row at several locations on the East Fork Wind River and Bear Creek and associated irrigation delivery systems on the Spence Moriarty WHA. Flow data collection began on May 1 and was terminated on October 9. A data summary from the three-year study will be written in 2015 and presented in an administrative report.

Fish Passage

Harmony Ditch Diversion, Phase 1 (Goal 2) - Lewis Stahl and Erin Sobel

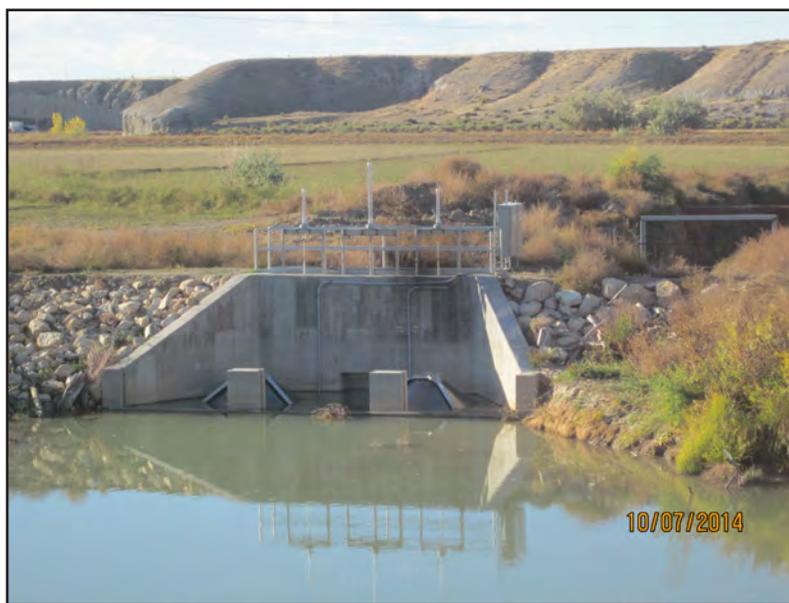


Figure 2. *Harmony Ditch Diversion with new concrete headworks, new headgates and two cone fish screens.*

The Harmony Ditch Diversion screening project is located on the Nowood River near the town of Manderson, WY in Bighorn County. Studies completed in 2006 and 2007, found 16 species of fish being entrained at an estimated rate of 55,415 fish annually. Entrained fish included four Species of Greatest Conservation Need (SGCN): burbot, flathead chub, mountain sucker and sauger. The first phase of construction involved a new irrigation headgate structure and two cone fish screens to prevent entrainment of fish into the irrigation canal (Figure 2). Phase 1 was completed during winter 2014 and the diversion was used during the 2014 irrigation season. The 2014 runoff year demonstrated that a log boom needed

to be placed in the river to divert large debris downstream, otherwise the debris gets stuck in the headgate structure causing the cone screens to not operate properly. This project was projected to be two phases of construction, but Phase 2 was postponed until a proper fish passage design can be developed.

Thunderhead Irrigation Diversion (Goal 2) - Lewis Stahl and Erin Sobel



Figure 3. Bear Creek looking downstream with the head-gate on the left and four completed boulder cross-vanes in the channel below.



Figure 4. Vertical flat plate wiping screen that will prevent fish moving into the irrigation canal. The brushes move side to side wiping debris off the screen.

The Thunderhead Irrigation Diversion is located on Bear Creek within the Spence and Moriarity WMA near Dubois in Fremont County. Construction of the project was completed in December 2014. The completed construction consists of a new diversion dam made up of boulder cross-vanes that will provide upstream fish passage, a new irrigation headgate sized correctly for the irrigation system (Figure 3), and a vertical flat plate wiping fish screen (Figure 4) to prevent entrainment loss to the irrigation canal. Solar power will be set up in spring 2015 to run the brushes on the fish screen, so that debris and sediment do not clog the screen.

Upper Green River Watershed Fish Passage Inventory (Goal 2) - Erin Sobel and Lewis Stahl



Figure 5. An instream diversion dam in the Cottonwood Creek drainage that is a fish passage barrier.

The Upper Green River Watershed is located in western Sublette County and northern Lincoln County encompassing the towns of Daniel, Big Piney and La Barge with land ownership consisting of 46% state, 31% federal, and 23% private land. The 1,880,330 acre watershed was selected for inventory because it contains Tier 1 and 2 priority species listed in the State Wildlife Action Plan (SWAP) and houses multiple WGFD Strategic Habitat Plan (SHP) crucial and enhancement priority areas. At the start of the inventory in 2013, 166 known points of water diversion were known, but another 130 unknown sites were identified during the 2013 and 2014 years combined. Data collected at these sites will allow prioritization of fish passage improvement projects in order to obtain the highest number of miles of reconnected habitat in key areas while

benefiting willing landowners. The Natural Resource Conservation Service (NRCS) and Trout Unlimited (TU) are also undertaking fish passage projects within the watershed to eliminate barriers (Figure 5). Access was obtained and 122 points of diversion were inventoried in 2014 within the Cottonwood Creek, Horse Creek, Piney Creek, LaBarge Creek, Fontenelle Creek and Lower and Middle Green River drainages. Landowner contacts were made for an additional 12 points of diversion where no access was permitted and 33 points of diversions could not be completed due to various reasons. To date, 231 points of diversion have been inventoried within the Upper Green River Watershed (Figure 6).

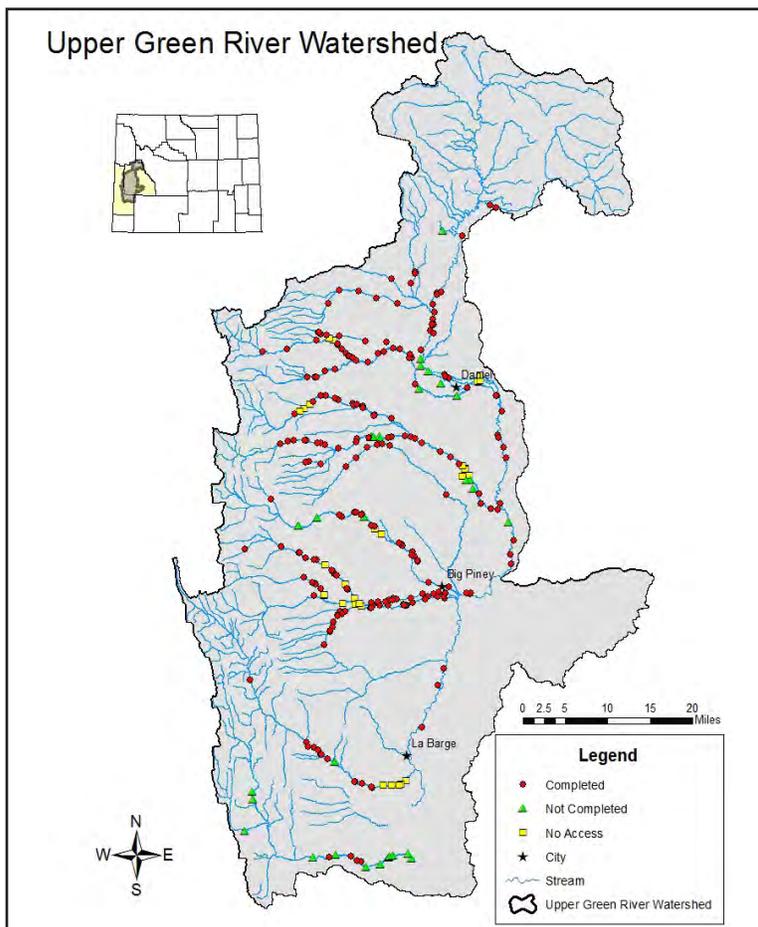


Figure 6. Points of diversion in the Upper Green River drainage completed during 2013 and 2014 field seasons to evaluate if they block fish movement or entrain fish into a ditch.

Fish Passage Grants (Goal 2) - Lewis Stahl

The Green Ditch Diversion project is located on the Wind River in the Lander Region. The project involves design of a fish screen. A \$14,944 contract was developed with One Fish Engineering to design the fish screen.

TU was awarded a \$10,000 fish passage grant to screen two irrigation diversions; one on East Dunoir Creek and one on West Dunoir Creek. East and West Dunoir creeks are tributaries to the Dunoir River in the Lander Region.

The Shafer Creek culvert replacement project is within the LaBarge Creek drainage in the Pinedale Region where extensive Colorado River Cutthroat Trout (CRC) restoration has occurred. The project involves replacing old perched culverts with a new bottomless arch culvert to allow for fish passage. The Bridger Teton National Forest was awarded a \$19,931 fish passage grant to assist with completing the project.

Habitat and Access Branch

The Habitat and Access Branch is responsible for the management of Wyoming Game and Fish Commission (WGFC) owned lands. Our mission is to conserve and enhance wildlife habitat, serve the Public. The Habitat and Access Branch in 2014 consisted of a branch chief located in Cheyenne, four regional supervisors located in Lander, Cody, Pinedale and Laramie, one statewide crew supervisor located in Cheyenne, four coordinators located in Sheridan, Casper, Cheyenne and Jackson, twelve biologists located in Jackson, Dubois, Lander, Yoder, Cody, Lovell, Laramie and Saratoga, and eight contract employees stationed across the state.

The Habitat and Access Branch manages 37 Wildlife Habitat Management Areas (WHMA), 196 Public Access Areas (PAA) and maintenance of 22 feedgrounds. In addition, there is a statewide crew that assists with habitat development projects across the state. The WHMAs are managed for specific wildlife habitat purposes and are included within the SHP. The Habitat and Access Branch incorporates specific objectives and strategies from the SHP into regional work schedules.

As part of the SHP, the branch manages and maintains approximately 410,000 acres, 95 wetlands, 140 miles of ditches/drains, 5,100 acres of irrigated meadows, 2,400 acres of farmland, 250 acres of food plots and more than 1,000 miles of fence for wildlife habitat purposes. To assist hunters and fisherman, another 1,100 miles of road, 395 parking areas, 67 boat ramps, 25 docks, 198 outhouses, and more than 6,000 signs are maintained.

During 2014, the branch also worked on other habitat development projects, including Mule Deer Initiative projects, aeration, meadow improvements, wetland developments and riparian projects. Grants provided \$440,000 for on-the-ground expenditures. These projects are highlighted in the regional sections of this report.

Lands Administration Branch

The Lands Administration Branch works within the Services Division to acquire, monitor, and help manage property rights around the state. During calendar year 2014, the Branch consisted of three full-time employees located in Cheyenne, and one full-time employee stationed in Lander. Branch personnel completed numerous projects involving habitat conservation, public access, and property rights monitoring. Branch personnel also spent a large portion of 2014 working toward completion of a GIS based property right inventory system called the “Uniform Real Property Reporting System” and on a federal aid audit of past years acquisitions.

Uniform Real Property Reporting System (URPRS) – Property Rights Inventory **Brian Rognon, Butch Parks, Judith Hosafros**

The URPRS inventory continued to be a primary focus of Lands Branch efforts during the year. The project was initiated during the Governor’s first term to bring all state of Wyoming property rights into compliance with state law which requires all lands records to be kept by the Office of State Lands and Investments. The inventory will eventually progress to a format that will allow WGFD personnel quick access to lands records, and to a GIS format for additional ease of use.

Property Monitoring (Goal 1) - Butch Parks, Kerry Olson, Brian Rognon

Property rights monitoring remains one of the most important functions of the Lands Administration Branch. Personnel spend a great deal of time monitoring wildlife habitat management areas for trespass threats from surrounding lands. In addition, conservation easements and public access areas are monitored for compliance with easement terms and conditions. During the recent calendar year, 20 conservation easements, 20 WHMA's, and numerous access areas were monitored by Lands personnel.



Figure 7. Blacks Fork Public Access Area Monitoring.



Figure 8. Salt River Public Access Area Monitoring.



Figure 9. Chrisman Green River Public Access Area Monitoring.



Figure 10. Chrisman Green River Public Access Area Monitoring.

Ongoing Projects (Goals 1 and 3) - Kerry Olson and Brian Rognon

Lands Branch personnel continue to move forward with several fee title, water rights, conservation easement and public access projects. Communication and coordination with other Services Division personnel, and with other WGFD divisions continue to be a high priority as several regional meetings were attended, and various committee assignments were completed.

Horse Creek WHMA Access (Goal 3) - Butch Parks

After years of negotiation and consideration of several landowner proposals, Lands personnel completed easement projects on 12 different parcels of private lands to improve administrative access to the Horse Creek WHMA. The project also included acquisition of approximately 40 acres of private lands for elk management purposes. Access to Horse Creek was limited to a relatively steep and unsafe roadway for years, while use of a more direct and safe route was denied by several landowners. The new access route will improve operation of the WHMA.

Packer Lake Public Access (Goal 3) - Kerry Olson

Public access to Packer Lake, located just west of the Nebraska state line near Torrington, was compromised by a local landowner's representative claiming ownership of the primary access road. The landowner initiated road closures without prior approval from the WGFD. Ownership of the road was determined to be held by the Village of Lyman, Nebraska. An agreement was prepared that will allow road maintenance and uninterrupted access to the lake and surrounding habitat for fishing and hunting.

Muddy Creek Feedground Access (Goal 1 and 3) - Brian Rognon

A recent survey of the access road to the Muddy Creek Feedground revealed the road crosses private lands not under easement. Access to the feedground and surrounding areas has been important for facility maintenance and operation, and for managing and monitoring local elk populations. Lands Administration secured a new easement which allows administrative access, as well as limited access for antler collecting and for fall hunting.

Wick WHMA Exchange (Goal 1) - Butch Parks and Kerry Olson

Lands administration completed a land exchange at the Wick WHMA that should improve management on Commission owned lands, and improve access to thousands of acres of public lands. Two similar sized parcels (160 acres), with equal appraised values were exchanged. The commission owned parcel was located well outside of the boundaries of the WHMA, and it could not be managed with the rest of WHMA lands. The private land parcel acquired was located immediately adjacent to the WHMA and to several thousand acres of public lands.

Terrestrial Habitat

In March of 2014 the Terrestrial Habitat Section was restructured: The Habitat and Biological Services Section(s) were combined into the Statewide Wildlife and Habitat Management Section (SWAHM). The three Habitat Extension Biologists (HEBs) working in Natural Resources Conservation Service (NRCS) District Offices were transferred to vacant Terrestrial Habitat Biologist (THB) positions in the Lander, Sheridan and Casper Regions. The Wheatland HEB position was re-structured to serve as the WGFD's first Statewide Habitat Biologist. The assistant manager position was restructured into an office manager position for the SWAHM section. The Terrestrial Habitat Program Manager position remains in Cheyenne and retains similar form. Tracking of grants, contracts, agreements and expenditures for all terrestrial habitat projects statewide remains a primary function of the Terrestrial Habitat Program in Cheyenne.

During calendar year 2014, Terrestrial Habitat Program personnel were heavily involved with on-the-ground implementation, oversight or verification of expenditures on 54 projects concerning Game and Fish trust funds and funds granted to the WGFD from sources such as, Wyoming Wildlife and Natural Resource Trust (WNNRT), various conservation organizations, USDA Farm Bill Programs, local, county, state and federal agencies, conservation districts, weed and pest districts and private landowners, and others. These sources provided over \$918,000 toward on-the-ground expenditures for terrestrial projects. The various partners and their contributions toward these projects are highlighted in the regional sections of this report. In addition, regional THBs and HEBs worked on other SHP actions not directly related to funded projects or projects funded through the standard maintenance and operational budgets. These actions included habitat protection, inventory and assessment work, monitoring previous project function and habitat response, habitat related education efforts, and training. Lastly, personnel spent a considerable amount of time throughout the year planning, coordinating and developing future projects with a multitude of partners and preparing funding applications for the WGFD and other entities.

Statewide, THBs closely coordinated with Wildlife Division personnel to address habitat presentations at the season setting meetings. They also conducted, coordinated and collated information collected by Wildlife Division personnel from 116 established annual vegetation production and utilization transects. Another important task performed by section personnel was collecting vegetation and habitat monitoring data on 229 permanent transects associated with past habitat enhancements. Terrestrial habitat personnel are also responsible for coordinating annual meetings with federal land management agencies relative to wildlife habitat enhancement projects and larger federal projects that may affect wildlife habitat. They provided assistance at hunter check stations to collect tissues for chronic wasting disease analysis and other biological information from harvested animals and participated in sage-grouse and sharp-tailed grouse lek surveys. Most habitat personnel also serve on one or more WGFD species working groups (moose, bighorn sheep, sage grouse, turkey, pronghorn and mule deer) and routinely serve on various habitat-related committees.

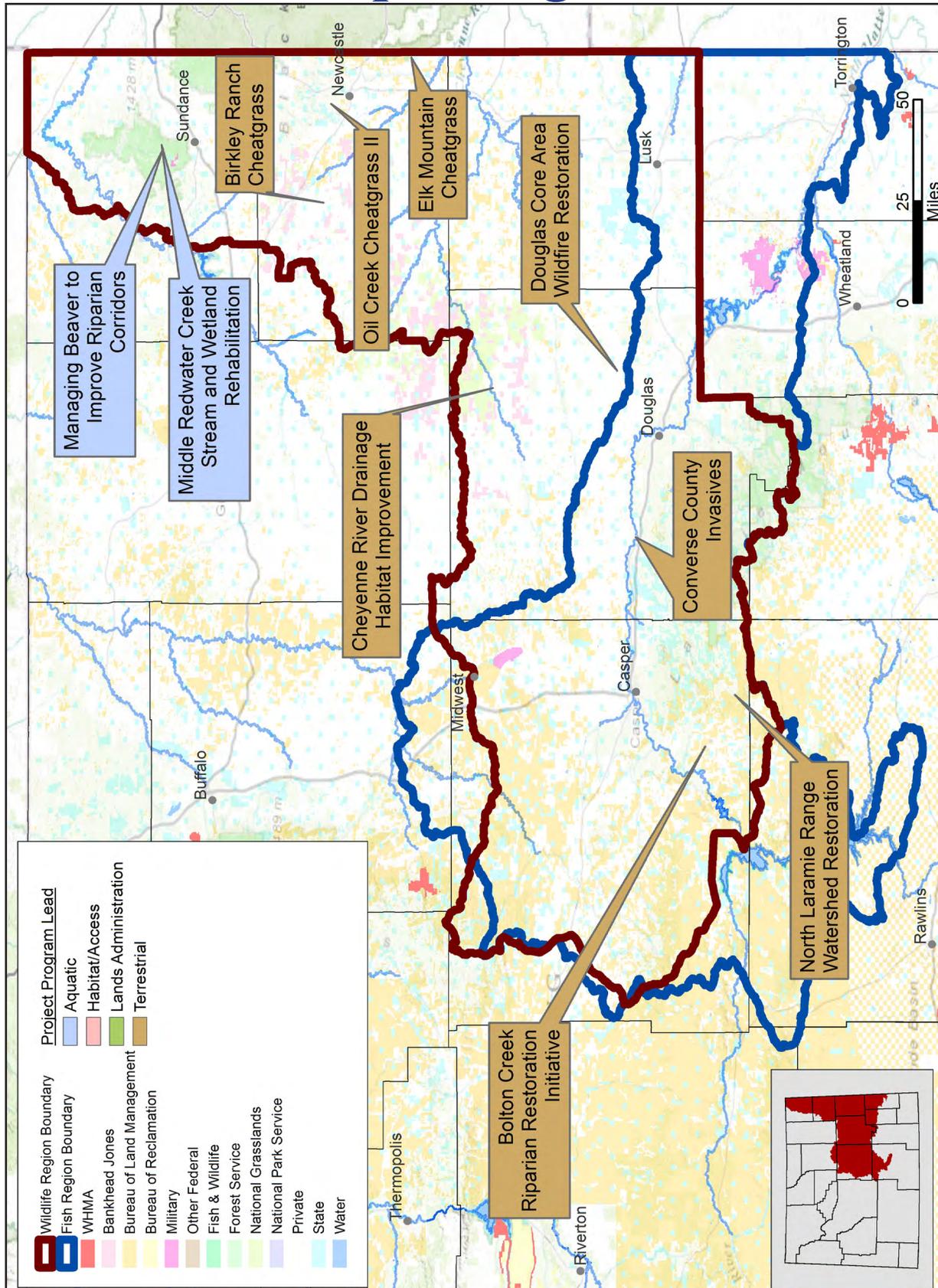
Wyoming Landscape Conservation Initiative

The Wyoming Landscape Conservation Initiative (WLCI) is a long-term science based effort to assess and enhance habitats in southwest Wyoming. In 2014, WLCI allocated \$726,327 to 30 projects and WLCI's partners contributed \$2,452,478. These projects and associated activities were accomplished through numerous coordination meetings, field trips, and work sessions. The WLCI Coordination Team members met with non-governmental organizations, permittees, landowners, other agencies and entities to coordinate WLCI activities. The 30 projects encompassed all of WLCI's focus communities: aspen (2 projects), aquatic (5 projects), mountain shrub (1 project), riparian (6 projects) and sagebrush (7 projects). Eleven projects addressed control of invasive species while reducing barriers to migration corridors was the objective of six other projects. One WLCI funded effort was the Red Desert to Hoback Mule Deer Migration Assessment which utilized GPS collars on mule deer to discover one of the world's longest migration corridors while identifying migration barriers. The WLCI anticipates new projects will be developed to reduce impediments to this mule deer migration.

The WGFD's coordinator to WLCI traveled to Washington D.C. to inform the National Workshop on Large Landscape Conservation (NWLLC) of the many aspects of WLCI. The NWLLC was a forum to "share ideas on the challenges and opportunities that lie ahead in implementing large landscape conservation, as well as the most effective tools, strategies and science available to inform large landscape initiatives."

WLCI received funding from El Paso Corp, to improve and assess sage-grouse and pygmy rabbit habitats in the vicinity of the Ruby Pipeline. The Ruby Pipeline Focus Group was established to fund projects for the pipeline under the direction of WLCI. In 2014, this group approved funding for four assessments and one project aimed to improve riparian vegetation around springs, seeps, and reservoirs. The assessment of seeps, springs, and reservoirs involves mapping springs and reservoirs and assessing them for potential sage-grouse brood rearing habitat. Results are driving the establishment of riparian enclosures to provide brood rearing habitats. A study to understand sage-grouse geophagic (dirt eating) tendencies was funded by Ruby. Two objectives are to analyze soil and sagebrush samples found at the sites the birds frequent compared to random samples to understand if there is a nutritional difference that sage-grouse are preferring. The other objective is to locate other sites sage-grouse are selecting. Two pygmy rabbit assessments were conducted; the first uses remote sensing equipment to photo-document the presence or absence of pygmy rabbits. The other relates pygmy rabbit distributions with variations in habitat, including gas field infrastructure. The data will improve a USGS model predicting current distribution, and information on levels of gas field development that are compatible with continued pygmy rabbit site occupancy. In 2014, these four projects received \$250,569 out of the Ruby funds.

Casper Region



Casper Region

The focus of 2014 in the Casper Region can be summed up in one word: invasives. Whether it is soil invading the river, cheatgrass intruding on native habitats or invasive Russian olive trees along riparian areas, the Casper Region has tackled invasives in 2014.

Casper Region habitat biologists worked hard to address nonnative species and poor habitat from the central waterways of the North Platte River to the Black Hills. New, innovative techniques have been developed to increase the success of sagebrush transplants, keep the North Platte River clean and allow for native grasses and forbs to regrow, all for the benefit of wildlife.

Elk Mountain Cheatgrass Project (Goal 2) - Todd Caltrider



Figure 11. *Bighorn sheep herd on Elk Mountain.*

Elk Mountain is a large isolated mountain at the southern end of the Black Hills and contains the only bighorn sheep herd in northeast Wyoming. The Kouba Canyon bighorn sheep herd contains approximately 80 bighorn sheep (Figure 11). In the past five years, Elk Mountain has been subject to numerous wildfires. While the wildfires have improved bighorn sheep habitat on Elk Mountain by reducing conifer cover, fires have also perpetuated cheatgrass establishment on the mountain. In September 2014, 710 acres of cheatgrass were treated with imazipic herbicide on crucial bighorn sheep winter range on the LAK ranch (Figure 12). Funding for this project was provided by the WGFH Habitat Trust, Wyoming Governor's Big Game License Coalition (WBGGLC), the Wyoming Wild Sheep Foundation (WyWSF), the participating landowner, and the Weston County Weed and Pest.



Figure 12. *Helicopter spraying imazipic herbicide on Elk Mountain.*

Blue Downey Park Reservoir (Goal 2) - Colin Tierney



Figure 13. *Blue Downey Park Reservoir*

Blue Downey Park Reservoir (Figure 13) is a one-acre impoundment on North Fork LaBonte Creek. Historically, the reservoir's depth permitted brook trout populations to persist for decades. Many in Douglas use this and the neighboring ponds and streams for fishing with their families. An incision dropping about six feet threatens to drain the reservoir and completely blocks upstream fish movement (Figure 14). Unchecked, this incision could drain the reservoir and wetland. Initially, a rock chute and various channel treatments were proposed to stabilize the headcut but this approach proved expensive. In 2014, additional data were collected to more fully assess alternatives. Longitudinal profiles and bankfull estimates were measured in the channel downstream to evaluate how the proposed channel would respond to peak flows. Bathymetric reservoir mapping done in 2014 illustrated that volume had decreased 50-66% over the 60-year lifespan of the reservoir. Maximum depth now is only about 9 feet and Sago pondweed is abundant in the reservoir, with large quantities occurring in water between 2 and 6 feet deep.

Given the shallow nature of the pond and likely limited remaining life span of the reservoir, it will likely be prone to winter kill in the future. As a result, there is not a great deal of urgency in stabilizing the overflow channel unless significant dredging were to occur. These options begin to reach a cost level that an alternative approach - constructing a new reservoir downstream - begins to appear more economically viable. A new reservoir would provide a new long-term fishery, stabilize the previous reservoir dam, maintain the existing wetland, and control the headcut migration. This reservoir would allow erosive energy from the current reservoir spillway flows to be dissipated in the pool of the new downstream reservoir, while the new dam would meet current engineering specifications by using modern spillway designs and on-site materials.



Figure 14. *The headcut threatening the reservoir.*

Oil Creek Cheatgrass II (Goal 2) - Todd Caltrider

This project is a continuation of 2,896 acres of cheatgrass herbicide treatment that occurred fall 2013 to curb the spread of cheatgrass in the Oil Creek drainage following a 62,000 acre wildfire that occurred summer 2012. In September 2014, an additional 2,021 acres was treated on a private ranch



Figure 15. Helicopter spraying imazipic herbicide on a cheatgrass infested pasture in Oil Creek.

adjacent to the 2013 treatments (Figure 15). Funding for this project came from the participating private landowner, Weston County Weed and Pest (WCWP), Rocky Mountain Elk Foundation (RMEF), WWNRT, WGBGLC, and the WGFD Habitat Trust. Results from 2013 herbicide treatment were spotty, with some areas seeing 100% control of cheatgrass while others showed an increase in cheatgrass density. Although cheatgrass density in some plots was higher than pre-treatment levels, cheatgrass was small and stunted in nature, which provides evidence of exposure to herbicide. High autumn precipitation in fall 2013 and increased litter accumulations likely favored cheatgrass germination despite herbicide treatment in some of the treated areas. Monitoring will continue to assess control of cheatgrass within the Oil Creek treatments.

The Platte River Revival (Goal 2) - Colin Tierney



Figure 16. Volunteers load Russian olive limbs and trash picked up at Morad Park for the 2014 Platte River Revival Volunteer Clean-up event in September.

The Platte River Revival was initiated in 2006 to foster a healthy and sustainable river system that is a catalyst for economic development and improved quality of life in the Casper area. Citizens participate in an annual volunteer day removing trash and beautifying the river corridor (Figure 16). Each year, the Platte River Revival Volunteer Clean-up draws hundreds of volunteers, with the largest to date in 2014 with over 630 participants. The city holds this event in conjunction with National Public Lands Day and has the largest participant base in the country. During its eight-years, volunteers have removed three mature Russian olive stands, planted 300 trees and removed over 1 million pounds of debris including cars, trucks, tires, concrete, and dog waste. Strong partnerships and community support are crucial. To date, over 2,600 citizens

have volunteered, and businesses, government agencies, and foundations have contributed funding and in-kind services totaling well over \$500,000. The Volunteer Day/National Public Lands Day Event has strengthened the public-private partnership and attracted private and in-kind contributions making completion of the North Platte River Environmental Restoration Master Plan possible.

Douglas Core Area Wildfire Restoration (Goal 2) - Willow Hibbs



Figure 17. Sagebrush seedlings grown from native seed collected in the Douglas Sage-grouse Core Area.

This project is located in the Douglas Sage-Grouse Core Area and assists in promoting the long-term sustainability of sage-grouse as designated by the Governor's Sage-Grouse Core Area Protection Executive Order. Project components include planting 12,000 sagebrush seedlings, treating 1,250 acres of cheatgrass, and establishing a vegetative firebreak within a 10,000-acre wildfire area (5,000 acre project area) north of Douglas, WY. The objective of the project is to increase habitat value and maintain proper functioning of the system to benefit pronghorn, mule deer and sage-grouse. Local sagebrush seed was collected and grown in 10ci containers (Figure 17) and planted in an island approach in November 2014 (Figure 18). The goal of this planting is to provide a seed source for natural re-establishment of sagebrush. The objective of the cheatgrass treatment, which was completed in 2013, and vegetative fire break are to reduce recurrence of fire within the project area. Additionally, treating cheatgrass will reduce competition with native species that wildlife depend on for forage and cover.



Figure 18. Sagebrush seedlings planted in exclosures in the Douglas Sage-Grouse Core Area.

Little Medicine Bow Upland/Riparian Grazing Management (Goal 2) - WLCI, Jim Wasseen

This project addresses approximately eight miles of riparian fence roughly 5 miles northwest of Medicine Bow on the Little Medicine Bow River. A mile of new fencing was installed during October 2014 to protect riparian vegetation and facilitate cattle and wildlife access to water and to implement a river crossing. The objectives of the project are to return this reach of the Medicine Bow to proper functioning condition by encouraging growth of riparian vegetation and reducing erosion and stream sedimentation.

Cheyenne River Drainage Habitat Improvement (Goal 2) - Willow Hibbs

Similar to many riparian areas throughout eastern Wyoming, native woody abundance has significantly decreased in drainages of the Cheyenne River. In partnership with a private landowner, the WGFD planted approximately 300 native trees and shrubs along the Dry Fork of the Cheyenne River and other draws and tributaries near the river. The local FFA chapter provided volunteer labor for planting (Figure 19). Plantings will continue in 2015. Habitat quality and riparian conditions can be significantly improved by successful re-establishment of native plants. Additionally, plantings can provide a seed source for future establishment of desirable plants.

Figure 19. Local FFA students plant trees and shrubs along the Dry Fork of the Cheyenne River.



Birkley Ranch Cheatgrass Treatment (Goal 2) - Todd Caltrider



Figure 20. Scenic view of the Birkley Ranch (left) and monitoring cheatgrass density on the Birkley Ranch (right).

The Birkley Ranch is located south of Upton, WY and contains important habitat for a variety of wildlife species, including sage-grouse, pronghorn, and mule deer (Figure 20). Due to growing concerns from the landowner on the increasing cheatgrass density and the importance of this area to sage grouse, the WGFD worked with the landowner to locate suitable pastures for treatment and to facilitate cheatgrass herbicide application. This area provides some of the better sage grouse habitat in the Newcastle Core Area. In September 2014, 475 acres of cheatgrass were treated on the Birkley Ranch. Funding was provided by the WGFD Habitat Trust, WGBGLC, WWNRT, the participating landowner, and the Weston County Weed and Pest.

Lusby PAA Bank Stabilization (Goal 2) - Colin Tierney



Figure 22. *Lusby Public Access Area bank before stabilization (above) and two years afterward (below).*

closer to 50-60%. The project has been photographically

monitored for pre- and post-construction comparisons (Figure 22). A project was completed in May 2012 to stabilize 210 yards of streambank erosion threatening the access road along the North Platte River at Lusby PAA. In the spring and summer of 2011, a previous attempt (2010) to stabilize the streambank failed, taking with it another 15-20 feet of the stream bank and much of the armoring. In April 2012, a contractor placed 70 concrete “Lego-style” blocks in the North Platte River; topped with 350 yards of 36” bank riprap. Non-woven geotextile material sat below the riprap and shredded fiber landscaping fabric capped the riprap. Personnel planted this area with approximately 500-750 harvested coyote willow cuttings using a waterjet stinger. The landowner watered these almost daily using a WGFD provided drip system. The willows within the watering area saw survival upwards of 95%, while those outside the watering system saw survival levels

closer to 50-60%. The project has been photographically

Converse County Invasives (Goal 2) - Willow Hibbs

The project area is located on the Dave Johnston WGFD Walk-In Access area as well as on unenrolled adjoining PacifiCorp property along the North Platte River. The treatment area is comprised of 4.5 miles of riparian habitat along the North Platte River and consists of approximately 380 acres of Russian olive stands. Mechanical removal work commenced in winter of 2014 - 2015 via mastication and will be completed by March 2015 (Figure 21). Chemical re-treatment and maintenance will occur through 2018, with long-term maintenance occurring less frequently thereafter. Native woody species will be planted in 2016 and 2017 depending on the level of Russian olive control. This project aims to substantially reduce Russian olive abundance and seed dispersal along the North Platte River, thus increasing native species diversity, water availability, and habitat quality for wildlife.



Figure 21. *Russian olive mastication at the Dave Johnston Walk-In Area.*

North Platte River Environmental Restoration Master Plan (Goal 2) - Colin Tierney



Figure 23. *Pulling Russian olives with a skid-steer mounted brush grapple along the North Platte River.*

Several decades of property owners' efforts to stabilize North Platte River banks along with regulated flows have created a channelized river with little bed diversity and localized areas of increased erosion and sedimentation. Russian olive trees dominate much of the terrestrial habitat. The North Platte River Environmental Restoration Master Plan is based on an assessment of the 13.5-mile stretch of the river within the city limits. Completed in 2012, it includes habitat and hydrologic assessments of the riparian corridor.

Seven sites will receive in-river habitat treatments, while twelve sites will receive vegetative habitat restoration (Figure 23). These sites were selected based on ecological and political parameters. The restoration of the North Platte River will improve physical, chemical and biological components of the river and downstream waters as well as produce economic and social benefits. Construction of the first two sites is planned for 2015. Russian olive removal began on the Morad Park site in September 2014, preceding river restoration construction in 2015 (Figure 24).



Figure 24. *Morad Park prior to (above) and following (below) Russian olive removal in September 2014.*

North Laramie Range Watershed Restoration – 2014 (Goal 2) - Keith Schoup

In July 2014, a landowner and WGF D personnel proposed and began implementation efforts to thin big sagebrush stands located within snow accumulation areas. These areas are small topographic features at the headwaters of small streams and drainages where snow accumulates. In these areas we have documented greater than 25% big sagebrush canopy cover, and in some instances, greater than 30%



Figure 25. *Snow accumulation area with big sagebrush thinning.*



Figure 26. *Snow accumulation area with big sagebrush thinning.*

big sagebrush canopy cover. Therefore, we proposed to mechanically treat these areas with a rubber-tracked skid steer and brush hog mower (Figure 25 and Figure 26). The treatment is designed in such a way that it is not considered a disturbance within the sage grouse core area executive order, and the benefits to sage grouse and other wildlife will be increased grass production, increased forb production, improved hydrologic function and increased plant community diversity. As of December 2014, three acres were mowed out of the 140 acres proposed. The small acreage figure is the result of the skid steer being too small (underpowered) and the brush hog mower not being capable of dispensing mowed material in an efficient manner. As a result, the largest skid steer built was rented and will be used with a Fecon mulching attachment to implement the treatment moving forward.

During 2014, Plateau® herbicide was purchased to aerially treat 12,936 acres of cheatgrass infested big sagebrush and true mountain mahogany communities. The cheatgrass treatment was not implemented due to a short treatment window in which the helicopter needed an engine overhaul. Once the heli-

copter was back in service, the cheatgrass in the proposed treatment areas began to germinate. Plateau® herbicide is not as effective at controlling cheatgrass once it has germinated with control expected in the 40 to 60 percentile range rather than in the 80 to 90 percentile range if the cheatgrass has not germinated. Therefore, the pilot, landowners and WGFD personnel decided to postpone the 2014 treatment until August 2015.

Lower Stinking Creek Enhancement (Goal 2) - Colin Tierney



Figure 28. *Stinking Creek prior to piling installation (top), immediately following installation (middle), and one year post-installation (bottom).*



Figure 27. *Vertical bundles used to stabilize creek banks can be seen growing along the far bank less than four months after they were planted.*

Beginning fall 2012, the WGFD installed 12 sheet piling sills along approximately seven miles to enhance riparian habitat and reduce sediment loading from Stinking Creek, a tributary to Bates Creek. The Aquatic Habitat Project Biologist worked with Habitat and Access staff in 2012 and 2013 to install these structures at eight locations on state and private lands. The structures act as sediment and water catchments and

encourage the development of native riparian plant communities. The benefiting riparian species will stabilize the channel, limit sediment transport, and encourage beaver activity. Additionally, several of the structures installed were intended to stabilize damaged reaches of the creek (Figure 28).

Sheet pilings were driven into the substrate, and a rock chute was used to dissipate the creek's energy. Geotextile fabric placed under the rock reduced contraction scour in these sandy soils. Vegetative and elevation data were collected at the four 2013 sites prior to installation, and photographic monitoring was used until the cameras failed. Efforts to control side channel headcutting occupied large portions of the spring field season. These efforts included transplanting willows in the form of buried waddles, silt fences, and vertical bundles (Figure 27). During the summer of 2014, longitudinal profiles were collected at three of the 2013 sites. It was necessary to rework some of the structures due to damage sustained in high flow events and a backhoe was used to realign or bolster rock chutes at several sites. This machine was also used to pull on-site Russian olives.

Bolton Creek Riparian Restoration Initiative (Goal 2) - Keith Schoup



Figure 29. *Insta-dam installation on Bolton Creek.*

In 2014 the WGFD hauled 152,720 pounds of shredded tree material and 38,180 pounds of tree branches and limbs for a total of 190,900 pounds. All of the tree branches and limbs were used to create 12 “insta-dams” in Bolton Creek. The “insta-dam” is designed to mimic a beaver dam, which will trap sediment, raise the water table, dissipate energy following precipitation runoff events, and slowly release water during low flow times of year (Figure 29 and Figure 30). In addition to the tree branches and limbs, WGFD personnel placed 73,040 pounds of shredded tree material onto the “insta-dams” to further improve their design. The remaining 79,680 pounds of shredded tree material was placed into a gully to slow the movement of an active headcut, which we estimate is approximately 20 feet deep, 15 feet wide, and 20 feet long (Figure 31). Following installation of the “insta-dams”, we live-trapped 2 beaver from Casper and relocated them into the section of Bolton Creek where the “insta-dams” are located. As of November 2014, the beaver have modified 5 of the “insta-dams” and created 3 new dams in close proximity. All of this work was conducted in-house utilizing rented equipment that consisted of a mini-excavator, skid steer, dump trailer and rubber-tracked dump truck.



Figure 30. *Insta-dam modification by beaver.*



Figure 31. *Shredded tree material placement in active headcut.*

50-Mile Flat Re-seeding (Goal 2) - Matt Pollock

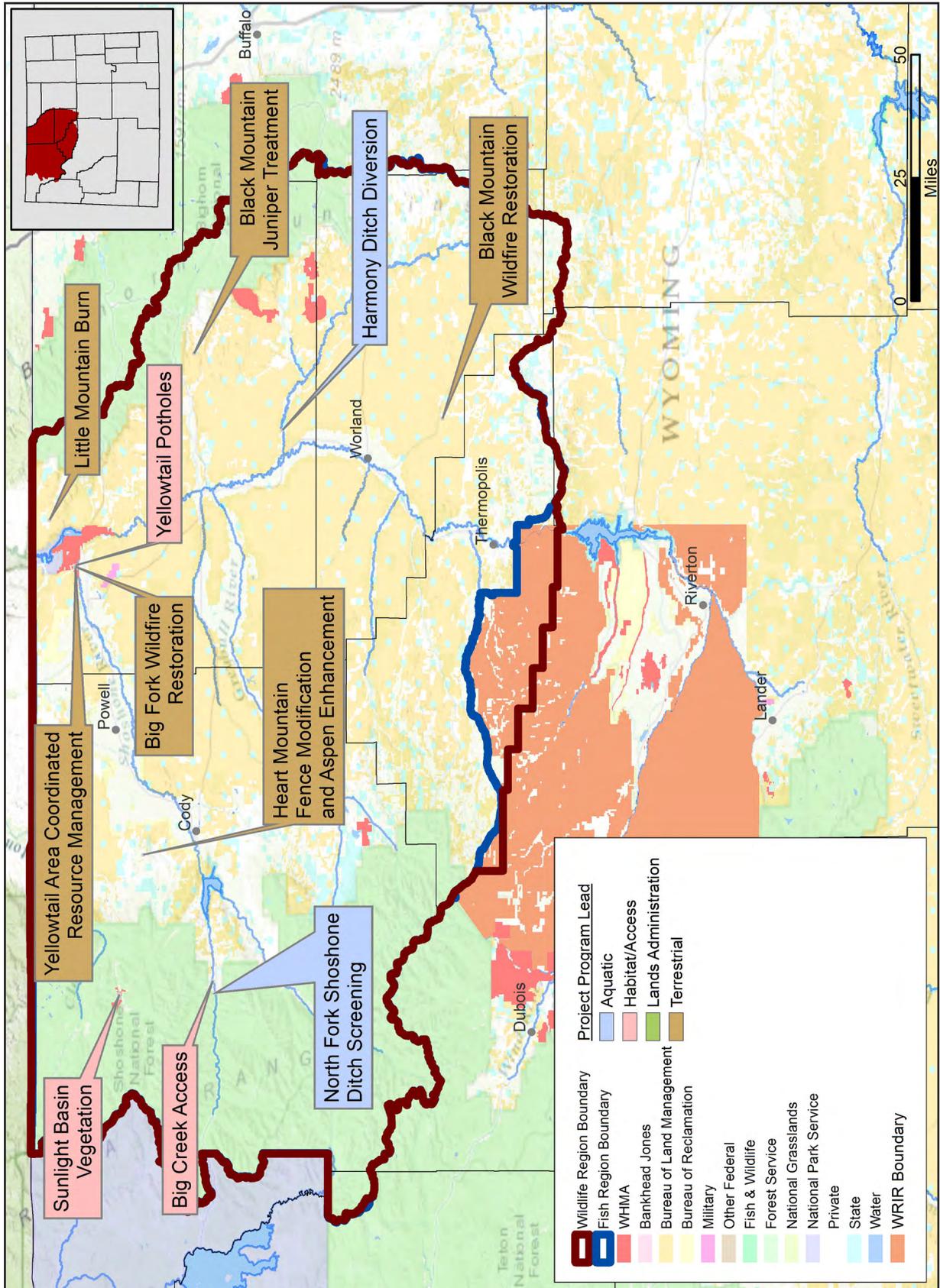
The Casper Habitat and Access Crew, in cooperation with the BLM Casper Field Office, conducted a habitat improvement project on 50-Mile Flat, north of Casper, near the south fork of the Powder River.



Figure 32. *Drilling seed on 50-mile flat.*

The project involved drill seeding native grass, forb, and shrub seed mixture on 250 acres of BLM land with a no-till rangeland seeder to rehabilitate important pronghorn and sage grouse habitats. The project took a bit longer than anticipated due to frequent precipitation, but the moisture aided in successful germination of the seed. Additional acreage may be seeded depending upon additional BLM funding. The BLM provided fuel and labor for the project. WGFD provided machinery, seed and labor.

Cody Region



Cody Region

Habitat efforts within the Cody region focused on improving and managing wildlife habitats throughout the Bighorn Basin that have been degraded by fire, invasive weed species or encroachment of conifers.

On the Yellowtail Wildlife Management Area near Lovell, removal of Russian olive trees continues and efforts are underway to address the effects of a 2013 wildfire. WGFD personnel are also working hard to reduce invasive weed species on Black Mountain southeast of Worland and in the Grass Creek area north of Thermopolis. To benefit elk, mule deer and/or sage grouse, conifer encroachment projects have been undertaken on Heart Mountain north of Cody and Black Mountain north of Schell. Work continues at four other wildlife habitat management areas within the Cody region to enhance crucial elk winter range.

BLM/WGFD Cooperative Prescribed Fire and Habitat Enhancement (Goal 2) - Eric Shorma

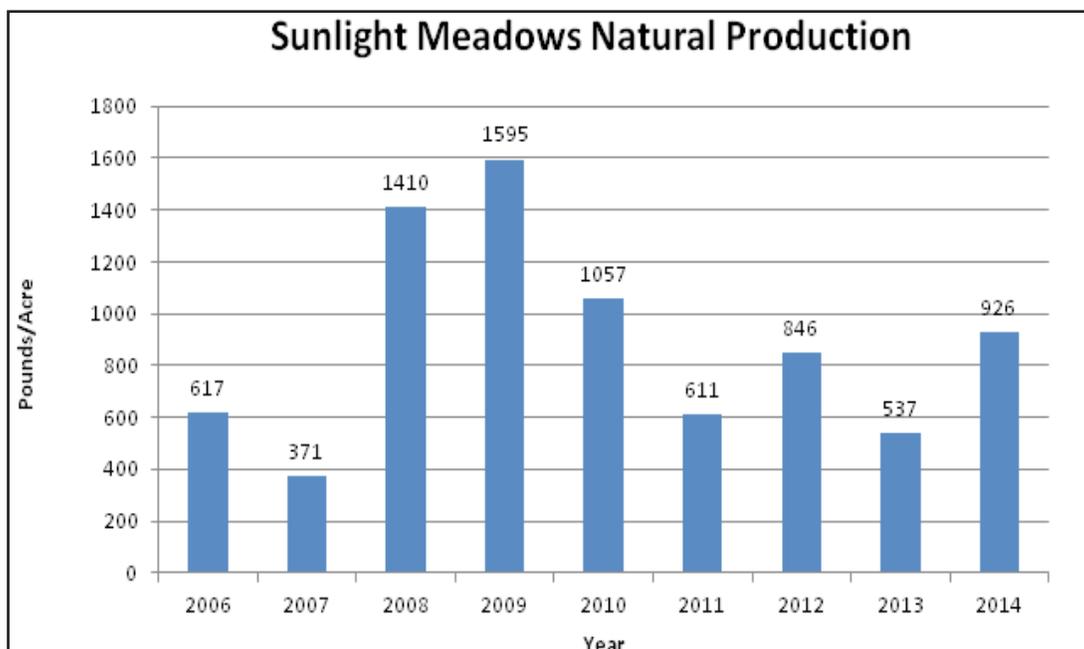
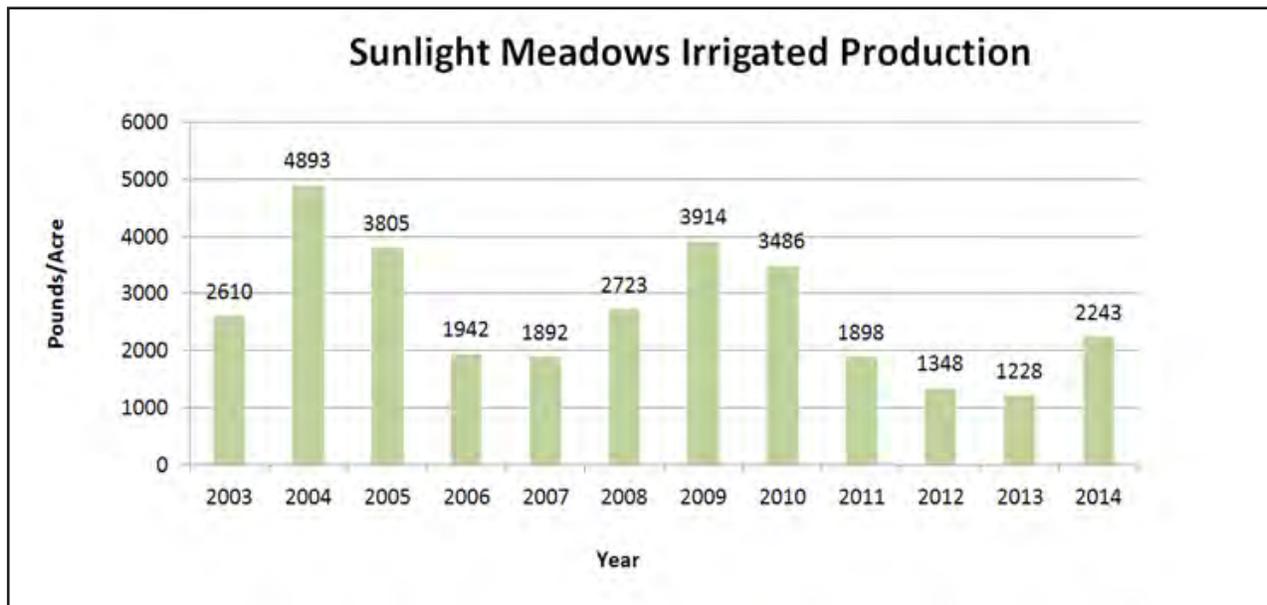
Approximately 600 acres of juniper were treated with prescribed fire in the Little Mountain area near Lovell. The objectives were to remove encroaching junipers from sagebrush communities to improve elk and deer habitat. The burns were conducted by the BLM Cody Field Office with assistance from WGFD and partial funding by the RMEF. The treatments are part of a larger prescribed fire project in the Little Mountain area that began in 1997 and has treated 11,500 acres in total.



Figure 33. *Prescribed fire in the Little Mountain area near Lovell, Wyoming.*

Sunlight WHMA (Goals 2) - Steve Ronne, Craig Swanson, Eric Shorma

Five different test plots were implemented on Sunlight WHMA. Plot sizes ranged from one-half-acre to one acre. The plot sites were mowed and chemically treated three times with Glyphos aquatic to eliminate/reduce smooth brome (*Bromus inermis*). Sainfoin (*Onobrychis viciaefolia*) was planted in a one acre plot, slender wheatgrass (*Agropyron trachycaulum*) and mountain brome were planted in three-fourths acre plots, American vetch (*Vicia americana*) mixed with mountain brome (*Bromus marginatus*) was planted in a one-half acre plot, and alpine fescue (*Festuca brachyphylla*) was planted in a one-half acre plot. This all occurred in 2013 and 2014 as part of a long-term evaluation of the species for viability and establishment to replace areas of smooth brome. Additionally, 240 acres of meadows were irrigated to provide crucial elk winter range, 15 miles of boundary fence were maintained to prevent cattle trespass, and approximately 8 acres of noxious weeds were treated.



Heart Mountain Fence Modification and Aspen Enhancement (Goal 2) -

Jerry Altermatt

Approximately 40 acres of conifer-encroached aspen were treated on The Nature Conservancy's Heart Mountain Ranch north of Cody. The treatment consisted of chainsaw-felling conifers inside and within 80 feet of aspen stands (Figure 34). In addition, herbicide treatments to control houndstongue and other noxious weeds were conducted adjacent to the aspen treatments. The treatments were part of a larger multi-phase project that included over 11 miles of woven-wire and 6-wire fence modification to more wild-life-friendly electric and 3-wire fence on the Heart Mountain Ranch and adjacent E&B Landmark Ranch.



Figure 34. *Before (left) and after (right) aspen treatments on the Heart Mountain Ranch.*

Medicine Lodge WHMA (Goal 2) - Steve Ronne, Craig Swanson, Eric Shorma

Approximately three miles of boundary fence were maintained to eliminate trespass livestock on Medicine Lodge WHMA. The contract farmer replanted 21 acres of alfalfa that was harvested in order to promote regrowth for wildlife. The farmer also irrigated 30 acres from May 1 to October 25th. High intensity/short duration grazing was conducted on 640 acres for 14 days to stimulate plant re-growth.

Yellowtail Area Coordinated Resource Management (Goal 2) - Jerry Altermatt

The Yellowtail Area Coordinated Resource Management (CRM) team continued to manage invasive plants on agency and private lands in the lower Shoshone and Bighorn River bottom lands near Lovell, Wyoming. The CRM consists of the four landowners on the Yellowtail WHMA (National Park Service, WGF, Bureau of Land Management, and Bureau of Reclamation), neighboring private landowners, the Bighorn County Weed and Pest, NRCS, Shoshone Conservation District and other interested parties. The terrestrial habitat biologist serves as chairman of the CRM and has been responsible for project planning and implementation as well as writing and submitting grant applications. With over 2,000 acres of riparian area mechanically and chemically treated to remove Russian olive and salt cedar, the

project is now entering a maintenance phase. This phase consists of herbicide treatments to eliminate re-sprouts or new seedlings of Russian olive and salt cedar in previously treated areas on the Shoshone River. In 2014, 250 acres of Russian olive re-sprouts and seedlings were treated with herbicide using backpack and ATV sprayers. Monitoring of treated areas, predominantly using photopoints, was conducted to determine herbicide effectiveness and vegetation response after treatments (Figure 35).



Figure 35. Russian olive treatment area prior to treatment (left) and two years after treatment (right).



Figure 36. Grazing monitoring site on Sunshine WHMA.

Sunshine WHMA (Goal 1) Steve Ronne, Craig Swanson, Eric Shorma

Grazing monitoring sites were established on Sunshine WHMA to facilitate future data collection (Figure 36). Around 931 AUMs of livestock grazing occurred on the WHMA to stimulate plant re-growth and provide high-quality forage for wildlife. Approximately 15 acres of noxious weeds were sprayed.



Figure 37. *Spraying Canada thistle (left) and planting buffaloberry shrubs (right) in the Big Fork Fire Area.*

Big Fork Wildfire Restoration (Goal 2) - Jerry Altermatt

On April 27, 2013, the Big Fork Fire burned over 1,500 acres on the Yellowtail Area Coordinated Resource Management Area (CRM), including the Yellowtail Wildlife Habitat Management Area and adjacent private lands. Included in the burn area were 752 acres that had been treated between 2009 and 2013 to remove Russian olive. These areas, because of heavy biomass in the form of Russian olive slash, burned with high intensity and prolonged heat, causing severe fire effects. This resulted in high herbaceous plant mortality and extensive areas of bare ground. Noxious weeds including white-top, Russian knapweed, and Canada thistle have proliferated throughout the burn area but especially in areas of highest fire severity. The CRM conducted herbicide treatments on approximately 275 acres to target infestations of Canada thistle and Russian knapweed. The treatments were conducted using backpack and ATV sprayers (Figure 37). Over 800 buffaloberry and redosier dogwood seedlings were planted within the burned area to re-establish shrubs lost in the fire (Figure 37). Buffaloberry seed was collected on the Yellowtail WHMA to provide a local seed source for the contract growing of seedlings in 2015.



Figure 38. *A typical “miss” area that was retreated with a ground application of herbicide.*

Black Mountain Wildfire Restoration (Goal 2) - Jerry Altermatt

A total of 9,535 acres of cheatgrass were aerially sprayed with imazapic herbicide in 2011 and 2012 in response to the 1996 Black Mountain and 2012 Zimmerman Butte wildfires southeast of Worland. In 2014, an evaluation was made to assess the treatments and identify areas where re-treatment was necessary. In late August, a ground herbicide application using ATVs was conducted on 300 acres where control was poor or in areas that were missed in the previous aerial treatments (Figure 38). The advantage of ground application is the ability to use larger volumes of water per acre than is practical with aerial application.

Renner WHMA (Goal 2) - Steve Ronne, Craig Swanson, Eric Shorma

Grazing monitoring sites were established (Figure 38) and nine acres of noxious weeds were treated. The contract farmer fertilized and irrigated 120 acres of grass/alfalfa meadows from May 10 to September 18. There was spot spraying of White top, Canada thistle, and Russian olive around the meadows and in Ziesman Canyon. The Renner Meadows were grazed from May 15 to June 9 and again from October 29 to November 27, with a total of 467 AUMs utilized to stimulate plant re-growth.



Figure 39. Grazing monitoring site on Renner WHMA.

Black Mountain Juniper Treatment (Goal 2) - Jerry Altermatt



Figure 40. Mulching juniper in the Black Mountain area.

Conifers were removed on 637 acres in the Black Mountain area to enhance habitat for elk, mule deer and sage-grouse. Conservation Seeding and Restoration of Kimberly, Idaho, using two skidsteers with mastication heads, accomplished the treatment between July 12 to September 10, 2014 (Figure 40). The project objectives were to 1) remove encroaching juniper (and some Douglas fir) from the project area, 2) restore a natural fire regime, and 3) maintain healthy sagebrush grassland habitat. All conifers, including

juniper and Douglas fir, over one foot in height were mulched where accessible by machine. Conifers were hand-sawn and scattered on approximately 30 acres where machine access was difficult because of steep, rocky slopes. Financial contributors included BLM, Wyoming Sage-grouse Conservation Fund and Rocky Mountain Elk Foundation.

Public Access Areas (Goal 3) - Steve Ronne, Craig Swanson, Eric Shorma

Russian olive trees were treated above and below the Willwood dam encompassing approximately 10 acres. A wide swath of willows were treated to allow future boat ramp development.

Yellowtail WHMA (Goal 1) - Steve Ronne, Craig Swanson, Eric Shorma

On Yellowtail WHMA there are 100 acres of farm fields irrigated for permanent cover (Figure 41). Sainfoin, Millet, Basin Wild Rye, Slender Wheat Grass, Green Needle Grass and Small Burnet were planted for food plots to benefit pheasants and turkeys and to provide cover for hunting.



Figure 41. Farm fields on Yellowtail WHMA.

A contractor rebuilt approximately 1,500 feet of fence and replaced 4 water control structures on Ponds 1 through 4 that were destroyed by the Big Fork Fire, which occurred in 2013.

Photo points were established to monitor the recovery of the areas burned by the fire. A second year of cottonwood tree monitoring was conducted by Rocky Mountain High School Biology students. With assistance from USFS, explosives were used to create two potholes for waterfowl nesting in an area that was dominated by cattails with no open water (Figure 42).



Figure 42. Before blasting (left) and after blasting (right) a cattail wetland on Yellowtail WHMA.

Cottonwood/Grass Creek Watershed Improvement (Goal 2) - Amy Anderson

A CRM/Watershed Improvement District has been in place on Cottonwood/Grass Creek since 2005 within the 270,000 acre watershed. In August of 2007, work began to control invading tamarisk and Russian olive on Cottonwood Creek. A Weed Management Area has been in effect on Grass Creek since 2005, and is highly effective at finding and treating infestations of all weed species on the Grass Creek portion of the watershed. Around 1,930 acres of Cottonwood Creek have been treated to remove tamarisk and Russian olive to date and 100% of these acres received follow-up chemical treatments in 2014 utilizing WWNRT and Weed and Pest funds.

Production/Utilization Surveys (Goal 2) - Jerry Altermatt

Regional wildlife personnel collected production/utilization data at ten sagebrush transects during 2014. Annual leader production was above the 11-year average, reflecting precipitation that was generally above average throughout the Bighorn Basin in 2014 (Figure 43). Utilization at transects in spring 2014 was generally below average and well below the 35% utilization level considered to be the threshold for over-use (Figure 44). Light utilization may indicate that populations are in balance with the amount of winter forage, but may also reflect the fact that the Cody Region has experienced relatively mild winters with big game distributed more widely over winter ranges rather than concentrating animals on crucial winter ranges where utilization studies are located.

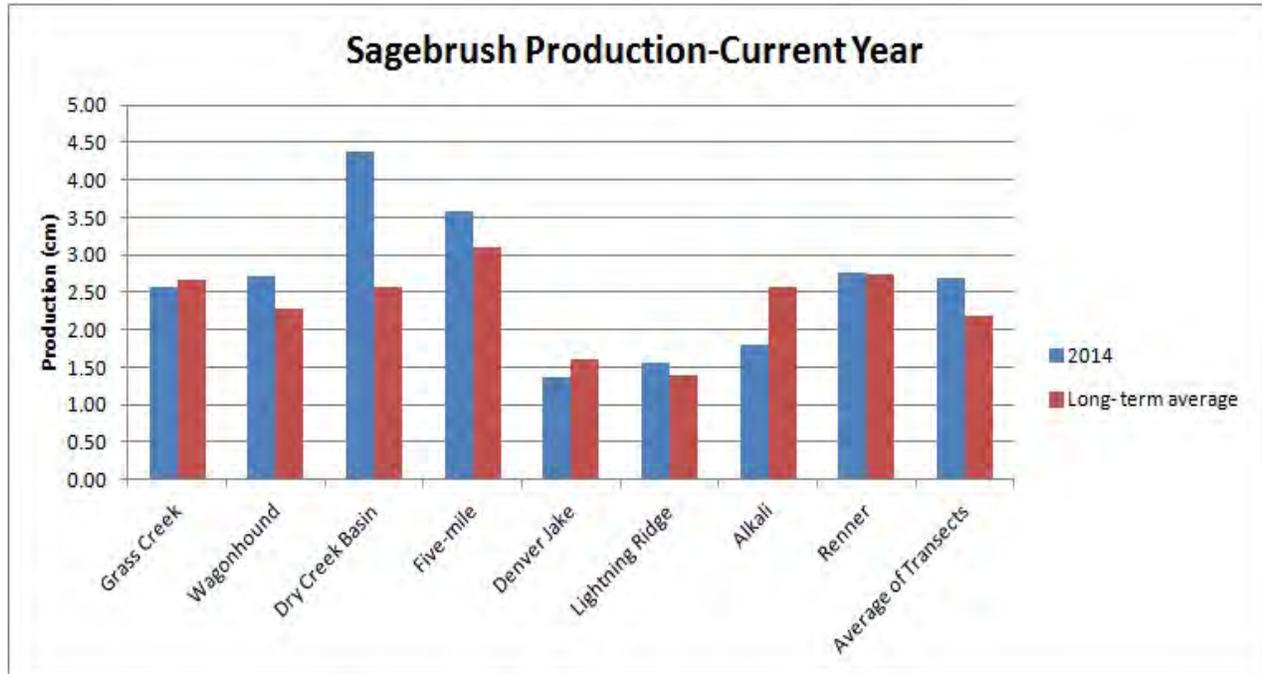


Figure 43. Annual production of sagebrush at eight locations.

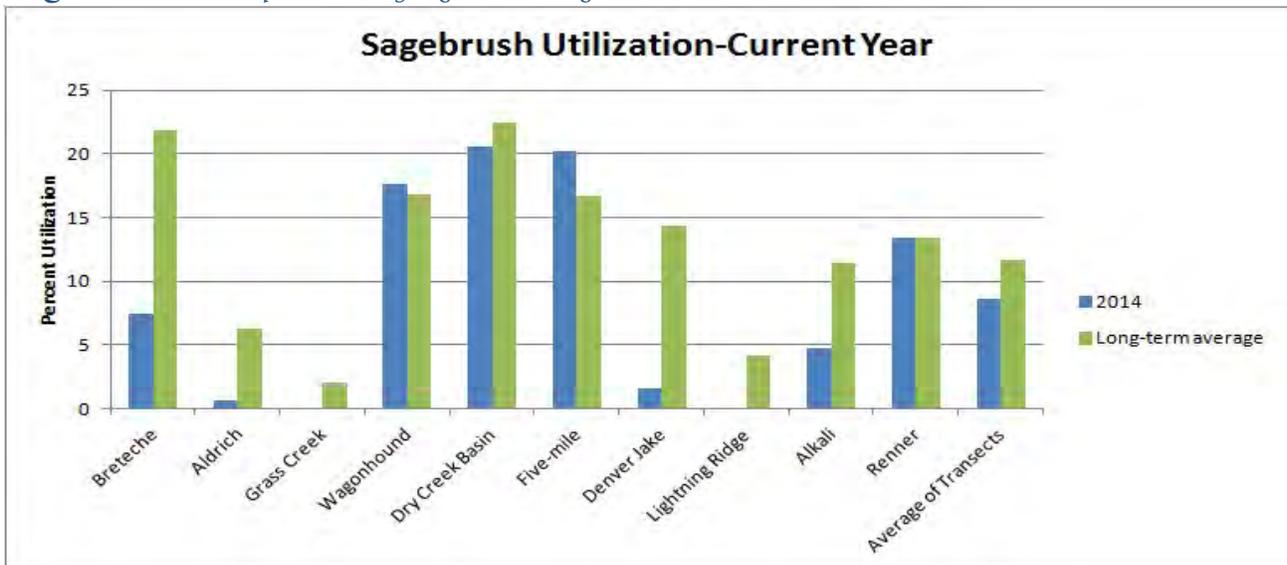


Figure 44. Utilization of sagebrush expressed as percent annual leaders browsed at ten locations.

Herbaceous production and utilization were measured at seven and four sites respectively on the Absaroka Front in areas where monitoring elk use is a priority. Production was above average, reflecting above average precipitation in these areas in 2014 (Figure 45). Utilization by elk on winter ranges continues to be high in Sunlight Basin, exceeding 70% at three sites (Figure 46).

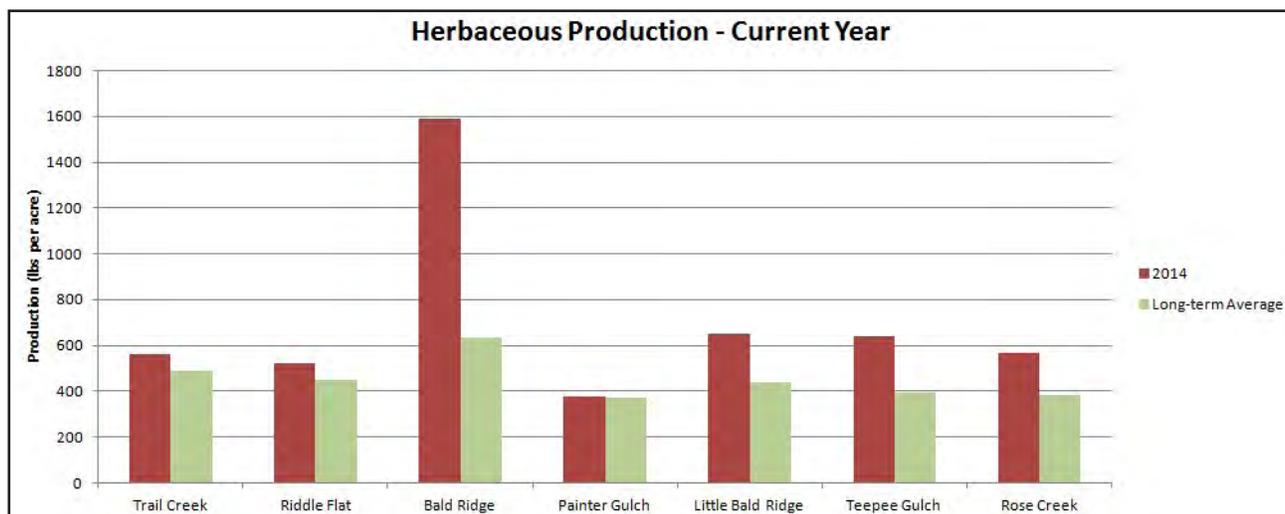


Figure 45. Annual production of herbaceous vegetation at six locations.

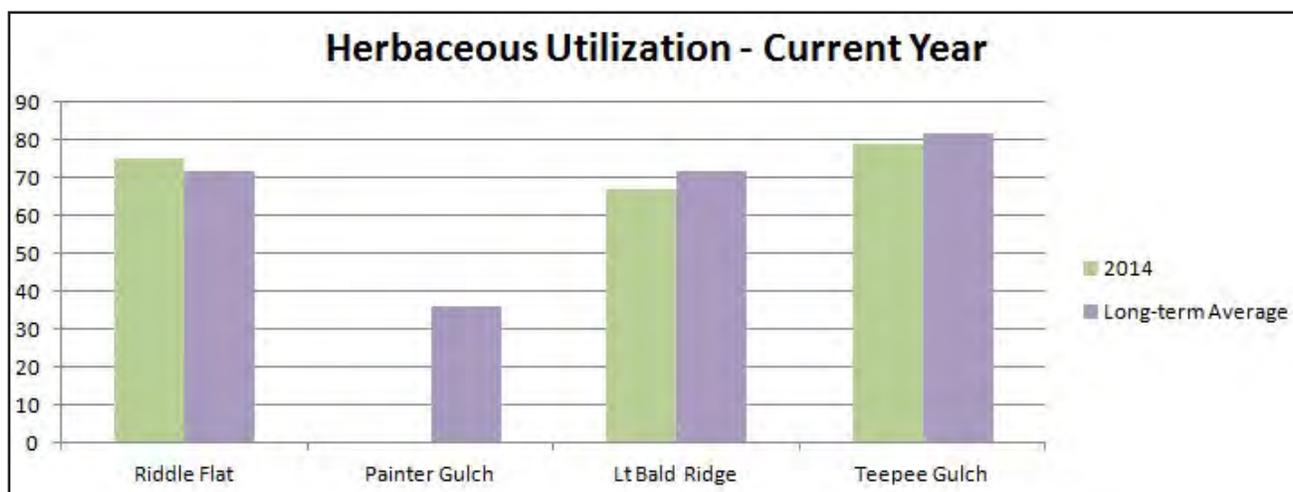
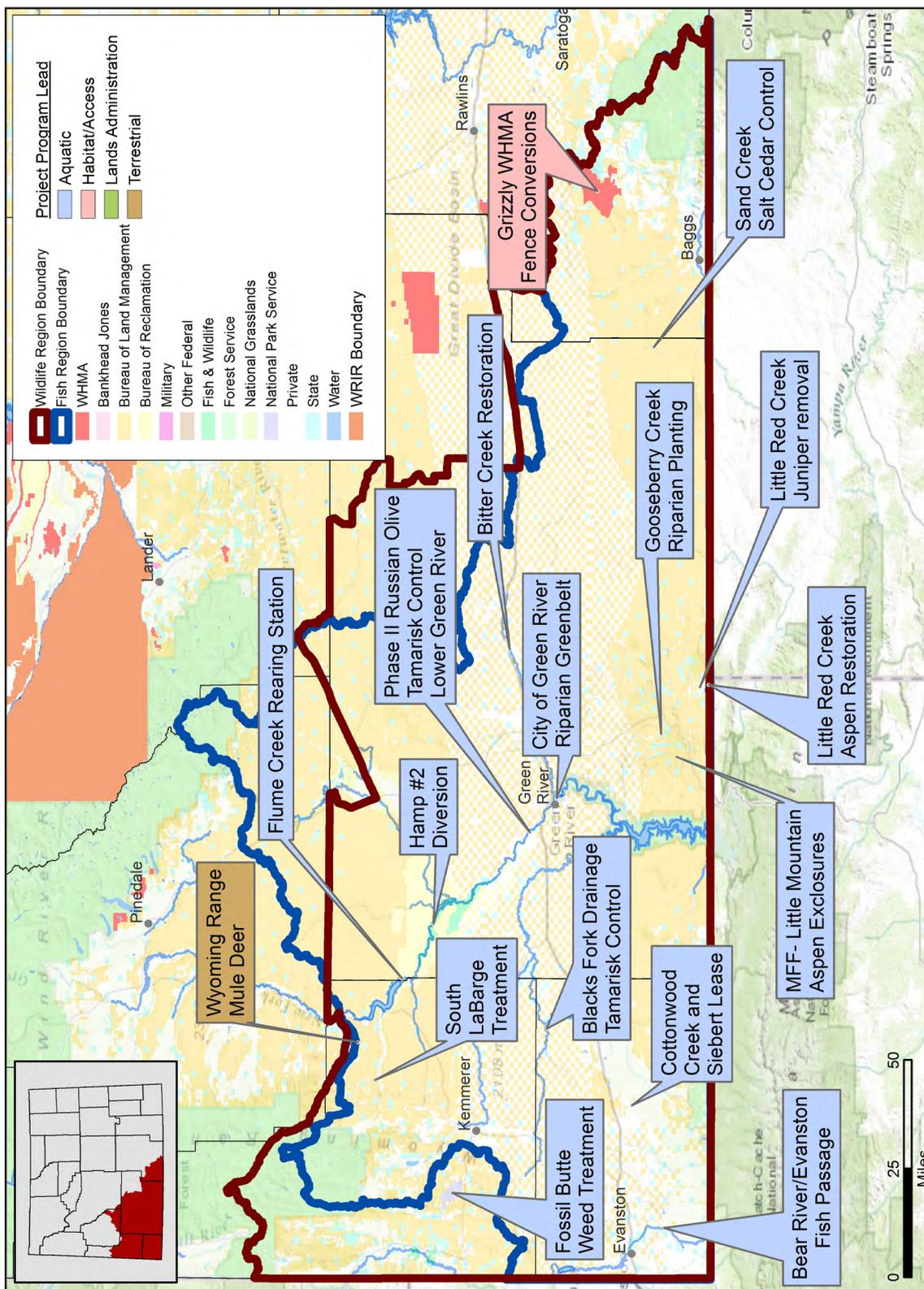


Figure 46. Utilization of herbaceous vegetation at six locations.

Green River Region



Green River Region

Habitat improvement projects in the Green River Region in 2014 focused on control of invasive species, improvement of riparian and aspen communities, maintaining and improving fish passage and spawning areas, spring fencing, and enhancing ungulate migration through fence modification. Areas of focus were driven by priorities defined in the Strategic Habitat Plan (SHP), the Wyoming Range Mule Deer Initiative, and plans developed by the Southwest and South-Central Sage-Grouse Local Working Groups. Project partnership development was also of prime interest for the region, including NGOs, the Wyoming Landscape Conservation Initiative (WLCI), county commissioners and conservation districts, and other federal or state agencies.

Another major focal area included planning for continuing and future projects and monitoring. Monitoring activities focused on determining aspen stand, mountain shrub, and riparian habitat health. Additionally, a catastrophic die-off of Wyoming big sagebrush throughout a large portion of the region led to a monitoring effort to determine the extent of the impact.

The final area focused on habitats and how terrestrial and aquatic wildlife species use these habitats. This included education programs designed specifically to improve the public's understanding and awareness of the importance of habitat. These programs included a wide variety of audiences and venues, including the Green River Riverfest, an annual local celebration, and a multi-year habitat data collection program with Green River High School students. Additionally, regional personnel provided the opportunity for public involvement in habitat related research projects through the use of deer capture and cameras, such as those deployed in Baggs and new ones for the Red Desert to Hoback Mule Deer Migration Route.

V- Cross Public Access Area (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Breanne Thiel



V- Cross Public Access Area (PAA) had to have road improvements to prevent further resource damage. The road bed was prepared, culverts installed and 700 tons of road base applied to the road surface. V- Cross PAA is primarily used for big game hunting.

Cottonwood Creek Wetlands (Goal 2) - WLCI, Jim Wasseen



Figure 47. *Enhanced wetland, July 2014 (photograph courtesy of U.S. Fish and Wildlife Service).*

This project is designed to increase and improve existing wetland habitat for a variety of wetland-dependent wildlife and terrestrial game and non-game wildlife species by constructing and repairing dikes, water control structures, and a reservoir on flood-irrigated land, within the Black's Fork drainage. Due to an unanticipated change in engineering firms, the repairs to Cottonwood Reservoir were not completed this year. However, monitoring of dikes and water control structures that have created or enhanced 16.3 wetland acres did occur (Figure 47). These structures were completed during 2012 and 2013.

Fossil Butte National Monument Invasive Plant Control (Goal 2) - WLCI, Jim Wasseen

The objective of this project is to increase wildlife forage by reducing invasive plant populations. In 2014, Fossil Butte National Monument (FBNM) used WLCI funds to hire an intern for three months to mechanically and chemically remove weeds from within the park. The intern hand pulled, applied herbicides, or mowed 13 weed species (flixweed, cheatgrass, henbane, yellow sweet clover, musk thistle, Canada thistle, black henbane, spotted knapweed, halogeton, hounds tongue, field bindweed, Russian knapweed, and Russian thistle) on more than 26 acres. The FBNM used a variety of methods to monitor weed species within the park during 2014. The FBNM used the National Park Services' National Inventory and Monitoring Team to continue monitoring routes that were established in 2011. The FBNM utilized their own Weed Team for treating weeds and identifying areas within the park infested with invasive weed species. The FBNM staff also conducted ocular monitoring.

Blacks Fork Drainage Invasive Species Treatment (Goal 2) - WLCI, Jim Wasseen



Figure 48. *Treated tamarisk along banks of Muddy Creek (photograph courtesy of Uinta County Weed and Pest District)*

This is a long-term project to minimize tamarisk from encroaching on the stream banks, preserve existing riparian habitat, and to improve native vegetation capacities. The area treated for invasive species and tamarisk consists of Uinta County and parts of Lincoln and Sweetwater Counties, along portions of the Black's Fork River, and Dry and Cottonwood Creeks. During 2014, the Uinta County Weed and Pest in collaboration with a private contractor treated 85 acres of tamarisk within a 3,803-acre area (Figure 48), and treated 141 acres of perennial pepperweed, Canada thistle, Musk thistle, Black henbane and Hoary cress within 1,775 acres. Unfor-

tunately, previously planted trees and shrubs on the Black's Fork were removed by ice jams during the winter of 2013-2014. Currently, the survival rate of the remaining trees and shrubs are approximately 20% with buffaloberry being the most prevalent species.

BQ Pole Top Fence (pole replacement) on the Rock Creek Allotment (Goal 2) - WLCI, Jim Wasseen

The BLM Kemmerer Field Office purchased 495 (16-foot) poles and replaced approximately 1.5 miles of pole top fence on the Rock Creek Allotment between the Beaver Creek pasture and Antelope pasture. The old poles had been re-attached several times and were rotted to the point that new poles were needed to make this fence functional. Permittees provided the labor to install the new pole tops. Pole replacement will help control livestock and also allow for free movement of wildlife species on their migration routes.

Raymond Mountain Invasive Weed Control (Goal 2) - WLCI, Jim Wasseen

Raymond Mountain is a highly visible area at the junction of U.S. Highway 30 and State Highway 89 in Lincoln County. This area is important winter and summer range for mule deer and elk and important to livestock producers for forage use. Dalmation Toadflax and Dyers Woad are problem species encroaching upon the area. With the partnership of Lincoln County Weed and Pest, the BLM, and local landowners a comprehensive weed control plan was created that has enhanced this area for the past several years. WLCI has been an important partner in helping control these invasive plants on the BLM-administered portion. The Lincoln County Weed and Pest District (LCWPD), through the use of aerial herbicide applications, has been able to reach many acres that are inaccessible by other methods of weed control. In 2014 the LCWPD again contracted with an aerial applicator to treat 443 acres on Raymond Mountain and the Hawkins Creek drainage, and monitored over 500 acres.

City of Green River Riparian Greenbelt Russian olive & Tamarisk Control (Goal 2) - Kevin Spence and Jim Wasseen

The City of Green River Parks and Recreation Department used grant funding from WWNRT, WLCI, and the USFWS Private Land Habitat Partners program during 2012 to complete mechanical removal of Russian olive and tamarisk on 586 acres of riparian habitat along 5 miles of river between Expedition Island and the Scott's Bottom area. As expected, a large number of young invasive Russian olive and saltcedar re-sprouts were observed by the end of the growing season in 2012 following the mechanical control treatment. The City of Green River Parks and Recreation Department hired a contractor to assist them with the initial follow-up basal bark and stump cut chemical treatments of re-sprouts during the fall of 2013 within the original 586 acres of riparian habitat treated mechanically during 2012. Additional sites with Russian olive and tamarisk growth were detected during 2014 along the 5 mile reach of river associated with town. These sites were either specific islands or sites missed during the initial mechanical and follow-up chemical treatments. The Green River Parks and Recreation Department were granted \$15,000 from WLCI in 2014 for follow-up control treatments and native tree plantings. Chemical control treatments were planned for late fall, however early winter weather conditions prevented treatments and the work was postponed until 2015.



Figure 49. *Green River High School students survey woody riparian vegetation along the river greenbelt to evaluate results of Russian olive and tamarisk control treatments.*

Technical assistance was provided by the Green River High School (GRHS) college prep biology class with monitoring woody riparian vegetation along the river greenbelt area during September. The City of Green River in cooperation with WLCI and other partners have been conducting Russian olive and tamarisk control efforts along the greenbelt area since 2012. Monitoring plots were established for GRHS biology students to survey and evaluate the results and effectiveness of the invasive vegetation control efforts (Figure 49), and provide the Green River Parks and Recreation Department with data regarding the possible need for follow-up control of Russian olive and tamarisk re-sprouts. The monitoring activity provided students with an opportunity to apply vegetation survey and evaluation skills while learning about native riparian vegetation communities and the threats of invasive plant species.

Little Red Creek Watershed Improvements (Goal 2) - Kevin Spence



Figure 50. Before (left) and after (right) comparison of juniper removal from a narrowleaf cottonwood gallery along upper Little Red Creek.

During July, a crew of regional WGFD and BLM workers cut several encroaching mature juniper trees from the understory of a 3-4 acre cottonwood gallery located on private lands along upper Little Red Creek (Figure 50). The goal was to promote and maintain healthy cottonwood habitat along the stream for the benefit of several wildlife species. Removal of the junipers is expected to reduce competition and promote more riparian ground water availability for young cottonwood tree survival. The cut juniper tree biomass was used to fashion woody debris barriers around cottonwood regeneration to discourage over-browsing by big game and allow the young trees to grow vertically and mature (Figure 51).

Past attempts by BLM fire crews to successfully implement prescribed burn treatments in a large conifer encroached aspen stand located near the tri-state site in upper Little Red Creek have fallen short of goals for restoring healthy aspen habitat and improving watershed function. One reason treatment attempts have not met project goals was the inherent difficulty in conducting a prescribed burn that



Figure 51. Cut juniper trees fashioned into a debris barrier around young cottonwood trees along upper Little Red Creek to discourage browsing and promote vertical growth.

was both intense enough to be effective yet controlled enough to prevent it from crossing the jurisdictional boundary of the Wyoming-Utah State line. Collaborative efforts with Utah Division of Wildlife Resources (DWR), BLM Rock Springs and Vernal Field Offices, and Wyoming State Forestry Division occurred during 2014 to expand the original project across the Utah state line and include treatment for the entire conifer encroached aspen stand. The effort has now increased from 1,000 acres to 1,262 acres in treatment size, and includes multiple phases of mechanical cutting and prescribed burning to meet aspen restoration goals. Mechanical treatment phases are expected to begin during 2015.

Bitter Creek Drop Structure (Goal 2) - WLCI, Jim Wasseen

This project is intended to replace a failing drop structure on Bitter Creek, located approximately 18 miles east of Rock Springs, Wyoming. The drop structure has restricted a 20-foot headcut from moving up the watershed for the past 40 years and protected the Flannelmouth Sucker (a native fish Species of Greatest Conservation Need) from cross breeding with other sucker species, maintaining a genetically pure population. In 2014, the Sweetwater County Board of Commissioners and Anadarko (the property owner) entered into negotiations. The negotiations resulted in Anadarko donating 20 acres to Sweetwater County. The land exchange will allow the project to move forward.

Phase II Russian Olive/Tamarisk Control along the Lower Green River Riparian Corridor (Goal 2) - Kevin Spence and Jim Wasseen

The WGFD collaborated with the Sweetwater County Weed and Pest District to obtain \$56,128 of WWNRT and \$39,128 of WLCI grant funding to initiate the Phase II Russian olive and tamarisk control treatments along the lower Green River. The Phase II effort was a result of a Teton Science School inventory completed in 2012 of the Green River riparian corridor between the southern boundary of Seedskaadee National Wildlife Refuge and Interstate 80, and that portion of the Flaming Gorge National Recreation Area between Scott's Bottom and Davis Bottom. In January, Sweetwater County Weed and Pest District hired Field Services and Weed Control LLC to complete the initial stump-cut and basil bark chemical treatments to control Russian olive and tamarisk along 28 river miles and within about 9,000 acres of riparian habitat where landowners were willing participants.

Phase II efforts to control Russian olive and tamarisk along the lower Green River corridor continued again in early August. WGFD biologists took advantage of the unusually high late season river flows and the WGFD's jet boat to shuttle contracted crews and equipment to treat Russian olive/tamarisk on



Figure 52. Crews utilize a jet boat to access and treat Russian olive and tamarisk during the Phase II Lower Green River riparian corridor control effort.

river islands, hard to reach river bank locations below cliff bands, and areas that were covered with ice sheets when control treatments began in January (Figure 52). This round of control treatments involved stump cut/herbicide spraying and foliar herbicide applications. Treatments focused on the Green River reaches between Pioneer Trails Picnic Grounds and the I-80 crossing, and Scott's Bottom to Davis Bottoms near the Flaming Gorge Reservoir inflow area. A total of 19 islands and 16 hard to reach locations were treated.

Preventing the gradual invasion of Russian olive/tamarisk from becoming a vegetative monoculture along this reach of the lower Green River system will be extremely important for future populations of fish and wildlife. Without projects such as this one, Russian olive and tamarisk invasion threatens to disrupt riparian ecosystem processes, including degradation or possible elimination of essential life stage habitat needs for many terrestrial and aquatic wildlife species.

Sagebrush Mortality Investigations (Goal 5) -

Jill Randall, Mark Zornes, Kevin Spence, Tom Christiansen

Several reports of dying sagebrush over the past several years coincide with a marked increase in sagebrush death occurring from 2010 to 2014. Areas of die-off were observed in the Farson area in 2010, and around Muddy Creek and Slate Creek in 2012. Local biologists noticed extensive sagebrush mortality in 2014 in the vicinity of Fontenelle Reservoir (Figure 53). A multi-agency group convened for a field tour in July 2014 to observe and discuss the event in southwestern Wyoming. The two-day event raised concern over extensive changes to the vegetation community and implications to wildlife and range resources, and prompted several additional days of work to investigate field conditions.



Figure 53. Sagebrush mortality in Eighteen Mile Canyon (left) and Sagebrush mortality observed near Shute Creek turn off (right).

Several causal factors have been discussed amongst the group comprised of experts from WGFD, NRCS, University of Wyoming, USGS, BLM, USFS, Sublette County Weed and Pest, Wyoming Natural Diversity Database, Colorado Division of Wildlife and other private consultants. Future monitoring will be required to understand changes to the sagebrush communities as well as impacts to sage grouse, pronghorn and other sagebrush obligates. The cause is not determined at this time but likely includes impacts from the 2012 drought in combination with other factors such as changes in soil chemistry, herbivory, old age of sagebrush and possibly insect defoliation. At this time, it is undetermined what future management actions, if any, will be taken across this affected landscape. Managers will have further discussions after data is collected and analyzed in 2015. Potential options include; hands-off management thereby letting the ecological processes occur naturally, managing livestock grazing and wildlife use for recovery, and facilitating recovery with a combination of range seeding and livestock management.

Native Plants for Reclamation and Restoration: Seed Collection and Germination Testing to Determine Optimal Planting Times (Goal 2) – WLCI, Jim Wasseen

This project is designed to study dormancy and germination characteristics of wild-collected and cultivated seeds of common species used in ecological restoration of Wyoming grass and shrublands. Laboratory-based germination and seed burial studies with wild-collected and cultivated seeds were initiated during 2014. These trial studies will conclude in 2015. Future plans include coordination with two landowners in Carbon County where the majority of seed collections took place. Wild collections will be compared and contrasted with cultivated ones in germination studies.

Anadarko Fence Modifications (Goal 5) - Mark Zornes and Jill Randall



Figure 54. *Volunteers team up with agency personnel to remove a net-wire fence on Anadarko Corp. land and improve wildlife movement between winter and summer ranges.*

Anadarko Corporation, Uinta Development Division (AC-UDD) recently replaced a fence that has long been identified through radio-marked animals as a barrier to pronghorn movement in Hunt Area 93. The fence is located (in part) on the jurisdictional boundary between the Rock Springs and Kemmerer BLM Field Offices. The WGFD provided funding to AC-UDD to modify the fence from a net-wire fence to a 4-strand wildlife friendly design. The original project began in 2013, and approximately 8 miles of fence was modified by AC-UDD. In 2014, the FMC Corporation replaced approximately two miles of this same fence on the southern end, and the aforementioned funds were provided to AC-UDD to convert another 8+miles. Pronghorn immediately redistributed in response to this project, reopening a large area for seasonal use, and facilitating migration from winter to summer ranges. In October, an additional 2 miles were removed during a work day that included representatives from the WGFD, NRCS, Muley Fanatics Foundation, Lincoln County Conservation District, Kemmerer Alternative High School, and grazing lessees (Figure 54).



Viva Naughton Reservoir PAA (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Breanne Thiel

Viva Naughton Reservoir PAA had day use and overnight campground construction completed. Roads were graveled and boulder barriers placed to prevent resource damage. Campsite construction was completed by the WGFD in cooperation with PacifiCorp and the town of Kemmerer.

Red Desert to Hoback Mule Deer Assessment (Goal 2) - WLCI, Jim Wasseen

Western Wyoming supports some of the largest and most diverse ungulate populations in North America. The health and abundance of these herds is largely dependent on their ability to seasonally migrate from low-elevation winter ranges to high-elevation summer ranges, where they can accumulate the fat reserves needed to successfully reproduce and survive the harsh Wyoming winters. The longest mule deer migration ever recorded (and 2nd longest land migration in North America) was discovered where deer travel a one-way distance of 150 miles from the Red Desert to the Hoback (RD2H). This newly discovered migration originates from sagebrush basins in the Red Desert and extends 40 miles north across the desert to the east side of the Wind River Range. From there, mule deer merge with several thousand other deer and travel a narrow corridor along the base of the Wind River Range for 60 miles, before crossing the upper Green River Basin and moving another 30-50 miles to their respective summer ranges in the Hoback Basin. An estimated 500 mule deer start the migration in the Red Desert (Figure 55), but >4,000 mule deer use the route from the Wind River Range north.



Figure 55. *Muley Fanatics Foundation volunteers help to release a collared mule deer doe in the Red Desert near Superior, WY (photograph courtesy of the University of Wyoming).*

Spatially-explicit information will be compiled through a “conservation assessment” synthesis document includes a combination of fieldwork, aerial survey, data analysis, and mapping. The completed conservation assessment will be produced by the Wyoming Migration Initiative team and will include detailed maps, images, GIS data, threat information, and potential conservation actions. The RD2H migration conservation assessment was begun in May 2013 and was completed in April 2014. The RD2H threat assessment will be used as a toolbox for conserving this migration route by providing the tools to prioritize conservation work, and WGFD believes this process may serve as a model for how to provide effective conservation for other migration routes in Wyoming and elsewhere.

The Wyoming Migration Initiative unveiled the Red Desert To Hoback Mule Deer Migration Assessment in April of 2014. This effort resulted in a 56-page document which details the entire 150+ mile migration route of deer that winter to the east of Rock Springs and summer in the high country of the Hoback Basin. Researchers mapped the entire migration route, inventoried fences, documented land ownership, identified stopover areas and determined bottlenecks and areas which restrict mule deer migration or could impede their migration in the future. In addition to the unveiling of the migration, researchers collared an additional 18 deer in March from this herd for continued monitoring. Two of these animals carry satellite collars, which allow real-time tracking of individuals, and have shown at least a portion of this long-distance migratory herd has been captured. Ten camera traps were placed in strategic places along the migration route. The goal is to determine whether remote camera traps would be able to capture timing, duration and density of mule deer migrating through this route. If successful, this technique could be utilized by wildlife managers to take proactive management techniques during the migratory time period. A specific example would be to inform managers when they might open an impassable fence crossing for a two to three week time period to facilitate migration.

Sand Creek Saltcedar Control (Goal 2) - WLCI, Jim Wasseen

The Sand Creek Saltcedar control project expanded in 2014 to include treating approximately 65 miles of stream bottom and all infested reservoirs/sites in the block BLM-administered land portions of the Colorado River Watershed. Treatment consists of ground application of herbicide to cut saltcedar stalks. This area is home to mule deer, elk, antelope, greater sage-grouse and other wildlife species. The headwaters contain an abundance of sensitive species in the lower tributaries. The project directly improves water quantity, erosion and sedimentation, and salt loading into the Little Snake River, a tributary to the Colorado River. The project area was expanded to include all tributaries of Sand Creek and Muddy Creek, as well as all incidental saltcedar found in the southwest portion of the BLM Rawlins Field Office. Chemical treatments, inventory, and monitoring were conducted on state, federal, and private lands from September through October 2014. Past treatments reduced infestations with approximately 98% kill rate. In total, 24 miles of stream bottom/floodplain were monitored and re-treated when necessary, along with 170 reservoirs/sites.

Sibert Ecosystems Services (Goal 2) - WLCI, Jim Wasseen

The primary objective of this project, located in the Black's Fork drainage, is to implement a five-year contract for ecosystem services (habitat improvements) on private lands to enrich native vegetation and wetland conditions. A collaborative effort between the landowner and a multiagency team resulted in habitat improvements and the design and implementation of monitoring objectives aimed at improving range condition for livestock and wildlife. Accomplishments during 2014 (year two of five) included the control of invasive weed species and reduced stocking rates. Invasive plants were controlled with herbicides and mechanical removal. Additional forage for big-game was accomplished by reducing stocking rates and leaving 218 AUMs unused for half of the grazing season. The landowner is also working with the WGFD to restrict human activities on his lands to reduce stress on wildlife during winter. The project area is located within crucial winter range and migration corridors for mule deer and elk. In addition to providing additional forage and improved range conditions, WLCI also benefits from this project by gaining the knowledge and experience on the best approaches to implement ecosystem services with on-the-ground habitat improvements that demonstrate outcomes that may expand this tool to a watershed level (landscape scale) in the future.



Figure 56. *Trout Unlimited Green River Project Coordinator Nick Walrath leads a crew of BLM and WGFD workers in planting native riparian trees and shrubs along Gooseberry Creek.*



Figure 57. *BLM employees Dennis Doncaster and the late John Henderson install a solar powered sprinkler system to water planted trees and shrubs along Gooseberry Creek.*

Support for Conservation Partner Projects (Goal 5) - Kevin Spence

Efforts to assist with Trout Unlimited and the Muley Fanatic Foundation-led activities continued through the year. During May, a crew of regional WGFD and BLM workers assisted the Trout Unlimited Green River Project Coordinator on planting native trees and shrubs in the riparian area along Gooseberry Creek where fish passage improvements were installed in 2012 and enclosed by steel jack fences erected in 2013 by TU and Muley Fanatic Foundation. Several potted and bare root aspen, narrowleaf cottonwood, coyote willow, currant, and redosier dogwood plants and trees purchased from the Sweetwater County Conservation District were planted to expedite recovery of the riparian zone previously disturbed by the installation of fish passage structures (Figure 56). Synthetic ventilated tree protectors were used to discourage ungulate browsing to several of the planted aspen and cottonwood trees. Trout Unlimited obtained a temporary water right for Gooseberry Creek. This facilitated the use of a solar powered pump and sprinkler set on a timer to water the planted trees and shrubs through the summer months (Figure 57).

During October, the Green River Habitat Biologist participated on a tour of the Little Mountain area with representatives of the Muley Fanatic Foundation, Wyoming Wildlife Federation, Trout Unlimited, and 4 of the 5 Sweetwater County Commissioners. The tour was organized by the Greater Little Mountain Coalition and provided an opportunity for commissioners to experience and learn more about the valuable wildlife resources of the area, observe some of the ongoing habitat restoration efforts, and discuss the need for conserving the area.

Several WGFD biologists participated in the River Festival event held in the City of Green River during August. The River Festival is an annual event produced by the Green River Chamber of Commerce. The event is held at Expedition Island, and includes games and entertainment for the community. Trout Unlimited worked with event organizers to promote public awareness about the ecological aspects of the Green River during the festival by expanding the event during 2014 to include a river walk where participants could visit stations along the greenbelt to learn about fisheries, stream and riparian habitats,

and terrestrial wildlife resources. The regional aquatic habitat biologist (AHAB) participated at a river walk station along with Green River Parks and Recreation, Wyoming Wildlife and Natural Resources Trust, and Sweetwater County Conservation District representatives, where festival goers learned about efforts to control Russian olive and tamarisk along the river corridor, the ecological importance of native riparian plant communities. Additionally, participants were able to plant native trees along the riparian greenbelt (Figure 58).



Figure 58. *Green River Festival participants plant native trees along the riparian greenbelt and learn about invasive tree species control efforts.*

Technical assistance was provided to the Muley Fanatic Foundation in planning and developing a steel jack fencing project to protect aspen regeneration from excessive browsing at select locations on Little Mountain. The Little Mountain landscape supports some of the most ecologically diverse wildlife habitats found in Southwest Wyoming. The top of the mountain itself literally is an oasis in the high desert ecosystem exhibiting montane habitat types of mixed mountain shrubs, aspen, riparian, and conifer that support numerous species of terrestrial and aquatic wildlife. Summer concentrations of ungulates in Little Mountain aspen stands result in excessive browsing of young aspen regeneration. Browsing impacts to aspen suckers at many locations impede vertical growth, and some sites exhibit browsing severe enough to cause retrogression and death of aspen suckers. Ungulate browsing not only limits vertical growth, but also weakens vigor and subjects aspen regeneration to losses from disease and insects. The cumulative effects of ungulate browsing likely are preventing enough young aspen trees from growing to maturity and being able to replace older trees in a stand when they die, and ultimately reducing aspen habitat on the Little Mountain landscape. The project's intent is to use portable fencing to exclude most ungulate use at select sites and encourage unimpeded vertical growth of aspen regeneration for stand replacement. A WLCI funding proposal was prepared and approved for half of the cost for the steel jack fencing. Sweetwater County Conservation District has also approved funds for the effort. The regional AHAB intends to pursue additional cost share funding in early 2015, so that project implementation may begin later in the year.

Flume Creek Rearing Station Channel Maintenance (Goal 3) - Anna Senecal

Flume Creek is a small, spring tributary to the Green River that enters a Green River side channel immediately downstream of Fontenelle Dam. The creek feeds directly into a rearing station that was brought online in the 1990's to supplement the state's kokanee salmon stocks. The station's doors shut shortly thereafter due to declining numbers of spawning fish as a result of prolonged drought and increasing water temperatures. The

lower Green River kokanee spawn occurs in two waves: an early and a late run. State stocks have historically consisted predominantly of early run fish. An attempt is being made to revive a late run stock that spawns later in the fall when water temperatures are cooler and percent success of egg take and rearing is likely to be higher. Flume Creek is currently too wide,



Figure 59. *Flume Creek project area and design elements.*

shallow and warm to safely and reliably allow adult kokanee entrance into the rearing station. Some channel maintenance of the spring creek directly downstream of the rearing facility is necessary to encourage spawning fish to return to the station. These improvements include narrowing and deepening the stream to maintain suitable flows and temperatures as well as protecting fish running from the Green River to the rearing station from predators. Two mainstem barbs are also proposed to redirect the Green River, reducing back eddy scour and deposition at the mouth of Flume Creek (Figure 59, Figure 60). Stream improvements are scheduled to take place the spring of 2015 pending permitting.

Figure 60. *Flume Creek where it enters the Green River side channel. A wide, flat plug of sediment has developed at the creek's mouth and impedes upstream movement of kokanee.*



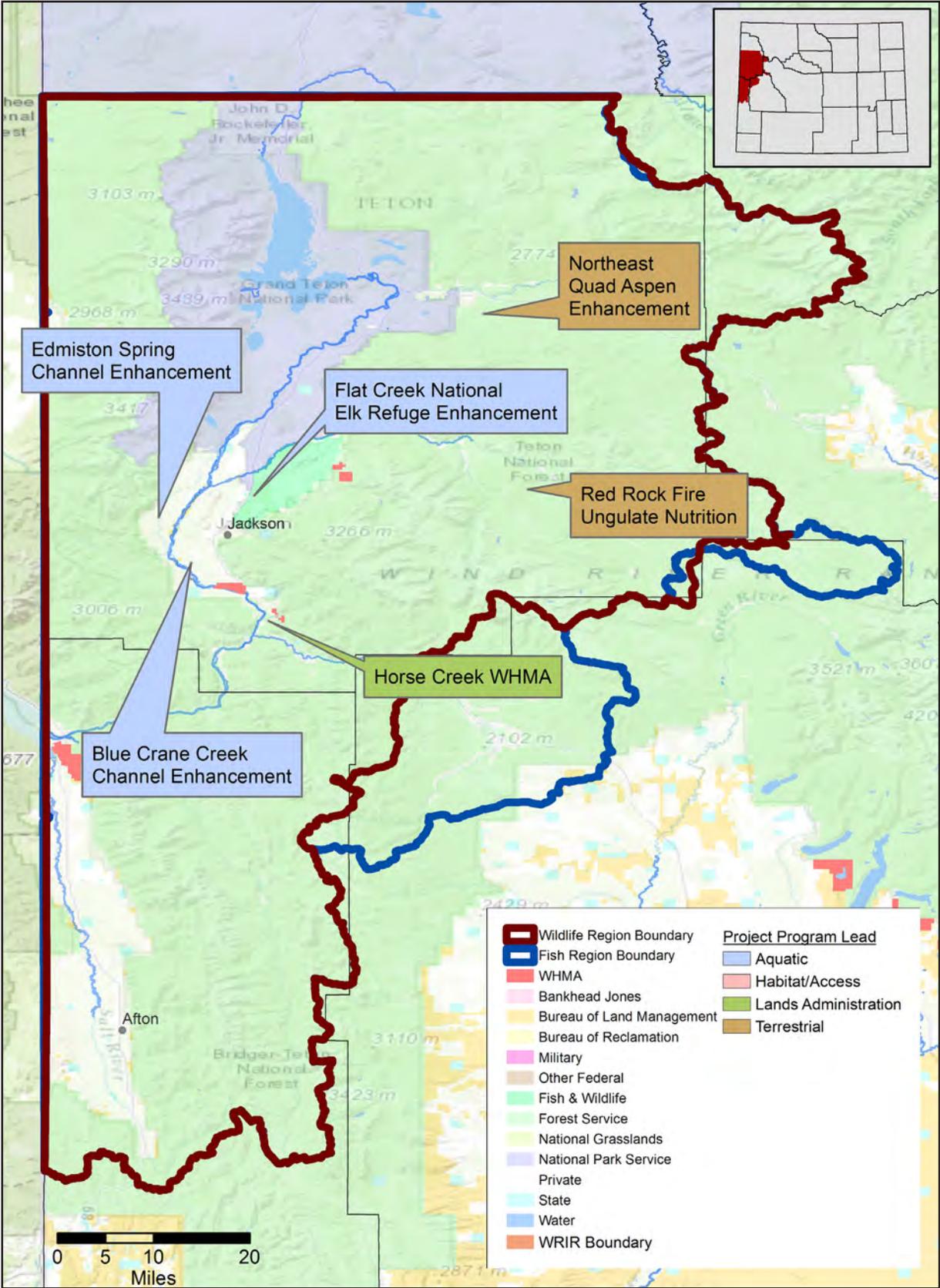
Red Rim – Grizzly Wildlife Habitat Management Area Improvements (Goal 2) - WLCI, Jim Wasseen

The BLM and WGFD worked together to convert up to 15 miles of woven-wire fence to 4-strand wildlife friendly fence standards within the Upper Muddy Creek/Red-Rim Grizzly Wildlife Habitat Management Area (WHMA). Fence conversion locations were established by mapping mule deer migration paths from the Atlantic Rim mule deer study. These fence conversions also benefit pronghorn and elk movements. WLCI funding was used toward materials and labor costs for constructing the fences. Grazing lessees on the Red Rim Grizzly WHMA completed an additional three miles of fence construction or conversion during the summer and fall of 2014.

Little Snake River Basin Aspen Conservation (Goal 2) - WLCI, Jim Wasseen

The objectives of this project are to restore aspen woodland communities, enhance watershed/ecosystem function, improve aquatic and terrestrial wildlife habitat, and sustain regional and local economic and aesthetic values through a vibrant aspen community. Project accomplishments in 2014 include: improved aspen age class and diversity in treated aspen stands, reduced threat of catastrophic wildfire, improved wildlife habitat, and improved watershed function. In 2014, 355 acres of aspen and mixed, aspen-conifer stands were mechanically treated on private, state, and BLM-administered lands in the Upper Savery Creek Watershed. Over 2,300 acres of treatments have been completed across the 78,000 acres of aspen habitat in the Little Snake River Basin.

Jackson Region



Jackson Region

There was a great deal accomplished for Wyoming's fish and wildlife in the Jackson Region this past year. Wyoming Game and Fish biologists collaborated with the Bridger-Teton National Forest on a prescribed fire to improve habitat for moose and elk east of Moran Junction. This is part of a much larger habitat improvement project that targets several additional areas for treating and improving habitat in the future.

Another multi-year habitat enhancement project was initiated on Flat Creek, a world-class fishery for Snake River cutthroat trout on the National Elk Refuge. The initial year enhanced approximately one mile of stream, which resulted in an 81% increase in spawning fish. There will be another 2.5 miles of stream enhanced over the next two years.

A third project involved meadow restoration at the South Park Wildlife Habitat Management Area, which also serves as an elk wintering area and feedground. Game and Fish Habitat & Access personnel worked with the Teton Conservation District and the Teton County Weed and Pest District to remove invasive vegetation, including cheatgrass, and reseed the area with a native plant seed mix. Initial results are quite positive.

Red Rock Fire Ungulate Nutrition (Goal 2) - Ben Wise and Alyson Courtemanch



Figure 61. Excellent aspen and forb regeneration 1 year post-fire (left) and 3 years post-fire (right) at an aspen site that burned at high severity.

Fire is generally considered to be beneficial for big game habitat because it sets back forest succession and improves forage quantity and quality. However, a recent study from the Wyoming Cooperative Research Unit on the Jackson moose herd in northwest Wyoming found that summer forage quality was significantly lower in areas burned in the 1988 Yellowstone fires than in unburned sites. These findings call into question whether all types of fire are beneficial for ungulates. In 2011, the Red Rock Wildfire burned over 9,000 acres in the Gros Ventre drainage on the Bridger-Teton National Forest (BTNF). The wildfire burned in a mosaic of burn pattern severities, ranging from unburned areas to high severity, stand-replacing fires. This event presented a unique opportunity to monitor changes in the nutritional quality of ungulate forage in response to fire of varying severities (Figure 61).

In summer 2012, a collaborative project was initiated to monitor these changes in ungulate forage quality with BTNF, with funding support WGBGLC, RMEF, and Wyoming Wild Sheep Foundation. The overall goal is to understand how fires of varying severity affect the nutritional and mineral content of common forage species for bighorn sheep, elk, moose, and mule deer. Nutritional and mineral content will be tracked over both the short-term (1-5 years) and the long-term (6-10+ years).

57 permanent sampling sites in aspen, conifer, meadow, and willow communities within the Red Rock Fire were established. These sites were selected to represent a range of burn intensities in each community, from unburned (control) to high severity. Key ungulate forage species were sampled at each site. In total, 231 vegetation samples were collected representing 11 different plant species. These samples were sent to the Colorado State University Plant and Soil Lab for nutritional and mineral analysis. Preliminary results indicate that forage quality increases with increasing burn severity. These sites will be re-visited each summer to collect samples from the same plant species to track changes in nutritional content over time. Results will reveal how fire severity affects nutritional quality for ungulates, and improve understanding regarding the benefits of prescribed fire and wildfire for big game populations.

Greys River, South Park and Horse Creek WHMAs (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Daniel Tumblin

The Greys River WHMA received annual fence maintenance on all 13 miles of crucial winter range elk fence. A new elk jump was added to the elk fence just south of Alpine to aid in seasonal elk migrations to the Alpine Feedground (Figure 62).

Annual fence maintenance continued on the South Park WHMA. Seven and one-half miles of boundary fence were maintained along with one mile of crucial winter range elk fence. The South Park elk feeding area was harrowed in spring 2014 to break up elk scat and promote growth of new grasses.



Figure 62. *New elk jump aids in seasonal elk migrations to the Alpine Feedground.*

The Horse Creek WHMA received annual maintenance on one mile of crucial winter range elk fence. Three miles of boundary fence around the Horse Creek WHMA were also removed. This fence was dilapidated and a cause of concern for migrating wildlife. There are no grazing allotments on the adjacent National Forest Service lands. Sixty acres of grass meadows on the Horse Creek WHMA were also irrigated before and after haying from May through August. The irrigation after haying helps provide highly nutritious natural forage for elk when they arrive on the Horse Creek Feedground prior to feeding in the fall.

The Jackson Region WHMAs and PAAs also received noxious weed treatment from the Teton County and Lincoln County Weed and Pest Districts. In 2014, 21.4 acres of noxious weeds were treated on WGFD Commission owned and managed lands.

South Park WHMA Reseeding (Goal 2) - Matt Miller



Figure 63. *Reseeding at South Park WHMA.*

South Park WHMA had sections of meadow reseeded in spring 2014 (Figure 63). Thirty-five acres of meadows were harrowed and reseeded in order to remove noxious weeds and establish desirable species. The WGFD worked with the Teton Conservation District and the Teton County Weed and Pest (TCWP) District to plan and pay for the reseeded. TCWP provided the hours and supplies to remove the noxious weeds in the 35 acres. The largest concern was the increasing amount of cheatgrass on the WHMA. Once the area was boom sprayed in fall 2013, WGFD personnel harrowed the area and then reseeded the 35 acres with native seed provided by the TCD and TCWP. In fall 2014, great results were noticeable and the TCWP and WGFD have set up photo points, monitoring transects and exclosures to keep track of growth and species composition.

Alpine Wetlands Water Delivery System Maintenance (Goal 2) - Matt Miller

The Alpine Wetlands complex provides nesting and brood rearing habitat for many species of waterfowl including trumpeter swans. Alpine Wetlands received an overhaul to its water delivery system in 2014. The WGFD jointly manages the Alpine Wetlands complex with the Bureau of Reclamation (BOR). After meeting with the BOR in spring 2014, it was determined that the Salt River diversion and canal feeding the wetlands complex needed updating. The BOR donated equipment and hours towards reshaping the diversion and dredging the canal feeding the wetlands. The improvements allow the wetlands to receive more water later into the summer once high water flows slow down.

Edmiston Spring Channel Enhancement (Goal 2) - Anna Senecal and Lara Gertsch

The Edmiston Spring project entails organizing multiple stakeholders to improve instream habitat for Snake River cutthroat trout while maintaining existing wetlands and riparian benefits. Edmiston Spring is a small tributary to Fish Creek that flows through the town of Wilson. This project, despite its small size, has the potential to create future stream improvement projects throughout the Fish Creek drainage, a class one, blue ribbon Snake River cutthroat trout fishery suffering from the impacts of historical development and land use. Edmiston Spring Creek provides habitat for a suite of terrestrial and aquatic organisms in the form of excavated ponds used by adult cutthroat, ungulates, waterfowl and other bird species, a relatively robust riparian corridor, and sections of flowing stream (Figure 64). WGFD partnered with Jackson Hole Trout Unlimited (JHTU) to undertake a stakeholder process involving the county, the school district, and all stream-adjacent private landowners to accomplish three primary goals: increase habitat for juvenile Snake River cutthroat trout, optimize fish habitat in late winter flow conditions, and promote and maintain existing wetland and riparian habitat. The project design contract was awarded to a local, private consulting firm in fall 2014 and conceptual designs are being finalized through a consensus-driven stakeholder process. Proposed stream modifications include limited earthwork, replacement of one culvert with a bottomless arch, enhancing spawning riffles and placing large wood structures using (volunteer) hand crews. Project implementation is slated for late summer/fall 2015. Successful completion of this project may create additional habitat improvement opportunities throughout the Fish Creek drainage.



Figure 64. *Habitat on Edmiston Creek benefits a host of aquatic and terrestrial species. Future stream improvements will maintain existing benefits and accentuate flowing portions of the creek for fisheries.*

Flat Creek National Elk Refuge Enhancement Phase 2 (Goal 2) - Anna Senecal and Lara Gertsch

The WGFD and project partners are collaborating to improve Flat Creek for native cutthroat trout. This system is locally and nationally renowned as an iconic Snake River cutthroat trout fishery located just north of Jackson on the National Elk Refuge. This native fishery, sustained by wild recruitment alone, boasts trophy fish and breathtaking views. This combined with road-side accessibility make it one of the most popular fisheries in Wyoming. Maintenance of instream and riparian habitat is critical for the persistence of wild spawning fish.



Figure 65. *Installed instream and bank structures are functioning to narrow the channel and provide overhead cover for native trout.*

Flat Creek's lack of flushing flows causes sediment and aquatic vegetation to fill the channel, pools, and spawning habitats. Sediment deposits have raised the stream bed and widened the channel. The stream lacks large woody debris and undercut banks to provide habitat diversity and overhead fish cover. The Flat Creek National Elk Refuge Enhancement project objectives include narrowing and deepening the channel to enhance trout migration and spawning habitat (Figure 65). The design strategically places instream structures, positions gravel for spawning, and uses bank fill and channel dredge to decrease the stream width and increase channel depth. The first phase of Flat Creek enhancements focused on instream, riparian and floodplain improvements to 1 stream mile in 2013. Post-construction monitoring indicates an 81% increase in spawning fish. Phase II was initiated in 2014 with removal or repair of existing structures and materials staging (Figure 66). Phases II and III construction will take place over the next two years (Octobers 2015 and 2016), accommodating cutthroat spawning, elk and bison hunting, elk feeding, and winter range restrictions. Approximately 1.25 miles will be treated each year.

Figure 66. *A local contractor loaded, hauled, and deposited these cottonwood logs for the next two phases of the Flat Creek National Elk Refuge Enhancement.*



Northeast Quad Aspen Enhancement (Goal 2) - Alyson Courtemanch

The Northeast Quad Aspen Enhancement Project was partially completed in 2014. The overall goal of the project was to enhance aspen communities by removing conifers and stimulating aspen regeneration with prescribed fire. The project area is located east of Moran on the Bridger-Teton National Forest. It is part of the Buffalo Valley Habitat Enhancement, which targets several areas for treatments. The Dry Quad Prescribed Burn was completed in 2014. The area provides moose crucial winter and transitional range and elk winter/year-long and transitional range. This is also a key migration corridor for elk moving to winter ranges in the Jackson Hole area from Yellowstone National Park. The area is very popular for elk and moose hunting. Mechanical removal of commercial-sized conifers and slash-



Figure 67. *A conifer-encroached aspen stand that was targeted for treatment in the Northeast Quad project area.*

ing of non-commercial conifers was completed in 2010. In October 2014, prescribed burning was completed on approximately 100 acres, including old and decadent aspen stands (Figure 67) to stimulate regeneration. Post-treatment monitoring will occur at 1, 2, 5, and 10 years post-treatment to evaluate whether objectives were met. Funding was provided by the WGFD Habitat Trust Fund and Bridger-Teton National Forest.

Horse Creek and South Park WHMA Haying (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Daniel Tumblin

Horse Creek and South Park WHMAs were hayed in 2014. In all, approximately 80 acres were hayed (Figure 68) and the WGFD produced 140 tons of hay (Figure 69). The hay was fed to big game on the Horse Creek and South Park Feedgrounds. The WGFD teams up with the Teton Conservation District (TCD) in order to fund the haying annually. The main goal of haying on the WHMAs is to produce more nutritious forage for wintering big game during the late fall and early spring as elk are migrating to and from the feedgrounds. Haying will continue on the Horse Creek and South Park WHMAs in the future with the hope of continuing to provide forage for big game and hay for the feedgrounds. This also reduces chances for commingling between elk and cattle on private land adjacent to elk feedgrounds, and reduces the amount of hay that the WGFD needs to purchase each year by feeding hay that we produce on our own lands.



Figure 68. *Hay being cut on the Horse Creek.*



Figure 69. *WGFD produced 140 tons of hay that was utilized on the Horse Creek and South Park Feedgrounds.*

Blue Crane Creek Channel Enhancement (Goal 2) - Anna Senecal and Lara Gertsch



Figure 70. *Before (left) and after (right) cross vane structure installation designed to narrow the creek, increase water velocities and move sediment through the system.*

Since completion of the original Snake River levee system in 1964 for flood protection, lateral connectivity within the Snake River floodplain has been dramatically reduced and rejuvenation of spring tributaries is lacking. Reduced availability of suitable spring tributary spawning habitat for Snake River cutthroat trout in the form of clean, appropriately sized gravels, is one limiting factor for this native, trophy fishery. To mitigate the effects of lost flushing flows and sediment transport, habitat improvement to lateral Snake River tributaries is a priority. One example of this work is a continuum of fish passage and habitat improvement projects collectively termed the “Snake River Spawning and Migration Project” that span approximately 15.5 miles of Spring and 2.5 miles of Blue Crane creeks.

Enhancement projects have taken place over the past 8 years in a series of phases. The most recent work took place on Blue Crane Creek during the spring of 2014 and winter 2014-15. Spring work entailed the construction of 7 cross vane weirs (Figure 70), mechanical dredging of 17 pools, and adjusting or removing existing trees to improve trout habitat quality and sediment transport dynamics. Improvements to Blue Crane Creek downstream of the Spring Creek confluence took place winter 2014-15 and included decreasing creek widths, increasing pool depths, excavating sediment detention basin and cleaning and rearranging existing gravels to improve spawning habitat.

This project has the potential to expand to the confluence with the Snake River, connecting spawning habitat throughout the length of these two important tributaries. Making these habitats readily available to the native fish community will result in resilient populations that are more able to withstand major events like fire, flood or drought. Increased connectivity to lateral, aquatic habitats will continue to provide a source of recruitment to the Snake River fishery.

Lander Region



The Lander Region covers a stretch of Wyoming from the top of the Wind River Mountains to Boysen Reservoir and from Dubois to Rawlins. A wide variety of habitats are found here and therefore a wide variety of habitat projects were completed in 2014. Much effort was put into the 210,000 plus acres of Commission administered lands in the region.

The majority of the work in 2014 was focused around Dubois on the Spence & Moriarity Wildlife Management Area, on the Inberg/Roy Wildlife Habitat Management Area (WHMA), and on the Whiskey Basin WHMA, which are crucial winter range habitat for several big game species, including bighorn sheep.

For the first time this year, two of these properties were utilized for hay production and hay was sent to elk feedgrounds to reduce WGFD expenses, while still leaving adequate feed for wintering big game. Other projects that were begun or completed this year include: fence removals and replacements, aspen regeneration, noxious weed control, controlled burns, irrigation improvements and fish passage work.

Whiskey Mountain Herbicide Treatment (Goal 2) - Amy Anderson



Figure 71. *Bighorn sheep within Torrey Rim treatment area.*

Torrey Rim on the Whiskey Mountain WHMA provides vital bighorn sheep winter range (Figure 71). While measuring production/utilization transects during the past several years, an increase in mat-forming forbs such as sulphur buckwheat, phlox, and fringed sagewort has been observed. These species are unpalatable to bighorn sheep. The Whiskey Mountain Bighorn Sheep Technical Committee decided

to apply herbicide to reduce these mat-forming forbs, which will be followed by a fertilizer treatment to improve conditions for preferred forage species. The fertilizer treatment will occur on Sheep Ridge, and a portion of Torrey Rim in April 2015.

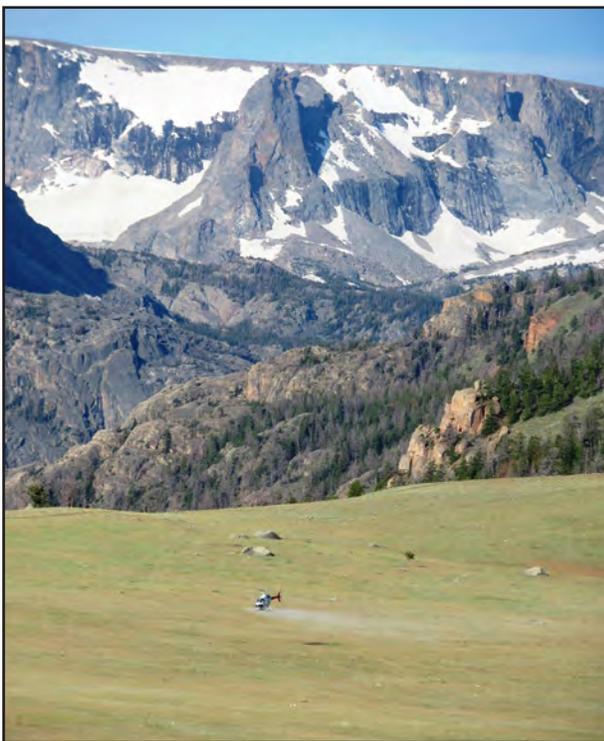


Figure 72. *Helicopter applying herbicide to control mat-forming forbs on bighorn sheep winter range.*

An aerial herbicide treatment was conducted on Torrey Rim within the Whiskey Basin WHMA in July 2014 to reduce mat-forming forbs and improve forage production for wintering bighorn sheep. Herbicide was applied as follows: 2-4d lovol ester- 1.5 quarts/acre, Tordon- 1 quart/acre, Surfactant/Crop oil- 1 quart/acre, with a total applied liquid volume of 5 gallons per acre, including water. A helicopter was used to apply the herbicide (Figure 72).

Pre-treatment forage analyses occurred on both treatment and control sites and will be repeated for three years post-treatment to estimate changes in nutritional content of herbaceous forage. Annual measurements on established transects will continue to monitor changes in production and utilization.

North Mountain Meadows Fence Construction (Goal 2) - Brian Parker



Figure 73. *New fence along the northeast boundary of Mountain Meadows.*

The Spence and Moriarity Wildlife Management Area (WMA) northeast boundary of Mountain Meadows was the only area of the Spence and Moriarity WMA that was unfenced. The lack of a legal fence resulted in a potential point of entry for trespass livestock. Mountain Meadows is an isolated area within the Spence and Moriarity WMA and provides crucial winter and parturition range for elk, mule deer and pronghorn. Mountain Meadows is used by bighorn sheep and both bear species.

A fence contract was awarded to construct approximately two miles of fence in the Mountain Meadows area of Spence and Moriarity WMA. This fence will help exclude trespass livestock and maintain productive elk habitat.

Construction began in September 2014 and was completed in October 2014.

BLM Rawlins Fence Conversion (Goal 2) - WLCI, Jim Wasseen

Over the past several years, fence conversions have been implemented in migration corridors, crucial winter range, and at locations where fences are damaged to improve big game passage and reduce stress, energy loss, injury, and mortality. Most of these historic and constrictive types of fences were built to control domestic sheep but the majority of these allotments have since been converted to cattle grazing that can be controlled with 3 or 4 strand barbed wire fences. The focal areas of past fence conversion projects were south and west of Rawlins, where the majority of fences were converted in conjunction with willing private landowners. Over the next several years, efforts will expand to areas north and east of Rawlins where four large allotments have sheep type fencing. Two allotments are willing to work with the BLM in this effort. Fencing conversion continued in three locations near Ferris Mountain in 2014 (Figure 74). Fencing conversions were completed on: 1.1 miles of private ownership, 0.6 miles of state property, 1.2 miles of BLM-administered land, and 1 riparian enclosure.



Figure 74. *Fence conversion, on the southeast side of Ferris Mountain, between the Buzzard and Stone Allotments. (photograph courtesy of BLM Rawlins Field Office).*

Wyoming Big Sagebrush Treatments- UW Research Project (Goal 2) - Kurt Smith, Stan Harter, Sue Oberlie, Derek Lemon



Figure 75. *WGFD personnel mowing within the study area.*

Figure 76. *Mowed and unmowed areas within the project area, first spring following treatment.*

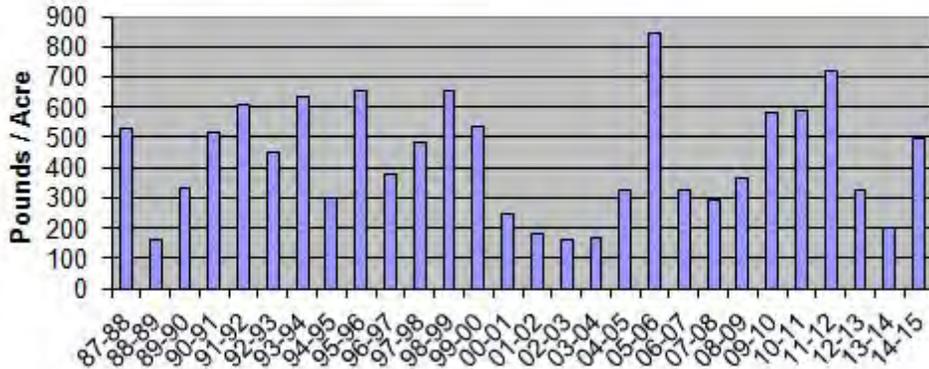
This phase of the study consisted of treating sagebrush with Spike® 20P and mowing within early sage-grouse brood-rearing habitats during winter and spring 2014. Female early brood-rearing locations were selected along with areas predicted to have high early brood-rearing occurrence to identify 4 treatment locations (2 Spike and 2 mowing treatments) and 2 reference locations to form replicated study sites to evaluate the response of grouse to habitat treatments. Treatments followed guidelines of the “Wyoming Game and Fish Department Protocols for Treating Sagebrush” to be consistent with Wyoming Executive Order 2011-5, Greater Sage-Grouse Core Area Protection. The only exception to the WGFD protocols, is instead of grazing rest for 2 growing seasons after treatments, exclosures were installed to measure post-treatment vegetative response in the absence of grazing. The size of these exclosures permit evaluation of vegetation and ground cover characteristics within an area equivalent to the size of plots used to assess sage-grouse microhabitat selection at nests and brood-rearing locations. During January and February 2014, the WGFD and the University of Wyoming mowed approximately 1,208 acres of sagebrush habitats across 2 mowing treatment areas. Spike treatments occurred in early May 2014 applying 1 pound/acre (0.2 pounds/acre active ingredient), anticipating a 50% kill rate of sagebrush, to 1,500 acres across 2 study areas. Exclosures were erected in May 2014 following treatments.

Duncan Bench Restoration (Goal 2) - Brian Parker

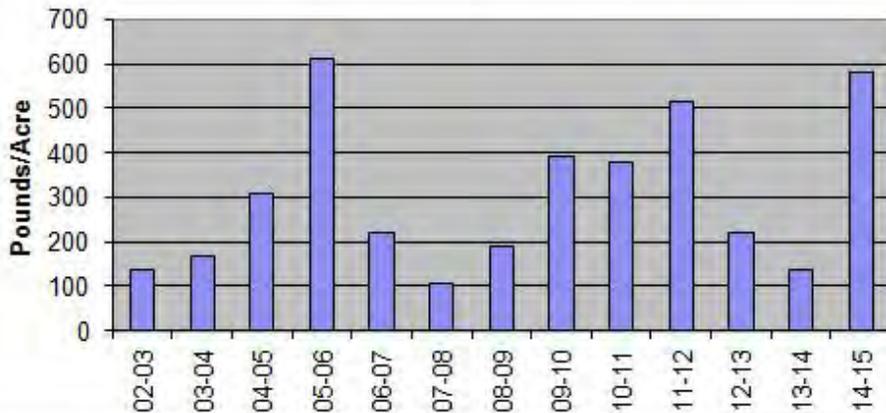
Restoration of Duncan Bench (~1,000 acres) pivot fields located on the Spence and Moriarity WMA began during the fall of 2011. Approximately 800 acres of the Duncan Bench has been planted with drought-tolerant wheat-grass seed mix since project inception. Approximately 200 acres were drilled in spring 2014. The remaining ~200 acres will be drilled during spring 2015. In April 2014, approximately 300 acres of Duncan Bench were sprayed with bromoxymil and Escort to mitigate field pennycress infestations and promote grass establishment. Approximately 60 acres of cheatgrass was sprayed with Plateau® in September 2014. Cheatgrass treatments will be repeated during 2015 as needed.

Dubois Winter Range Production Monitoring (Goal 2) -
Amy Anderson and Greg Anderson

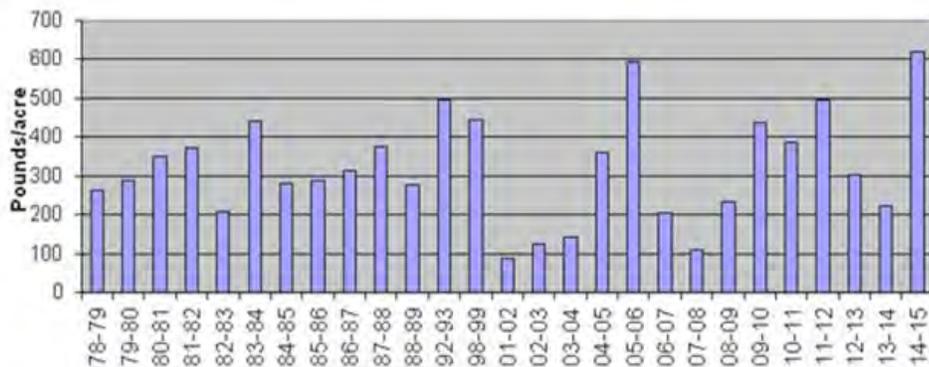
**Herbaceous Production:
Whiskey Basin - Unit Average**



**Herbaceous Production:
Spence/Moriarty - Unit Average**



**Herbaceous Production:
Inberg/Roy - Unit Average**



WGFD personnel, with the assistance of USFS and BLM Biologists, continued monitoring production and utilization on bighorn sheep and elk winter ranges on the Whiskey Basin WHMA, Spence and Moriarty WMA, and the Kirk Inberg/Kevin Roy WHMA. With good fall moisture in 2013, and well timed spring and summer precipitation in 2014, all areas showed vast improvements in production in 2014. The Whiskey Basin WHMA produced 500 lbs of forage/acre which is 251% of 2013 production, and about average when compared to the last ten years. Production on the Spence and Moriarty WMA, and Kirk Inberg/Kevin Roy WHMA averaged 577 lbs/acre, nearly 300% of 2013 production and 178% of the 10 year average.

Figure 77. Average production on Dubois area managed meadows.

Lander Region Aspen Regeneration Projects (Goal 2) - Amy Anderson

In addition to the on-going aspen work occurring near South Pass, initial planning and inventory work has begun to identify and prescribe treatments for “at-risk” aspen stands throughout the Lander Region. These aspen stands are at risk due to conifer encroachment, drying sites, over-use and lack of disturbance. To date, stands have been identified on Green and Crooks Mountains, Long Creek near Dubois, Mountain Meadows on the Inberg/Roy WHMA, and in the Red Canyon WHMA. A variety of treatment



methods are being considered to improve the health of these at risk and important aspen communities. Working with private landowners, BLM, USFS, State Lands, and other entities, treatments will include prescribed fire, mechanical, root ripping, and other methods to encourage aspen regeneration.

Figure 78. *Green Mountain Aspen showing heavy encroachment by conifers.*

Spence and Moriarity WMA Bear Creek Habitat Improvement (Goal 2) -

Nick Scribner



Figure 79. *Six feet of bank loss was measured at this segment along the 200 foot long segment where the average loss was roughly 3 feet.*

Approximately 700 feet of streambank were improved in 2014 on Bear Creek near Dubois. This drainage provides crucial Yellowstone cutthroat trout habitat, especially for spawning trout. The primary issue addressed was five eroding banks that were impacting adjacent and downstream habitat. Bank Erosion Hazard Index (BEHI) surveys were completed in 2012 and allowed determination of erosion rates to identify and prioritize streambanks where improvements were needed. For example, a predicted loss of 1.2 feet/year was calculated for a streambank that was addressed in 2014. However, measurements after runoff in 2014 revealed an average loss of approximately 3 feet over a 200 foot span that

equates to 30 dump truck loads of dirt (Figure 79). Higher bank loss occurred due to high snowpack levels that produced flows greater than bankfull, which is the flow used for calculating erosion rates.

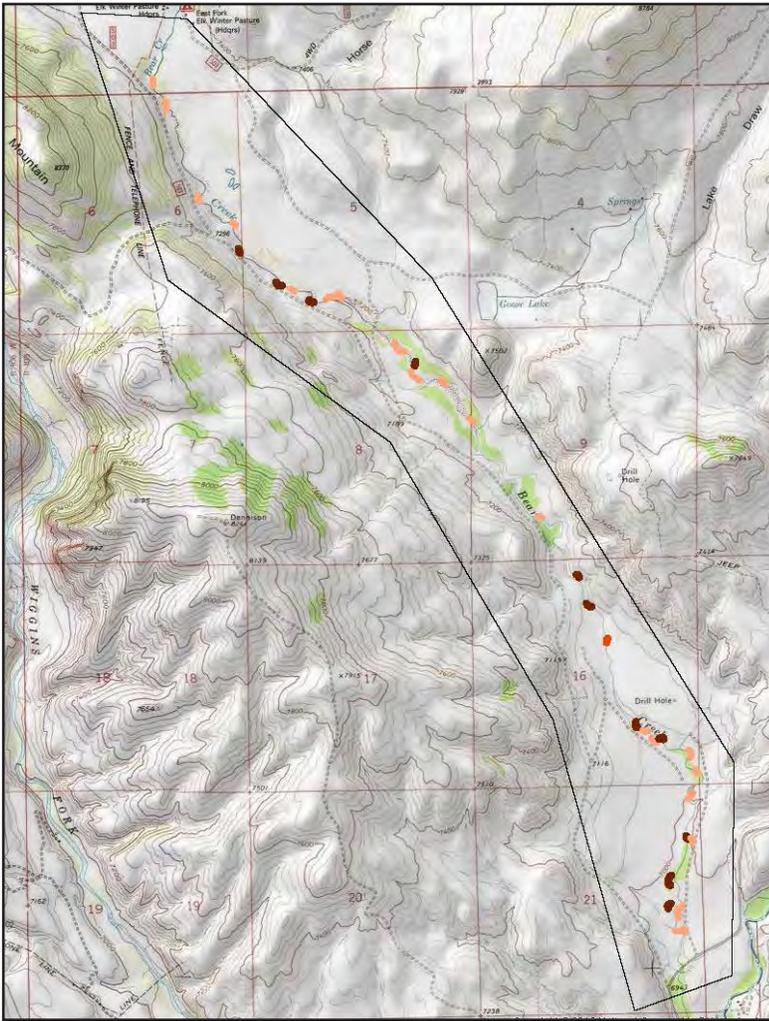


Figure 80. Map from 2012 BEHI surveys for Bear Creek; all high risk sites (dark red) were improved in 2013-2014.

All of the stream banks had similar features: steep, devoid of vegetation, highly erosive, and providing very little habitat value. To improve these banks, nearby conifer trees were felled and placed at the toe of the banks and secured with large boulders, bank material, and cable. This wood absorbs the power of the water, protects the bank from further erosion, and provides overhead cover. Banks were also shaped and seeded to decrease the slope and promote vegetation establishment. Additional maintenance was needed to repair two sites completed in 2013 where logs slightly dislodged from the bank. Overall, sites completed in 2013 held up well to high flows in 2014 with vegetation taking hold. Collectively, 1,400 feet of stream-bank stabilization was completed on Bear Creek the past 2 years addressing the highest risk banks determined from 2012 BEHI surveys (Figure 80).

Meadow Restoration (Goal 2) - Brian Parker

As part of the Spence and Moriarity WMA 10-Year Plan, irrigated fields/meadows have been farmed to increase forage palatability, combat noxious weeds and ultimately generate hay for use on elk feedgrounds. These were the 2014 efforts;

Bain Meadow- farming began on approximately 60 acres; fall 2014

Long Meadow- farming began on approximately 10 acres; spring 2014

Pease Meadow- farming began on approximately 25 acres; spring 2014

North Andy's Meadow- farming began on approximately 15 acres; spring 2014

Ocean Lake Winter Grazing (Goal 2) - Derek Lemon

Approximately 260 AUMs were utilized at Ocean Lake WHMA in order to remove decadent vegetation and promote vigor and palatability of meadow vegetation to benefit waterfowl and pheasants. Grazing occurs during January on a five-year grazing rotation.

Wiggins Ditch Emergency Spill Structure (Goal 2) - Brian Parker

In conjunction with the Wiggins Ditch flume replacement on Spence and Moriarity WMA, the Wiggins Ditch emergency spill structure was replaced in late 2014. This structure is critical to the function of the Wiggins Ditch and correspondingly the irrigation of the meadows the ditch serves.



Spence and Moriarity WMA Flow Monitoring (Goal 1) - Nick Scribner

In 2012, flow monitoring stations were placed at 6 different locations on Bear Creek, East Fork Wind River, and associated irrigation ditches to monitor irrigation use for 3 seasons (2012-2014). Goals were to document use of WGFD water rights, determine areas of inefficiencies, and balance our irrigation with needs of the fishery. Fortunately, both an extremely dry year (2012) and a very wet year (2014)

	Flow (cfs)		Kirwin Snotel (SWE)
	Bear Ck.	East Fork	
2012	14	20	6.8
2013	17	23	11.1
2014	38	70	19.2

Table 1. Stream flow measured July 24 and snow water equivalent (SWE) measured May 1 for the past 3 years. Kirwin Snotel is near the headwaters for both drainages and the 30 year mean for May 1 is 11.1 inches.

were observed during our monitoring effort (Table 1). On Bear Creek, irrigation was turned off once flows reach 20 cfs just above the confluence with the East Fork Wind River, which is downstream of all diversions. This target flow was developed through intensive surveys and data analysis based on fish habitat needs. Obviously, this target will be reached at different times each year based on precipitation and air temperatures. For example, irrigation on Bear Creek was shut down

by July 5 in 2012 but not until August 29 in 2014, which illustrates the importance of snowpack levels. This study will assist with future water management activities to maintain native fishery and irrigated meadows for big game winter forage.

CM Horse Grazing (Goal 2) - Brian Parker

Approximately 15 horses (37.5 AUMs) from the CM Ranch grazed the Basin Meadow on Whiskey Basin WHMA from November through December 2014 in lieu of grazing the ranch's BLM allotments. This agreement results in increased forage availability within core bighorn sheep winter range to be used by wintering bighorn sheep. 2014 was the fifth year of the latest five-year agreement.

Ocean Lake WHMA Pond 5 Prescribed Burn (Goal 2) - Derek Lemon



Figure 81. *Ocean Lake WHMA Prescribed Fire.*

A prescribed burn was conducted at Pond 5, Ocean Lake WHMA as part of a cattail management plan. The burn improves wetland habitat by removing decadent vegetation, increasing plant diversity and providing nutrient rich forage for migrating waterfowl and shorebirds. Pond vegetation at Ocean lake WHMA was composed almost entirely of cattails. Cattail encroachment has reduced available open water for waterfowl nesting and foraging.

In addition to the prescribed burn, a new water control structure was installed to help regulate the water level in Pond 5. Pond water depth manipulation can result in increased open water, vegetative diversity and increased forage availability.

Hay Reservoir Invasive Species Control (Goal 2) - WLCI, Jim Wasseen

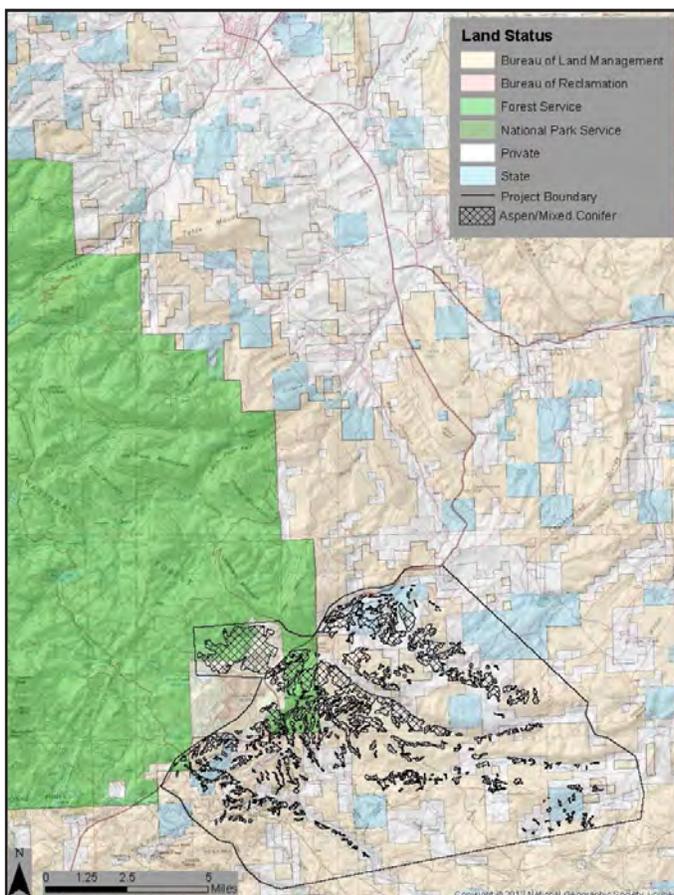
During 2014, the Hay Reservoir project entailed treating and monitoring Russian knapweed, whitetop, and Swainson pea on approximately 1,200 acres in northeast Sweetwater County. Treatment consists of herbicide application to control these species across the project area, including state and private lands. In addition, well pads and rights-of-ways are being treated by the oil and gas company that operates wells in the project area. Objectives are to remove weed species from currently affected areas and to remove or contain other noxious weeds to prevent further degradation and improve wildlife habitat quality and livestock grazing forage. The Hay Reservoir area provides some winter habitat for elk, mule deer, and antelope. There are also greater sage-grouse within the project area and livestock grazing. As invasive plant densities decline and activities through WLCI and the landowner continue, the project area should no longer require large-scale treatments in the future.

South Pass Aspen Restoration (Goal 2) - Nick Scribner

The South Pass area contains a diverse vegetation community consisting of forest, shrubland, sagebrush, wet meadows, and riparian corridors that provide important habitat for a myriad of species. The area provides crucial winter, parturition, and transitional range for deer, pronghorn, elk, moose, as well as important summer sage grouse habitat. Large springs and vital riparian habitats support aquatic wildlife and ultimately feed into the Sweetwater River and Wind River. Health of these habitats has degraded due to conifer encroachment (Table 2), drought, overbrowsing, and other land management practices. This project aims to reverse that trend through a suite of treatments to address aspen regeneration, mountain shrubs, and willows over the next 10 years across a broad landscape that includes USFS, BLM, State, and private land (Figure 82). These treatments will indirectly impact several thousand acres and miles of stream by increasing available water.

Plot	Stems/acre (>5 ft)	% Browse	Canopy cover	
			Aspen	Conifer
FS2	1622	6	52	48
FS16	4640	10	85	15
FS8	774	30	39	61
FS10	2025	20	55	45
Mean (n=4)	2265	17	58	42

Table 2. Conifer canopy cover is approaching 50% across the treatment area illustrating the need to reduce conifers to promote aspen. Data were from 4 individual treatment units located on USFS land.



Efforts in 2014 focused on fundraising, monitoring, securing a contractor, finalizing treatment prescriptions, and planning future treatments. Initial work will occur on USFS land (~2,700 total acres) with the mechanical removal of conifers by Summit Forests Inc. They anticipate starting in July 2015 with the goal to treat 600-800 acres by year's end. Roughly \$350,000 was awarded in 2014 for this work with efforts underway in 2015 to secure additional funds to treat more acres. Work on USFS land will likely take 3-4 years to complete. Meanwhile, reconnaissance of BLM ground and contacting private landowners has begun for planning future treatments within the project area.

Figure 82. Potential treatment units within the project area approximately 20 miles south of Lander.

Noxious Weed Control (Goal 2) - Brian Parker



In addition to spraying approximately 300 acres on Duncan Bench, Rocky Mountain Agronomy applied herbicide across approximately 400 acres of irrigated meadows on the Spence and Moriarity WMA to control noxious weeds, largely white-top and Canada thistle, in early June and July. Additionally, Fremont County Weed & Pest sprayed a variety of noxious weed species on irrigated meadows and rangeland starting in July and continuing through fall 2014. Habitat and Access personnel constructed a spray trailer during winter/spring 2014 and dedicated increased time to noxious weed control. The spray trailer leverages available time and money to yield a robust and flexible spray program.

Ferris Mountain Wilderness Study Area Leafy Spurge (Goal 2) - WLCI, Jim Wasseen

The Ferris Mountain Wilderness Study Area (WSA) Leafy Spurge project includes BLM-administered land, state lands, and two private ranches (47 Ranch and Ferris Mountain Ranch). This project entails inventory, monitoring, and herbicide applications to control invasive plant species (primarily leafy spurge, whitetop, and Russian knapweed). The objectives are to restrict weed infestations, remove or contain other noxious weeds to prevent further degradation, and improve wildlife habitat quality and livestock grazing forage. These areas provide winter habitat for elk, mule deer, and antelope, as well as a few remaining bighorn sheep. The majority of the area contains greater sage-grouse habitat including core area in the north. Livestock grazing occurs throughout the area. The project is conducted as a partnership between the WLCI, BLM, Carbon County Weed and Pest District, and the two landowners.

The eastern end of Ferris Mountain was burned in a wildfire during the summer of 2012 and cheatgrass treatments were conducted on portions of the burned area in fall 2012. The burn area was monitored for cheatgrass and other invasive species in summer 2014, and further treatments occurred in fall 2014. In 2014, the project included inventory, monitoring, and chemical treatments of 1,160 acres. Past treatments have curtailed infestations to the point that aerial treatments were not needed this year and for the foreseeable future.

Chain Lakes WHMA Winter Grazing (Goal 5) - Matt Pollock

Domestic sheep graze on Chain Lakes WHMA from December through April each year. During 2014, approximately 900 AUMs were utilized. Chain Lakes WHMA presently operates as a grass bank. The domestic sheep operator grazed Chain Lakes WHMA while resting the Powder Mountain allotment west of Baggs, WY.

Red Rim Daley WHMA Grazing (Goal 5) - Matt Pollock

Red Rim-Daley is comprised of Office of State Lands and Investments, BLM and WGFC owned property. Two operators annually graze the Red Rim - Daley WHMA, collectively consuming approximately 1,650 AUMs.

Bain Meadow Pipeline (Goal 2) - Brian Parker



Figure 83. *Bain Meadow pipeline install.*

At approximately 200 acres, Bain Meadow is the largest meadow on the Spence and Moriarity WMA. Bain Meadow is served by three separate headgates on the Wiggins Ditch. Due to the drop of the field, the transport ditches were quite long and extremely inefficient in terms of water loss and maintenance requirements. In order to increase time and water-use efficiency, Bain Meadow was converted to a pipeline system irrigated with gated pipe. This conversion began in early 2014 and has continued into 2015. Close to 7,300 feet of 12-inch buried transport pipeline has been laid to service over 18,000 feet of gated pipe. The conversion to a pipeline system will result in increased water use efficiency and increased time efficiency by WGFD employees. Additionally, the pipeline will result in increased hay production, increased supplemental winter forage and reduced noxious weed densities.

Red Canyon Coordinated Resource Management (CRM) Grazing (Goal 2) -

Derek Lemon



WGFD is an active member of the Red Canyon CRM. The CRM cattle grazed the Upper and East meadows of Red Canyon WHMA in late May 2014 in order to remove decadent vegetation and promote vigor and palatability of meadow vegetation for wintering elk. Grazing of the meadows occurs every other year. Temporary electric fence was deployed to mitigate riparian impacts. The Upper and East meadows were irrigated throughout the summer following grazing to provide supplemental forage for wintering elk.

Red Rim – Daley Wildlife Habitat Management Area Improvements (Goal 2) - Matt Pollock and WLCI, Jim Wasseen

The project's objective is to improve the vegetative structure of the Red Rim Wildlife Habitat Management Area (WHMA) and improve wildlife habitat. This project includes the maintenance and conversion of fences to meet wildlife fence standards, well development and maintenance, noxious weed control, and terrestrial habitat treatments. Improved fencing will allow access to important habitat for all wildlife, especially pronghorn, by eliminating woven and five-wire fencing. The future goal of the WHMA is to create a forage reserve where ranchers can rest their pastures in exchange for grazing on the WHMA. Windmills in the Separation Creek watershed are not functioning; therefore, they are not providing consistent water to encourage livestock distribution across the WHMA. Dispersing cattle will reduce the concentration of cattle along Separation Creek and should increase riparian vegetation and improve forage and cover for wildlife such as elk, mule deer, pronghorn, and greater sage-grouse. Sagebrush areas have become dense and/or decadent and may benefit from thinning which often results in an increase of grasses and forbs. Weeds such as halogeton, Canada thistle and whitetop are competing with native species and need to be removed to improve forage. In 2014, two miles of fencing was reconstructed by WGFD along the northwest boundary fence. The WGFD, BLM, and the grazing lessee worked together to improve grassland habitats. Future projects will include additional fence replacement, weed treatment and conversion of windmills.



Cheatgrass Treatments (Goal 2) - Amy Anderson

In 2012, Plateau® herbicide was applied aerially to control cheatgrass on 1,200 acres of private land in the Willow Creek and Twin Creek drainages. Follow-up site visits and discussions with landowners indicate that re-treatment is necessary. Additionally, areas have been identified to expand these treatments, including several patches on the Red Canyon WHMA, and the Cottonwood Pass wildfire that burned in 2000 (Figure 84).

Figure 84. 2000 Cottonwood Pass Fire showing signs of cheatgrass invasion.

Morgan Creek WHMA Boundary Fence (Goal 2) - Matt Pollock

In 2012, a wildfire damaged approximately two miles of boundary fence. Sharing costs with the Bureau of Reclamation, the Habitat and Access Branch contracted to have the two miles of damaged fence rebuilt. We also converted approximately 1,100 feet of barbed wire fence to buck and pole fence that resides in an area of heavy snow loads. The original plans called for replacing the existing four-wire fence with four-wire, however, at the direction of the WGFD, the contractor converted the existing four-wire fence to a more wildlife-friendly, three-wire fence. The fence provides a visible border to lands contained within the WHMA for use by recreationists. The fence also protects forage from use by domestic livestock, thus reserving it for wildlife.

Mountain Meadows Fence Removal (Goal 2) - Brian Parker



Volunteers from the Rocky Mountain Elk Foundation and Wyoming Wildlife Federation assisted WGFD personnel in removing two interior cross fences in the Mountain Meadows area of the Spence and Moriarity WMA. Removal of the fence will allow for unimpeded movement of winter elk in this area.

Feedground Hay Production (Goal 2) - Brad Sorensen

Approximately 40 tons of hay from Garrison Meadow on the Spence and Moriarity WMA and approx-



imately 60 tons of hay from the Basin Meadow located on Whiskey Basin WHMA were baled and trucked to Bench Corral Feedground north of Big Piney.

Sinks Canyon Post Fire Restoration (Goal 2) - Derek Lemon

WGFD personnel provided technical support and helped coordinate vegetative restoration activities following the Sinks Canyon wildfire. Approximately 350 pounds of native grass, forb and shrub seed was broadcast in addition to 1,500 shrub seedlings, which were planted for mule deer habitat enhancement and to provide soil stabilization.

East Fork Wind River Tributary Enhancement (Goal 1) - Nick Scribner

The Bitterroot Ranch operates on the upper East Fork Wind River and uses water from Pine Creek, Meadow Creek, and the East Fork to irrigate approximately 180 acres. The upper East Fork Wind River drainage is crucial habitat for native Yellowstone cutthroat trout (YSC) and WGFD has been exploring solutions to reduce impacts to the fishery and improve water management since 2011. Conceptual plans under evaluation include improvement of fish passage on the East Fork, installation of a sprinkler irrigation system, construction of a fish screen, and abandonment of the Meadow Creek diversion. Entrainment sampling was completed in both Pine Creek ditch and Meadow Creek ditch from 2012-2014.

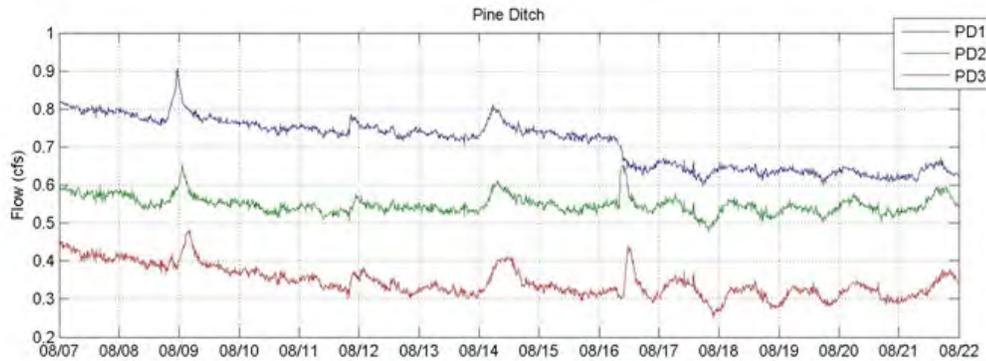


Figure 85. Flow data in Pine Creek diversion from August 7 – August 22, 2014, PD1 is top of ditch near headgate while PD3 is end of the ditch.

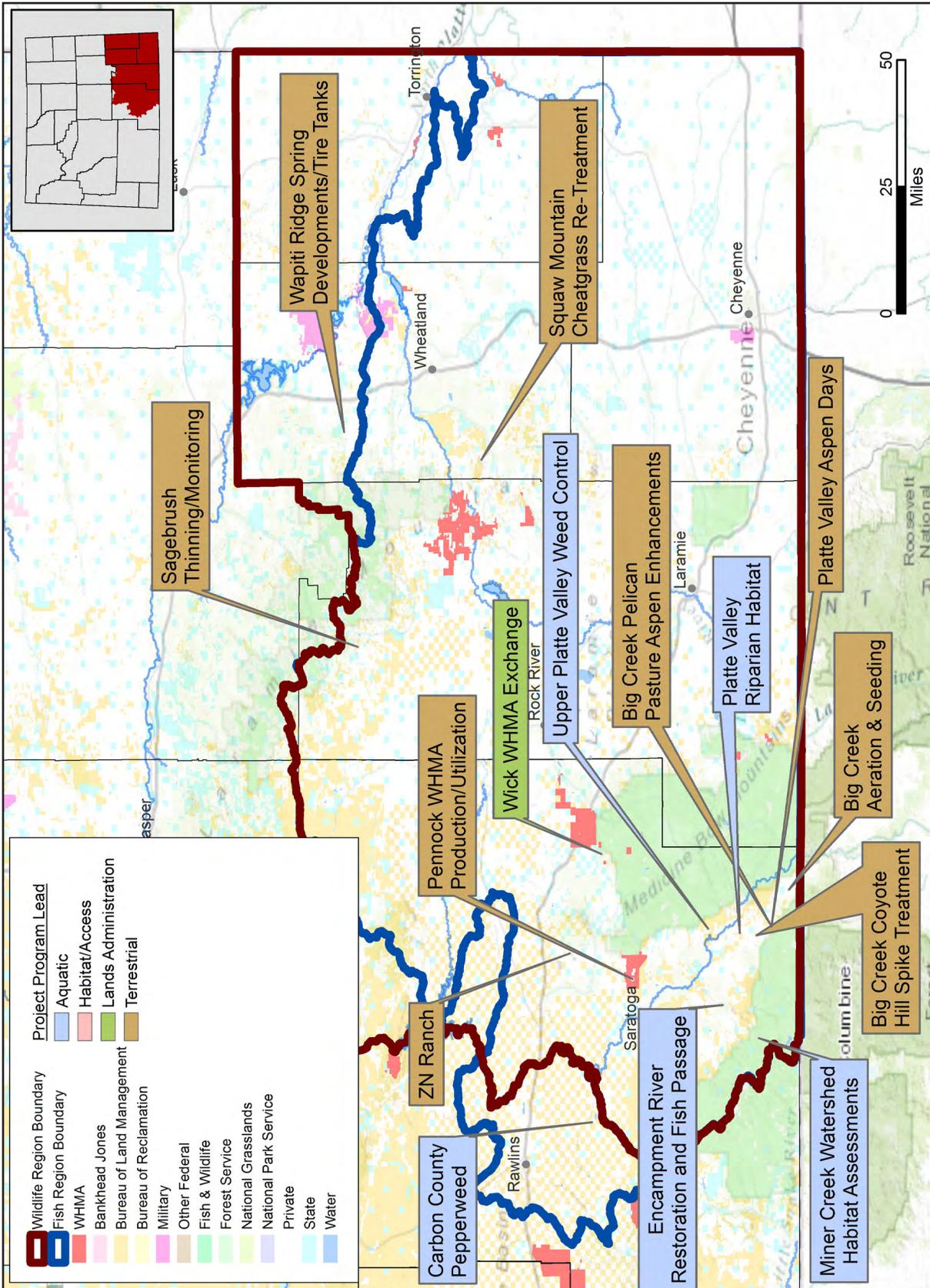


Figure 86. Meadow Creek diversion affects upstream fish movement.

Most entrainment occurs in Pine Creek where at least 150 YSC were captured in 2013 ranging from 1” to 17” long with a majority (66%) of them less than 3 inches. It is suspected that many of these fish were moving downstream to wintering habitat in the East Fork since entrainment occurred predominantly in September. As much as 60% of diverted water from Pine Creek never reaches the meadows intended for irrigation in late summer (Figure 85). Meanwhile, diversions periodically deplete Meadow Creek and impact YSC habitat and passage (Figure 86). Surveys of the area confirm a gravity fed sprinkler system will function with water piped from Pine Creek. In addition, a fish screen would be constructed prior to piping water eliminating entrainment while drastically reducing water loss from the current

open ditch. Water savings from this closed system could eliminate diversions from Meadow Creek effectively improving YSC habitat for both drainages. Final design and implementation in fall 2015.

Laramie Region



Laramie Region

The Platte Valley, in the western part of the Laramie Region, was the focal point for many habitat projects in 2014. The bulk of these projects focused on habitat for mule deer and aquatic species such as trout. Mule deer habitat projects implemented with cooperation from the Platte Valley Habitat Partnership include prescribed burns, fence conversions, willow sprigging along streams, water development projects and vegetation treatments on ranches near Saratoga. These are part of a long-term effort to help stop or slow the decline of mule deer in Wyoming.

Trout in the Encampment River will benefit from habitat enhancements in 2014. Game and Fish personnel assessed habitat along nearly 21 miles of four separate streams. Other projects in the western part of the region include improvements to riparian habitat on the Encampment River, and noxious weeds treatments along smaller streams in the Upper Platte Valley.

The eastern part of the region near Torrington saw major improvements at Table Mountain WHMA through a water delivery enhancement system, which will help ensure an adequate water supply in the wetland ponds, and irrigation work and guzzler installation at the Springer WHMA. These projects will improve habitat for waterfowl, pheasants and other species.

Notable Information and Education efforts in the region in 2014 include Platte Valley Aspen Days and the Platte Valley Volunteer Fence Day. WGFD greatly appreciates all the volunteers who came out to help with these projects.

Perennial Pepperweed Partnership (Goal 2) - WLCI, Jim Wasseen

This project includes the BLM and the Overland Trail Ranch in a partnership to reduce noxious weeds in the checkerboard land pattern that encompasses the majority of the ranch. The Perennial Pepperweed Partnership entails treating Little Sage Creek, one of two main stream branches in the Sage Creek watershed, for mainly perennial pepperweed, but also some whitetop, saltcedar, leafy spurge, and Russian knapweed. Treatment consists of herbicide application to remove and control weeds. Other objectives are to contain other noxious weeds to prevent further degradation and to improve wildlife habitat and livestock grazing forage.

The area contains greater sage-grouse habitat as well as year-round habitat for antelope and mule deer, and winter range for elk. The WLCI funds were used on the western portion of the project area where the landowners conducted weed control on the eastern end of the ranch. A total of 1,750 acres of private and BLM-administered land were inventoried and treated. The removal of noxious weeds helps improve riparian area condition and aids in reducing erosion and sediment delivery to tributaries of the North Platte River. Approximately 90% of the pepperweed invasion has been reduced, according to 2014 monitoring (ocular and photographs).

UW Greenhouse, Mountain Shrub Seedlings (Goal 2) - Ryan Amundson

In 2014, the University of Wyoming, College of Agriculture was contracted to grow 2,000 shrub seedlings from seed at the UW greenhouse facility in Laramie. These seedlings will be planted in areas identified as Mule Deer Initiative focus areas throughout the state in 2015.

Table Mountain WHMA (Goal 5) - David Lewis and Jerry Cowles



Ducks Unlimited and the WGFH Habitat and Access Branch hired a contractor to rebuild the main water control and diversion structure that supplies water to the eight ponds in the wetland system. A contractor was hired to drill, case, test pump and complete a new 600 foot deep well to supplement the wetlands system for moist soil management for all species of waterfowl. This well and new water supply will enhance food production and brood production of nesting waterfowl on the WHMA.

Upper Platte Valley Weed Management Area (Goal 2) - WLCI, Jim Wassen

The Upper Platte Valley Weed Management Area (UPVWMA) project includes the inventory, monitoring, chemical, and mechanical removal of invasive weeds, mainly leafy spurge, musk and Canada thistle, and spotted knapweed. The primary objective is to prevent weed encroachment onto the adjacent Forest Service and private lands and restrict weed infestations to the currently affected landscape. Secondary objectives include removing or containing other noxious weeds where possible to prevent further degradation and improve wildlife habitat quality and livestock grazing forage.

This area provides seasonal and crucial winter habitat for elk, deer, and antelope as well as bighorn sheep. The majority of the UPVWMA is located within greater sage-grouse core habitat, and supports livestock grazing. Partners include BLM, Carbon County Weed and Pest District, and multiple private landowners. Chemical treatments, inventory, and monitoring were carried out on state, federal, and private lands in July and August 2014. A total of 600 acres of private and BLM-administered land were treated. Approximately half of the known sites in the project area were treated in 2014, mostly in the Bennett Peak area. Past treatments have thinned infestations to the point that aerial treatment was not conducted this year, and may not be needed if maintenance activities continue on an annual basis.

Rawhide WHMA (Goal 2) - Jerry Cowles

The contractor sprayed 75 acres for Russian olive re-sprouts and also sprayed 5 acres of noxious weeds. Seven miles of boundary fence were maintained and seven acres of corn were planted, irrigated and harvested through the Exchange of Use agreement with an adjacent landowner.

Boykin-Encampment River Restoration, Phase II (Goal 2) - Christina Barrineau and WLCI, Jim Wasseen

The Boykin-Encampment River Restoration is a phased river restoration within the Upper North Platte priority area. Activities include streambank stabilization, channel reconstruction, and riparian enhancements downstream of the Town of Riverside. This reach is highly unstable with areas of erosion, extensive mid-channel bar and transverse bar development, channel degradation and excessive sediment deposition. These issues are a legacy of land uses such as historic tie drives, mining, channel dredging, and water diversions, which all contributed to the channel instability. These conditions are associated with riparian water table declines and reduced deep-rooted native riparian vegetation. The unstable channel and streambanks have led to degraded habitat for aquatic species, amphibious and terrestrial species, and contributed to agricultural land loss.

Revegetation following recent channel restoration has proven difficult along the Encampment River. Coarse cobble substrate with limited fine sediment has inhibited streambank and overbank zone revegetation efforts to date. Six riparian habitat study plots utilizing containerized shrubs were established throughout the Encampment River - Boykin Reach. The study plots were designed by Randy Walsh, an ecologist with Stantec Consulting Services, Inc. and placed along riffle habitats throughout the 3,400 ft reach. The plots were arranged in a randomized complete block design with a split-plot treatment structure to test the effects of elevation (relative to bankfull elevation) and soil amendments (fertilizer, top soil, and Terra-Sorb®).



Figure 87. *Native riparian shrub study plot on the Encampment River-Boykin Restoration.*

In early August, 270 native shrubs were planted over four days in the plots with 45 plants per plots (Figure 87). The following is an accounting of the species and number planted within the 6 plots: river hawthorn (24), Booth's willow (18), geyer willow (60), park willow (36), water birch (48), thinleaf alder (48), redosier dogwood (9), chokecherry (9), wood's rose (9), and golden currant (9). Plant container sizes were 10 cubic inch, 14-inch deep-rooted, and 1 quart. Holes in the cobble substrate were dug with shovels or post hole diggers. After each planting a 4 ft tree tube (Blue-X® tree shelter or Tubex® tree shelter) was placed around each plant to protect from browsing and to offer a greenhouse environment. Additionally, 10 5-gallon alder plants were randomly planted near the experimental plots. WLCI funds were used to purchase plants.

Red Rim – Grizzly WHMA Forage Reserve Grazing (Goal 1 and Goal 5) - Dave Lewis and Mark Cufaude

Six cattle operators grazed the WHMA under the cooperative management of the WGFD and BLM in a rest rotation grazing plan designed to benefit wildlife habitat values inside the WHMA and habitat adjacent to the WHMA boundary on the operator's grazing allotments. A total of 3,877 AUMS were utilized.

Platte Valley Habitat Partnership (Goal 5) - Ryan Amundson and Katie Cheesbrough

In November 2013, the Platte Valley Habitat Partnership (PVHP) committed \$94,000 of WGFC funds to mule deer habitat improvement projects in the Platte Valley. Since these PVHP funds were granted, they have generated approximately \$429,000 (plus ~\$71,000 from WLCI pending final approval) in additional funds and in-kind contributions from over 15 different partners for multi-year, landscape-level mule deer habitat enhancements. Approved PVHP projects that began implementation in 2014 include the USFS French Creek fence conversion, BLM/SERCD fence conversions and water developments, the Big Creek Ranch mountain shrub and aspen treatments, and the ZN Ranch riparian and mountain shrub enhancements.



Figure 88. *Platte Valley Volunteer Day participants after removing hazardous fence from the French Creek area.*

The USFS French Creek fence conversion consisted of converting nearly 1 mile of dilapidated 5-wire fence in an area of high mule deer use to a wildlife-friendly 4-wire laydown fence along a Forest/private landowner boundary. Also, a half mile of remnant boundary fence was removed during the Platte Valley Volunteer Day event (Figure 88). The fence conversion was completed in June 2014 with \$3,000 of PVHP/WGFC funding for fence supplies.

In 2014, the BLM and Saratoga-Encampment-Rawlins Conservation District (SERCD) fence conversion and water development project converted 12.5 miles of fence and completed 2 water developments throughout the Platte Valley using \$19,341 of PVHP/WGFC funds. An additional 7 miles of fence conversions and 6 spring developments are expected to be completed during the 2015 field season.



Figure 89. *Dr. Paul Rogers of the Western Aspen Alliance discusses the importance of healthy aspen stands to wildlife at the Platte Valley Aspen Days event.*

In addition to collaborative project development, funding, and implementation, PVHP hosted “Aspen Days” in cooperation with the Western Aspen Alliance and Voices of the Valley. This workshop highlighted the importance of aspen communities to wildlife and discussed aspen health within the Platte Valley with a group of over 30 participants (Figure 89). PVHP also helped to coordinate the Saratoga-Encampment-Rawlins Conservation District Volunteer Day, where PVHP partners participated in removing hazardous fencing in areas of high mule deer use.

Project implementation and PVHP events in 2014 have generated further interest in PVHP and mule deer habitat improvements within the Platte Valley as well as interstate opportunities with Colorado. PVHP project development continued in 2014 with expanded landowner and agency participation.

The second round of PVHP project funding applications were approved in November 2014 and allocated \$84,120 of WGFC funds to projects that will cost an estimated \$536,585. These projects include 780 acres of prescribed burning and mechanical treatments (including conifer and aspen encroachment treatments) in mixed mountain shrub and aspen communities, 4.5 miles of wildlife-friendly fence conversion in mule deer migration corridor and stopover areas, 2,060 acres of invasive weed treatments and cheatgrass herbicide trials, 110 acres of improved irrigation and reseeding on the Pennock WHMA, and 10 miles of road decommissioning and reclamation.

Squaw Mountain Cheatgrass Re-Treatment (Goal 2) - Ryan Amundson



Figure 90. *Helicopter application of Plateau herbicide on Squaw Mountain.*

In 2011, approximately 14,489 acres of BLM and private lands were burned by wildfire on Squaw Mountain, located 15 miles southwest of Wheatland. In 2012, 5,866 acres of south facing aspects were treated with imazapic herbicide. Two years of cheatgrass control was achieved on the majority of the 5,866 acres treated. A follow-up application was completed on 1,000 acres in September 2014 in order to protect this investment. Native, perennial grass re-establishment, in combination with application of sound grazing management practices, should reduce risk of cheatgrass invasion on the majority of the treated acres. An additional 2,000 acres of BLM lands will be receiving a follow-up reapplication in September 2015 to control the most at-risk acres.

Big Creek Ranch Mountain Shrub and Aspen Treatments (Goal 2) - Ryan Amundson and Katie Cheesbrough

The Big Creek Ranch provides extensive habitat for many species of wildlife throughout the year. This includes winter/year-long range for elk, spring/summer/fall range for pronghorn, core habitat for sage-grouse, and winter/year-long ranges for mule deer. The areas proposed for treatment are known to serve as valuable transition range for mule deer, particularly as they migrate eastward from the Sierra Madre Range to Prospect Mountain and other nearby foothill habitats. As such, this project was identified through the 2013 WGFD Platte Valley Habitat Event and was proposed as a multi-year project



Figure 91. *Big Creek aspen stand pre-treatment monitoring.*

that includes 920 acres of sagebrush herbicide (Spike) treatment, 200 acres of aeration and reseeding, and 30 acres of aspen enhancement treatments. Funding partners for this project include the WGFC, Wyoming Wildlife Natural Resource Trust, Rocky Mountain Elk Foundation, Mule Deer Foundation, Bowhunters of Wyoming, and the South Central Local Sage-Grouse Working Group.

In June 2014, pre-treatment monitoring of aspen (Figure 91) and aeration treatments were conducted and soil samples were sent to CSU to be analyzed for Spike herbicide application rates. Aspen enhancements and Spike treatment will be completed in 2015.

Because the Big Creek aeration and seeding project is located within the South Rawlins Core Area it was designed in compliance with Executive Order 2011-5 and WGFD Protocols for Treating Sagebrush in Sage-grouse Core Area 2.Bii. Native and non-native seed mixes were developed based on favorable habitat features for sage-grouse and big game, seed availability, and recommendations from representatives of the South Central Local Sage-Grouse Working Group and local agencies. Starting in late October 2014, WGFD Habitat and Access personnel used a Lawson aerator outfitted with a broadcast seed box to aerate and seed 100 acres with the native seed mix, 15 acres with the non-native seed mix, and 75 acres were aerated with different intensities but not seeded (Figure 92). Funds spent on this project in 2014 included \$10,000 from the LSGWG for purchase of seed and \$10,000 from RMEF for purchase of herbicide. Habitat and Access personnel implemented this treatment. Pre-treatment measurements and photos were taken and post-treatment monitoring will begin in spring 2015.



Figure 92. *Lawson aerator outfitted with a broadcast seed box on the Big Creek Ranch.*

Lower Encampment River Restoration and Fish Passage Planning (Goal 2) - Christina Barrineau

Planning and coordination continues for future restoration and fish passage projects on the lower Encampment River. The Laramie Aquatic Habitat Biologist assisted the Saratoga-Encampment-Rawlins Conservation District and Trout Unlimited with several successful grant proposals for watershed-wide funding for the Encampment River. These grant sources included WLCI, Wyoming DEQ 319, and the NRCS Resource Conservation Partnership Program. Many habitat funding sources have asked for us to plan at a larger scale. In 2015, bank stabilization is planned upstream of Riverside along with riparian restoration efforts at 2011-2015 project sites. Additionally, a detailed plan for the lower Encampment River, covering project needs from below Purgatory Gulch downstream to the confluence with the North Platte River, will be refined. The plan will focus on estimates of sediment coming from unstable banks and potential restoration ideas along with locations of fish passage projects.

Habitat Monitoring (Goal 4) - Ryan Amundson

Shrub production and utilization monitoring continues throughout southeastern Wyoming pre- and post-treatments. With favorable and timely precipitation in 2014, most winter range shrubs responded favorably and produced leader growth not witnessed since 2011. Spike herbicide applications completed 2 years ago on 1,850 acres in the Laramie Range took effect, and thinned sagebrush stands by nearly 50% (sagebrush canopies thinned from 30% pre- to 18% post-treatment). Herbaceous response was excellent and growing season grazing deferment allowed for further recovery of perennial plants in the understory.



Figure 93. Excellent bitterbrush leader growth observed in 2014 (left) and sagebrush thinning evident two years post herbicide application (right).

Red Rim –Grizzly WHMA fence conversion (Goal 5)-Dave Lewis and Mark Cufaude

WLCI funding was used to purchase fence materials and extend the contract for the conversion of 5.5 miles of woven wire and five wire fences to improve migration of mule deer, pronghorn and elk. The fence will be converted to a four –wire wildlife friendly fence design. This WLCI project is in its sixth year, with 12 miles of fence converted during the previous 5 years.

ZN Ranch Riparian and Mountain Shrub Enhancement - Ryan Amundson and Katie Cheesbrough



Figure 94. *Prescribed burning on Rattlesnake Creek/ZN Ranch.*

The ZN Ranch is located in the Platte Valley crucial mule deer winter and year-long range, and contains important mule deer spring/fall transition ranges. Given the high mule deer usage in the area, several habitat enhancements were identified during the 2013 WGFD Platte Valley Habitat Event. Treatments



Figure 95. *Statewide Habitat Biologist, Ryan Amundson transplants willows along Rattlesnake Creek on the ZN Ranch.*

include 1.8 miles of riparian fence, willow pole cutting and sprigging, and 300 acres of upland mixed shrub prescribed burn and/or mechanical treatments.

In May 2014, WGFD personnel cut and transplanted approximately 200 willow poles to Rattlesnake Creek to aid in woody species establishment (Figure 95). Construction of 1.8 miles of riparian fence was completed in October 2014 to better manage livestock during seasonal use, allowing the vegetation (including new willow poles) to establish and keep the riparian area in good condition. Prescribed fire was proposed for the upland shrub habitats on ZN Ranch to promote a mixed age class of shrubs, and to improve shrub production and nutritive quality in these important mule deer browse species. Due to



unexpected late fall moisture and warm temperatures, conditions were not favorable for burning during the 2014 fall burn window. The first attempt at burning on the ZN Ranch in mid-October 2014 yielded 5 burned acres (Figure 96). WGFD and contract personnel will reattempt these burn units in spring 2015.

Figure 96. *Prescribed burning on ZN Ranch.*

Wildlife Habitat Management Areas and Public Access Areas (Goal 1) - David Lewis, Josh DeBerard, Mark Cufaude, Jerry Cowles

- In Albany County, 12 acres of Public Access Areas was treated for noxious weeds. In Carbon County, 25 acres of Public Access Areas were treated for noxious weeds.
- 466 acres of hay meadows was irrigated on the Wick WHMA to provide forage for wintering wildlife. A total of 240 acres of noxious weed control was completed by the contractor and 20 miles of crucial winter range fence was maintained. The livestock operator used 220 AUMs on the existing grazing lease. Sheet piling and rock rip rap were installed on the Carlson Creek ditch west as gradient controls to prevent erosion.
- 35 acres of hay meadow was irrigated on the Pennock WHMA and 29 miles of crucial winter range boundary fence were maintained. The contractor completed 25 acres of noxious weed control.
- 88 miles of boundary fence was maintained on the Red Rim - Grizzly WHMA and 3,877 AUMs of livestock grazing were utilized in forage reserve.
- 4 miles of boundary fence was maintained on the Forbes WHMA and Albany County Weed and Pest sprayed two acres for noxious weeds.
- 6 miles of crucial winter range fence was maintained on the Laramie Peak WHMA and Albany County Weed and Pest sprayed one acre for noxious weeds.
- 7 miles of boundary fence was maintained on the Thorne-Williams WHMA. Over 2 miles of woven wire fence conversion to wildlife friendly fence was completed by a private contractor, and 4 acres of noxious weed control were completed by the Albany County Weed and Pest District (Figure 97).
- 3 miles of boundary fence were maintained on Cottonwood Draw WHMA.



Figure 97. *ThorneWilliams WHMA woven fence (left) was converted to a wildlife friendly fence (right).*

The conversion of 2.3 miles of woven wire fence on the west boundary of the Thorne Williams WHMA opened 2,834 acres of bighorn sheep winter and year-long range, mule deer winter and year-long range, elk winter range and pronghorn spring/summer/fall range. The fence contractor completed the removal and conversion of 12,200 linear feet of woven wire 2-strand sheep tight fence and replaced it with 6,850 feet of 3-strand, 750 feet of 4-strand, 2,600 feet of pole top, and 2,000 feet of buck and pole wildlife friendly fence (Figure 97).

Springer WHMA (Goal 2) - Jerry Cowles

A total of 352 acres were irrigated. Roughly 120 acres of warm season grasses and 10 acres of cool season grasses were irrigated six times under the north pivot irrigation system by a contract farmer on the Springer WHMA. The farming contractor planted, irrigated and harvested 160 acres of corn. The farmer also irrigated 35 acres of small grain food plots that were left standing for wildlife forage. Habitat and Access personnel irrigated 157 acres of Dense Nesting Cover (DNC). About fifteen acres of dryland food plots were left standing for wildlife. A noxious weed contractor sprayed 303 acres on Springer, Bump Sullivan, and Mac's 40 WHMAs. Three new steel goose pit/blinds were installed under the Thaler south pivot to provide improved goose hunting to the public. Goose nesting structures were repaired and re-bedded with assistance from Two Shot Goose Hunt volunteers. Six miles of boundary fence were maintained and the WGFD crew repaired and rip-rapped 1,600 feet of wetland dikes at the Wellnitz ponds.

Big Game Nutrition - Interpreting Nutritional Analysis of Forages and Fecal Diet Composition (Goal 4) - Ryan Amundson

Guidelines were developed and distributed in summer 2014 to assist WGFD personnel with interpreting lab results from forage and fecal analysis. This information will be used to make informed decisions regarding the value and need for habitat treatments in key areas to meet the nutritional needs of wild ungulates.

Encampment River Peryam Restoration (Goal 2) - Christina Barrineau



Figure 98. *Aquatic Habitat Technician, Stephanie Stoughton and contractor installing a rock-constructed riffle structure on the Encampment River Peryam Restoration.*

The Encampment River Peryam Restoration is a 1,200 ft reach immediately downstream of the 2011-2013 Boykin Restoration. Prior to restoration, the Peryam reach was a C4 channel with two short pools at the top of the reach that transitioned into a long, over-widened riffle/run feature throughout the remainder of the reach. Project goals included narrowing the stream channel and adjusting the pool to pool spacing to provide enhanced habitat for trout, especially during periods of low flow. The restoration included two constructed riffles, 250 ft of toe wood, pool depth enhancements, and bankfull benches for floodplain connectivity. Old cobble berms were also graded to the floodplain elevation to enhance floodplain access. Construction oversight assistance was provided for the construction, which took 11 days in September (Figure 98). Riparian enhancements, such as willow staking, may occur on the reach in 2015.

Similar to previous Encampment River restorations, monitoring for the Peryam restoration included establishing pre-restoration channel cross-sections and photo points. Cross-sections were measured and photos points were retaken immediately following construction completion. Biological monitoring was added for this project to provide information on restoration effects on trout populations and aquatic macroinvertebrates for Encampment River projects (Figure 99). A pre-restoration trout population estimate was conducted, and pre-restoration riffle macroinvertebrate samples were collected within and downstream of the Peryam reach. Post-restoration biological monitoring will occur in 2015 at the same sites. Additional information about the Encampment River Peryam Restoration can be found in the WGFD Fish Division Progress Report.

Partners for the Encampment River Peryam Restoration included WGFD, Trout Unlimited, private landowner, WWNRT, NRCS, and Saratoga-Encampment-Rawlins Conservation District.

Figure 99. *Aquatic Habitat Technician, Stephanie Stoughton, collecting a macroinvertebrate sample from a riffle in the Encampment River Peryam Restoration reach prior to construction.*



Riparian Habitat Improvement/Wildlife Friendly Fence Upper North Platte Priority Area (Goal 2) - WLCI, Jim Wasseen

During 2014, 16 miles of fence were converted to wildlife friendly standards on both BLM and private lands within the Platte Valley Management Area. These fence conversions were meant to improve migration routes for mule deer.

Miner Creek Watershed Habitat Assessments (Goal 2) - Christina Barrineau



Figure 100. Irrigation diversion structure on North Fork Miner Creek. Low summer stream flows and diversion materials may create a fish passage barrier.



Figure 101. Potential beaver relocation site in the lower reaches of North Fork Miner Creek.

Wyoming Habitat Assessment Methodology (WHAM) surveys were conducted throughout the Miner Creek Watershed, a 6th level HUC (101800020506) within the Encampment River Watershed. Surveys were completed on 4 streams covering 20.7 miles. Streams surveyed included North Fork Miner Creek, South Fork Miner Creek, Hell Creek, and Cooper Creek. Reference reaches for A and B channel types were identified, but no reference reach data was collected. Reference reaches provide vital stream channel design criteria for restoring degraded stream reaches.

Two irrigation diversions, one on North Fork Miner Creek (Figure 100) and the other on Copper Creek, were observed. Both structures appear to be barriers for upstream fish movements, especially during the summer months. Future investigations of the fisheries upstream and downstream of these diversions will be needed prior to any fish passage enhancement. Areas for potential beaver reintroductions were noted on lower North Fork Miner Creek and South Fork Miner Creek (Figure 101). A landowner in the watershed is interested in future habitat enhancements for both aquatic and terrestrial wildlife. Habitat enhancement planning with this landowner will occur in 2015. Additional information about the Miner Creek Watershed WHAM Level 1 surveys can be found in the 2014 WGFD Fish Division Progress Report, and WGFD WHAM and Photo databases.

Red Rim-Daley WHMA Forage Production (Goal 2) - Amy Anderson, Matt Pollock, Katie Cheesbrough



Figure 102. *Production sampling site on the Red Rim-Daley WHMA.*

In coordination with the Rawlins BLM Field Office and the WGFD, forage production/utilization monitoring on the Red Rim-Daley WHMA was re-initiated in fall 2014. In October, BLM and WGFD personnel collected fall production clippings from 7 established sites across the unit and found an average of approximately 169 lbs/acre of forage on the Red Rim-Daley WHMA (Figure 102). Production values will be compared with utilization sampling conducted spring 2015 to estimate wildlife forage use.

Baggot Rocks Invasives (Goal 2) - WLCI, Jim Wasseen

Located within the BLM/Upper North Platte Geographic Priority Area, the proposed project was designed to remove or treat invasive or encroaching plant species. Targeted species include all noxious and invasive species such as leafy spurge and Russian thistle and conifer trees that have encroached into riparian areas within the Baggot Rocks and Platte Valley areas. In 2014, the National Environmental Policy Act (NEPA) process was completed for the targeted areas. Treatments will be implemented in spring-fall 2015 in cooperation with Saratoga-Encampment-Rawlins Conservation District, WGFD, and Montana Conservation Corp as a potential partner. The project will be associated with a large-scale timber removal project currently estimated at 150 acres.

Laramie Range Conservation Easement (Goal 1) - Ryan Amundson

A 2,200 acre conservation easement is in the works on the foothills of the Laramie Range, west of Glendo. The private property is home to a resident herd of ~200 elk, pronghorn, mule deer, white-tailed deer, wild turkeys, and many neo-tropical migrant songbirds. The Rocky Mountain Elk Foundation is poised to be the easement holder, with easement monitoring being offered by the WGFD. In addition, the landowner recently installed four tire tanks on developed springs, with funding from RMEF, to provide reliable water sources for wildlife.



Figure 103. *One of four tire tanks installed on private property slated for conservation easement protection.*

Pennock WHMA Forage Production Monitoring (Goal 2) - Ryan Amundson and Katie Cheesbrough

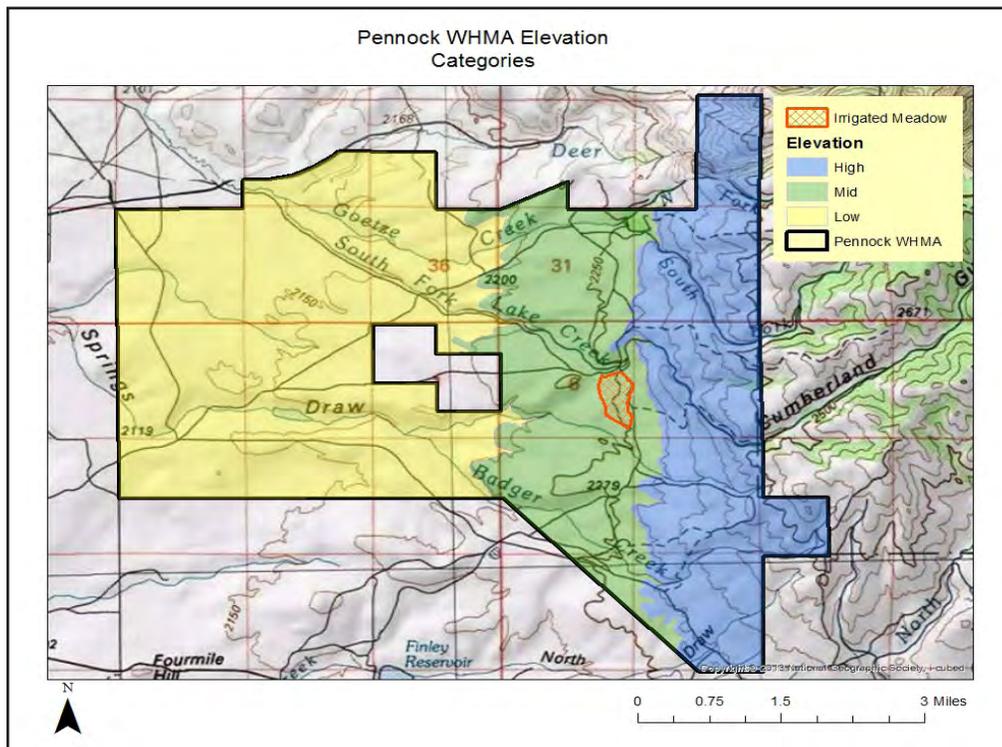


Figure 104. Elevational ranges in which forage production monitoring was conducted on the Pennock WHMA.

Based on collaborative PVHP discussions with local stakeholders, the Pennock WHMA has been identified as an area that could potentially be used as a “grassbank” to graze livestock that have been displaced as a result of habitat treatments in the area. As such, terrestrial habitat biologists began forage production monitoring in July 2014 on the Pennock WHMA to determine forage capacity for both



Figure 105. Production sampling site on the Pennock WHMA.

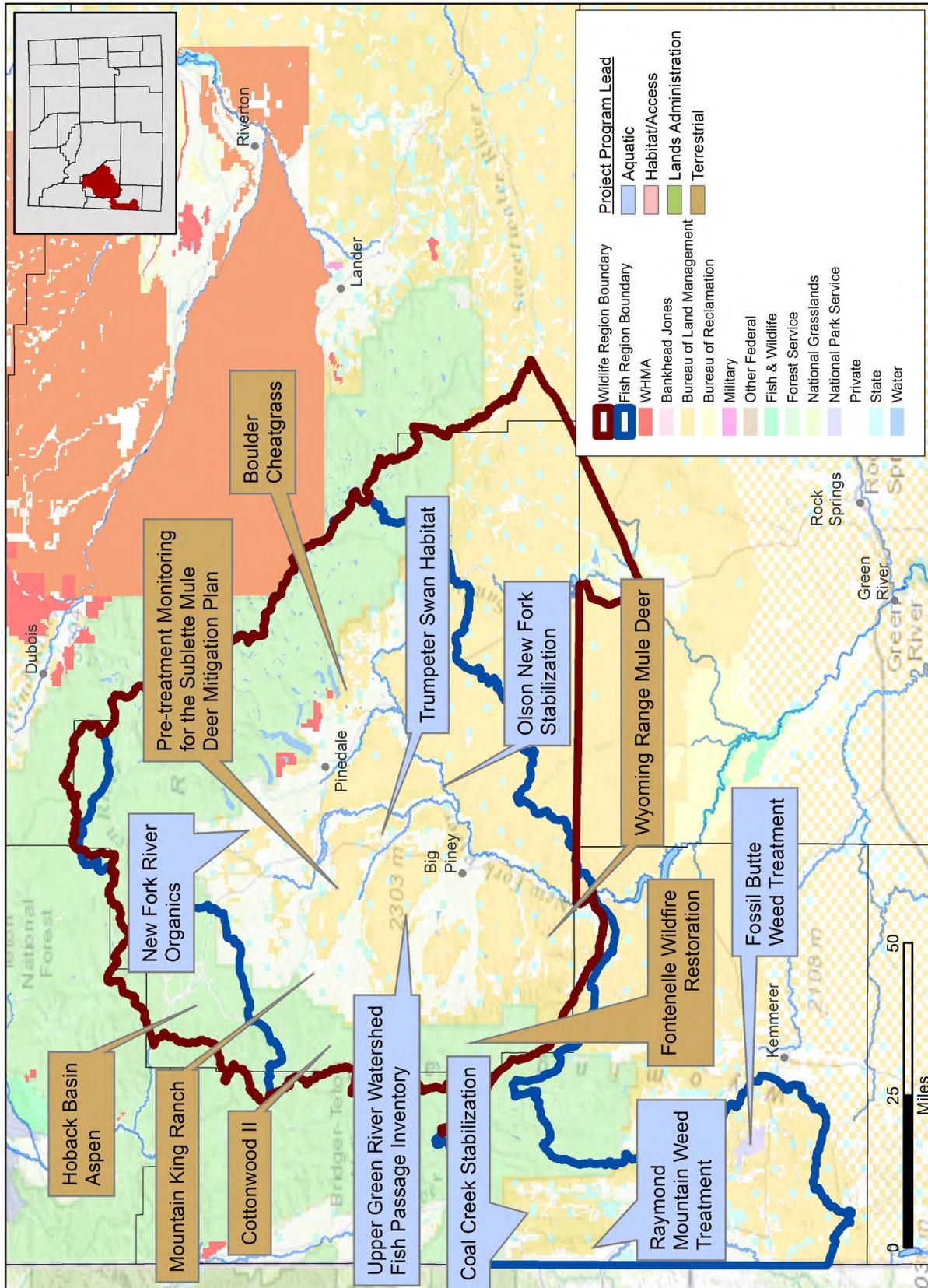
wildlife and livestock. At least three years of production and utilization data will be collected and analyzed against known wildlife use prior to making any final determinations or recommendations regarding livestock use on the Pennock WHMA.

Plot sites were selected to capture the different vegetation types that exist within elevational ranges (Figure 104) as well as on the irrigated meadow. As such, 4 plots were clipped at low elevation (6,500-7,200 feet), 3 plots were clipped at mid elevation (7,200-7,500 feet), 4 plots were clipped at high elevation (7,500-8,200 feet), and 2 plots were collected on the irrigated mead-

ow. At each site all grasses and forbs were clipped within a 12"x24" plot, collected, dried, and weighed to determine total pounds per acre of vegetation (Figure 105).

Above average precipitation was experienced in the Platte Valley in 2014 which influenced the production values found on the Pennock WHMA. The total average production across the WHMA, based on total acres in each elevational range, was approximately 668 lbs/acre. These production numbers will be compared to forage utilization sampling conducted in spring 2015 to estimate wildlife forage use.

Pinedale Region



Pinedale Region

Wyoming Game and Fish personnel partnered with a number of different agencies and organizations to accomplish a great deal for Wyoming's fish and wildlife in the Pinedale Region this past year.

Several habitat improvement projects were completed as part of the Wyoming Range Mule Deer Initiative. We treated a total of 3,300 acres in the Wyoming Range. Our plan is to treat a total of more than 30,000 acres from 2014-2021. Vegetation monitoring was also completed pre-treatment on these projects and will be conducted on years 2, 5, 10 and 20 post-treatment in cooperation with BLM personnel.

A number of aquatic habitat projects were initiated including the creation of wetlands on local private lands for trumpeter swans and other water birds. There were also several stream habitat improvement projects involving bank stabilization and grazing management on Coal Creek and the New Fork River and removal of a wooden fish migration barrier from Rock Creek. Also, a large multi-agency effort is underway to improve the Pine Creek fishery through the town of Pinedale.

2014 was also a good year for Public Access Areas (PAAs). Habitat and Access personnel developed a new walk-in fishing easement, the Chrisman PAA, on the Green River near Big Piney and an existing fishing access easement was expanded on the Pine Creek PAA in cooperation with the town of Pinedale.

Rock Creek Old barrier Removal (Goal 2) - Floyd Roadifer

A wooden fish migration barrier constructed in the mid 1970's was removed from Rock Creek (Figure 106). About 0.75 miles of the creek that had been isolated between the old barrier and a rock gabion barrier constructed circa 1982 is now reconnected.



Figure 106. Before (left) and after (right) removal, a 0.75 mile reach of Rock Creek that has been isolated since about 1982 was reconnected when this fish passage barrier was removed.

Cottonwood II Aspen (Goal 2) - Jill Randall and Eric Maichak



Figure 107. *Firefighters ensure burning conditions will meet vegetation goals for aspen regeneration.*

BTNF completed 482 acres of prescribed fire to promote aspen communities in the North and South Cottonwood Creek drainages in 2014. The project included mechanical slashing of conifers to provide a fuel base to accomplish vegetation objectives and ensure firefighter safety when performing the prescribed burn (Figure 107 - Figure 108). This slash allows for a greater level of control with prescribed fire due to the greater flammability of slash relative to adjacent untreated conifer stands. Previous treatments with this technique in the Wyoming Range have been very successful at regenerating aspen communities. Monitoring of aspen density, height and browse ensures management goals are being met to improve habitat quality for Wyoming Range and Sublette mule deer, Piney elk and Sublette moose herds. Funding partners include WWNRT, WGFD Trust and BTNF. The remaining 611 acres are planned for implementation in 2015-2016, based on burn window and funding availability.



Figure 108. *Conifer encroached aspen is frequently targeted for prescribed fire treatments to return fire to an ecosystem that is dependent on disturbance to maintain healthy aspen communities.*

Public Access Areas (Goal 2)- Miles Anderson, Matt Miller, Kade Clark, Derek Appley



Figure 109. *New parking area at Fear Meadows.*



Figure 110. *Culverts will be replaced with a steel arch plate (bridge) structure.*



Personnel from Habitat and Access performed annual required maintenance and monitoring of Pinedale regional PAAs. Airport PAA required further access road improvement due to high runoff levels. New culverts were added and access road heights were increased to prevent resource damage. A new walk-in fishing easement called Chrisman PAA was developed on the Green River at the Chrisman Ranch property. Also fishing easements were increased on Pine Creek PAA with cooperation with the town of Pinedale. Parking lot improvements were completed at Fear Meadows PAA on the Green River to exclude vehicle traffic from riparian areas (Figure 109).

Coal Creek Stabilization (Goal 2) - Floyd Roadifer and WLCI, Jim Wassen

In September, BLM approved the NEPA documents necessary to proceed with modifications and improvements along BLM Road 4216. This project is designed to reduce sediment entering Coal Creek, through bridge/culvert crossings, road and stream realignment, and stabilization of back slopes and toe slopes along the road. Final design plans and hydrological analysis were completed by A.V.I., an engineering firm. Approximately 375 cubic yards of rock riprap was delivered and stockpiled at a central location in the project area. The BLM is finalizing details with a landowner to make an adjustment to an easement. Questions regarding public access to BLM Road 4216 at its intersection with U.S. Highway 89 remain unanswered. A Temporary Use Permit was approved by the Wyoming State Land Board for the bridge across Little Muddy Creek. Two bridges (Figure 110) have been purchased with the intent to install and implement road improvement work (Figure 111) in the summer or fall of 2015.

Figure 111. *Road improvement and slope stabilization work will be implemented to reduce sediment inputs to Coal Creek and improve Bonneville cutthroat trout habitat.*

Soda Lake, Muddy Creek, Fall Creek and Halfmoon Wildlife Habitat Management Areas (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Derek Appley



Figure 112. Elk fence repair on Soda Lake WHMA.

Annual maintenance and improvements continue on Pinedale Region. Soda Lake WHMA had 36 miles of crucial winter range boundary and stock fence maintained and repaired (Figure 112). Additional work included beetle killed tree removal, fence repairs, elk jump repairs, and pole top replacement on boundary fences. Muddy Creek WHMA had 1.25 miles of crucial winter range elk fence maintained and one elk jump repaired. On the Fall Creek WHMA, 4.5 miles of crucial winter range boundary fence was maintained and 15,785 feet of donated drill pipe stockpiled for future construction of wildlife friendly pole top fence. On Half Moon WHMA, 11.6 miles of crucial winter habitat boundary fence was maintained. In Sublette

County, Habitat and Access contracted 2.2 acres of noxious weeds to be identified and sprayed on PAAs, WHMAs and Feedgrounds.

Wyoming Range Mule Deer Habitat (Goal 2) - Jill Randall and WLCI, Jim Wasseen

The objective of this project is to address the degradation of habitat quality on big game crucial winter range, transitional and parturition ranges for the Wyoming Range mule deer herd on federal, state and private lands in Sublette and Lincoln Counties. Project goals include: (1) improve the quality of mule deer habitat; (2) increase aspen regeneration; (3) reduce conifer encroachment; (4) improve the structure and regeneration of sagebrush and mountain shrub communities; (5) increase forb and grass diversity and percent composition; and (6) remove invasive plant species.



Figure 113. Habitat and Access personnel mowing sagebrush in South LaBarge.

During the summer and fall of 2014 a total of 3,313 acres were treated including mowing treatments on 1,553 acres of sagebrush communities on BLM, state and private land in the South LaBarge area (Figure 113). Dixie harrowing and seeding was implemented on 62 acres of BLM land near Cretaceous Mountain (Figure 114). Aspen mechanical prep work was completed on 775 acres of BLM land on the west slope of Miller Mountain. In addition, 73 acres of true mountain mahogany on BLM land near Saddle Ridge had aerial application of Plateau to stimulate resprouting shrubs and 850 acres of cheatgrass on BLM land in North and South LaBarge were sprayed with Plateau through aerial and ATV applications. In addi-



Figure 114. *Habitat and Access personnel treating sagebrush with a Dixie harrow near Cretaceous Mountain.*

tion, approximately 5 miles of fence was constructed to facilitate resting treated areas from grazing when future parts of the project are implemented. Cultural inventories were completed on 5,258 acres of federal and state lands that will have future soil-disturbing treatments. A total of over 30,000 acres will be treated over an eight year period from 2014-2021. Vegetation monitoring was also completed pre-treatment on these projects and will be conducted on years 2, 5, 10 and 20 post-treatment in cooperation with BLM personnel.

BLM Smithsfork AMP Coordination, Monitoring, & Management (Goal 1) - Floyd Roadifer

The Smithsfork Grazing Association in cooperation with the Wyoming Department of Agriculture and Lincoln County Conservation District initiated efforts to restart Coordinated Resource Management (CRM) processes to aid with development of a revised AMP for the BLM’s Smithsfork Allotment. Although this process continues to evolve, WGFD will primarily provide informal, technical information and advice to the “CRM Committee,” and provide formal comments to the BLM pertaining to the AMP revisions. Extensive comments were provided to the BLM in response to the scoping letter for the AMP revision. To clarify the long-term emphasis on Bonneville cutthroat trout in this area a summary was written describing the management history of this species with an emphasis on the Smithsfork Allotment.

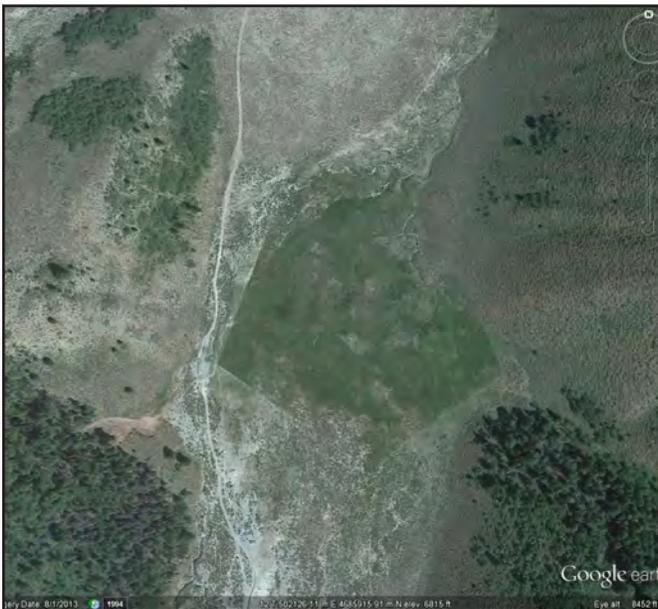


Figure 115. *Google Earth image of the Huff Creek enclosure taken August 1, 2013 showing healthier, more vigorous plant communities inside.*

To assist with monitoring direction provided in the 2009 Settlement Agreement the Pinedale AHAB coordinated closely with the Kemmerer BLM to implement a stream temperature monitoring plan across the allotment. A total of 19 stream temperature loggers and 3 air temperature loggers were downloaded in the spring and fall of 2014.

Most of the enclosures in the Smithsfork Allotment were maintained. The more vigorous condition of vegetation inside these enclosures is clearly visible on Google Earth imagery. The enclosure constructed in 2008 on Huff Creek to help prevent an old beaver dam from being breached provides one example (Figure 115).

Halfmoon and Black Butte Wildlife Habitat Management Areas Grazing (Goal 2) - Miles Anderson, Matt Miller, Kade Clark, Derek Appley



Figure 116. *New water tank at Halfmoon WHMA.*

Livestock grazing of 440 AUMs (3,769 acres) was used to improve nutritional quality of rangeland health/forage on the Halfmoon WHMA. This was done in cooperation with the Fontenelle fire regeneration project to provide grazing rest on allotments that would normally be grazed where the Fontenelle fire occurred. On Black Butte WHMA, livestock grazing of 335 AUMs on 525 acres was used to improve nutritional quality of rangeland health and forage. A new water tank and spring water lines were installed to provide water and distribute grazing for wildlife and livestock (Figure 116).

Fontenelle Wildfire Restoration (Goal 2) - Jill Randall, Floyd Roadifer, WLCI, Jim Wasseen

The goal of the project was to defer grazing for two years on the areas burned by the 64,000 acre Fontenelle Wildfire in 2012. Although the wildfire was not planned, agencies responded in a manner similar to a planned treatment by working with permittees to maximize the benefits of the wildfire in terms of vegetation recovery, habitat quality and forage production. This was accomplished by providing alternate sources of forage for livestock, assisting with the movement of livestock to the identified alternate allotments or pastures, and providing riders to manage livestock while on the temporary pastures. Although the primary vegetation type affected by the fire was conifer, there were significant areas of aspen that have demonstrated a positive suckering response and expansion into areas where they were previously overtaken by conifers (Figure 117). The benefits to wildlife include higher quality herbaceous forage (Figure 118), restoration of aspen communities and returning natural fire cycles to the ecosystem which experienced many years of fire suppression.

The cooperators also monitored the vegetative response and early detection and control of weed infestations, and provided assistance by replacing lost infrastructure within the burned area. Aspen monitoring stands on BLM (n=7) have an excellent density of suckers (range of 4,550-21,450 stems/acre) and have less than 10% annual leaders browsed (range of 2%-9%). BTNF aspen stand monitoring (n=4) also showed similar conditions as the BLM sites



Figure 117. *Aspen regeneration has been excellent after the Fontenelle Wildfire.*



Figure 118. *A mule deer doe benefits from the post-wildfire herbaceous understory response including wild hollyhock which has excellent nutritional value.*

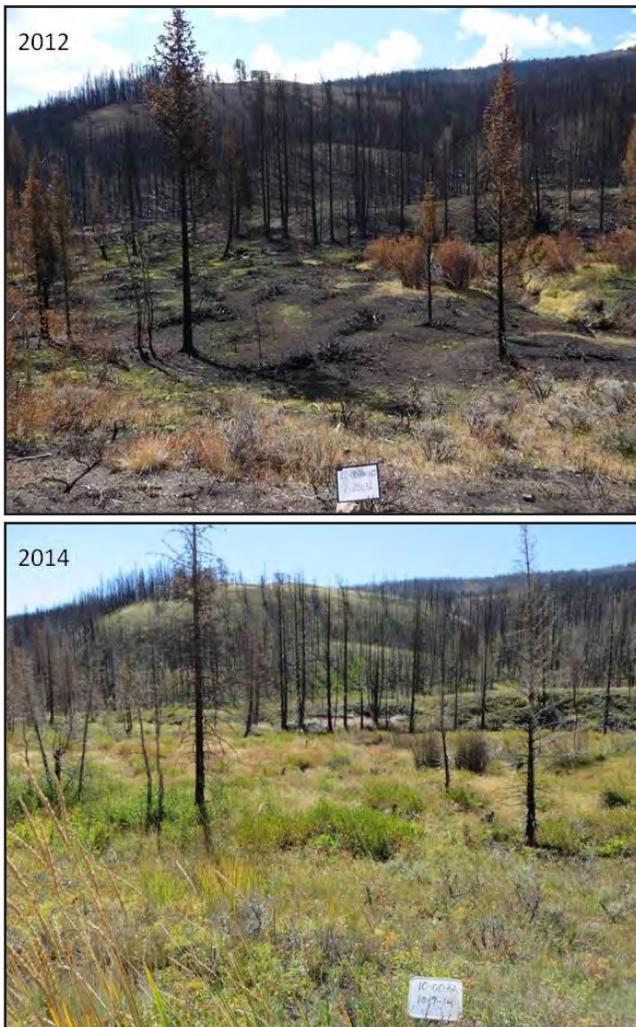


Figure 119. *Vegetation restoration in a burned riparian area that greatly benefited from the management actions in 2013-2014.*

Commissioners. Other agency partners include USFS, BLM, NRCS, Sublette County Conservation District, Sublette County Weed and Pest, and UW Extension.

Trumpeter Swan Summer Habitat Enhancement (Goal 2) - WLCI, Jim Wasseen

The major objective of this project, which has been ongoing since 2007, is to construct and restore shallow water wetland habitat on private lands in the Green River Basin to increase high quality summer habitat for a resident population of Trumpeter Swans, other waterbirds and wildlife. In 2014, NEPA, permitting, and design work for two ponds on the Lazy River Ranch were completed. Construction of the “Homestead” Pond on the Lazy River Ranch was completed in April 2014 and the pond was filled in May. In July 2014, an agreement was signed with the Rimfire Ranch to complete work to fortify the dike on the Sago Pond, fix the Agridrain on the Trumpeter Pond, and replace pipes and rework dikes at both ponds. Given the wet conditions this summer in the Daniel area, work could not be started on the Rimfire Ranch; this work will be postponed until 2015. Partners include the Lazy River Ranch, Lost River Ranch and Rimfire Ranch, WGFD, USFWS, WWNRT, Upper Green River Grazing Association, Ducks Unlimited, and BLM.

and will also help managers understand effects on vegetation once livestock use resumes. Ground cover data on BLM and BTNF indicates most sites are relatively stable and can sustain livestock grazing in 2015. Isolated areas of extreme sedimentation or lack of ground cover will be monitored on a site-specific basis to ensure future management does not negatively affect restoration efforts (Figure 119).

In 2014, all displaced livestock from 11 federal allotments affected by the wildfire were relocated to other available USFS allotments, WGFD Half Moon WHMA, or leased private pastures. The livestock were herded by riders in these new locations; the permittees were satisfied with the agency response to their plight. Weed control efforts were initiated, including backcountry mapping and treatments with horseback, backpack and ATV spraying efforts. Infrastructure (fence) replacement on the burned allotments are complete to ensure livestock management will be feasible once livestock return to the burned area. The second year of vegetation monitoring was completed with positive results, and the BLM and USFS have ensured permittees that all livestock will return to their customary allotments in 2015. The project has identified the need for long-term maintenance, in regard to weed surveillance and control as well as vegetation monitoring. Funding partners include WWNRT, WGFD Trust, WGBGLC, RMEF, and Sublette County

Using Interagency Teamwork and Grass Production to Assess Long-Term Range Health at Bench Corral (Goal 5) - Eric Maichak and Jill Randall

During early October 2014, personnel from WGFD, BLM (Figure 120), and Sublette County Conservation District collected herbaceous production clippings from 7 sites clipped previously in 1995 and 2000. This study resulted from 1) allotments encompassing the Bench Corral feedground used consistently by elk were labeled out of “properly functioning condition” (PFC), as well as 2) assisting BLM with allotment plan updates by providing the most accurate data possible. The elk population using the area has increased over time (Figure 121) and may be contributing to lack of PFC. Therefore we used above-ground grass production collected at 7 sites previously monitored to assess if production was A) lower or B) declining over time following inception of the North Piney to Bench Corral feedground elk migration.

We found that production was not lower following the migration ($P = 0.45$), but there was a difference among years sampled ($P = 0.004$) with no visible decreasing trend over time (Figure 122). The difference among years is likely a function of precipitation, so we compiled precipitation data from 1 May to 30 September at the Big Piney weather station to compare among years (Figure 122). We found that precipitation does not differ prior to and following the migration ($P = 0.15$), and that there is a slight difference ($P = 0.09$) among years. Precipitation and grass production patterns corresponded to one another suggesting that rain drives production.



Figure 120. Ben Wise (left) and Sydney Bleach (right) collect herbaceous production clippings from Bench Corral, 2014, in western Wyoming.

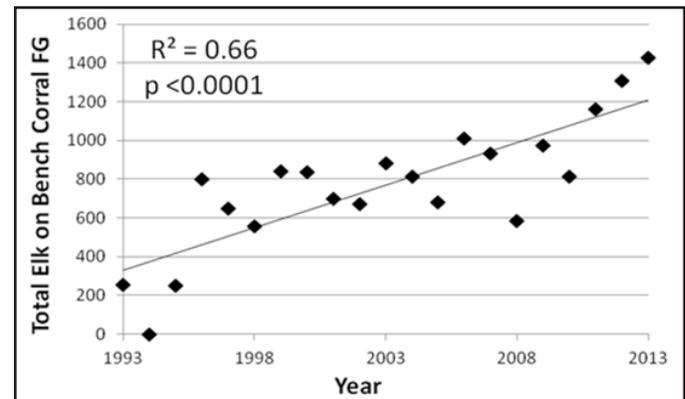


Figure 121. Annual counts of elk on Bench Corral Feedground, 1993-2013. Annual migration from North Piney to Bench Corral was instituted by 1996.

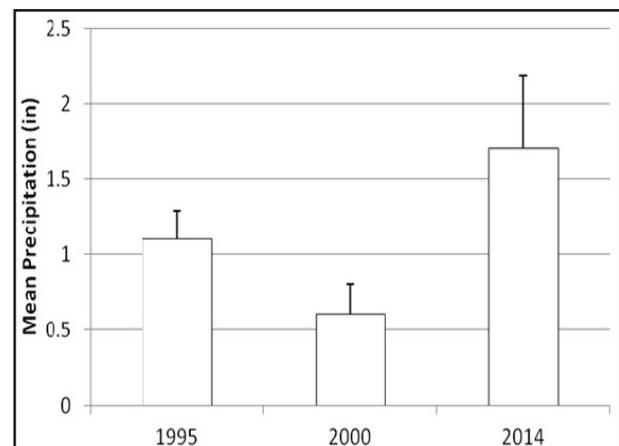
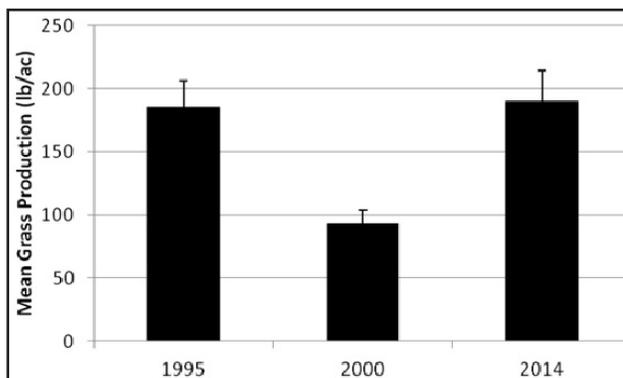


Figure 122. 1995-2014 annual mean precipitation (left) and annual mean grass production (right) on Bench Corral Feedground.

When compiled with results from 2013 (i.e., increased younger age sagebrush age, no change in cover of grasses or forbs, increased Shannon-Weiner diversity indices, stable sagebrush densities, stable grass and forb production), the migration and particularly increased population of elk has not diminished the health of the upland portion of the range on the Bench Corral area. Use by elk during the dormant season is likely not reducing seed production, grass reproduction, or health of the upland portion of the range.

Tall Forb Monitoring in Forage Reserves (Goal 5) - Jill Randall and Floyd Roadifer

Regional WGFD Habitat and BFH personnel assisted the Bridger Teton National Forest (BTNF) with scheduled monitoring of key species and ground cover at three tall forb sites in the Triple Peak Forage Reserve (TPFR) and one in the Wyoming Range Allotment Complex (WRAC). The WRAC site is in North Horse Creek (Figure 123) and the TPFR sites included one in South Cottonwood Creek, Lunch Creek Meadows and near Menace Falls.

The monitoring in forage reserves indicates a slow recovery is in progress. Additional key species have been noted on monitoring sites which indicates lower herbivory levels are allowing for establishment of high quality forage plants. Ground cover is improving although still far below the goal of 80%



cover, indicating a great deal of time is still required before the areas will be suitable for the return of domestic sheep grazing. Benefits, including reduction of sedimentation into watersheds and improved forage conditions for big game wildlife, are far reaching and long-term in these two forage reserves.

Figure 123. *Monitoring site in North Horse Creek drainage which still indicates a need for recovery of species diversity and ground cover.*

Aspen Restoration on the East Slope of the Wyoming Range 2014 Treatments and Monitoring (Goal 5) - Eric Maichak and Jill Randall

On-the-ground treatment, partnerships, and research-based monitoring continued in aspen stands along the east slope of the Wyoming Range in 2014. The final site (Miller Mt.) within the Wyoming Front Aspen Restoration Project (WYFARP), was burned by BLM and Piney BFH personnel in December (Figure 124). An adjacent landowner with prior concerns of smoke damage to his cabin observed, photographed, and commented that he was pleased with the treatment and lack of “scorched earth”. Although the monitoring site was not treated it is scheduled for slash/pile/burn in 2015.



Figure 124. *Burning slashed conifer piles in a Miller Mountain WYFARP aspen stand, December 2014.*

Collaboration among WGFD, BLM, and Sublette Co. Conservation District in July made for efficient monitoring of aspen at 5 sites ranging from 1 to 5 years post-treatment. Among stands we found that aspen densities declined as is typical with increased time since treatment (13,000 to 1,000 stems/acre). We found that proportions of suckers increased with time since treatment in 3-6 ft tall (18% to 53%) and ≥ 6 ft tall (0% to 14%) categories. Browsing of terminal leaders on suckers 0-6' tall was low (mean = 11%) with 1 site (Camp Creek) that excluded livestock. These data suggest good regeneration among stands and will be used to help WGFD, Grand Teton National Park, and Teton Science School

develop a database and model to predict appropriate thresholds of aspen metrics (e.g., density, % terminal browsing, height categories) to determine grazing turn-on following treatment or wildfire.

At Upper Billies (2 years post-treatment), we collected species composition (converted to Shannon-Weiner Index) and basal ground cover (percent) in July as well as herbaceous production (lb/acre) in October (Table 4). Measurable objectives for 5-years post-treatment included no net loss of species diversity, 95% basal ground cover, and a 100% increase in herbaceous production. We found that since pre-treatment (Table 4), species diversity declined and has recovered and exceeded the objective. Cover (exposure) of bare ground increased and appears to be recovering. Grass and forb production declined and recovered, and in combination, has exceeded the objective. Since treatment this site has incurred full livestock use with application of range riders.

Year Post-Treatment	Shannon-Weiner Diversity Index*	% Basal Cover of Bare Ground	Production (lb/acre)	
			Grass	Forb
-2	1.80 (± 0.21)	0	4.2	8.5
0	1.08 (± 0.29)	23	0	5.8
2	2.15 (± 0.12)	15	1.4	243.0

*Includes all grass, forb, shrub, and tree species encountered.

Table 3. *Select results from Upper Billies aspen macroplot, 2014, western Wyoming.*

Site	Years Post-Treatment	Suckers per Acre	% Suckers 3-6 Ft Tall	% Suckers ≥ 6 Ft Tall	% Terminal Leaders Browsed*
Camp Creek	1	13371	17.7	0	5.8
Upper Billies	2	7083	43	0.001	12.6
Red Canyon	4	1130	52	0	17.8
Maki (BLM)	5	1059	52.8	9.4	5
Maki (USFS)	5	1360	51	14	15

* Percentage of aspen suckers 0' to 6' tall with current-year browsing of terminal leader.

Table 4. *Select results from aspen stands monitored in 2014, western Wyoming.*

Winter Range Shrub Monitoring (Goal 5) - Jill Randall

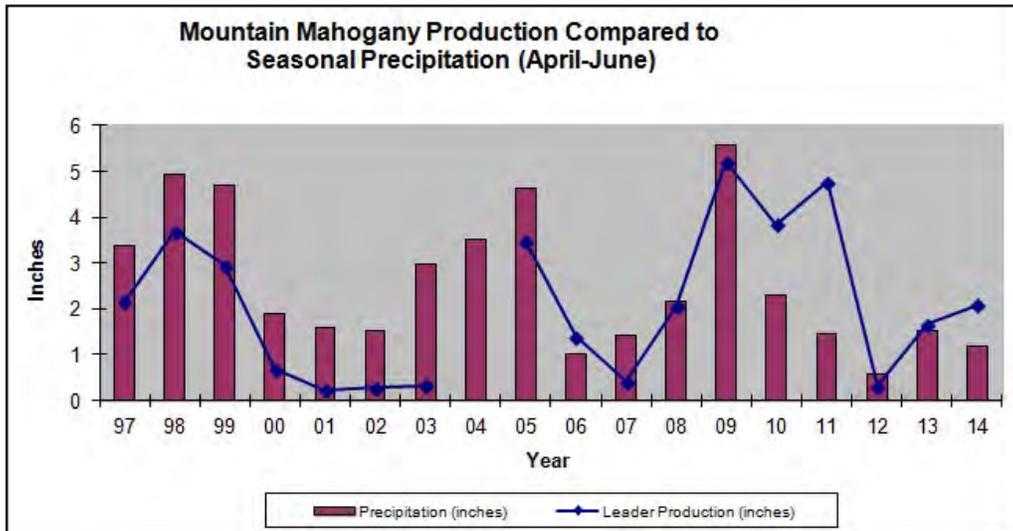


Figure 125. Production on true mountain mahogany compared with precipitation total for the months of April through June annually, as collected in the Calpet winter range.

The growing conditions were good, but not exceptional in 2014 for shrubs on winter ranges in the Pinedale Region. Spring and summer rains (Figure 125) also generated good conditions for shrub seed production. Although seed production is the first step in seedling establishment, growing conditions for the next three years will need to be favorable to establish a new age class in Wyoming big sagebrush and many other shrub communities. Leader production in 2014 for sagebrush species was around 1 inch and for bitterbrush and true mountain mahogany it was over two inches, on average (Figure 126). Although local residents consider the summer of 2014 to be very wet, there are a number of other factors that contribute to leader production such as the extreme drought of 2012 and overall health of shrubs. The stand average includes leaders from zero up to eight or nine inches long. Fortunately, summer conditions allowed wildlife to maximize fat reserves in 2014. Many habitat treatments WGF D has planned for Wyoming Range and Sublette mule deer herds have the objective of establishing young age class shrubs for long-term improvements of wildlife foraging conditions.

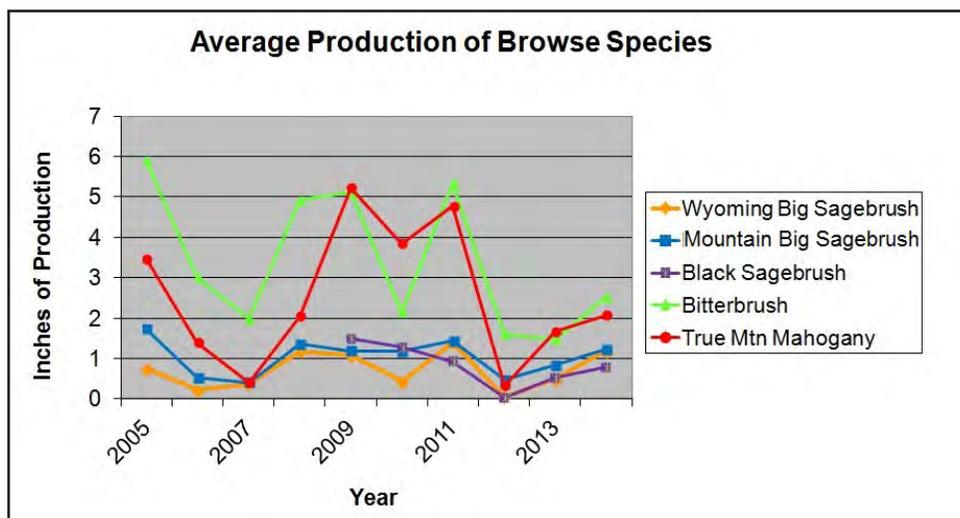


Figure 126. Average leader production in the Pinedale Region, delineated by species.

Pinedale Anticline and Jonah Field Reclamation (Goal 2) - Dan Stroud

The Reclamation Plan in the 2008 Record of Decision (ROD) for the Pinedale Anticline Project Area (PAPA) requires reclamation to meet specific benchmarks. At the fifth year after seeding, reclaimed locations should be revegetated with a self-sustaining, vigorous, diverse, native plant community that is resilient as evidenced by well-developed root systems, flowers, and seed heads.



Figure 127. Reclaimed Pad, not meeting reclamation success criteria.



Figure 128. Cheatgrass found on 1/3 of the reclaimed locations monitored.

The WGFD staff with the Pinedale Anticline Project Office (PAPO) monitored 232 reclaimed gas field development pads in 2014. Monitoring results found 75 reclaimed pads were either newly seeded or had just 2 growing seasons. Locations with 3 or more growing seasons were evaluated for trends demonstrating reclamation success. Operators also submitted 60 locations for final reclamation. This status indicates industry had no plans for additional development at the location.

The Pinedale Region experienced high moisture in early spring and summer 2014 that should have provided reclamation a welcome boost. However, even with the added moisture monitoring results found 61% of the locations with 5 seasons of growth, were not meeting the criteria set out in the ROD.

Unfortunately, the moisture received in early spring provided perfect growing conditions for cheatgrass. Monitoring found cheatgrass on nearly 1/3 of all locations. Some locations with successful reclamation may be compromised by cheatgrass invasion. Cheatgrass is expected to be listed as a Sublette County declared noxious weed in 2015. The PAPO along with the BLM and Sublette County Weed and Pest will work with Operators this year to explore actions that can be taken to address cheatgrass and the high percent of locations lacking reclamation success.

Sage Grouse Treatment Analysis (Goal 5) - Jill Randall and Katelyn Hayward (Pinedale Middle School)

During August, Katelyn Hayward, an 8th grade student, collected data for her science fair project which has applicability to some of our current management questions regarding sage grouse in Wyoming. Her study was designed to determine if sage grouse use was higher in treated areas compared to adjacent untreated areas in mountain big sagebrush communities which are used as brood rearing habitat (Figure 129). She visited four previous mechanical sagebrush treatments (2007 Ryegrass Mowing, 2009 Ryegrass Mowing, 2007 O Bar Y Aerator, and 2008 Double J Aerator) and conducted pellet group counts along a 1 x 50 m. belt in three paired control and disturbed locations in each treatment. Pellets were



Figure 129. *Mix of sagebrush and forbs that sage grouse prefer for brood rearing habitat.*

classified as a roost or foraging group based on the number and distribution of individual pellets. The majority of pellets were foraging, opposed to roost piles. Her results indicated at most sites (n=10) the treatment had a higher count of pellet groups compared to adjacent untreated areas and at the other sites (n=2) the treatment and control pellet counts were equal.

Jill Randall collected sagebrush canopy cover data to understand time required for the site to return to 15% sagebrush canopy, to improve data accuracy for the disturbance database and future DDCT analyses. The 2007 O Bar Y Aerator has already returned to 23.3% canopy cover within 7 years, while the 2008 Double J Aerator is close at 11.3% canopy cover. Based on ocular estimates mowing treatments were not close to 15% canopy cover of sagebrush.

Olson New Fork Wetland Creation and Stream Bank Restoration (Goal 2) - WLCI, Jim Wasseen

The project objectives are to prevent further erosion and development of a new channel that would cut off one large river meander and shorten the river by about one mile (Figure 130), protect an irrigation diversion located 0.67 miles downstream, create and enhance about 20 acres of seasonal wetlands, stabilize an eroding bank, and enhance stream habitat on approximately 600 feet of the New Fork River. Water control structures were installed in the vicinity of the threatening incision, which enabled the inundation of a large wetland area; however, high runoff overwhelmed the water control structures causing them to fail. The engineering firm will repair the structures at their cost. The stream enhancements are waiting for the Army Corp of Engineers permitting to begin, at which time the rehabilitation of the wetland structures will be completed.



Figure 130. *Downstream river bank and side channel habitat that would be abandoned if meander were cut off.*

Hoback Basin Aspen Inventory (Goal 5) - Jill Randall

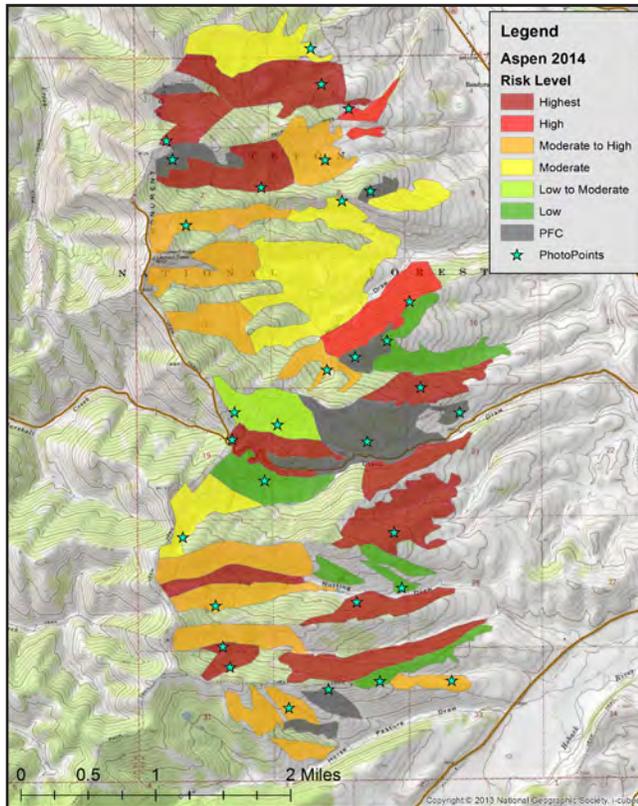


Figure 131. Map of the inventory area with risk assessment information and photo points.

To better plan future aspen treatments, several areas in the Hoback Basin were reselected to assess current distribution and condition of aspen communities and to prioritize potential future treatments with Bridger Teton National Forest. Within a priority area on Monument Ridge, aspen were community typed and a risk assessment was conducted for each stand monitored. Aspen community types were adopted from “Aspen Community Types of the Intermountain Region” and the risk assessment was adopted from the “Key to the Risk Factors Used to Prioritize Areas with Aspen for Restoration and Conservation Actions in the Intermountain West.” Over 4,200 acres of aspen communities were inventoried as part of this effort. Throughout the area, eight different community types were identified with Aspen/Subalpine fir/Russet buffaloberry type encompassing the most acreage. The risk assessment indicated 3,251 acres were in Moderate to Highest priority level (Figure 131), indicating management action should be prioritized to prevent conversion to conifers (Figure 132). In addition, 34 photo points were established which will serve as a good tool to describe current conditions and can be retaken post-treatment to assess changes as a result of management actions.

Figure 132. Beaver pond that may not persist if the aspen community continues to convert to conifers.



Potential Influence of Natural Gas Wells on Surface Water in the Pinedale Anticline (Goal 2) - WLCI, Jim Wasseen

This project identified groundwater sources to the New Fork River. Waters associated with natural gas drilling are often saline and have a corresponding high electrical conductivity. By identifying groundwater inputs to surface waters in the New Fork River drainage, the project will allow for future monitoring for hydrocarbons and other contaminants associated with natural gas drilling activities. The U.S. Geological Survey conducted float and ground surveys of the New Fork River during the fall of 2014; eighteen miles of the New Fork River were surveyed. The electrical conductivity of spring sources and side channels were identified using conductivity probes and the location of each site was recorded using a handheld GPS. Electrical conductivity will be monitored at six sites using data logger conductivity meters for one year to identify potential pulses of high conductivity water. Monitoring at the six sites will continue through fiscal year 2015.

Pre-treatment Monitoring for the Sublette Mule Deer Mitigation Plan (Goal 2) - Dylan Bergman and Dan Stroud

The Sublette Mule Deer Mitigation Plan has been in the planning phases for several years. The project will likely treat ~3,000 acres of habitat over four years, primarily in decadent sagebrush and mountain shrub communities. Overall project goals are to improve crucial winter range habitat quality. Treatments in sagebrush habitats will promote greater age class diversity and reduce overstory shrub dominance. Treatments in Wyoming big sagebrush will also entail seeding on some sites. The NEPA process is nearly complete and implementation is anticipated in fall of 2015.

In 2014 pre-treatment monitoring was done on 18 locations (12 treatment sites and 6 control sites), and supplemental monitoring was done on 10 locations (6 treatment sites and 4 control sites) to bolster data collected in 2013 (Figure 133). Data collection in 2014 included; 500 line-point intercept points, shrub age classification, shrub density, shrub height and species richness sampling targeted towards rare forbs (Figure 134). Extensive coordination occurred between permittees and PAPO office personnel in 2014 to ensure future success of project implementation.

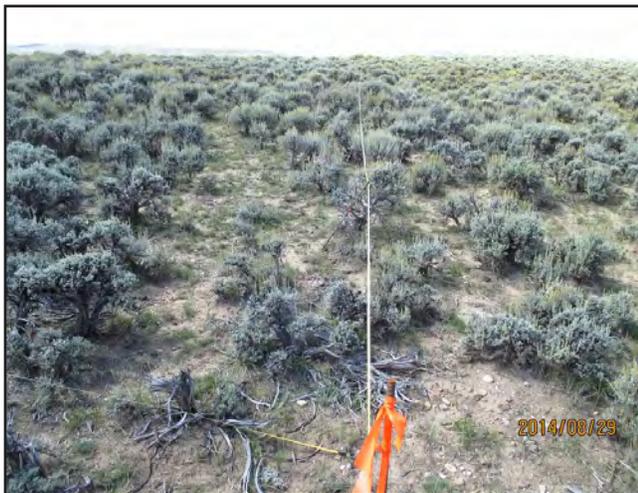


Figure 133. Pre-treatment monitoring in a mountain big sagebrush community.



Figure 134. Pre-treatment monitoring method to sample forb density.

Thomas Fork Tributaries – Giraffe Creek Riparian Restoration (Goal 2) - Floyd Roadifer

The Pinedale aquatic habitat biologist continued to coordinate with private landowners to improve riparian and in stream habitat on Giraffe Creek. The WGFD provided a small grant to the downstream landowner to support efforts to better control cattle by herding them off of the riparian areas along this ~1.5 mile section of Giraffe Creek that provides critical spawning habitat for Bonneville cutthroat trout. Over the past 5-7 years the landowner has demonstrated a desire to improve riparian conditions on this 640 acre parcel that was apparently sprayed with herbicides sometime in the past (circa 1960s or 1970s). Results of these efforts have generally been positive, but progress is slow (Figure 135). Use on willows in 2014 was measured at 37% at the upper site and 47% at a downstream location. The goal is to reduce use levels to 35% or less to release this community and achieve long-term habitat improvements. To monitor the long-term trends from these improved grazing management efforts, a riparian greenline monitoring site was established.



Figure 135. *Improved riparian management on Giraffe Creek in recent years has allowed willow communities to gradually begin to recover. However, only a few mature plants are present.*

Post-treatment Monitoring in Spike and Prescribed Fire Sites, East-Slope Wyoming Range (Goal 5) - Eric Maichak and Jill Randall

WGFD brucellosis feedground and habitat and Pinedale terrestrial habitat, BLM range/wildlife, and SCCD personnel conducted post-treatment monitoring along the east-slope of the Wyoming Range in summer and autumn 2014 (Figure 136). Sites ranged from 15 to 20 years post-treatment with prescribed fire in mountain big sagebrush (Brodie Draw, burned twice in one week autumn 1999) and Spike herbicide in Wyoming big sagebrush (O’Neil Individual, Deer Hills/McNinch in 1994). Compared to readings from 5 years ago, we found that among all sites 1) grass and forb production was higher; 2) percent cover of grasses, forbs, and shrubs was higher; 3) species richness and density of live shrubs was similar; and 4) basal cover of litter was lower. Increased production and percent cover of herbaceous species was likely from good summer moisture and warm temperatures. Increased cover of sagebrush is likely from good moisture from autumn 2013 through summer 2014. Decreased percent cover of litter is likely from a difference in methodology/observer bias between WGFD and BLM/SCCD personnel as prior readings were solely from WGFD personnel. The prescribed fire site had greater species diversity than Spike sites (Shannon-Weiner Index = 2.38 vs 1.25), a difference similar to observations from prior years. Within treatment types, prescribed fire and Spike sites had higher grass production than respective control sites (lb/acre = 233 vs 105), while forb production was again lower



Figure 136. Monitoring photos from Brodie Draw RX burn (A), Deer Hills/McNinch (B) and O’Neil Individual (C) Spike herbicide treatments, east slope Wyoming Range, June 2014.

in Spike than respective control sites (lb/acre = 6 vs 24). For the prescribed fire site, sagebrush plants were finally encountered on line intercept transects (% cover = 0.02). Working with other agencies increased data collection efficiency and sharing. We appreciate their support and will provide BLM with production and ground cover data for allotment plan updates. This has ultimately fostered positive relations, collaboration, and trust among all cooperating agencies.

Mountain King Ranch (Goal 2) - Jill Randall and Eric Maichak

Planning and inventory of the north portion of Mountain King Ranch was conducted by WGFD, NRCS and Sublette County Conservation District personnel in 2014 in preparation for treatments and changes in livestock management to improve habitat conditions on the ranch (Figure 137). The objectives of the ranch include increasing wildlife use of the ranch which is consistent with the Sublette Mule Deer Initiative and other WGFD efforts to improve habitat for a significant number of sage grouse, moose, pronghorn and elk that currently use the ranch. Plans are in place to conduct treatments in 2015 including legume seeding, planting mountain shrubs, ripping aspen roots and weed control. Additionally, the southern portion of the ranch will be inventoried in 2015 in order to identify potential project work on the rest of the ranch in future years.



Figure 137. Private land providing important habitat for wildlife on the east slope of the Wyoming Range.

Chicken Creek Monitoring, 5 Years Post-Prescribed Fire (Goal 5) - Jared Rogerson and Jill Randall

The Chicken Creek prescribed burn was implemented in the fall of 2009. It was a 1285 acre project with sagebrush, aspen, conifer, and willow vegetation. Much of the aspen was encroached by conifers. The objectives of the Chicken Creek burn were: 1) attain 60% ground cover in treated sagebrush/grass areas within 2 years post burn and 80% within 5 years post burn; and 2) attain 1000 aspen stems per acre in burned aspen areas that are 10 feet tall within 15 years.

At 5 years post burn, the Chicken Creek prescribed burn has not met ground cover objectives but sagebrush recovery and herbaceous response are good (Figure 138). This may be a result of a combination of burn severity and soil texture. Further investigation into ESD's indicate that 80% ground cover is likely not attainable due to coarse soil characteristics. We will continue to monitor to inform future projects in similar soil types. These bare soils are currently quite vulnerable to colonization by cheat-grass, although none was observed by the Fire Effects Crew and Wyoming Game & Fish personnel in July 2014. Two aspen monitoring stands were selected for monitoring and both demonstrated abundant suckering after the fire (Figure 139). Sucker density was measured in year two post-burn (7,260 and 8,690 stems/acre) and in year five post-burn (6,500 and 5,673 stems/acre) and indicates it is on track to meet long-term objectives after natural thinning occurs in the next several years. Sucker height class data indicates that the stand is successfully getting taller, with a substantial proportion of the population reaching the 3-6 foot group. A few suckers are also making it into the 6-10 foot range. This indicates that ungulate browsing is not having a detrimental effect on stand regrowth.



Figure 138. Sagebrush monitoring site showing pre-treatment, immediate post-treatment and years two and five post-treatment vegetation response.



Figure 139. *Aspen stand repeat photos showing immediate post-treatment conditions and aspen regeneration in years two and five post-treatment.*

Cheatgrass Control (Goal 2) - Jill Randall and WLCI, Jim Wasseen

This is a long-term project to address the spread of cheatgrass in Sublette County, Wyoming. Cheatgrass, an invasive non-native grass, has infested areas within sage-grouse core area, crucial ranges for mule deer, elk and moose, and has replaced native plant species. In coordination with the Sublette County Invasive Species Taskforce, the county's Cheatgrass Management Plan has been implemented by Sublette County Weed and Pest, which includes grant funding from WLCI and Sage Grouse Local Work Group for fall aerial and ATV treatments. Line-point intercept vegetation monitoring has been completed annually in June since treatments began in 2011. Past treatments are experiencing a return of cheatgrass to the level that existed pre-treatment, which has required prioritization of these areas for re-treatment in 2015. This is similar to results reports state-wide. In 2014, approximately 5,474 acres of land (including 850 acres that was reported in the Wyoming Range Mule Deer Habitat Project) were treated across Sublette County and the South LaBarge area of Lincoln County.

**Wyoming Range Mule Deer Research (Goal 5) -
Dr. Kevin Monteith (UW COOP), Gary Fralick, Jill Randall, Alyson Courtemanch**

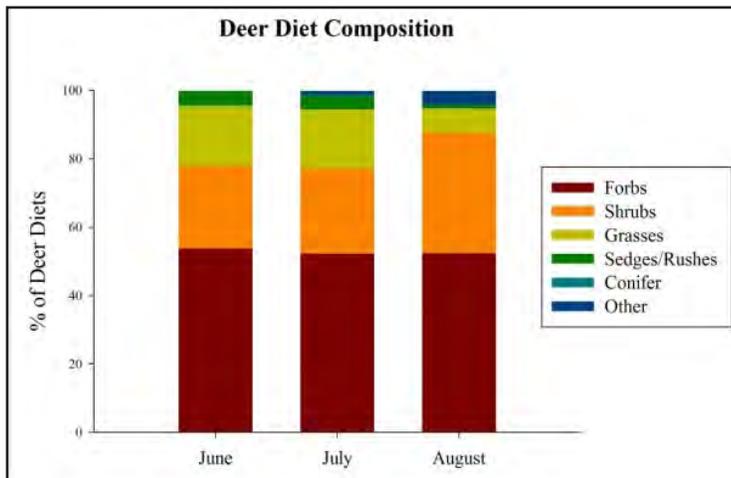


Figure 140. Preliminary diets of mule deer for June, July and August as delineated by vegetation type, Wyoming Range.

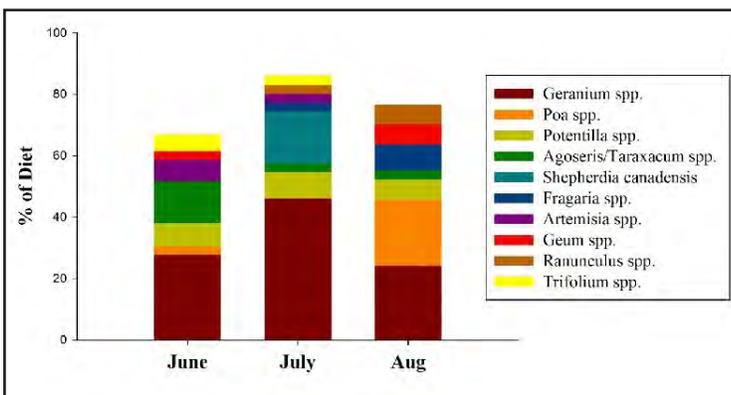


Figure 141. Preliminary breakdown of species that were found at high levels in the diet of mule deer in June, July and August, Wyoming Range.

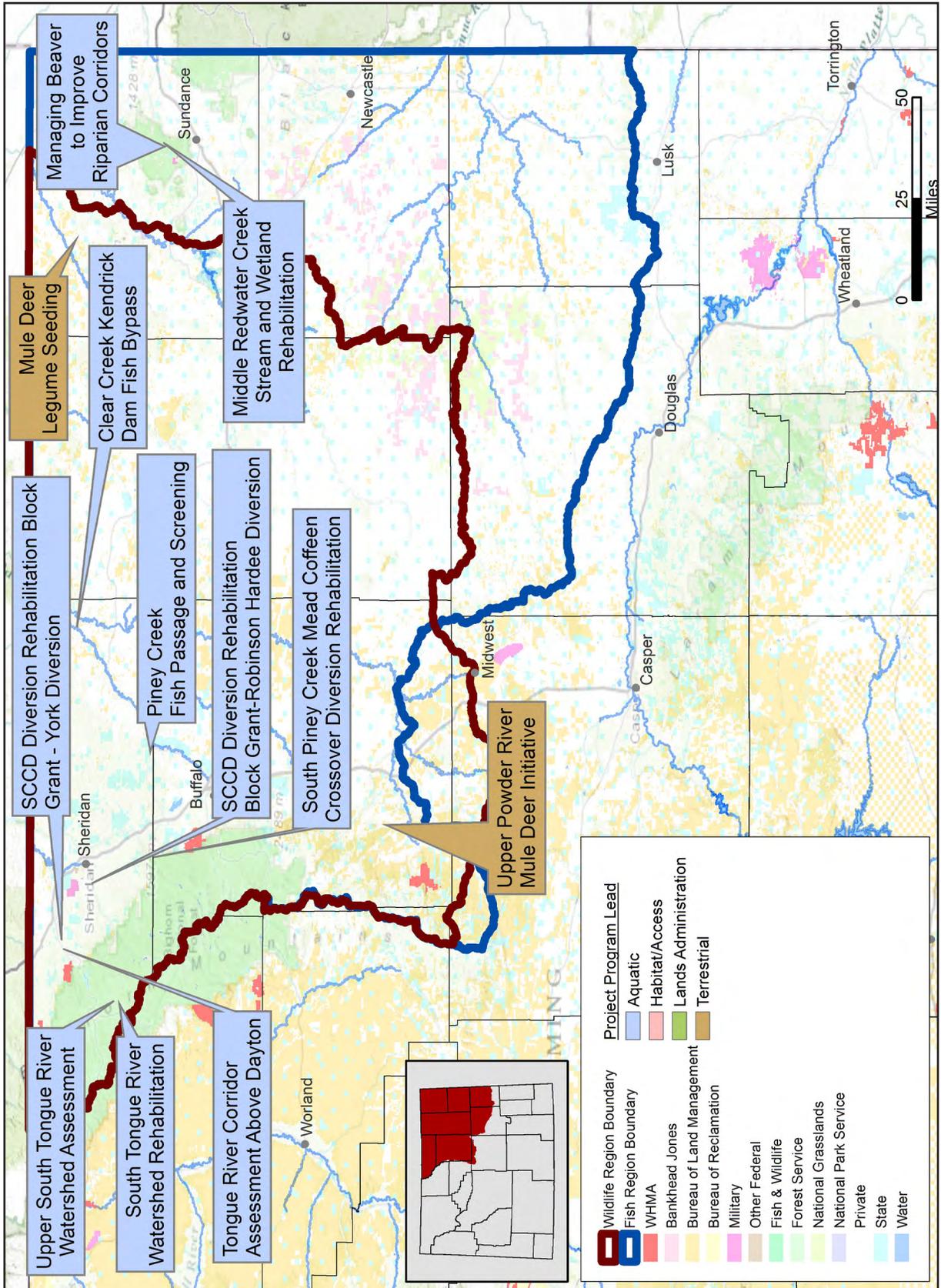
The Wyoming Cooperative Fish and Wildlife Research Unit and the WGF, along with numerous research partners initiated the Wyoming Range Mule Deer Project in March 2013. The overarching goal of the work is to investigate the nutritional relationships among habitat conditions, climate, behavior, and population dynamics of mule deer in the Wyoming Range of western Wyoming. In 2014 spring and summer fieldwork involved collecting data to quantify habitat quality and diet composition of mule deer during migration and while on summer range. It is hypothesized that phenology, or the life stage of plants, plays an important role in driving migration and habitat use on summer range, and these behavioral strategies are reflected in nutritional condition.

Throughout the spring of 2014, graduate students collected a suite of data from stopover sites used by mule deer fitted with GPS collars throughout the Wyoming Range. Stopover sites are areas along a migration route that are characterized by prolonged use. It is suspected that these sites are selected because of enhanced quality of forage (i.e. the phenology is “just right”) allowing for refueling as animals migrate

from winter to summer ranges. Data collected from these stopover sites will be used to identify migratory strategies and quantify the benefits of transitional habitats during migration.

To evaluate composition and quality of mule deer diets on summer ranges, graduate students collected fecal samples from summer home ranges of 35 GPS collared mule deer in summer 2013. Summer home ranges were visited 3 times throughout the summer to capture variation in diet choice as they relate to plant phenology and habitat composition across the landscape (Figure 140 & Figure 141). In summer 2014, graduate students revisited summer home ranges and collected plant samples that will be analyzed for nutritional content (i.e. crude protein and digestibility). Plant samples collected in 2014 were based on diet results from fecal samples collected in 2013 and were focused on plant species that frequently appeared in deer diets. Ultimately, connecting conditions of summer range with deer behavior and diet will yield key information to the components of summer range habitat that are most productive for growing mule deer in western Wyoming.

Sheridan Region



Sheridan Region

Most aquatic and terrestrial wildlife habitat enhancements in northeast Wyoming focus on streams and their associated riparian areas; however, Game and Fish in the Sheridan Region also put attention towards managing rangelands to meet the feed and cover needs of mule deer and sage grouse.

Riparian areas are extremely important wildlife habitats as 80% of all wildlife in Wyoming use riparian areas during some stage of their life. The scarceness of these areas in northeast Wyoming elevates their importance, so maintaining their quality is critical. In 2014 personnel here engaged in several projects related to riparian areas. When practical, restoring beaver populations in suitable habitats where beaver are absent continues to be one of our preferred tools to increase water retention in riparian corridors and buffer the effects of dry years and lower stream flows on fish and wildlife.

Today, as opportunities become available, efforts in the Sheridan Region are made to restructure irrigation diversions so landowners can get the water they have a right to divert while allowing fish passage through the diversions. Providing access past barriers expands habitat available for fish to meet their seasonal needs such as spawning and thermal refuges during low flow conditions.

Other habitat projects focused on maintaining rangelands to provide a diversity of native grasses and forbs. This is essential for numerous wildlife species.

Middle Redwater Creek Stream and Wetland Rehabilitation (Goal 2) - Travis Cundy

Cost share assistance was secured through the habitat trust fund and Wyoming Wildlife and Natural Resource Trust to stabilize channel degradation below a 3-acre shallow wetland complex along Middle Redwater Creek. The wetland complex is a relict beaver pond that supports finescale dace.

Geomorphic surveys and a preliminary design for the grade control were completed with assistance from Black Hills National Forest personnel. Pending permitting and contracting, the rehabilitation will be implemented in 2015.

Sheridan Public Access Areas (Goal 1) - Seth Roseberry

Annual maintenance and improvements continue on the 14 Sheridan Region Public Access Areas. The Sand Creek PAA received annual noxious weed control through chemical treatment and livestock grazing. 130 AUMs livestock grazing was utilized for cheatgrass and Canada thistle control in exchange for 2 miles of fishing access on Sand Creek through a Barter Contract with Ox Yoke Ranch.

The recently acquired Ellis and Beartrap/Pheasant PAAs were posted and signed for public use. Annual facility maintenance contracts were completed on Tongue Canyon, Monument Point and Sand Creek PAAs in a continued effort to provide quality public recreation opportunities.

South Tongue River Watershed Rehabilitation (Goal 2) - Travis Cundy

During fall 2013, 1,200 willows were planted inside the West Fork South Tongue River enclosure. The intent was to improve streambank stability and increase riparian shrub canopies near the stream (e.g., shade, insect and biomass inputs). Planting survival through summer 2014 was difficult to estimate due to erosion of outside banks during spring runoff, but appeared to be over 90 percent.

Managing Beaver to Improve Riparian Corridors (Goal 2) - Travis Cundy



Figure 142. *Live-trapped beaver and release watershed on Middle Redwater Creek.*

One beaver was trapped along Big Goose Creek in Sheridan County to address landowners concerns. The individual was released during fall in upper Middle Redwater Creek on the Black Hills National Forest (Figure 142), where additional colony establishment and dam-building is desired to raise stream-side water tables and inhibit the channel down-cutting occurring in segments of the watershed.

Periodic monitoring has occurred to determine if beaver colonies established and persisted as a result of past transplants. Three dam complexes occurred in the Blacktail Creek watershed that were being maintained by beaver (Figure 143).



Figure 143. *Beaver pond on a tributary stream.*

Upper Powder River Mule Deer Initiative (Goal 4) - Dan Thiele, Grant Gerharter, Todd Caltrider

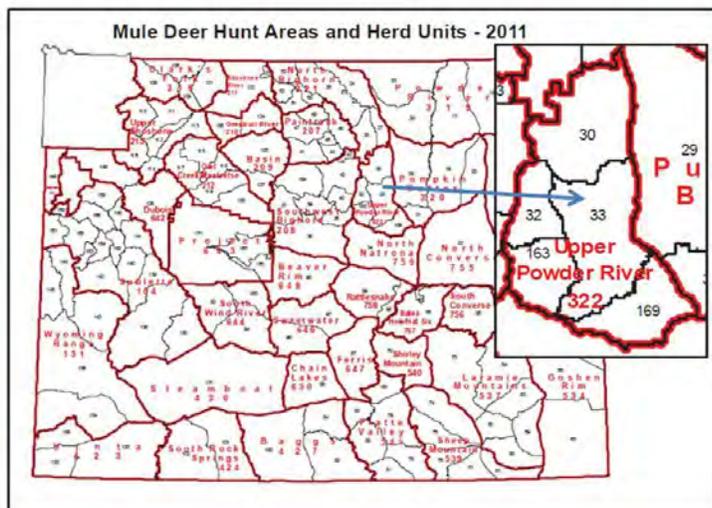


Figure 144. *The Upper Powder River Mule Deer Herd Unit.*

(Figure 145). In addition to public meetings, WGFD sent out surveys to sportsmen and private landowners to solicit information regarding perceptions of hunting seasons and perceived issues affecting local mule deer numbers in the Upper Powder River herd. Four hundred and twenty-one hunter surveys were mailed and to-date 69 have replied. Seventy-six private landowner surveys were mailed and to-date 20 have been returned. Some of the major issues affecting mule deer populations identified from the meetings and surveys included; predation, overharvest, vehicle collisions, drought, and lack of quantity and quality forage for mule deer. Following these comments, WGFD is working with WYDOT on vehicle collision avoidance measures, making changes to hunting seasons, and meeting with private landowners and BLM to pursue habitat projects focused on mule deer nutritional needs.

The Upper Powder River mule deer herd (HU 322) (Figure 144) was chosen as the Sheridan Region's focus area as part of the statewide Mule Deer Initiative program. The Upper Powder River mule deer herd is located in the upper Powder River drainage west of Kaycee, Wyoming, Mule deer populations in this herd unit have been approximately 50% under objective for many years. The WGFD held two public meetings in Kaycee to present information regarding mule deer population and habitat management in Wyoming and to solicit feedback from private landowners, local business-owners, and sportsmen on issues concerning mule deer. One meeting was held November 14, 2014 and had 20 in attendance



Figure 145. *MDI meeting in Kaycee, Wyoming*

Sheridan Wildlife Habitat Management Areas (Goal 2) - Seth Roseberry

Annual maintenance and improvements continue on the 4 Sheridan Region Wildlife Habitat Management Areas. Kerns WHMA received 11.5 miles of fence maintenance, including 10 miles of crucial winter range elk fence and 1.5 miles of stock fence. Major repairs on 7.5 miles of elk fence and 1 elk jump install was performed as part of the East Slope Big Horns Elk Fence Project (Figure 146). Annual noxious weed treatment was performed along with increased weed surveillance and mapping. The Amsden WHMA farming lease of 50 acres of hay meadow was irrigated and harvested through an AIPA with Amsden Creek Ranch; second growth forage was irrigated and left for wildlife utilization. Annual maintenance of 10.5 miles of crucial winter range boundary fence was performed, including 8 miles of elk fence and 2.5 miles of stock fence.



Figure 146. East Slope Elk Fence at Kerns WHMA north of Parkman, WY.



Figure 147. Permanent cover irrigation on Bud Love WHMA west of Buffalo, WY.

The Bud Love WHMA received 13.6 miles of crucial winter range fence maintenance; 8 miles of elk fence, 4.6 miles stock fence and 1 mile of electric drift fence was installed for trespass livestock control. Approximately 100 acres of noxious weed control was performed. Irrigation for standing wildlife forage was performed on 11 acres (Figure 147).



Figure 148. Solar well and water tank to be upgraded and expanded in 2015.

The Ed O. Taylor WHMA received 20 miles of boundary fence maintenance. Noxious weed control was completed on 25 acres, primarily in the Middle Fork of the Powder River Canyon. Conifer removal continued in the area to reduce encroachment on Curleaf Mountain Mahogany stands. Two wildlife watering facilities were maintained, a natural spring and solar well and funding was received from RMEF, WWNRT, WFW, WGFD Trust Fund and Mule Deer Foundation to improve and expand wildlife watering in 2015 on the WHMA (Figure 148).

Mule Deer Legume Seeding (Goal 2) - Todd Caltrider

A total of 593 acres of alfalfa were planted spring of 2014 in Crook County. The plantings will provide high quality forage for mule deer and include 301 acres of alfalfa on the McDonald Ranch (Figure 149) and 292 acres of alfalfa on the Jolley Ranch (Figure 150). These projects were funded out the statewide WGFD Grass and Legume Seeding Program.

Figure 149. *McDonald Mule Deer Legume Seeding 2014.*

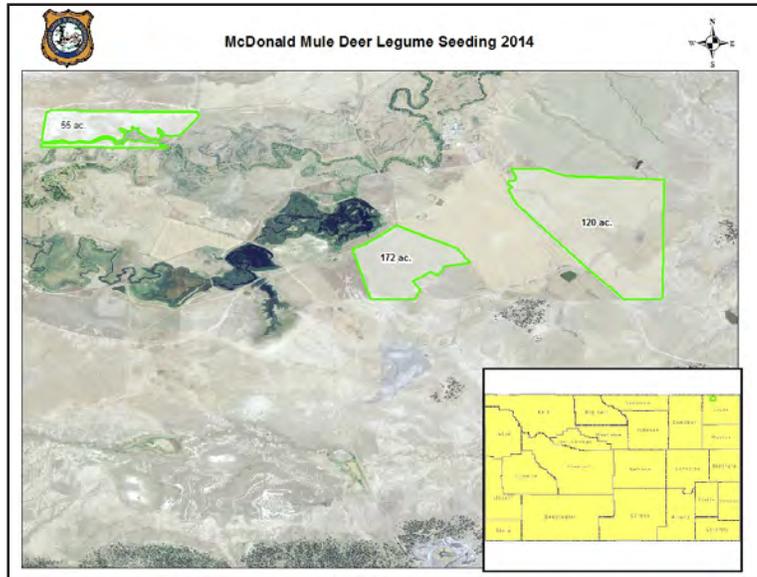
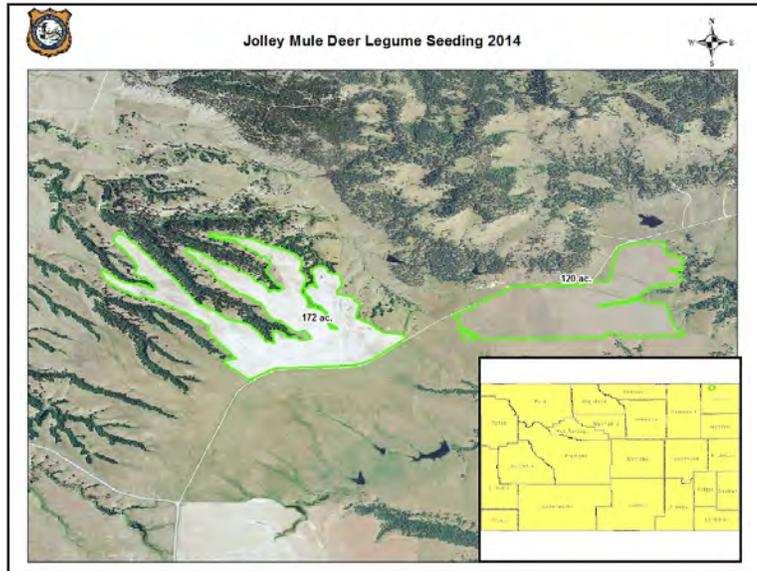


Figure 150. *Jolley Mule Deer Legume Seeding 2014.*



Upper South Tongue River Watershed Assessment (Goal 2) - Travis Cundy

Long-term declines in willow communities have been apparent in the South Tongue River watershed. Additional monitoring has occurred since 2012 to quantify willow growth and use trends, and identify factors influencing community declines. The ultimate goal is to achieve healthy communities with a diversity of age classes to provide cover and bank stability along streams throughout the watershed.

Willow leader growth averaged 0.39 ft (ranged 0.28-0.59 ft) during 2014. Growth in 2012 and 2013 ranged from 0.22-0.33 ft. Leader use during the growing season averaged 16 percent (ranged 4-38%). Previous averages from 2012 to 2013 ranged from 16 to 20 percent. Estimates of total leader use after winter 2014-2015 will not be available until spring 2015. Previous total use from 2012 to 2013 ranged from 22 to 31 percent. Cytospora fungus infections appeared to be contributing to willow leader die back at two of the transect sites, but the levels of dieback did not appear to be as severe as in 2013. Detailed summaries of willow use and growth trends are presented in the 2014 Sheridan Fisheries Management Region annual progress report.

Fish Passage and Diversion Screening (Goal 2) - Travis Cundy

Piney Creek Dunlap Diversion

Assistance was provided through the WGFD's habitat trust fund to help the Apache Foundation reha-



Figure 151. *WGFD and Apache Foundation personnel using a waterjet stinger to plant willow live-stakes alongside the Dunlap Diversion ramp.*

bilitate the Dunlap dam and diversion on Piney Creek. The dam was replaced in 2013 with a bed-form structure and rock ramp to provide upstream fish passage. In 2014, 200 willow live-stakes and 100 bare-root riparian shrubs were planted alongside the structure to stabilize streambanks and increase riparian plant canopy coverage (Figure 151). Plant survival was over 90 percent in August. Grating with 0.5 inch gaps between the vertical bars was placed in front of the diversion headgate to trap debris and screen larger fish from entering the 11 to 18 cfs diversion ditch (Figure 152).



Figure 152. *Vertical grating debris and fish screen at the Dunlap Diversion. The ramped vane structure (right) and attached screen was completed in 2013.*

Piney Creek Pratt and Ferris #1 Diversion

Funding assistance was secured through the habitat trust fund to help the Apache Foundation design a fish ladder and diversion screen at the Pratt and Ferris #1 dam and diversion on Piney Creek. Wild Fish Engineering and One Fish Engineering were contracted to design the dual vertical slot fish ladder and rotating drum screen. Ninety percent designs and cost estimates were completed during 2014. Additional funding assistance is being sought through the habitat trust fund to construct the ladder and screen during 2015. The fish ladder will reconnect about 30 contiguous miles of Piney and Clear Creeks. The drum screen will limit fish entrainment in the 18 to 24 cfs diversion ditch.

Sheridan County Conservation District Diversion Rehabilitation Block Grant

With funding assistance from the habitat trust fund, the WGFD collaborated with the Sheridan County Conservation District and Natural Resource Conservation Service to renovate deficiencies at the Robinson Hardee diversion on Big Goose Creek and the York Diversion on the Tongue River. Additional funding assistance was provided by the Wyoming Wildlife and Natural Resource Trust.



Figure 153. *Renovated sluiceway completed at the Robinson Hardee diversion.*

The check board sluiceway at the Robinson Hardee step vane diversion structure was retrofitted with a smaller lift gate that will draw less flow (Figure 153). The adjustments will direct bedload substrate movement during high flows over the crest of the stepped vane structure and replenish the smaller bed materials needed to plug and maintain the step pool seals in the stepped vane.

A rock ramp was built below the existing vane structure at the York Diversion. The rock ramp eliminated the plunging flow effect that was undermining the vane structure and provides upstream fish passage past the diversion (Figure 154). The renovation reconnected 5.7 river miles below the diversion to 3.5 river miles above the diversion.

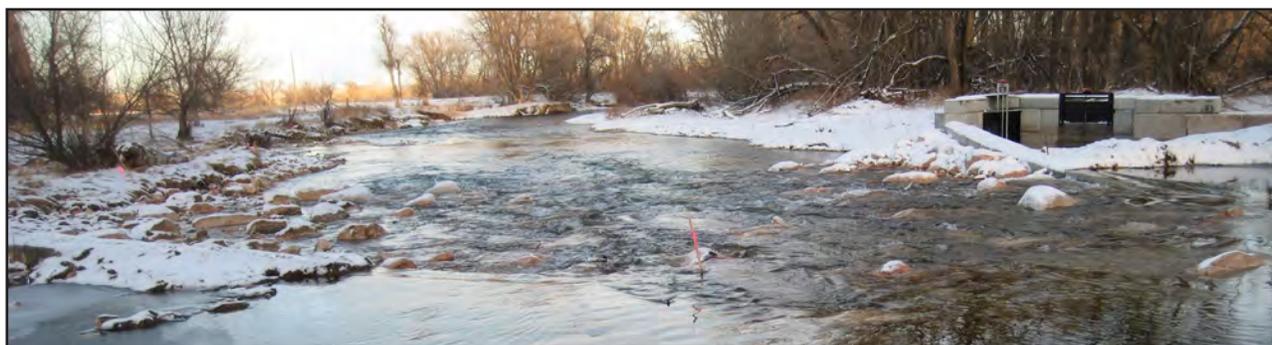


Figure 154. *Ramped vane diversion structure completed at the York Diversion on the Tongue River.*

Collaborations continued with the Natural Resources Conservation Service to develop designs to renovate the Hanover Diversion stepped vane structure on the Tongue River. The tentative designs entail altering the sluiceway, which is eliminating bedload substrate movement that is needed over the crest of the structure to keep the step pool sealed, and replacing the rock step pools with a roughened ramp to improve fish passage over a wider range of flow stages. Final designs and implementation are expected in 2015.

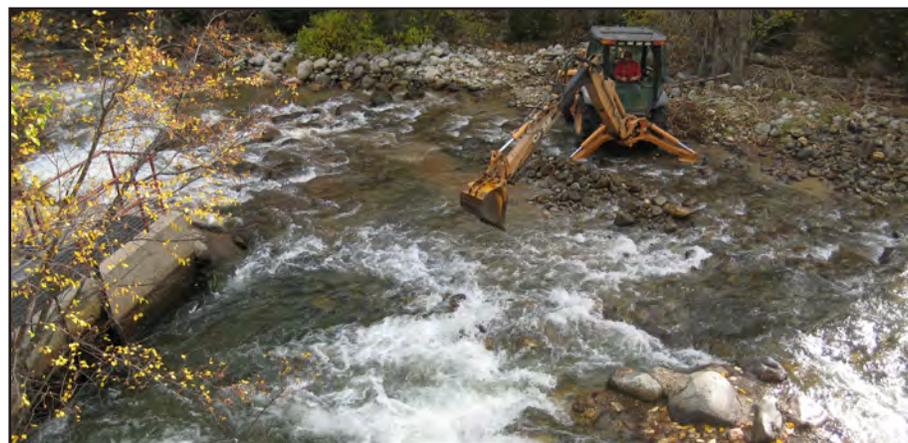
South Piney Creek Mead Coffeen Crossover Diversion Rehabilitation

The Mead Coffeen Crossover Diversion on South Piney Creek diverts flows to Spring Creek, which is the primary flow-through water supply for the Story Fish Hatchery. Designs were completed to rehabilitate the dam and improve upstream fish passage over the dam, but no funding has been secured to implement the rehabilitation. Monitoring continued to track the progression of the headcut along the toe of the dam (Figure 155). Most of the rock patch placed in the headcut during 2012, which used under-sized materials available near the site, washed downstream during 2014.



Figure 155. *Degradation of toe and flank of the Mead Coffeen Crossover Diversion Dam prior to patching in fall 2011(left), rock patch placed to limit degradation in spring 2012 (middle), and condition of the patch in fall 2014 (right).*

Habitat and Access personnel helped alleviate the head cutting during 2014 by reducing the center channel deposition bar developing above the dam (Figure 156). The depositional bar redirected some flow



towards the degrading section of the dam. The substrate removed was repositioned as a point bar feature that will direct flow away from the head cut.

Figure 156. *Center channel bar removal above the diversion dam.*

Clear Creek Kendrick Dam Fish Bypass Channel

The bypass channel, which allows fish from the Powder River to access 36-miles of Clear Creek above Kendrick Dam, operated from mid April to early July before irrigation demands prompted its closure. An elevation survey was completed along the length of the bypass to monitor how the sediment load of Clear Creek is affecting the channel. Additional discharge estimates were obtained during high flows to refine the stage-discharge relationship for the bypass. Summaries of these assessments are presented in the 2014 Sheridan Fisheries Management Region annual progress report.

Aquatic Habitat Assistance, Information, and Education (Goal 5) – Travis Cundy

The Aquatic Habitat Biologist consulted with landowners and other agency representatives on 66 new or ongoing requests for information or assistance during 2013. Several project partnerships involving cost share or services from the WGFD are developing from these 2014 or previous year's contacts. These include opportunities to trap and transplant beaver to unoccupied riparian habitats, evaluate fish movement and potential losses in diversions, develop fish passage or screening, rehabilitate deteriorating stream and riparian conditions, and assess factors contributing to deteriorating riparian habitat conditions.

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<http://www.wy.blm.gov/jio-papo/index.htm>

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List of Acronyms

AC-UDD - Anadarko Corporation, Unita Development Division	SAFE – State Acres for Wildlife Enhancement
AHAB – Aquatic Habitat Biologist	SCCD – Sublette County Conservation District
AIPA – Area Improvement Project Agreement	SCWPD – Sublette County Weed and Pest District
AMA – Agricultural Management Assistance	SEO – State Engineers Office
AMP – Allotment Management Plan	SERCD – Saratoga-Encampment-Rawlins Conservation District
AUM – Animal Unit Month	SGI – Sage Grouse Initiative
BPS – Budget Planning System	SHP – Strategic Habitat Plan
BEHI – Bank Erosion Hazard Index	TCD - Teton Conservation District
BLM – Bureau of Land Management	THB – Terrestrial Habitat Biologist
BNF – Bighorn National Forest	TNC – The Nature Conservancy
BOR – Bureau of Reclamation	TSS – Teton Science School
BOW – Bowhunters of Wyoming	TU – Trout Unlimited
BTNF – Bridger-Teton National Forest	UCC – Utah Conservation Corps
CCRP – Continuous Conservation Reserve Program	UCWP – Uinta County Weed and Pest District
CE – Conservation Easement	USFS – US Forest Service
CMR – Cokeville Meadows Refuge	USFWS – US Fish and Wildlife Service
CRM – Coordinated Resource Management	USGS – US Geological Survey
CRP – Conservation Reserve Program	UW – University of Wyoming
EA – Environmental Assessment	VIT – Vaginal Implant Transmitter
EIS – Environmental Impact Statement	WFARP – Wyoming Front Aspen Restoration Project
EQIP – Environmental Quality Incentive Program	WGBGLC – Wyoming Governor’s Big Game License Coalition
FSA – Farm Services Agency	WGFC – Wyoming Game & Fish Commission
GIS – Geographic Information System	WGFD – Wyoming Game & Fish Department
GPS – Global Positioning System	WHAM – Watershed Habitat Assessment Methodology
GVID – Greybull Valley Irrigation District	WHMA – Wildlife Habitat Management Area
HEB – Habitat Extension Biologist	WIA – Walk-in Area
I&E – Information and Education	WID – Watershed Improvement District
JIO – Jonah Interagency Office	WLCI – Wyoming Landscape Conservation Initiative
JCWPD - Johnson County Weed and Pest District	WMA – Wildlife Management Area
L-D – Live-Dead	WRP – Wetland Reserve Program
LCWP – Lincoln County Weed and Pest	WSA – Wilderness Study Area
LDCD – Lake DeSmet Conservation District	WSGALT – Wyoming Stock Growers Agricultural Land Trust
LSRCD – Little Snake River Conservation District	WWDC – Wyoming Water Development Commission
MDF – Mule Deer Foundation	WWNRT – Wyoming Wildlife and Natural Resource Trust
MIM – Multiple Indicator Monitoring	WWSF – Wyoming Wild Sheep Foundation
NEPA – National Environmental Policy Act	
NHD – National Hydrography Dataset	
NRCS – Natural Resources Conservation Service	
NWR – National Wildlife Refuge	
OSLI – Office of State Lands and Investments	
PAA – Public Access Area	
PAPA – Pinedale Anticline Project Area	
PAPO – Pinedale Anticline Project Office	
PIT – Passive Inductive Transducer	
RMEF – Rocky Mountain Elk Foundation	
RMP – Resource Management Plan	
ROD – Record of Decision	