Annual Report 2016

Strategic Habitat Plan

Wyoming Game and Fish Department
April 2017

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

Friends,

I want to thank all of the many partners who again stepped forward in 2016 to invest in Wyoming's wildlife habitats. Over the course of the year Game and Fish contributed $1.1 million to habitat improvements and our invaluable partners put forward over $5.2 million in direct, on-the-ground contributions. Incredible!

The importance of wildlife habitat continued to grow in 2016, which is part of a larger trend where habitat's role has grown more prominent across the world. At the same time the need for strategic planning for the allocation of dollars to fund habitat projects has also grown more necessary. The State of Wyoming is always examining how to best support all of the diverse species that call our state home. All told there are 800 species in the Cowboy State including fish like the sauger and cutthroat trout, birds including sage grouse and the iconic mule deer. The population of mule deer has been on the decline across the continent for a couple of decades. The answer wildlife managers continually come back to for conserving this species and all others always involves habitat work. In 2016, Game and Fish continued to delve further into habitat projects and the complexities involved with doing this work in a meaningful and efficient manner.

In 2016, our Strategic Habitat Plan helped direct restoration, monitoring and enhancement activities aimed at improving 175 stream miles and over 484,000 acres of terrestrial habitats including planting over 44,000 native trees and shrubs. Again, incredible!

But, none of this is possible without the wide-ranging support of the people of this state that has ensured we will leave Wyoming a better place. This report shows real projects that made a difference. Many of these projects would not have been possible without the investment of time and money from countless volunteers and folks who care about Wyoming's wild places and wildlife. Thank you all for your work to improve Wyoming's future.

I also want to pay my respects to Mark Fowden. He was our Chief of Fisheries and retired at the end of 2016. He passed away shortly after. I want to thank him for all he did throughout his 39-year career with Game and Fish. Mark made a profound impact with his love of Wyoming and his expertise and emphasis on aquatic habitat. He made this state a better place and is missed.

Scott Talbott

Director
Wyoming Game and Fish Department

Table of Contents

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 (WGFC) 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. WGFD funds (figures rounded to the nearest $1,000) expended for on-the-ground projects primarily directed at implementation of SHP goals and management on WGFC lands during calendar year 2016 (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: **$1,100,000**

II. Non-WGFD funds expended for implementation of SHP goals for calendar year 2016 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: **$5,216,000**

Grand Total for SHP Goals: $6,316,000

WGFD applied funding from outside sources amounting to approximately **$4.74** 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 **$10,180,000** of WGFD regular maintenance and operating funds, State Wildlife Grants from US Fish and Wildlife Service (USFWS) 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 **53%** 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 **42%** for materials and supplies.

Personnel overseeing the WGFD Education, Information and Publications Programs spent approximately **12.5%** of their time in 2016 on SHP goal 4 "habitat" activities totaling approximately **$281,000** 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 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 (OLSI). Property taxes paid to counties by the WGFD in 2016 totaled approximately **$511,500**. These taxes include WGFC owned state offices, fish hatcheries, bird farms, houses, Wildlife Habitat Management Areas (WHMA) and Public Access Areas

(PAA). During 2016, WGFD costs for leases totaled approximately **$151,600.** The majority of lease payments were made to the OLSI involving State Land leases associated with the 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 toward the habitat program during calendar year 2016 are summarized below:

Activity	2016 Accomplishments	5 Year Average Accomplishments
Watershed stream assessments	21 on 59.7 miles	19 on 59 miles
Detailed stream assessments	17 on 3.9 miles	16 on 3.1 miles
Stream restorations or bank enhancements	6 on 1.7 miles	21 on 2.1 miles
Instream structures	51 on 8.1 miles	39 on 4.5 miles
Instream flow segments	none	5 on 20.8 miles
Fish screens installed	2	3
Fish passage structures installed	9	6
Fish passage upstream miles connected	11.2 miles	33.3 miles
Fish passage structures monitored	11	10
Fish passage structures maintained	4	7
Fish tracking or entrainment investigations	15	6
Project monitoring - detailed stream channel	15 on 4.8 miles	8 on 2.2 miles
Management monitoring - detailed riparian	5 on 1 mile	14 on 0.5 miles
Stream temperature or flow monitoring sites	37	55
Project monitoring sites using photos	21 on 35.9 miles	32 on 25 miles
Aspen/cottonwood browse monitoring	52 on 7 miles	40 on 4.1 miles
Beaver transplanted	6 influencing ~0.1 miles	5 influencing ~0.1 miles
Riparian assessment	26 on 27 miles	12 on 39 miles
Riparian protection, enhancement, management	12 on 15.5 miles	15 on 12 miles
Private landowner contacts	584	360
Technical assistance requests	108	127
Conservation easements in process	7	7
BLM RMP or USFS Cooperator Status	4	6
Trees or shrubs planted	44,223 on 436 acres	22,234 on 4,166 acres
Herbicide weed treatments	24,470 acres	33,964 acres
Herbicide vegetation to thin sagebrush	none	1,704 acres
Mechanical tree removal	2,965 acres	3,417 acres
Mowing, chopping, aerator treatments	5,186 acres	2,832 acres
Upland grass, forb and food plot seeding	959 acres	1,226 acres
Water wells drilled	none	1
Water guzzlers or water tanks installed	20	13
Water pipelines installed	5.8 miles	4.6 miles

Activity	2016 Accomplishments	5 Year Average Accomplishments
Spring developments	3	3
Water wells converted to solar pumps	10	3
Fences installed	45 miles	41.2 miles
Wetland development or major renovation	10 on 1,398 acres	6 on 384 acres
Prescribed burns	2,654 acres	3,358 acres
USDA Farm Bill contract involvement	8	52
Livestock Grazing Management Plans	10 on 74,452 acres	12 on 124,287 acres
Wildlife Habitat Stewardship Plans	none	2 on 12,029 acres
Upland and rangeland inventories, intensive scale	192,890 acres	228,400 acres
Upland vegetation/habitat treatment monitoring sites	5,562 acres	29,793 acres
Annual vegetation production/utilization sites	54	109
Field cooperative research projects	11	7
WGFC managed lands intensive livestock/forage reserve/meadow rejuvenation and grazing administered	11 on 127,250 acres	12 on 88,702 acres
WGFC managed lands fence maintained	526 miles	639 miles
WGFC managed lands irrigated	4,732 acres	4,969 acres
WGFC managed lands noxious weed control	3,077 acres	2,932
WGFC managed lands meadow mowed/farmed	2,698 acres	1,743 acres
WGFC managed lands farming contracts	2,599 acres	2,551 acres
Public Fish Access projects	13 on 0.3 miles	12 on 5.9 miles
Public Hunting Access projects	4 on 1,880 acres	4 on 3,601 acres
WGFC property right monitoring	105 on 171,555 acres	109 on 154,600 acres
Funding sources/contracts/grants administered	191	137
Funding applications prepared for other entities	24	40
Cheatgrass hand grubbing	1,970 acres	
Fence removed	4.4 miles	
Range riders hired for livestock management	3	
Trichosirocalus horridus biocontrol insects for musk thistle	2,625	

Miles of stream and riparian habitat and acres of riparian and upland habitat directly impacted by habitat work in 2016 are tallied below:

Stream and Riparian Activity	Stream Miles
Watershed stream assessments	59.7
Detailed stream assessments	3.9
Stream restorations or bank enhancements	1.7
Beaver restoration	0.4
Instream structures	8.1
Fish passage upstream miles connected	11.2
Project monitoring - detailed stream channel	4.8
Project monitoring sites using photos	35.9
Riparian aspen, cottonwood, willow browse monitoring	7.0
Riparian assessment	27.0
Riparian protection, enhancement, management	15.5
Total	**175**

Riparian and Upland Activity	Acres
Riparian aspen, cottonwood, willow browse monitoring	3,789
Riparian assessment	448
Riparian protection, enhancement, management	365
Conservation easements in process and coordinated with partners	27,800
Trees or shrubs planted	436
Herbicide weed treatments	24,470
Mechanical tree removal	2,965
Mowing, chopping, Lawson Aerator	5,186
Upland grass, forb, and food plot seeding	959
Prescribed burns	2,654
Rangeland fertilization	250
Wetland development or renovation	1,398
Livestock grazing management plans	74,452
Upland habitat inventory, landscape evaluation scale (e.g. GIS)	192,890
Upland and rangeland intensive inventory (e.g. Rapid Habitat Assessments)	5,562
WGFC managed lands forage reserve/ meadow rejuv. grazing administered	127,250
WGFC managed lands irrigated	4,732
WGFC managed lands noxious weed control	3,077
WGFC managed lands meadows mowed/ farmed	2,698
WGFC managed lands farming contracts	2,599
Fee title acquisition	352
Total	**484,332**

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 spent in 2016. 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 omitted.

Funding Partner	Approximate amount for 2016 (rounded to nearest $100)
Bowhunters of Wyoming	$2,000
Bureau of Land Management	$388,500
Chesapeake Energy	$204,400
Converse County Weed and Pest District	$10,700
Denbury Mitigation	$26,400
Federal USDA Farm Bill Program Funds (NRCS and FSA)	$155,000
Goshen County Weed and Pest	$4,000
Governor's ESA	$254,500
Jonah Interagency Office	$153,300
Mule Deer Foundation	$19,300
Muley Fanatic Foundation	$50,500
National Wild Turkey Federation	$13,000
North American Waterfowl Conservation Act	$500,000
Pheasants Forever	$14,000
Pinedale Anticline Project Office (BLM)	$163,200
Platte Valley Habitat Partnership	$31,500
Popo Agie Conservation District	$5,500
Powder River Conservation District	$3,300
Private Foundation Donors (Other)	$25,000
Private Landowners	$151,100
Rocky Mountain Elk Foundation	$76,900

Sage Grouse Local Working Group - State of Wyoming Funds	$85,800
Saratoga-Encampment-Rawlins Conservation District	$27,800
Sublette County Conservation District	$66,500
Sublette County Weed and Pest	$7,600
Teton County Conservation District	$4,400
The Nature Conservancy	$3,100
Trout Unlimited	$14,300
US Fish and Wildlife Service - Fish Passage	$50,000
US Fish and Wildlife Service - National Wildlife Refuge	$13,300
US Fish and Wildlife Service - Private Lands Program	$53,200
US Forest Service	$117,900
Water for Wildlife Foundation	$22,000
Wyoming Wildlife Foundation	$1,000
Wyoming DEQ 319 Funds from EPA	$45,000
Wyoming Governor's Big Game License Coalition	$104,000
Wyoming Landscape Conservation Initiative	$373,500
Wyoming Sportsman's Group	$3,500
Wyoming Wild Sheep Foundation	$17,000
Wyoming Wildlife and Natural Resources Trust Board	$1,955,000
Grand Total	**$5,216,000**

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/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports

Aquatic Habitat Program

The aquatic habitat program works to protect, restore and enhance Wyoming's water, watersheds, and waterways. The program consists of 13 permanent full time employees: 6 regional aquatic habitat biologists (AHABs), a statewide fish passage coordinator, a statewide fish passage biologist, a Wyoming Landscape Conservation Initiative coordinator, an aquatic habitat supervisor, an aquatic habitat program manager, a water management supervisor and a water management instream flow biologist. Two contract employees worked for the section in 2016: one in Cody assisted the fish passage coordinator (this position became permanent in early 2017 and is reflected above); and one in Lander split time between monitoring Bolton Creek, monitoring the Middle Fork Popo Agie River in Lander, and working on issues in the East Fork Wind River watershed. Seasonal biologist technicians assisted the Water Management crew and biologists in the Sheridan, Cody and Jackson regions.

During calendar year 2016, the aquatic habitat section was involved in 42 projects involving funding from the Game and Fish Trust Fund, Department fish passage budget, the Wyoming Wildlife Natural Resource Trust (WWNRT), USFWS, Wyoming Landscape Conservation Initiative (WLCI) and other sources. These partners provided over $1.99 million toward aquatic projects. Department aquatic habitat dollars spent on contracts or grants in calendar year 2016 totaled over $452,000. 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 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, providing habitat education and training.

The number of on-going aquatic habitat projects involving significant funding (42) has been similar the last four years and remains a little lower than a 2012 peak (50). However, total partner funding has increased in recent years. For example, project partners provided $987,000 in 2011 compared to nearly 2 million in 2016. Renewed funding from the WGFD Trust fund has been leveraged to produce designs that are then used as cost share toward total project cost. Under this approach, WGFD does a lot of the initial planning and invests personnel time at all stages including follow-up monitoring while project partners are asked to contribute toward construction cost.

Water Management

Water Management (Goal 1) – Tom Annear

The Water Rights Management team met two times to discuss the status of various water right related issues and recommendations were provided to field personnel involved with activities on Blue Downey Reservoir, Table Mountain WHMA, and Elk Mountain Reservoir. A decision regarding the removal of the dam at Douglas Fishing Lake near Douglas was deferred to an unspecified future date. Significant progress was achieved to increase water security in Bump Sullivan Reservoir for fish and wildlife management.

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

Two new instream flow studies focusing on native Colorado River cutthroat trout habitat were initiated in the LaBarge Creek drainage including Rock Creek (2.7 miles; Figure 1), and Trail Ridge Creek (4.2 miles). Data collection on both sites was completed in September 2016. Data analysis, report preparation, and applications for instream flow water rights in these two locations, as well as five study sites in the Upper Wind River watershed (field studies conducted in 2015) will be completed in 2017.

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

Fish Passage

Ishawooa Creek Fish Screen and Entrainment (Goal 2) –Erin Sobel and Nick Scribner

Ishawooa Creek is a tributary to the South Fork Shoshone River that supports a conservation population of Yellowstone cutthroat trout (YSC) and provides irrigation water to a large ranch downstream. Ishawooa Creek provides important spawning habitat for YSC and in fall, young-of-year fish move out to seek better winter habitat in the South Fork. During migration these small fish are highly susceptible to entrainment into irrigation canals, especially in Ishawooa Creek. During low flows in the fall, a majority of flows are taken for irrigation effectively disconnecting Ishawooa Creek from the South Fork. Led by Trout Unlimited (TU), project partners worked together to install a fish screen in 2016 which leads fish out of the irrigation ditch and into an overflow return channel that connects to the South Fork. This essentially reconnects the two streams during fall migration and will help maintain YSC populations. Entrainment monitoring was not conducted prior to installation of the fish screen, which is our preference to ensure screens are put in high priority locations and funding is invested wisely. However, project partners felt reconnecting Ishawooa Creek to the South Fork during fall was only possible with installation of a fish screen. To verify its impact we conducted entrainment netting in September and October 2016 to estimate fish numbers migrating down to the South Fork via the fish screen and return channel. Sampling was conducted for roughly 196 hours downstream of the fish screen. A total of 1,232 fish were captured at an average rate of 6.3 fish per hour with a majority of them young-of-year YSC (Figure 2). The highest catch rate was 441 in a 15 hour period. Based on sampled catch rates, this screen is keeping an estimated 4,200 - 6,300 young-of-year YSC out of the irrigation system during fall migration. These fish are now available to contribute to the upper South Fork Shoshone fishery.

Figure 2. *Young-of-year YSC from an entrainment net.*

Cottonwood Creek Entrainment Study (Goal 2) – Erin Sobel and Nick Scribner

	Species													
Ditch	**SPD**	**UNK**	**MTS**	**MSC**	**RSS**	**LKC**	**LND**	**WHS**	**FMS**	**FHM**	**CUT**	**RBT**	**BNT**	**Totals**
Belden	4	1	3	28										36
Booker														
Burrell	4													4
Essex	3	2	1	9	21	7		8	2	8	1	2		64
Fredell	1		2	1							1		1	6
Lawrence	92	59	16	7	73	2	1	15		36	1			302
Ray	20	1	16	1	3					4	1			46
Totals	124	63	38	46	97	9	1	23	2	48	4	2	1	458

Figure 3. *Fish numbers sampled from ditches on South Cottonwood and Cottonwood Creek in 2016. UNK were unable to be identified in the field.*

Cottonwood Creek is a tributary to the Green River west of Big Piney. To determine if fish loss is a major issue, an entrainment study was conducted on seven separate ditches that divert water from Cottonwood Creek. These ditches were chosen because the Cottonwood drainage is home to ten conservation populations of Colorado River cutthroat trout (CRC). Improving and maintaining these populations is an important goal of the Department as described in the Strategic Habitat Plan and State Wildlife Action Plan. Sampling was conducted on all ditches during the irrigation season that started as early as May and was completed by August. Several of these ditches were turned off in mid-July as part of the State Engineer's pilot program to pay water users to forgo late season irrigation and keep water in the stream, which may have reduced our total entrainment catch. The most abundant fish species caught was Speckled Dace (SPD) with Redsided Shiner (RSS) and Fathead Minnow (FHM) next highest in abundance (Figure 3). Very few non-native fish were captured during the study, which may indicate they exist in low numbers throughout the Cottonwood Creek drainage (Figure 4). Based on our entrainment rates, roughly 2,787 to 3,714 fish are annually entrained from these seven ditches sampled. Over 69% of that total is from Lawrence Ditch with another 14% from Essex Ditch. Both of these ditches are lower in the Cottonwood drainage after the confluence of the South Fork and North Fork. Two primary species of interest for this study were CRC and Flannelmouth Sucker, but very few were documented in our entrainment nets. Additional sampling may provide more insight to entrainment in these ditches, but it appears screening is not warranted at this time based on low entrainment rates and species being entrained.

Code	Common Name	Scientific Name	Status*
BNT	Brown Trout	*Salmo trutta*	nonnative
CUT	Cutthroat Trout	*Oncorhyncus clarki*	NSS2
FHM	Fathead Minnow	*Pimephales promelas*	NSS7
FMS	Flannelmouth Sucker	*Catostomus latipinnis*	NSS1
LKC	Lake Chub	*Couesius plumbeus*	NSS5
LND	Longnose Dace	*Rhinichthys cataractae*	NSS7
MSC	Mottled Sculpin	*Cottus bairdi*	NSS5
MTS	Mountain Sucker	*Catostomus platyrhynchus*	NSS5
RBT	Rainbow Trout	*Oncorhyncus mykiss*	nonnative
RSS	Redside Shiner	*Richardsonius balteatus*	NSS5
SPD	Speckled Dace	*Rhinichthys osculus*	NSS5
UNK	Unknown		
WHS	White Sucker	*Catostomus commersoni*	NSS7

Figure 4. *Three letter code, common name, scientific name and native species status ranking for fish captured in an entrainment study on South Cottonwood and Cottonwood Creek during 2016.*

Figure 5. *Before construction, perched outlet and scoured streambanks.*

Labarge Creek Culverts (Goal 2) – Nick Scribner and Erin Sobel

Upper Labarge Creek has been a focus area over the past decade for CRC restoration. Chemical treatments were conducted in 2005 and 2006 to remove non-native fish and a barrier was completed in 2009-10 to protect the upper 58 miles of habitat from invasion of non-native trout from downstream. Above the barrier are thirteen road crossings of Labarge Creek and its tributaries that are being improved to allow fish passage and enhanced stream function. Three of the crossings have been improved since 2009 with two more being fixed in 2016. Undersized and perched culverts at Shafer Creek and Labarge Creek meadows were replaced with concrete bottomless arch culverts to reconnect five miles of habitat (Figures 5-6). Engineers also completed surveys in 2016 in order to develop designs on the remaining eight sites that will open up approximately 17 streammiles. The entire 58 stream miles above the fish barrier will be reconnected once all 13 crossings are improved. This re-connected network of streams including Labarge Creek and its tributaries will mean the CRC population will be more likely to survive droughts and life stages can readily access habitats needed to thrive.

Figure 6. *New concrete bottomless arch culvert, October 2016.*

Trout Creek Fish Screen Gantry and Supports (Goal 2) – Erin Sobel

Trout Creek is a tributary to the North Fork Shoshone River west of Cody and provides important habitat for YSC. Trout Creek Ranch operates near its confluence with the North Fork, and maintains three diversions. The Department has been working with the ranch for several years as a proving ground for several screening approaches. In addition to YSC benefits, we test and learn about screen technologies and can demonstrate them to other interested landowners.

Figure 7. *Vertical screen supports (metal bars in middle) after installation.*

One of the diversions has a Hydrolox traveling fish screen to prevent fish from becoming entrained into a canal. This screen was installed in spring 2009 and has recently required routine maintenance. This year's maintenance included screen support bars and building a gantry. Two screen support bars were installed vertically along the

Figure 8. *Gantry over the Hydrolox fish screen.*

back of the screen frame to support the polymer screen from being pulled away from the internal support bars (Figure 7). During operations the polymer screen will be pulled and stretched because of water velocities passing through, which causes additional stress on the motor. Furthermore, the polymer screen has reached its life expectancy and can no longer be tightened, so a replacement is planned for fall 2017. A gantry was also installed so the screen could be raised above the water during non-irrigation months, for maintenance needs, and to prolong the life of the screen (Figure 8).

Fredell Ditch Passage Improvement (Goal 2) – Nick Scribner

Fredell Ditch diverts water from South Cottonwood Creek west of Big Piney approximately three miles downstream of the USFS boundary. South Cottonwood Creek is one of the few remaining strongholds for genetically pure CRC in the Wyoming Range. Improving

Figure 9. *Fredell Ditch passage before and during construction; structure is 75% complete.*

connectivity and maintaining high quality habitat within this drainage will help maintain CRC populations. Numerous irrigation diversions exist on South Cottonwood Creek with some passable and others barriers to upstream movement. During higher flows Fredell Ditch likely allowed some level of passage for larger fish, but at lower flows it precludes most upstream fish movement. A two foot drop in water surface elevation is created by this diversion consisting of old beaver dam material on top of old fence, pallets, tires, and other material (Figure 9). In September the old diversion was removed and replaced with two rock cross vane structures that divert irrigation flows while gradually stepping the river channel down. Instead of a single two foot drop in water surface elevation, these structures have a 0.5 foot change over four drops allowing fish to pass upstream. This project improves fish passage and stream function while reducing annual in channel maintenance by the water user. A similar project was completed on a ditch approximately three miles downstream in 2014. One fish passage obstruction remains to be addressed upstream of Fredell Ditch to entirely connect South Cottonwood Creek upstream of Little Cottonwood Creek.

Habitat and Access Branch

The Habitat and Access Branch is responsible for managing Wyoming Game and Fish Commission (WGFC) lands. Our mission is to manage Commission lands to be the benchmark for wildlife habitat while providing public access. The Habitat and Access Branch in 2016 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, five coordinators located in Sheridan, Casper, Cheyenne and Jackson, twelve biologists located in Jackson, Dubois, Lander, Yoder, Cody, Lovell, Laramie and Saratoga, and numerous seasonal employees stationed across the state.

The Habitat and Access Branch manages 37 Wyoming Habitat Management Areas (WHMAs), 198 Public Access Areas (PAA) and 22 feedgrounds. In addition, a statewide crew 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.

The branch manages and maintains approximately 449,882 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, 199 outhouses, and more than 6,000 signs are maintained.

During 2016, the branch also worked on other habitat development projects, including Mule Deer Initiative (MDI) projects, aeration, harrowing, mowing, meadow improvements, wetland developments and riparian projects. Grants provided projects with $1,002,533 dollars in on-the-ground expenditures. These projects are highlighted in the regional sections of this report.

Lands Administration Branch

The mission of the Lands Branch is to administer the Commission's property rights and work with other agencies, NGOs, and the public to acquire property rights for the benefit of wildlife conservation and public access. The Lands Branch currently administers over 400,000 acres of property rights including WHMAs, Public Access Areas (PAAs), conservation easements, and administrative facilities. During calendar year 2016, the branch supervisor and one contract lands specialist left the agency. The Lands Branch generally consists of one supervisor and two land administration specialists located in Cheyenne and Lander. The state is divided into two land administration regions with one specialist assigned per region.

Branch personnel worked on numerous projects involving habitat conservation, conservation easements, and public access. Branch personnel also spent a large portion of 2016 monitoring property rights, and communicating lands issues with coworkers, state and federal agencies, and various non-governmental agencies including TNC, RMEF and others.

Coco Belle Acquisition (Goals 1 and 3) – Brian Rognon, Miles Anderson and Derek Lemon

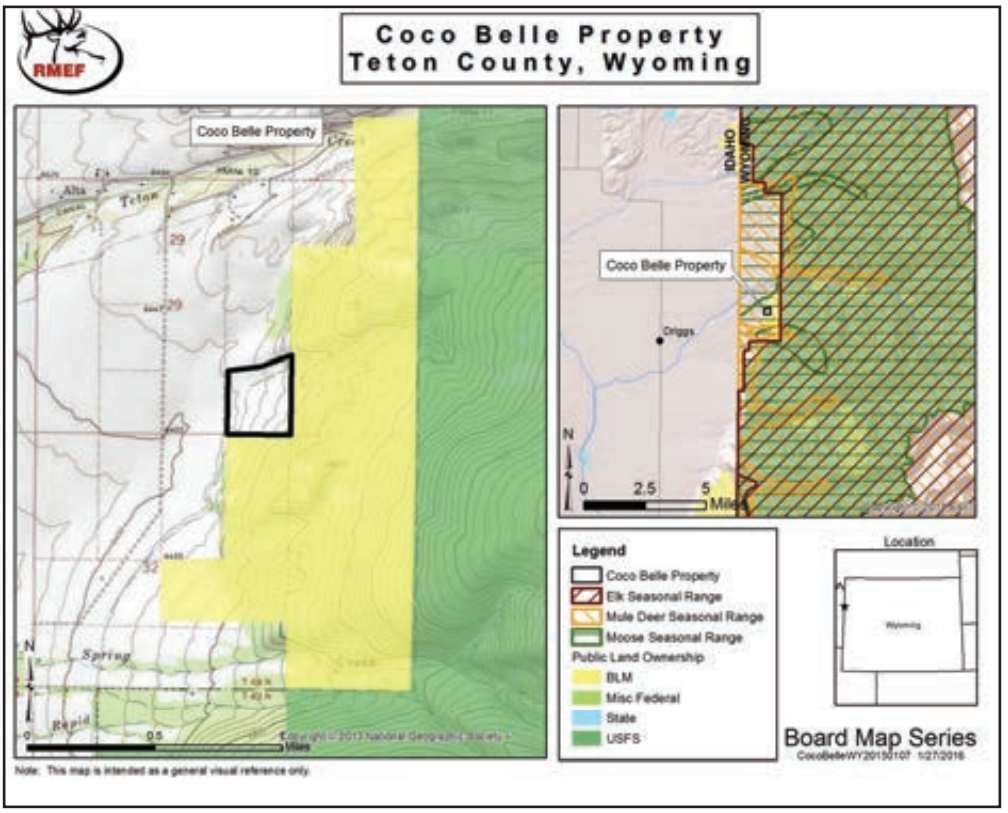


Figure 10. *Coco Belle WHMA map.*

Figure 11. *Coco Belle Wildlife Habitat Management Area.*

The Wyoming Game and Fish Commission acquired the Coco Belle van Meerendonk WHMA (Coco Belle WHMA) through a cooperative effort between the van Meerendonk family and RMEF in September 2016. This unique property is one of the few access points to thousands of acres of public land. This WHMA creates contiguous public access from the lowlands of the Teton River Valley through BLM land to the 123,450 acre Jedediah Smith Wilderness Area and GTNP to the east. The property is 44 acres in size which consists mainly of grass hay meadows with some riparian and mountain shrub habitats (Figures 10-11).

Conservation Easements (Goal 1) – Kerry Olson and Brian Rognon

Lands Branch personnel continue work on conservation easement projects on the Rocking Chair Ranch, Lewis Property, Lander-Table Mountain and Giraffe Creek. Several other conservation easement opportunities were evaluated during the year.

Diamond Lake Water (Goal 3) – Kerry Olson and Brian Rognon

The Wheatland Irrigation District and the WGFD entered into a permanent easement deed for hunting and fishing at Diamond Lake on August 7, 1974. The deed did not include water supply or minimum pool provisions, and in recent years Diamond Lake has suffered from inadequate water to support fish populations. Lands Branch personnel completed an appraisal for a sale of storage water from the Wheatland Irrigation District for Diamond Lake. The water supply is expected to enhance fish habitat and increase recreational opportunities.

Figure 12. *Diamond Lake Public Access Area.*

Goshen County Acquisitions (Goal 1) – Kerry Olson

Branch personnel continued to work with Ducks Unlimited (DU) on several potential acquisitions of land and water in Goshen County. An appraisal of water rights was completed on property near the Springer/Bump Sullivan WHMA for use in a proposed DU acquisition. The acquisition may result in additional lands and water to benefit wildlife and increase public recreation.

Ocean Lake Exchange (Goal 1) – Brian Rognon

Negotiations to exchange the Maxon Parcel at Ocean Lake for a conservation easement with public access at Table Mountain south of Lander continued during the year. Appraisals and landowner negotiations were completed, and Lander region personnel conducted extensive public outreach efforts to involve all interested parties. At a November Commission meeting, final authorization was granted for the exchange which will retain public access to the Maxon parcel and provide public access to portions of Table Mountain.

Terrestrial Habitat

The Statewide Terrestrial Habitat Section is a component of the Statewide Wildlife and Habitat Management Section (SWAHM) and consists of the Terrestrial Habitat Program Manager and Office Manager stationed in Cheyenne and a Statewide Habitat Biologist stationed in Wheatland. The Terrestrial Habitat Program works closely with regional personnel to track grants, contracts, agreements and expenditures for all terrestrial habitat projects statewide.

During calendar year 2016, Terrestrial Habitat Program personnel were heavily involved with on-the-ground implementation, oversight or verification of expenditures on 95 projects concerning Game and Fish trust funds and funds granted to the WGFD from sources such as, WWNRT, 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 approximately $2,969,900 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 and statewide Terrestrial Habitat Biologists (THBs) 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.

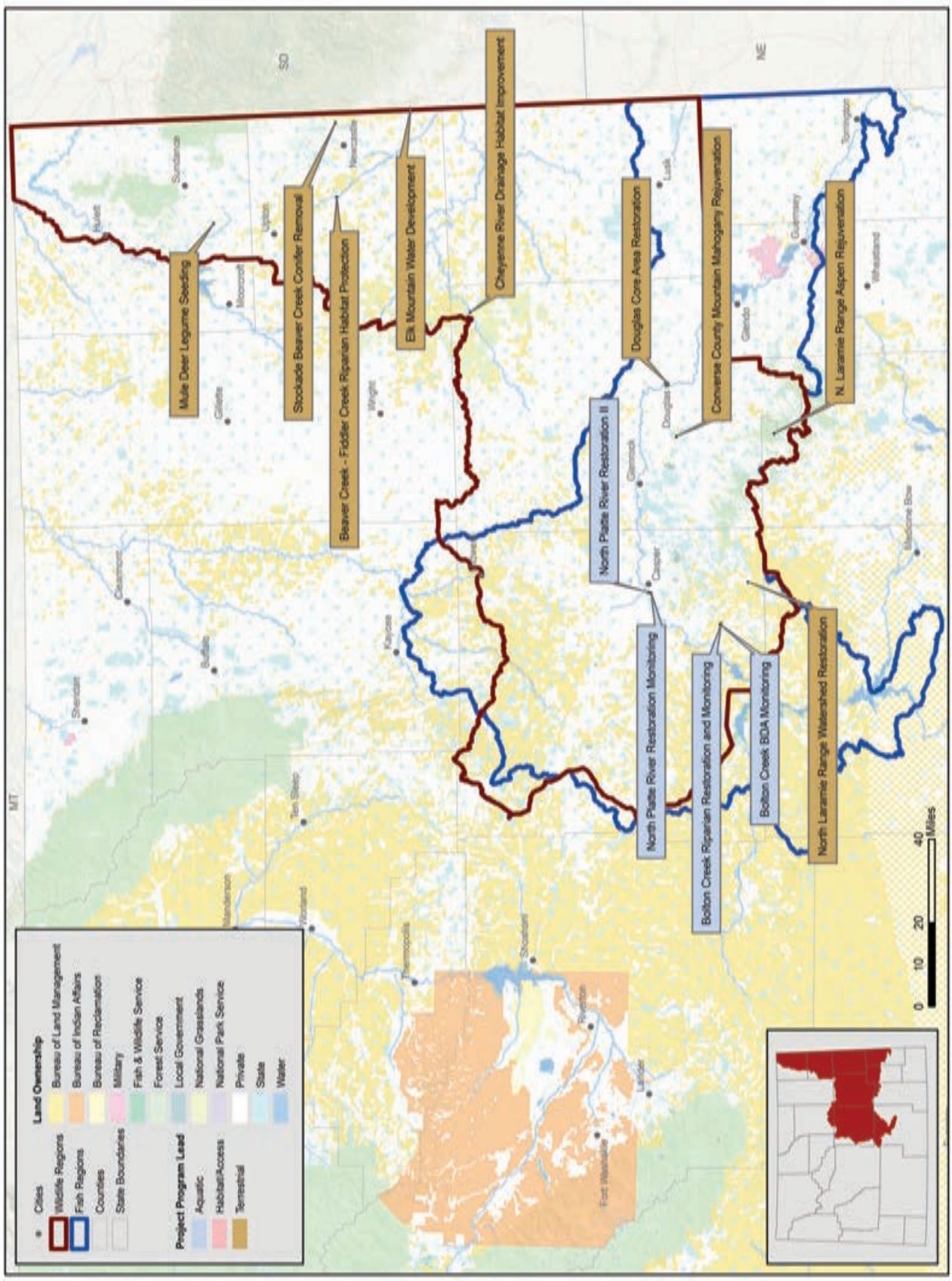
In 2016, Terrestrial Habitat personnel further refined a new inventory and assessment methodology for the Department. "Rapid Habitat Assessments" (RHAs) are a landscape level assessment that will be used to help inform mule deer objective reviews as well as provide baseline data for habitat conditions statewide. A parallel effort to capture and store these data in job completion reports was further developed. Statewide, THBs closely coordinated with Wildlife Division personnel to provide habitat presentations at season setting meetings. 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 biological information from harvested animals and participated in non-game surveys as well as 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

In 2016, the Wyoming Landscape Conservation Initiative (WLCI) had another successful year working with partners on a long-term science-based program to assess and enhance aquatic and terrestrial habitats. In spite of a reduced budget again this year, WLCI funded many projects through obligated funds from other BLM sources. In 2016, WLCI allocated $771,800 to 21 projects and estimated WLCI partner contributions were about $5,100,000. In other words, for every dollar WLCI contributed, project proponents had $6.65 in matching funds. These projects and associated activities were accomplished through numerous coordination meetings, field trips, and work sessions. The WLCI Coordination Team members met with NGOs, permittees, landowners, other agencies, and entities to coordinate WLCI activities. The 21 projects encompassed all of WLCI's focus communities: aspen (two projects), aquatic (one project), mountain shrub (five projects), riparian (seven projects) and sagebrush (five projects). Eight of the 21 projects addressed control of invasive species. Reducing barriers to migration corridors was the objective of three other projects.

In August the WLCI Executive Committee (EC) met to discuss, among many topics, the future of WLCI. The continued reliance on BLM funds to meet the needs of all the projects is diminishing. The BLM receives funds for WLCI through the Healthy Lands Initiative. While the funding for the Healthy Lands Initiative has remained the same, the number of initiatives other than WLCI has increased. The EC formed a subcommittee to examine potential funding sources and ways to market WLCI.

Casper Region



Casper Region

Partnerships and cooperation were once again the foundation of the Casper Region's habitat improvement projects, both aquatic and terrestrial. Without key partnerships with landowners, land management agencies, funding partners, local governments, sportsmen's groups, and NGO's, these diverse projects would not be possible. WGFD also gives many thanks to the volunteers who were on the ground helping wildlife across the Casper Region.

Due in part to collaboration with a citizen based mule deer working group; habitat projects designed to benefit mule deer were a focal point. Conifer removal to promote more herbaceous and browse habitat was done in both the Bates Hole and Black Hills areas of the region. Reducing competition and opening up more of the understory will benefit hydrologic function and will greatly enhance grass and forb production. This provides nutrition for a wide variety of wildlife.

Native tree and shrub plantings were conducted in the Cheyenne River and Hat Creek Breaks. Habitat quality and riparian conditions can be significantly improved by successful re-establishment of native plants.

Monitoring continued on the Bolton Creek watershed project with past efforts showing success. A few years ago, Casper biologists applied a tool for improving hydrologic function called a Beaver Dam Analogue (BDA), formerly known as an "insta-dam". These BDAs are not a permanent dam, but are a tool biologists use to trap sediment in Bolton Creek. Several BDAs were built in 2015 and in 2016 and have proven to be effective in trapping sediment as well as improving water depth in these areas. Continued monitoring will determine if BDAs will be used not only to improve Bolton Creek, but possibly be used as a management tool across Wyoming. So far, results have been positive. Sediment trapping on Bolton Creek is key to the reduction of sediment deposited into the North Platte River, a blue-ribbon trout fishery.

Work on the North Platte River restoration project continued into Phase 2 during 2016. Work picked up where it left off in 2015, downstream of Morad Park, just below the Casper Regional Game and Fish office, with a braided section of the river being returned to a single channel. This work showcases what partnerships in a community can achieve and WGFD is proud to be a part of the work the Platte River Revival and City of Casper has achieved.

Mule Deer Legume Seeding (Goal 2) – Todd Caltrider

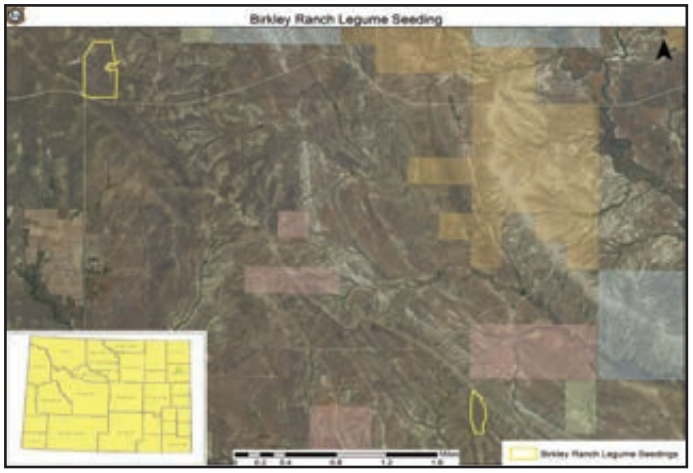


Figure 13. *Birkley Ranch Mule Deer Legume Seeding 2016.*

Figure 14. *Blacktail Canyon Ranch Mule Deer Legume Seeding 2016.*

A total of 117 acres of falcata alfalfa were interseeded into rangeland during spring 2016 in Weston County. Ninety-four acres of falcata alfalfa was interseeded into crested wheat dominated rangeland on the Birkley Ranch (Figure 13) and twenty-three acres of falcata alfalfa was interseeded into native rangelands on the Blacktail Canyon Ranch (Figure 14). The purpose of these plantings is to provide high quality forage for mule deer and improve nutritional content of rangelands. Unfortunately, growing conditions were dismal after planting, with high temperatures and little to no precipitation occurring. No germination was observed during 2016. Hopefully the seeds remain viable, and we will see germination during the spring of 2017. This project was funded, in part, through the statewide WGFD Grass and Legume Seeding Program.

Figure 15. *North Platte River restoration construction, October 2016.*

North Platte River Restoration II (Goal 2) – Matt Hahn and Paul Dey

Work continued on phase 2 of the North Platte River restoration in Casper (Figure 15). Work began at the downstream end of the 2015 work by Morad Park and progressed downstream. A total of 1,771 linear feet of the North Platte River was re-shaped. The existing channel was narrowed, deepened and slightly realigned. A braided section of river was returned to a single channel. Over 1,200 linear feet of woody debris toe protection was installed. In addition, two boulder vanes were constructed to deflect current away from the banks. Re-seeding and planting of willow and cottonwood is scheduled for spring 2017. This work is funded by a wide variety of partners including WWNRT and WGFD.

Bolton Creek Riparian Restoration (Goal 2) – Keith Schoup

Figure 16. *Shredded tree material placed in headcut.*

Figure 17. *Beaver dam analogue maintenance*.

During 2016, 290 tons of shredded tree material were placed to slow the movement of two headcuts that are contributing sediment into Bolton Creek (Figure 16). In addition, one beaver dam analogue and two sediment dams were placed. Ten beaver dam analogues and six sediment dams were maintained to repair damage sustained following runoff events occurring throughout the spring, summer and early fall of 2016 (Figure 17).

Bolton Creek BDA Monitoring (Goal 2) – Betsy Morgan, Matt Hahn and Keith Schoup

Figure 18. *Surveying a Bolton Creek cross section downstream of a BDA.*

A monitoring reach that encompasses four Beaver Dam Analogues (BDAs) on Bolton Creek was resurveyed in 2016. The monitoring effort was initiated in 2015 to quantify the effectiveness of BDAs in retaining sediment and their ability to reduce stream incision and improve riparian vegetation. Photos from 2015 and 2016 as well as survey data (eight cross sections and a 600 ft. longitudinal profile of the stream) show promising results for the use of BDAs within Bolton Creek. Although two of the structures within the reach washed out, the most upstream BDA (Figure 18) is stable after one year and has accumulated one foot of sediment. In addition, the average water depth during the 2016 survey was 1.7 feet compared to a dry channel during the same time in 2015. Surveying will continue annually with additional emphasis placed on vegetation monitoring, consistency among photo points, and collaboration with the BLM regarding groundwater monitoring data. Results will be used to improve management of Bolton Creek and inform the use of BDAs as a restoration tool in Wyoming.

Douglas Core Area Restoration (Goal 2) – Willow Steen

The Douglas Sage-grouse Core Area (DCA) has pre-existing disturbances which surpass the Governor's Sage-Grouse Executive Order threshold of 5%. To address this issue the Department and partners began initiating sagebrush restoration efforts in 2013. In addition to this on-going effort, Department personnel were invited to join the DCA Restoration Team (RT), a multi-stakeholder team with the goal of facilitating large-scale habitat improvement and restoration efforts. The team is led by Chesapeake Energy through a management plan approved in 2013. Combined Department and RT efforts in the DCA have resulted in planting approximately 90,000 seedling sagebrush plants within areas previously exposed to wildfire (Figure 19).

Figure 19. *Sagebrush seedlings planted in the DCA.*

Stockade Beaver Creek Conifer Removal (Goal 2) – Todd Caltrider

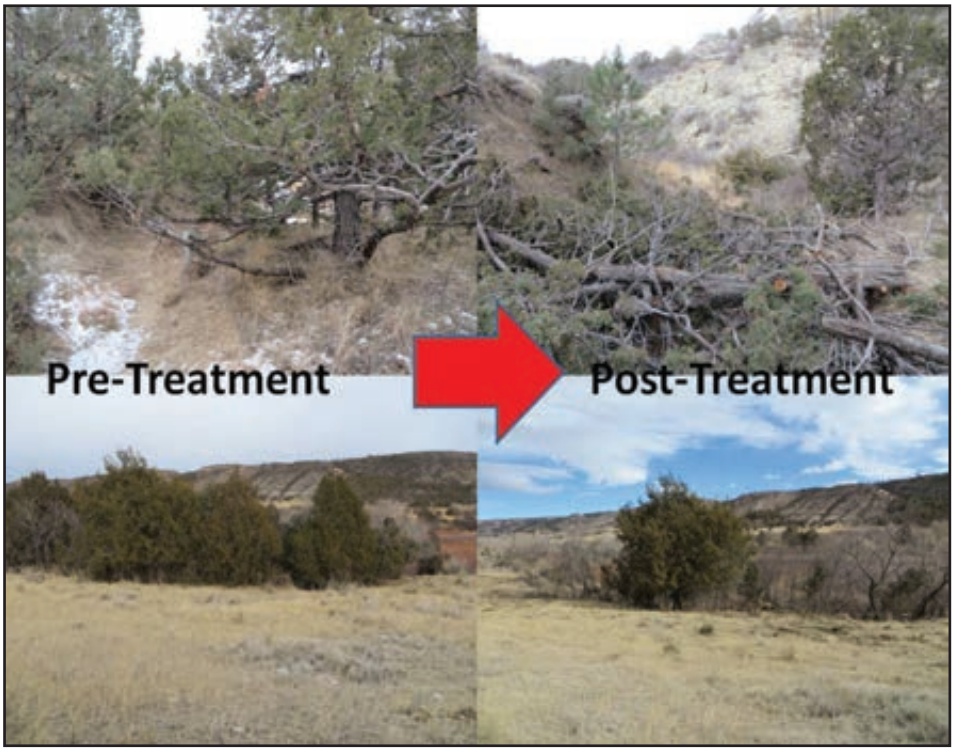


Figure 20. *Pre- and post-treatment conifer removal in Stockade Beaver Creek.*

Stockade Beaver Creek is a large drainage in Weston County that runs north to south out of the Black Hills to the prairie near the Wyoming/South Dakota state line. This area serves as a major migration cor-

ridor for mule deer traveling between winter range at the base of the Black Hills in Wyoming to summer range at the highest elevations of the Black Hills in Wyoming and South Dakota. Transition/winter habitat for mule deer is currently threatened by conifer encroachment into mesic meadows and mountain shrub communities. In addition to conifer encroachment issues, a large percentage of the true mountain mahogany in the valley, the major mule deer browse species in the drainage, is mature and decadent. To improve nutritional condition for mule deer in the Stockade Beaver Creek drainage, WGFD has been working with private landowners and Wyoming State Forestry to set back succession and create early seral habitat in the Stockade Beaver Creek drainage. To accomplish this, WGFD has worked with landowners to thin areas dominated by both juniper and ponderosa pine to promote more herbaceous and browse habitat for mule deer (Figure 20). In addition to conifer removal, WGFD is also mowing large stands of decadent and mature true mountain mahogany to increase leader growth and production. In 2016, a total of 123 acres of conifer removal/mountain mahogany mowing was completed. Another 319 acres is planned to be treated in 2017. Funding was provided by WGFD, WWNRT, RMEF, BOW, WSG, MDF, WGBGLC, and NWTF.

North Platte River Restoration Monitoring (Goal 2) – Mike Robertson

Figure 21. *Restored North Platte River channel in Morad Park, Casper.*

A monitoring plan was developed in 2016 to evaluate improvements in stream channel function and trout population abundance associated with the North Platte River Restoration project through the City of Casper. This plan includes all seven proposed project sites through the 13.5 mile project corridor and includes methods to evaluate primary project goals of narrowing the over-widened river, improving fish habitat, and stabilizing stream banks. The monitoring plan also includes photo monitoring stations, an assessment tool for in-stream structures, and fish population monitoring.

There are details on procedures for each method and a timeline indicating the frequency that each procedure should be employed over a five year monitoring period. In fall 2016, the first year of monitoring was completed atMorad Park (Figure 21). Data were collected in a reach of approximately 2,000 feet including four cross-sections (Figure 22). All of the data show that the project achieved its goals and the resto-

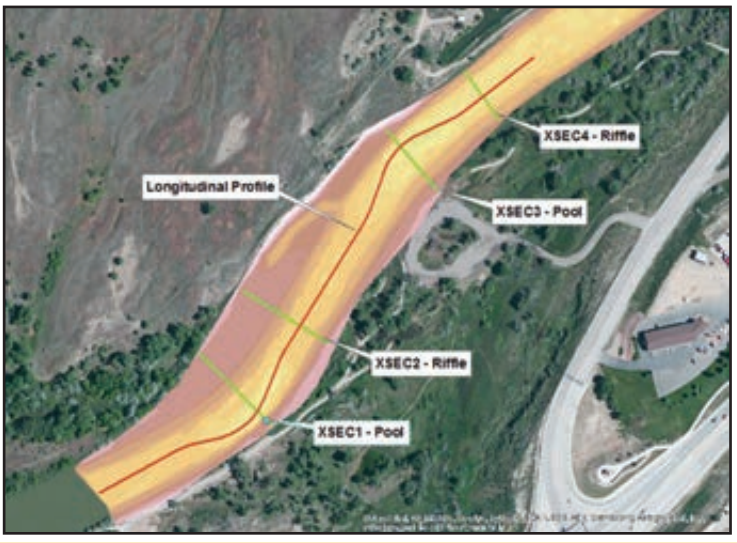


Figure 22. *Morad Park project site.*

ration efforts are stable following a high flow event. Sites 2-3 were completed in fall 2016 and will be monitored for the first year in 2017. As each new project site is completed, it will be added to the monitoring efforts on its own five-year timeline.

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

Figure 23. *Juniper mulching equipment.*

Figure 24. *Snow accumulation area big sagebrush thinning.*

WGFD personnel used rented equipment to mulch 61 acres of juniper encroached big sagebrush-grassland communities within the Little Red Creek drainage. The same equipment was used to mow 10 acres of basin big sagebrush stands located within the Little Red Creek riparian area (Figure 23). The Mud Springs and Seepie Springs big sagebrush snow accumulation area thinning project was completed in 2016 with a total of 205 acres of big sagebrush thinned (Figure 24).

Converse County Mountain Mahogany Rejuvenation (Goal 2) – Willow Steen

Many of the true mountain mahogany stands in Converse County are decadent and no longer providing nutritional browse for wildlife, particularly mule deer. Plateau herbicide was used to partially top kill the mahogany, thus allowing for re-sprouting from the root crown. Understory cheatgrass, which is abundant in these communities, is also treated through this application. Building upon this existing work, plans were developed, and approval and funding were acquired in 2016 for an additional 1,811 acres of treatment (Figure 25). This project will occur on BLM, state, and private land and will be implemented in fall 2017. The South Converse Mule Deer herd uses this area extensively. This herd has experienced a significant decline and shows a high prevalence of chronic wasting disease (CWD). Current fawn production has been inadequate to maintain or increase the population. Habitat improvements are planned to begin reversing the trend of poor fawn production and recruitment and also may help mitigate the impacts of CWD on this herd.

Figure 25. *Future true mountain mahogany treatment site.*

Elk Mountain Water Development (Goal 2) – Todd Caltrider and Seth Roseberry

Figure 26. *Guzzler installed on Elk Mountain.*

Two guzzlers were installed in conjunction with a new waterline on Elk Mountain during the summer of 2016. Elk Mountain near Newcastle is a large area divided almost equally between Wyoming and South Dakota. This area has four grazing allotments with limited dependable water sources. To better distribute grazing on Elk Mountain and improve water sources for wildlife, the USFS and the South Dakota Game, Fish & Parks (SDGFP) contributed funds to build a waterline. Water will only be available when livestock are in the allotments, so to provide a year round water source for wildlife, WGFD obtained grant money from the Water for Wildlife Foundation, WGBGLC, MDF, and WWSF to purchase guzzlers that could be added to the pipeline. When the pipeline is in use, the guzzlers will be filled with water. Once the pipeline is shut off, the guzzlers will still be able to provide a water source due to their ability to catch rain water and protect remaining water from evaporation (Figure 26). WGFD, SDGFP, and USFS installed two guzzlers during summer 2016 (Figure 27), and are planning to install two more during upcoming field seasons. Trail cameras were put up near the newly installed guzzlers, and within a short time wildlife on Elk Mountain found the guzzlers (Figure 28). In addition to installing guzzlers, WGFD is also working with a landowner to develop a water source for bighorn sheep on crucial winter range that will provide water for wintering sheep.

Figure 27. *Guzzler installation crew.*

Figure 28. *Wildlife utilizing the new guzzlers.*

North Laramie Range Aspen Rejuvenation (Goal 2) – Willow Steen

Aspen communities within the North Laramie Range lack successful regeneration to persist on the landscape in the short or long term, due to altered disturbance regimes and herbivory. WGFD worked with the USFS to conduct an Environmental Assessment (EA) for aspen work within the Laramie Range. The EA was completed and in 2016 plans were developed and funding processes were initiated to mechanically remove encroaching conifers from targeted aspen stands or meadows and to coppice specific stands of above-ground aspen to encourage recruitment (Figure 29). This project will increase regeneration of aspen and introduce a new age cohort of stems, thereby increasing the quality of browse available for wildlife. Treatments will begin in fall 2017.

Figure 29. *Future Aspen treatment site.*

Beaver Creek - Fiddler Creek Riparian Habitat Protection (Goal 2) - Todd Caltrider

Figure 30. *Beaver Creek CCRP, Weston County.*

Figure 31. *Fiddler Creek, part of Beaver Creek CCRP, Weston County.*

A new CCRP contract was initiated on Beaver Creek and Fiddler Creek, southwest of Newcastle, WY. This contract will protect 131 acres of riparian habitat from heavy livestock use and allows for riparian vegetation recovery (Figures 30-31). This new CCRP is located between two additional CCRP's which were initiated in 2004 and 2013 respectively. With the addition of this new CCRP, a total of six miles of Beaver Creek (239 acres) of riparian habitat will be protected from degradation. This project was funded by WGFD and NRCS/FSA.

Cheyenne River Drainage Habitat Improvement (Goal 2) – Willow Steen

Native woody abundance has significantly decreased in drainages of the Cheyenne River, similar to many riparian areas throughout eastern Wyoming. In partnership with private landowners, WGFD planted approximately 1,200 native trees and shrubs along Walker Creek and adjacent draws and tributaries in spring 2016 (Figure 32). Additionally, 200 native trees and shrubs were planted in the Dry Fork of the Cheyenne River. 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 32. *Native woody planting in Cheyenne River tributary. This photo was taken in late summer of 2016 to show growth of plants planted in spring of 2016.*

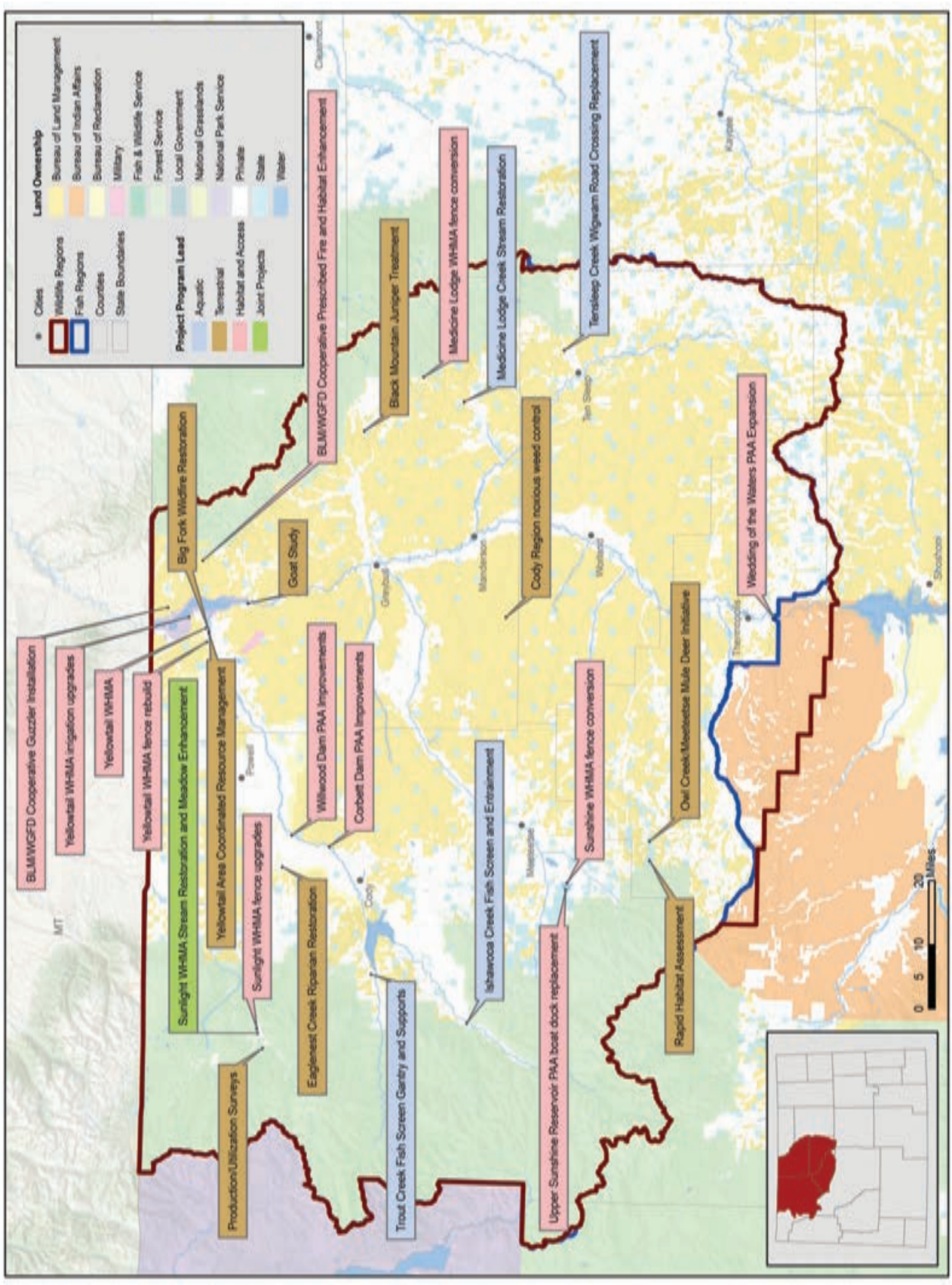
Figure 33. *Antelope Creek planting area.*

Plans were also developed to plant native trees and shrubs along Antelope Creek and the Cheyenne River, primarily on Forest Service lands (Figure 33). These areas are showing cottonwood recruitment, but currently lack sources on intermediate cover such as native, fruit-bearing shrubs. Due to the need to construct exclosure fencing to allow the plants to become established, a cultural resources inventory is required. The funding to hire a consultant was acquired and the survey will be conducted in 2017. Project implementation will occur in the fall 2018.

Lastly, an additional 500 chokecherry plants were planted in draws along Hat Creek Breaks in Niobrara County in Spring of 2016. Converse County Sportsmen for Fish and Wildlife provided the bulk of the planting labor (Figure 34). These plants were grown in deep pots to increase success by having long roots which are more likely to access water during drier periods of the year.

Figure 34. *Hat Creek Breaks planting with SFW crew.*

Cody Region


Land Ownership
Bureau of Land Management
Bureau of Indian Affairs
Bureau of Reclamation
Military
Fish & Wildlife Service
Forest Service
Local Government
National Grasslands
National Park Service
Private
State
Water
Project Program Lead
Aquatic
Terrestrial
Habitat and Access
Joint Projects
Cities
Wildlife Regions
Fish Regions
Counties
State Boundaries
BLM/WGFD Cooperative Guzzler Installation
Yellowtail WHMA irrigation upgrades
Yellowtail WHMA
Yellowtail WHMA fence rebuild
Sunlight WHMA Stream Restoration and Meadow Enhancement
Yellowtail Area Coordinated Resource Management
Sunlight WHMA fence upgrades
Eagle nest Creek Riparian Restoration
Production/Utilization Surveys
Trout Creek Fish Screen Gantry and Supports
Big Fork Wildfire Restoration
Goat Study
Willwood Dam PAA Improvements
Corbett Dam PAA Improvements
Ishawooa Creek Fish Screen and Entrainment
Upper Sunshine Reservoir PAA boat dock replacement
BLM/WGFD Cooperative Prescribed Fire and Habitat Enhancement
Black Mountain Juniper Treatment
Medicine Lodge WHMA fence conversion
Medicine Lodge Creek Stream Restoration
Cody Region noxious weed control
Sunshine WHMA fence conversion
Tensleep Creek Wigwam Road Crossing Replacement
Wedding of the Waters PAA Expansion
Owl Creek/Meeteetse Mule Deer Initiative
Rapid Habitat Assessment
MT
Powell
Cody
Meeteetse
Greybull
Manderson
Worland
Ten Sleep
Thermopolis
Kaycee
Shoshoni
0 5 10 20
Miles

Cody Region

The Cody Region lies in the foothills of the Absaroka Mountains stretching from the Montana state line south to the Owl Creek Mountains, flanked to the east by the Bighorn Mountains and by Yellowstone National Park to the west.

While diverse, efforts to manage and enhance wildlife habitats and improve public access in the Cody Region have a common thread, they are collaborative efforts involving diverse partners including sportsmen, conservation partners, private landowners, and land management agencies.

In 2016, terrestrial 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. A Coordinated Resource Management team continues to focus on management of Russian olive on Yellowtail WMA near Lovell and as part of the ongoing Owl Creek/Meeteetse Mule Deer Initiative, a treatment to remove conifers on 635 acres of sagebrush and riparian habitats in the Iron Creek drainage on BLM lands is planned for 2017.

Aquatic habitat efforts have focused recently on improvement of Wyoming Game and Fish Commissioned-owned lands in the Cody Region. Construction is anticipated to occur as soon as 2017 for a stream restoration project on Medicine Lodge Creek and a stream crossing on Ten Sleep Creek. Planning is also underway for stream restoration and meadow enhancement on Sunlight WHMA.

Improvement of public access areas throughout the Bighorn Basin has also been a strong focus. Most notably, a new parking lot and boat ramp were developed and improved both above and below Willwood Dam on the Shoshone River, a new boat ramp was installed at Upper Sunshine Reservoir west of Meeteese and the parking lot was expanded at Wedding of the Waters access area on the Bighorn River near Thermopolis.

Goat Study (Goal 2) – Eric Shorma and Jerry Altermatt

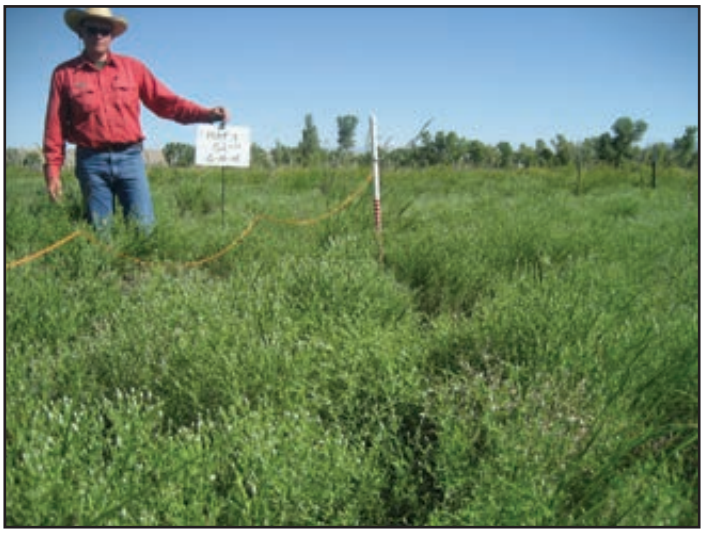


Figure 35. *Pre-grazing monitoring of Russian knapweed targeted grazing experimental plots.*

Department personnel, in cooperation with University of Wyoming Extension and Bighorn Canyon National Recreation Area initiated a long term study to evaluate the effectiveness of targeted goat grazing in reducing Russian knapweed. The research is being conducted on the Yellowtail WHMA, where goats have been used since 2014 to manage noxious weeds. Fenced enclosures were constructed to provide four sets of five experimental plots to receive five different treatments: goat grazing pre-bloom, goat grazing pre-bloom and re-growth, goat grazing pre-bloom and herbicide, herbicide only and non-treated. Pre-treatment monitoring was conducted before goats were brought into the enclosures in June (Figure 35). Goats were held in each grazing treatment plot until approximately 70-80% utilization of knapweed was obtained (Figure 36). Because of drought conditions, no significant re-growth of knapweed occurred after the pre-bloom grazing. The grazing treatments will be repeated annually for at least three years.

Figure 36. *A goat kid foraging on Russian knapweed.*

Figure 37. *Temporary electric fence in high elk use area.*

Medicine Lodge WHMA Fence Conversion (Goal 2) – Eric Shorma and Craig Swanson

Approximately 1,200 linear feet of seasonal electric fence was installed in a high wildlife use area. This seasonal fence will be utilized to keep trespass livestock off of the Medicine Lodge WHMA during grazing periods on the neighboring forest service allotment. This fence will be removed once livestock are off the forest service allotment to allow wildlife to freely move between the forest and the WHMA (Figure 37).

Sunlight WHMA Stream Restoration and Meadow Enhancement (Goal 2) – Laura Burckhardt and Craig Swanson

Figure 38. *Sunlight stream restoration and irrigated meadow project areas.*

Sunlight WHMA consists of 1,414 acres of wildlife and fisheries habitats along Sunlight, Trail and Painter creeks. The WHMA contains sagebrush grassland, conifer, irrigated meadow and riparian habitats. The area is crucial big game winter range for elk, moose, mule deer, and bighorn sheep. Sunlight Creek supports a fishery for cutthroat, rainbow and brook trout. This area was purchased in the 1960s by WGFD to preserve the area for wildlife habitat, public use and access to adjacent USFS lands. WGFD is actively working on collaborative habitat management efforts across the Sunlight Basin with the public, conservation partners, private landowners and land management agencies. The proposed Sunlight Stream Restoration and Meadow Improvement project (Figure 38) is one of the first on the ground restoration efforts in this collaborative effort to protect and improve wildlife habitats within the Sunlight Basin.

Sunlight Creek, within the WHMA, has experienced unnatural stream channel movement and severe bank erosion for the last 40 years. These channel movements resulted from changes in land use practices and have been accelerated by subsurface flow of irrigation return flows. The unnatural rate of change in Sunlight Creek: 1) degrades fish habitat due to sedimentation and over widening of Sunlight Creek and; 2) results in excess sediment deposition in Sunlight Creek downstream which has previously closed and threatened public access roads. WGFD is currently reviewing multiple alternatives for addressing the channel instabilities that have resulted in accelerated bank erosion.

The WHMA contains 200 acres of irrigated meadows and has water rights for an additional 50 acres of irrigated land. The goal in managing these irrigated meadows is to maximize the forage available as elk winter range habitat. The current irrigation system severely limits the quantity and quality of winter range for elk and the flood irrigation system can only efficiently irrigate approximately 20% of the 250 acres of allotted water rights. This translates to an elk carrying capacity five times lower than the potential of the meadows. The primary reason the flood irrigation system is so inefficient is the extremely porous soils that were formed when the area was a glacial lake bed. These soils occur in the three miles of canal and across the 250 acres of meadows habitat. A significant portion of water is lost and flows subsurface back into Sunlight Creek. The subsurface irrigation return flows have resulted in accelerated bank erosion on Sunlight Creek.

Approximately 1,000 elk use the meadows and the surrounding native range on WHMA and USFS lands. Utilization levels by elk on grass averages 60% on the irrigated meadows. Utilization on native rangelands regularly exceeds 70% and has been as high as 96% causing deterioration of rangeland health. The proposed irrigation system improvements on the meadows would achieve 100% irrigation coverage to all 250 acres and increase elk winter range capacity from 208 to 1,040 elk AUMs. The proposed work will upgrade the existing flood irrigation system to a pivot system. Project design for both the stream restoration and meadow enhancements is ongoing with construction expected in 2017 and 2018.

BLM/WGFD Cooperative Guzzler Installation (Goal 2) – Brad Sorensen, Eric Shorma and Craig Swanson

Figure 39. *Little Mountain guzzler before back filling.*

Figure 40. *Completed Little Mountain guzzler.*

During the summer 2016 four guzzlers were installed on BLM lands on top of Little Mountain to provide water for the Devil's Canyon bighorn sheep herd. The area is low elevation, dry and has karst geology which limits available water. Many of the reservoirs do not fill up as the water seeps into the ground and enters the karst formation. Therefore, utilizing guzzlers is a good method of collecting precipitation for wildlife use.

The BLM requested WGFD assistance. The guzzlers were placed in already heavily disturbed locations minimizing surface disturbance and removal of habitat (Figures 39-40). Guzzlers were also placed in or around reservoirs that don't hold water. Game cameras were set up on all guzzlers to verify use.

There are now a total of six guzzlers on Little Mountain which should provide enough water to make the area suitable habitat and maintain separation from areas to the south where domestic sheep graze. The purpose is to keep wild and domestic sheep from co-mingling.

Yellowtail WHMA Fence Rebuild (Goal 2) – Eric Shorma, Craig Swanson and Brad Sorensen

3,900 feet of stock fence was removed and replaced with wildlife friendly fencing. This new fence will keep neighboring livestock off the riparian areas within the WHMA. Wildlife friendly fencing will allow whitetail and mule deer to freely cross the WHMA boundary while keeping the cattle on the neighboring property (Figures 41-42).

Figure 41. *New fence posts being installed.*

Figure 42. *Completed boundary fence on Yellowtail WHMA.*

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 WHMA and adjacent private lands. Included in the burn area were 752 acres that had been treated to remove Russian olive between 2009 and 2013. These areas, because of the heavy biomass 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 whitetop, Russian knapweed, and Canada thistle have proliferated throughout the burn area but especially in areas of highest fire severity.

Figure 43. *Photos taken 2014 (above) and 2016 (below) show a reduction in Canada thistle from herbicide treatments.*

In 2016, the CRM conducted herbicide treatments on approximately 700 acres to target infestations of Canada thistle and Russian knapweed. The treatments were conducted using backpack and ATV sprayers. Youth from TNC's Leadership in Environmental Action for the Future hand watered approximately 2,000 buffaloberry plants that were planted within the burned area in 2015 to re-establish shrubs lost in the fire. In July, Department personnel revisited 43 photopoint monitoring sites established after the wildfire. Most photo re-takes show a marked reduction in noxious weeds as a result of herbicide treatments in the last two years (Figure 43).

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

Figure 44. *Prescribed fire on Little Mountain.*

Approximately 233 acres of juniper were treated with prescribed fire in the Cottonwood Creek area near Lovell. The objective was to remove encroaching junipers from sagebrush communities to improve bighorn sheep, elk and mule deer habitat. The burns were conducted by the BLM Cody Field Office with assistance from WGFD and RMEF. The treatments are part of a larger prescribed fire project in the Little Mountain area that began in 1997 which has treated nearly 12,500 acres in total (Figure 44).

Upper Sunshine Reservoir PAA Boat Dock Replacement (Goal 3) – Brad Sorensen and Craig Swanson

A new wedge style boat dock was installed on upper Sunshine Reservoir to allow sportsmen to safely enter and exit the reservoir with boats. This new style of boat dock replaced an unsafe floating dock and will stay in position during high wind events (Figure 45).

Figure 45. *New boat dock on Upper Sunshine Reservoir.*

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

Figure 46. *Backpack spraying Russian olive re-sprouts.*

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, WGFD, BLM, and BOR), neighboring private landowners, 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 in 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.

Figure 47. *Chainsawing and spraying mature Russian olive trees.*

In 2016, approximately 740 acres of Russian olive re-sprouts and seedlings were treated with herbicide using backpack sprayers (Figure 46). A National Park Service Exotic Plant Team spent several days in the spring and fall treating mature Russian olive trees that could not be accessed by masticating machines because of soft soil conditions. Trees were felled using chainsaws and immediately stump treated with herbicide (Figure 47).

Eaglenest Creek Riparian Restoration (Goal 2) – Jerry Altermatt and Laura Burckhardt

Figure 48. *Severe bank erosion on Eaglenest Creek from artificially high flows and emergency spills from the Heart Mountain Canal.*

A riparian and stream restoration project on Eaglenest Creek on TNC's Heart Mountain Ranch north of Cody continued into its second year. The stream has experienced accelerated erosion due to operational spills from the Heart Mountain Canal, and shrubs and trees are largely absent in the riparian area due to historic livestock use (Figure 48).

Four BDAs were constructed in the creek in 2016 with the objective of raising the water table to support woody vegetation establishment and slow water flows through stream meanders to reduce bank erosion. Wooden posts were driven into the stream bed and willow branches were weaved through the posts to mimic a beaver dam (Figure 49).

Figure 49. *Constructing a beaver dam analogue.*

The BDAs are part of a larger restoration effort that included over four hundred feet of tree revetments and shrub plantings in 2015. Partners include WGFD, TNC, Wyoming Disabled Hunters, WWNRT, Wyoming Outdoorsmen and BLM.

Corbett Dam PAA Improvements (Goal 3) – Brad Sorensen

Corbett Dam PAA was improved by converting a primitive dirt parking area and primitive boat ramp to a graveled parking area with a concrete boat ramp. This access area allows sportsmen access to the Shoshone River below Corbett Dam (Figure 50).

Figure 50. *New concrete boat ramp at Corbett Bridge on Shoshone River.*

Production/Utilization Surveys (Goal 2) – Jerry Altermatt

Regional wildlife personnel collected production/utilization data at nine sagebrush transects in fall 2016. Annual leader production varied widely with four sites above and five sites below their 13-year averages, reflecting variable precipitation throughout the Bighorn Basin. Utilization at ten transects in spring 2016 was generally below average and only one transect exceeded the 35% utilization level considered to be the threshold for over-use (Figure 51).

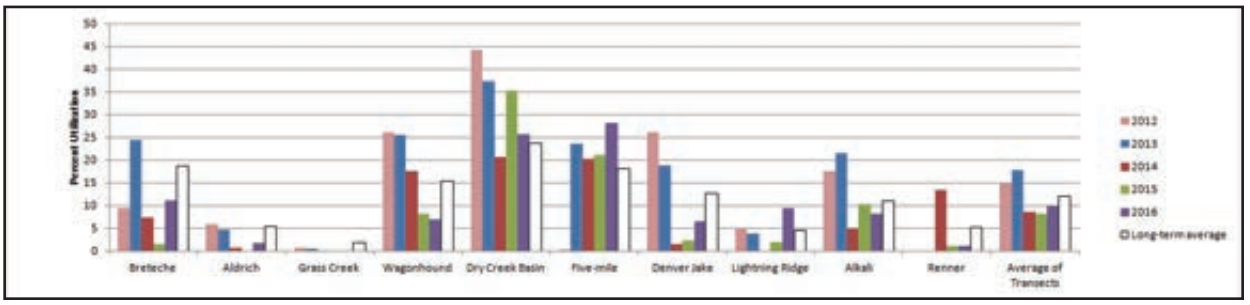


Figure 51. *Sagebrush utilization expressed as percent annual leaders browsed.*

Herbaceous production and utilization were measured at six sites on the Absaroka Front in areas where monitoring elk use is a priority. Production varied from site to site with three sites above and three sites below their 13-year average. Utilization by elk on winter ranges continues to be high in Sunlight Basin, exceeding 65% at three out of five sites (Figure 52).

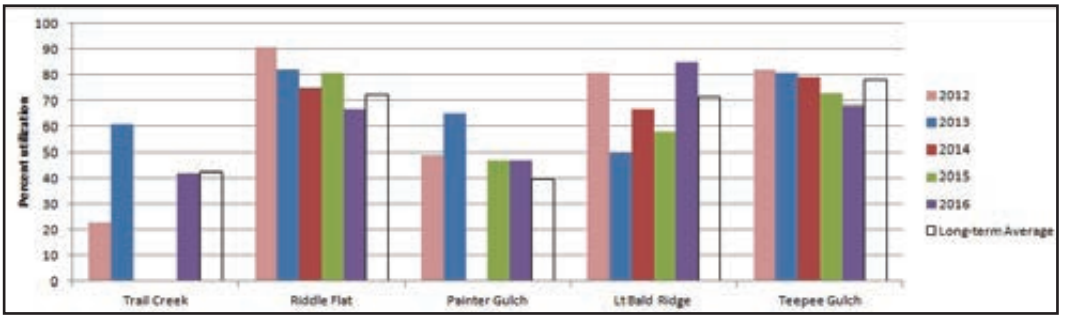


Figure 52. *Utilization of herbaceous vegetation at five locations in Sunlight Basin.*

Willwood Dam PAA Improvements (Goal 3) – Brad Sorensen

A new public access area was developed on BOR land managed by the WGFD. A 5,200 square foot parking area was developed along with a concrete boat ramp. This area will allow sportsmen to access the Shoshone River downstream of the Willwood Dam (Figure 53).

Figure 53. *New concrete ramp at Willwood Dam on the Shoshone River.*

Cody Region Noxious Weed Control (Goal 2) – Brad Sorensen, Craig Swanson and Eric Shorma

Approximately 1,000 acres of invasive plants were treated by Cody Region Habitat and Access personnel during 2016. The invasives were treated using chemical and mechanical methods to stress the plants during the growing season. Controlling these noxious weeds will enhance habitat for wildlife while allowing native plants to thrive (Figure 54).

Figure 54. *Spraying spotted knapweed on Renner WHMA.*

Black Mountain Juniper Treatment (Goal 2) – Jerry Altermatt

Conifers were removed on 380 acres of private and state land in the Black Mountain area to enhance habitat for elk, mule deer and sage-grouse. Flitner Ranch removed the conifers by cutting with chainsaws and scraping/pulling with a mini-excavator (Figure 55). The project objectives were to 1) remove encroaching juniper (and some Douglas fir), 2) restore a natural fire regime and, 3) maintain healthy sagebrush grassland habitat. The project area was in the early phase of juniper encroachment, an opportune time for treatment since removal of junipers is less intensive and understory vegetation has not been significantly altered due to juniper competition. Partners include Big Horn Basin Sage Grouse Local Working Group, RMEF, WGBGLC, and WGFD.

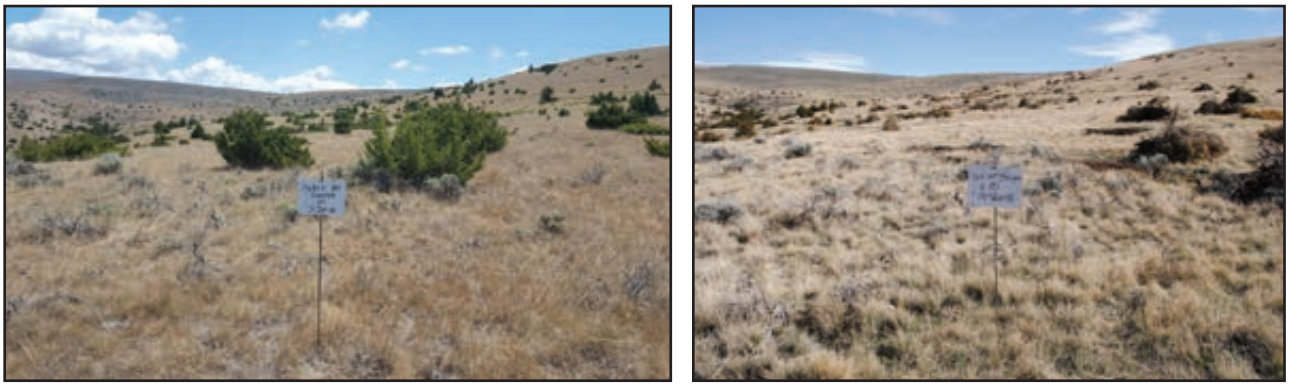


Figure 55. *Before (left) and after (right) juniper removal on the Black Mountain project site.*

Sunlight WHMA Fence Upgrades (Goal 2) – Brad Sorensen and Craig Swanson

Approximately 6.3 miles of dilapidated stock fence was converted to wildlife friendly pole-top fence thanks to generous donations by USFS, WWNRT, RMEF and WGFD (Figures 56-57).

Wildlife friendly fencing will enhance migration for elk and mule deer and better manage livestock grazing on adjacent lands. Improved WHMA boundaries will allow for additional improvements to be conducted and decrease the potential for disease transmission between elk and cattle. As this area serves as crucial winter range for elk and mule deer, wildlife friendly fencing will help minimize barriers to wildlife movement and will aid in energy conservation during this stressful time. Replacing these fences with wildlife friendly fence will also improve public awareness by setting a good example of proper

Figure 56. *New pole top fence in Beam Gulch (left) and Painter Gulch (right).*

Figure 57. *Cooperating partners sign.*

stewardship of public lands. Wildlife friendly fences allow animals to easily jump over or crawl under without injury thus reducing entrapment and undue stress on wintering animals. Addition of top rails also makes wildlife friendly fences highly visible for both ungulates as well as a visible boundary to the public. These fences will help facilitate proper WHMA management and result in more forage available for wildlife (Figure 56).

Medicine Lodge Creek Stream Restoration (Goal 2) – Laura Burckhardt

Medicine Lodge Creek, from the State Park Headquarters downstream to the end of the WHMA, has experienced significant channel instabilities for at least 40 years. The stream channel and floodplain is laterally and horizontally confined by a bridge, by road and trail development, and by development and maintenance of two irrigation diversion dams. In the 1970s, the WGFD documented damage to stream habitat by bulldozer work at the two irrigation diversions, Anthony and Betty. Prior to the property becoming a WHMA, the stream was scraped and channelized at both diversion dams. These modifications caused instability, extreme bank erosion and movement of the stream channel over 200-feet from it's original location (Figure 58). Stream bank erosion is contributing about 2,455 tons of sediment per year. If restored to a stable state, a natural bank erosion rate would be about 135 tons per year. The proposed project would reduce bank erosion by approximately 2,320 tons of sediment per year, eliminating land loss and excess deposition downstream of the project area.

In 1981, the WGFD attempted to reduce bank erosion and move the stream back into its original channel. This stabilization work was temporarily successful from 1980 through 1993. However, since 1994 significant lateral migration has continued to occur downstream of the State Park boundary, cutting off additional meanders and eroding further into the irrigated field on the WHMA. The channel is currently over-widened and shallow with steep eroding banks. In addition, the Anthony Diversion is a complete fish passage barrier. Previous attempts at bank stabilization were only temporary because they focused on only specific eroding banks rather than all functions in a reach. Also, channel manipulation associ-

Figure 58. *Aerial imagery of Medicine Lodge Creek showing the stream channel in November 2015 compared to the stream channel in 1994 (in pink.).*

ated with the two irrigation diversion continues to impart instability. To restore this section of Medicine Lodge Creek, a reach wide approach is planned to address all channel constraints at once.

In coordination with Wyoming State Parks and the private user of the irrigation diversions, WGFD proposes to repair channel degradations across about 1.0 stream mile. A new bridge will be constructed, year-round fish passage will be available at the Anthony and Betty irrigation diversions, and a stable stream channel will allow for sediment transport, floodplain connectivity and fisheries habitat. The project will also provide an outstanding fishing access area for the public including children and handicapped access. By replacing the bridge, improving the irrigation diversions, and restoring the channel dimensions across the entire reach, we will have a long-term solution to the channel instabilities and degradation in Medicine Lodge Creek. State Parks and WGFD will also design and construct a trail system for improved public access.

Funding has been obtained from Wyoming State Parks, WGFD, WDEQ, and WWNRT and construction could occur in summer and fall 2017.

Sunshine WHMA Fence Conversion (Goal 2) – Brad Sorensen and Craig Swanson

Figure 59. *New fence and gate installed in a high wildlife use area.*

Figure 60. *New high tensile fence on Sunshine WHMA boundary.*

Approximately 12,000 linear feet of stock fence was converted to wildlife friendly high tensile fence to allow migrant elk, mule deer, and pronghorn to move on and off the WHMA with ease. This project was in conjunction with the Larsen Ranch Company and the Pitchfork Ranch (Figures 59-60).

Rapid Habitat Assessments (Goal 2) – Jerry Altermatt

Department personnel including habitat biologists, wildlife biologists and wardens completed rapid habitat assessments (RHA) to determine condition of select habitats (Figure 61). The focus was on aspen communities in the Owl Creek/Meeteetse mule deer herd unit and riparian communities in moose Hunt Area 42 in the Bighorn Mountains. Assessments were conducted at a total of 24 locations, including 20 assessments in aspen communities and four assessments in riparian communities. Assessments in aspen communities included utilizing GPS to map the perimeter of aspen stands. Data from RHAs will be used to inform decisions on big game population and habitat management, especially in conjunction with five-year population objective reviews.

Figure 61. *Riparian Rapid Habitat Assessment being conducted on a tributary of Shell Creek in the Big Horn Mountains.*

Tensleep Creek Wigwam Road Crossing Replacement (Goal 2) – Laura Burckhardt

The Wigwam Road is a WGFC owned, high public use access road to the Wigwam Rearing Station and Tensleep Game Warden station. The access road is located on a split flow channel of Tensleep Creek. The access road has a series of six culverts, spanning approximately 30-feet, located on a side channel and a bridge, spanning approximately 60-feet, located on the main channel of Tensleep Creek.

Figure 62. *Tensleep Creek flooding and debris jams prior to the road washing out on June 30, 2011.*

oming Department of Transportation (WYDOT) spent $100,783 to repair Highway 16 after the 2011 flood.

After careful consideration of stream channel, stream flow, the history of the structures, and costs of conceptual design options the WGFD did a cost benefit analysis for two road crossing options. The first option is to construct a new road downstream of the current location (Figure 63). Under this option, the current road, culverts, and bridge would be removed and fully reclaimed. The second option is to replace the culverts with a bridge or box culvert designed to pass spring flows and debris.

The road crossings are not properly designed to pass flow, sediment and debris during annual high water events. As a result, erosion, sediment deposition, and debris jams have resulted in numerous flooding and safety concerns since the 1980s. The most significant event occurred in 2011 when department staff were stranded as a result of a severe debris jam and washout of the access road and Highway 16 (Figure 62). To date, the Department has spent more than $100,000 on maintaining these crossing and preventing washouts. In addition, Wy-

Figure 63. *Aerial imagery showing the current and proposed location (in red) of the Wigwam Road and bridge crossing on Tensleep Creek.*

Owl Creek/Meeteetse Mule Deer Initiative (Goal 2) – Jerry Altermatt

The Cody Region identified the Owl Creek/Meeteetse mule deer herd unit to focus efforts as part of the statewide Mule Deer Initiative. Two of the habitat issues identified through the public process were the loss of aspen communities on summer and transitional ranges and encroachment of conifers into riparian and sagebrush habitats. During summer 2015 and 2016 aspen communities at risk of being lost to conifer encroachment were identified and mapped (Figure 64). A contract was let for treating at least 75 acres with work to begin in December 2016; however, unusually deep snow conditions precluded the work. A treatment to remove conifers on 635 acres of sagebrush and riparian habitats in the Iron Creek drainage on BLM lands is also planned for 2017.

Figure 64. *Typical aspen community identified for treatment to remove conifers.*

Wedding of the Waters PAA Expansion (Goal 3) - Brad Sorensen, Craig Swanson, Eric Shorma and Seth Roseberry

Figure 65. *New parking lot looking from the South-east corner.*

Figure 66. *20 yard side dump delivering road base*

A new parking area was developed (Figure 65) to accommodate the increased use at Wedding of the Waters PAA south of Thermopolis. The existing 18,000 square foot parking area would not accommodate the skyrocketing demand by sportsmen. Approximately 340 yards of road base was hauled in to increase the parking area to 22,500 square feet (Figure 66). This project was made possible with donations made a local sportsmen group called The Wyoming Outdoorsmen.

Yellowtail WHMA (Goal 1) – Eric Shorma, Craig Swanson and Brad Sorensen

Figure 67. *Cover field on Yellowtail WHMA.*

Figure 68. *West classroom field germinating on Yellowtail WHMA.*

Yellowtail WHMA contains 100 acres of farm fields irrigated for permanent cover (Figure 67). Milo, millet, barley, oats, forage peas, basin wild rye, slender wheatgrass, green needle grass, chufa and small burnet were planted to benefit waterfowl, pheasants and wild turkeys (Figure 68).

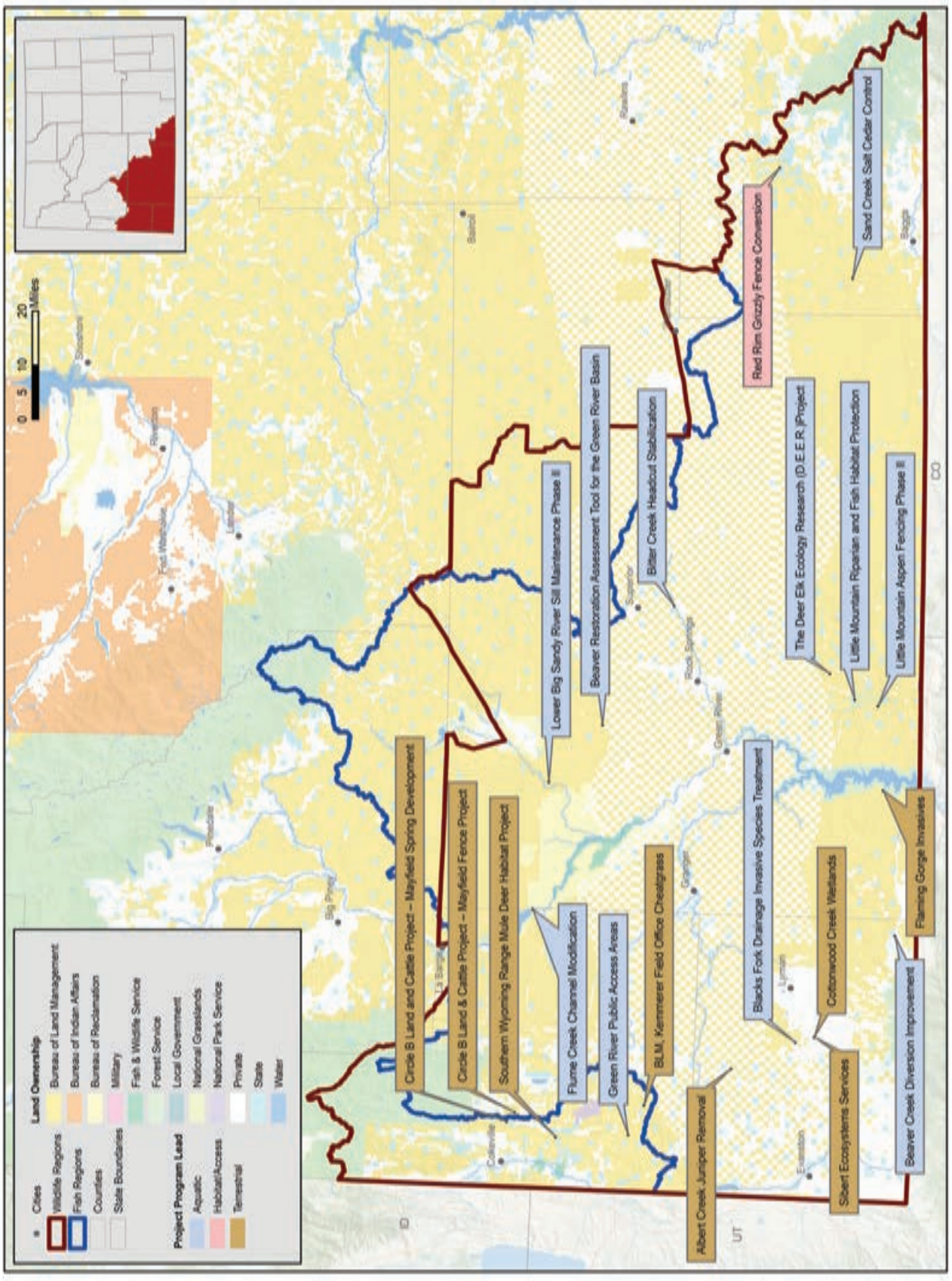
Yellowtail WHMA Irrigation Upgrades (Goal 2) – Eric Shorma and Craig Swanson

A new concrete check, diversion box, and 400' of transport pipe were installed to efficiently deliver irrigation water to a 31 acre permanent cover field. Irrigation is a critical part of maintaining and improving wildlife habitat on the Yellowtail WHMA. This check and diversion box will allow Habitat and Access personnel to split the water along the field resulting in more efficient use of irrigation water (Figures 69-70).

Figure 69. *New concrete check in Big Fork canal at Yellowtail WHMA.*

Figure 70. *New diversion box used to split irrigation water on a permanent cover field.*

Green River Region



Green River Region

In 2016, all habitat improvement efforts in the Green River Region were driven by the priority areas defined in the Strategic Habitat Plan, the Wyoming Range Mule Deer Initiative, and plans developed by the Southwest and South-central Sage-grouse Local Working Groups. The habitat improvement projects focused on seven areas:

-enhance habitat for big game, beaver, and sage grouse;
-maintain and improve fish passage and spawning;
-improve maintenance for Public Access Areas;
-control of invasive species;
-modify fence to wildlife-friendly;
-develop upland water;
-and improve fencing for livestock grazing management and stream stabilization.

Project partnership development, as well as the continuation of existing partnerships, was also of prime interest for the region, including non-governmental agencies (NGOs), county commissioners and conservation districts, other federal or state agencies, and the Wyoming Landscape Conservation Initiative (WLCI). WLCI partnerships remained strong and diverse throughout the region.

Another major focal area included planning for ongoing and future projects and monitoring. Treatments began in the western portion of the region to reduce juniper encroachment and improve sage-grouse and mule deer habitat. A great deal of work was also done to improve and enhance riparian areas and the region's recreational sport fisheries. Temporary steel jack fencing is being used in the southern portion of the region to protect aspen and willow regeneration from excessive browsing by big game, livestock, and feral horses.

A new approach involved Game and Fish contracting with Utah State University to use its Beaver Restoration Assessment Tool as a pilot project for the Green River Watershed in developing a basin-wide prediction model of stream reaches having suitable habitat for beaver transplants.

Beaver Creek Diversion Improvement (Goal 2) – WLCI, Jim Wasseen

Figure 71. *Rock push-up irrigation diversion. Photo courtesy of TU.*

Figure 72. *New headgate and rock vane installed to improve water delivery and fish passage. Photo courtesy of TU.*

The Beaver Creek Diversion Improvement Project focused on improving connectivity between genetically-pure Colorado River cutthroat trout throughout Beaver Creek and the Henry's Fork River and improving aquatic habitat. An additional objective was upgrading agriculture infrastructure. A push-up irrigation diversion was removed (Figure 71) and converted to a low-maintenance, fish passable rock vane structure with a head-gate (Figure 72). The push-up diversion inhibited fish passage and required constant maintenance with heavy equipment. Construction of the new diversion structure was completed in 2016. In addition, six miles of stream were monitored.

Through the Adopt-A-Trout program at McKinnon Elementary School, TU will track tagged fish as they move upstream past the diversion at low flows. TU will focus future fish tagging efforts above and below the diversion to determine if fish can navigate the new structure year-round. The project partnerships include the Lone Tree Ranch, NRCS, TU, and WWNRT.

Beaver Restoration Assessment Tool for the Green River Basin (Goal 2) – Kevin Spence and Floyd Roadifer

Beaver are a keystone ecological species where active pond complexes promote stream stability and watershed function, diverse riparian wetland systems, and provide essential habitat for numerous terrestrial and aquatic wildlife species. The ability to use beaver as a stream, riparian, and watershed restoration tool through live trapping and transplanting has been a keen interest of habitat biologists in Wyoming for several years; however results of these beaver transplant efforts have varied. The Department contracted with watershed ecologists at Utah State University (USU) during 2016 to utilize their Beaver Restoration Assessment Tool (BRAT) to develop a basin wide beaver habitat assessment model for the Green River watershed in Wyoming. The Green River basin model would serve as a pilot project to evaluate the tool's accuracy and usefulness, and if proven successful, BRAT would be expanded with applicability statewide. The BRAT model utilizes existing nation-wide geospatial data sets from the National Hydrography Dataset (NHD) for the locations of perennial stream flow, LANDFIRE to identify locations of woody riparian vegetation for beaver dam building material, and USGS StreamStats data for stream gradient and power. BRAT makes predictions of reaches along perennial streams where beaver habitat is suitable and beaver may be useful as a restoration tool if they are not already present

(Figure 73). The model also identifies where beaver may act as a nuisance, and their impacts either mitigated or be a source population for live-trapping and relocation to areas where they can help improve stream and riparian habitat. Once USU produced the Green River Basin BRAT, Department habitat biologists used their experience and knowledge of the basin's streams, aerial imagery, and ground truthing sites with USU scientists to evaluate model accuracy. Unfortunately, there were many instances of inaccuracy. This was mainly due to the 30 meter pixel data from LANDFIRE creating serious vegetation misclassifications. Some of these BRAT outputs could be corrected manually to improve accuracy; however this dismissed the BRAT's usefulness as a prediction model. As a result, the Department decided to discontinue development of the BRAT in Wyoming until more reliable geospatial vegetation input data is commonly available to improve model output predictions.

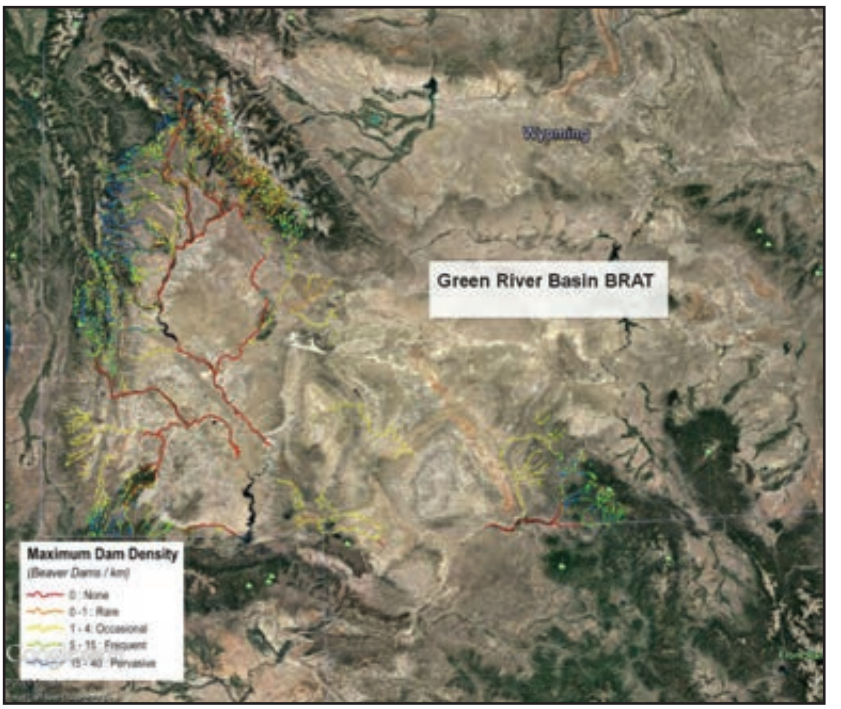


Figure 73. *Green River Basin BRAT model showing stream reach habitat suitability predictions for beaver activity.*

Flaming Gorge Invasives (Goal 2) – WLCI, Jim Wasseen

Controlling noxious weeds within the Flaming Gorge National Recreation Area (FGNRA) will benefit native vegetation and wildlife. Control is being accomplished by using highly specialized watercraft capable of accessing shallow water areas of the FGNRA which are inaccessible by conventional transportation (i.e. ATVs, UTVs, and other OHVs). This watercraft is used to map and treat noxious weed infestations along Flaming Gorge Reservoir and other tributaries such as the Black's Fork River and Green River. Targeted plants include perennial pepperweed, black henbane, thistles, knapweeds, common reed, Russian olive, and tamarisk. Monitoring is done using photo points established each field season using GPS. Photo points are re-visited each year and re-photographed to quantify long-term efficacy of herbicide treatments. Comparisons of photographic images indicate year-to-year efficacy of herbicide treatments is good to excellent. Areas of noxious weeds infestations were revisited and treated along with new sites in 2016 for a total of 1,071 acres treated. The efficiencies of 2016 treatments are estimated to be at > 90%. The FGNRA was also treated by land with ATV/UTV/pickup/backpack sprayer units. The project is a partnership between USFS, Sweetwater County Weed & Pest District, and WLCI.

Green River PAAs (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Personnel from Habitat and Access performed annual required maintenance and monitoring of PAAs in the Green River Region. At Viva Naughton PAA a new floating dock was added to improve public access and prevent resource damage (Figure 74). In Lincoln County, Habitat and Access contracted one acre of noxious weeds to be identified and sprayed on PAAs this year.

Figure 74. *Floating Dock addition at Dempsey Point Viva on Naughton Reservoir.*

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

This project intends to improve native vegetation, riparian, and wetland conditions on over 1,400 acres of private lands for the benefit of southwestern Wyoming's wildlife populations. These objectives will be accomplished by engaging in cooperative monitoring, integrating the data and lessons learned into WLCI's information structure, and developing and implementing an adjustable grazing strategy that meets NRCS and WLCI desired outcomes for ecological improvements along with the property owners needs to manage a sustainable livestock operation. New fencing was installed throughout the 1,448 acre project area. Invasive weed control occurred through both the application of herbicide and hand picking of invasive plants. This activity is 100% complete for 2016. Over the course of the project, invasive species have been dramatically reduced within the project area. Thistle was very abundant along the banks of the reservoir, roads, and under the pivot. During the summer of 2016, it took some effort to locate any thistle. The landowner has left 75 acres (15 acres uncut and 60 acres of regrowth) of Sainfoin (an introduced non-bloat causing legume) for mule deer and other wildlife. This breaks down to 30 tons of uncut Sainfoin, and 75 tons of (one cut) crop regrowth left in the field for wildlife use. Improvements to all classes of vegetation (riparian, shrub, and grasses) have been achieved through the landowner's willingness to reduce his cattle herd below the recommended NRCS stocking rate. Not only has the landowner been stocking the project area with lower numbers of livestock than defined in the NRCS grazing plan, he has been doing so for shorter periods of time than what was endorsed. The landowner also has planted willow clippings along the banks of Three Mile Creek and installed new fencing to create pastures within the 1,448 acre project area and moving/rotating livestock regularly. Project partners include NRCS, USFWS Partners for Fish and Wildlife, WDA, WLCI, and Uinta County Conservation District (UCCD).

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

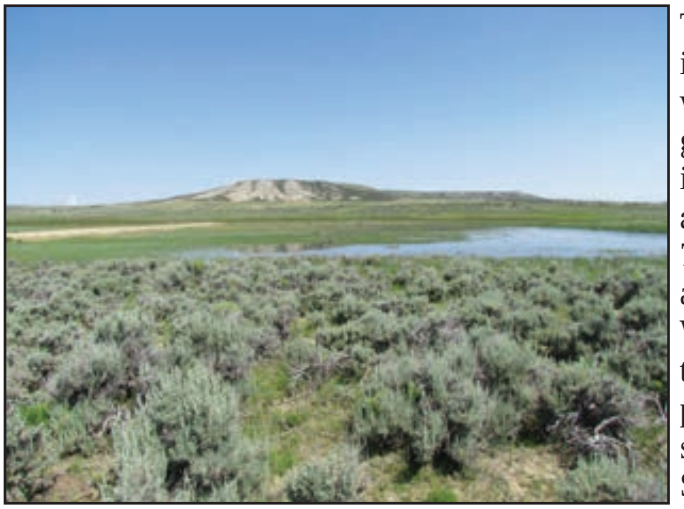


Figure 75. *Monitoring the functionality of the wetland at site 6. Photo by US Fish and Wildlife Services.*

This project will increase wetland habitat and improve existing wetland habitat for a variety of wetland-dependent wildlife including terrestrial game and nongame wildlife species by constructing and repairing dikes, water control structures, and a reservoir on flood-irrigated land (Figure 75). No additional acres were completed this year as the project is still in the administrative phase. Work continued on design and soliciting bids for the Cottonwood Reservoir repair, which is the last part of this project. The majority of efforts were spent fulfilling requirements of the Wyoming Dam Safety and Water Development Commission. Another significant task was securing BLM authorization due to an isolated 40 acre BLM inholding that will be impacted by the project. Project partners include the BLM Kemmerer Field Office, DU, NRCS, private landowners, USFWS Partners for Fish and Wildlife, WLCI, Wyoming Water Development Commission, WWNRT, and UCCD.

Red Rim Grizzly WHMA Fence Conversion (Goal 2) – Mark Cufaude and WLCI, Jim Wasseen

Figure 76. *The fence along Deep Gulch Allotment converted to wildlife friendly fencing standards.*

This project aims to allow big game to more easily move and migrate across the WHMA. An existing woven-wire and 6-strand barbed wire fence will be replaced by a 4-strand wildlife-friendly fence along the Upper Muddy Creek within the Red Rim Grizzly WHMA. The contract was rebid and awarded on June 10, 2016. In August, five miles of fence conversion was completed (Figure 76). Fences that are converted are monitored three times a year at a minimum. Initially, they are checked in the spring for maintenance issues following the winter, and again in the summer and fall for maintenance needs caused by livestock or wildlife. Fences are also checked following construction to ensure they meet wildlife friendly specifications. Photos are taken pre- and post- conversion and monitored for any wildlife issues. Both the BLM Rawlins Field Office and WLCI are partners on this project.

Lower Big Sandy River Sill Maintenance Phase II (Goal 2) – Kevin Spence, Kyle Berg and Miles Anderson

Figure 77. *Before and after maintenance improvements to Sill #11 on the Lower Big Sandy River.*

Aquatic Habitat, Habitat and Access, and USFWS Seedskadee National Wildlife Refuge (SNWR) collaborated during 2015 to maintain 19 in-stream rock sill structures located on state lands along the lower Big Sandy River near Farson. This group worked together again during 2016 to perform maintenance for an additional 18 in-stream rock sill structures located further down the Big Sandy River on BLM and BOR lands. The original purpose of each structure was to enhance river aquatic and riparian habitats, and thereby improve the fisheries potential. These sills needed maintenance to function properly, remain hydrologically sound, and continue to provide habitat. Additional angular rock was added and used to reconfigure each structure to encourage sediment transport, maintain trench pools, provide interstitial niches between rocks, and scour clean gravel substrates to improve fish habitat (Figure 77). Over the years, these 37 structures have provided habitat to support a recreational sport fishing opportunity for the public in nearly ten miles of stream that virtually did not exist prior to the structures. The sills have also encouraged the river channel to narrow, deepen, and stabilize through each stream reach they were installed, and have improved riparian vegetation species composition and vigor. Rock materials donated by BOR from existing stockpiles and leftover rock from the previous year were used to complete the structure improvements. The Habitat and Access crew hauled and sized the rock materials, and Seedskadee NWR provided the heavy equipment and operators to complete maintenance improvements. Extra access planning and effort were required to mobilize rock and equipment to each structure site to protect historical cultural resources associated with a variant of the Oregon Trail.

The Deer Elk Ecology Research (D.E.E.R.)Project (Goal 5) – Patrick Burke, Mark Zornes and Kevin Spence

Concerns over mule deer population status, potential competition with other wild ungulates (namely elk), and aspen stand health in the South Rock Springs herd units has been a data need in the Green River Region for a number of years. Continued declining stand health and deer numbers in the face of increasing elk numbers and extreme public interest in gaining a better understanding of the factors influencing deer and elk populations led to a conversation between local wildlife enthusiasts, habitat and wildlife personnel, and the University of Wyoming's Cooperative Fish and Wildlife Research Unit

in 2012 about a study that would address data needs and concerns. In response, the D.E.E.R. (Deer-Elk Ecology Research) project was initiated in late 2015, a cooperative project between WGFD, UW Coop, and MFF. This project evaluates mule deer reproduction and recruitment, habitat selection on seasonal ranges, ungulate forage selection by season and dietary overlap, movement and distribution of mule deer and elk and their migration routes, and identifies factors limiting recruitment of yearling male deer to adults.

Game and Fish personnel, volunteers, and Coop Unit researchers initially placed GPS collars on 53 adult female mule deer and 35 adult female elk during helicopter captures in fall 2015 and spring 2016 (Figure 78). Female mule deer were fitted with VITs, which allow researchers to determine when and where animals give birth and help in capturing fawns during spring 2016. A total of 55 fawns (32 females and 23 males) were later captured and fitted with transmitters. At the time of this writing, 51% have died from a variety of causes.

In addition to following movement and assessing cause specific mortalities, nearly 900 individual fecal samples were collected across the Greater Little Mountain Area from mule deer and elk. Diet composition will help evaluate dietary overlap among ungulate species and help understand what key forage items are needed to grow mule deer in this arid landscape. Some interesting preliminary results of the research include: 1) Deer that inhabit the area south of Rock Springs are roughly 30% smaller than deer in the Wyoming Range based on body weight, 2) deer south of Rock Springs appear to gain less fat over summer but lose less fat over winter compared with deer in the Wyoming Range, 3) deer south of Rock Springs peak in parturition timing roughly one week earlier than deer from the Wyoming Range, and 4) deer are selecting birthing areas in grasslands/sagebrush near aspen stands in the Greater Little Mountain Area. This result is in contrast to the notion that aspen stands are critical fawning habitats and suggests selection of fawning areas is more complex than previously thought.

Researchers are working to understand more about the ecology of elk that inhabit the arid high desert and understand how they have continued to thrive in the face of declining/struggling aspen and associated mesic habitat and mule deer in the same system. From the first year of GPS collar data, it appears elk have a similar preference for habitat during birthing as mule deer. One difference is the stronger selection for conifer, which is actually a selection for areas with more juniper than large stands of conifer. As in the collared deer, elk select areas closer to aspens but in grasslands and juniper instead of aspen stands. This suggests that elk and mule deer are birthing in similar areas and signals potential for important interactions between the two species.

Figure 78. *One of fifty-three doe mule deer fitted with GPS telemetry in the Greater Little Mountain area as part of the DEER Project.*

In fall 2016, deer were captured again and showed increased body condition compared to the previous year, likely due to increased moisture and habitat health. Additionally, 15 yearling and adult buck deer were collared to begin assessing factors influencing recruitment and survival.

Little Mountain Aspen Fencing Phase II (Goal 2) – Kevin Spence and WLCI, Jim Wasseen

Figure 79. *Portable steel jack fencing erected to protect young aspen trees from excessive browsing on Little Mountain.*

WGFD habitat biologists and BLM wildlife biologists collaborated with the Southwest Chapter of MFF to complete the second phase of steel jack fencing for protecting two additional over-browsed aspen stands on Little Mountain located south of Rock Springs. Browsing of young aspen suckers at each of these locations has impeded vertical growth and some browsing has been severe enough to cause regression and death of aspen suckers. The fencing is portable and is designed to discourage large ungulates including elk, moose, and cattle from accessing the aspen stands and further degrading the condition of young trees (Figure 79). Once the young aspen trees have grown to an average height where they are no longer susceptible to browsing and are capable of maintaining a healthy stand, the fencing will be dismantled and moved to another nearby aspen stand in need of protection. The overall goal is to promote healthy aspen habitat conditions on Little Mountain which support lush and diverse understory vegetation that benefit multiple terrestrial and aquatic wildlife species. Funding and labor was provided by the MFF, WGFD, WLCI, Sweetwater County Conservation District, and the Bureau of Land Management. Wexpro Energy and Breitburn Energy both donated drill stem pipe for fence construction, and R&M Welding was contracted to design and fabricate the fence.

BLM, Kemmerer Field Office Cheatgrass (Goal 2) – WLCI, Jim Wasseen

Cheatgrass throughout the BLM Kemmerer Field Office (KFO) threatens winter ranges, impacts grazing, and increases the chance for a wildfire. The project has three main objectives: 1) Identify and map cheatgrass areas within the KFO, 2) prioritize areas of cheatgrass infestation for treatment, and 3) aggressively treat prioritized cheatgrass infestations. Small areas will be treated by the KFO staff while larger acreages will be treated aerially. The BLM continued to work with cooperators to map, prioritize, and determine treatment areas regardless of ownership within the KFO. In 2016, 2,453 acres of cheatgrass were treated. Aerial treatments included 523 acres of cheatgrass in the Bear River project area, 893 acres in the Uinta project area, and 1,037 acres in the sagebrush focal area. Partners include the BLM KFO, Lincoln County Weed and Pest District, NRCS, National Fire Plans Operating System, private landowners, Uinta County Weed and Pest District, and WLCI.

Little Mountain Riparian and Fish Habitat Protection (Goal 2) – WLCI, Jim Wasseen

This effort is about improving stream function, increasing woody material availability near streams, and enhancing fish passage throughout Sage Creek, Currant Creek, and Red Creek within the WLCI Little Mountain Priority Area. Actions include fencing, planting willows and trees, and addressing fish passage limitations. TU is working with OSLI to permit remaining riparian fence projects and is working with Currant Creek Ranch to design improved fish passage on the ranch.

Figure 80. *Steel-jack fence to protect riparian vegetation along Red Creek. Photo courtesy of TU.*

On August 27, 2016, the Red Creek riparian fence was completed and enclosed one-acre of vital riparian area. Volunteers from the local TU chapter and Boy Scout troop put up the steel jack fence that was delivered to the site in July (Figure 80). In September, volunteers from TU, BLM, and WLCI constructed two rock vanes in Red Creek within the riparian fence to improve trout habitat. A local high school student and TU chapter member is leading the Red Creek project. She has set up a monitoring plan and will start monitoring next year. This project also includes partnerships with the BLM Rock Springs Field Office, Currant Creek Ranch, Questar Gas Company, TU, WLCI, and WWNRT.

Circle B Land & Cattle – Mayfield Fence Project (Goal 2) – WLCI, Jim Wasseen

The project is designed to provide better management of livestock by controlling their seasonal movements between BLM, USFS, and Circle B Cattle Company (Circle B) lands. A fence will be erected that would run for 2.5 miles along the border between public lands managed by the USFS and Circle B's property on the Mayfield Ranch and connect to an existing BLM/USFS fence. The landowner prefers a wildlife-friendly laydown fence and intends to work with the BLM and USFS to develop the most appropriate type. No fencing was installed in 2016; however, Circle B met with representatives of the USFS and BLM to discuss the location and design of the boundary fence between the USFS and Circle B Mayfield Property. The BLM participated in the meeting to facilitate future fencing needs on Circle B's BLM grazing allotments that border the USFS. The BLM and Lincoln County Conservation District are working on an agreement to commit funds towards reimbursement of fencing materials. Circle B has proceeded with clearing the fence line along the USFS/Mayfield boundary and surveyed the Mayfield property boundaries to ensure the fence is installed on private land. The project is also supported by the Lincoln County Conservation District, USFS, and WWDC.

Southern Wyoming Range Mule Deer Habitat (Goal 5) – Cheyenne Stewart and Jill Randall

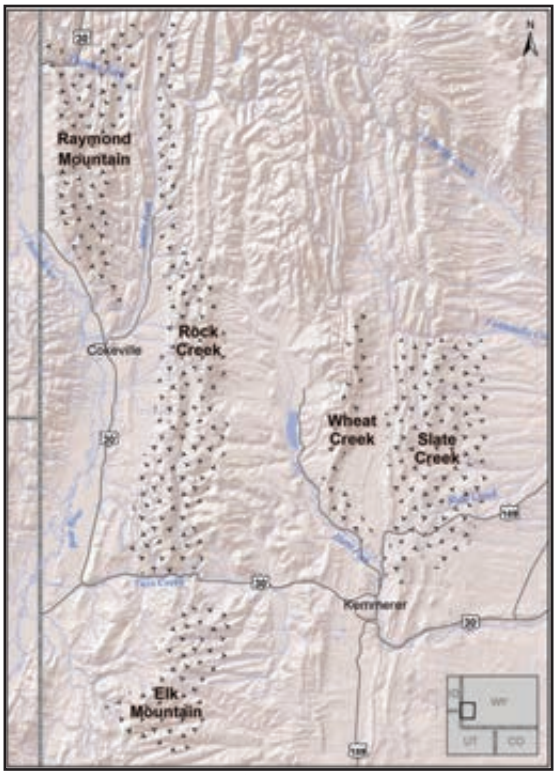


Figure 81. *Potential treatment sites associated with the Southern Wyoming Range Mule Deer Habitat Project.*

In 2012, the Wyoming Range Mule Deer Habitat Management Plan was completed for the Kemmerer/Cokeville area. Implementation was anticipated in 2013; however, progress was delayed due to the lack of a terrestrial habitat biologist. In 2016 the Department hired a Habitat Biologist Trainee to reestablish the project. Work included delineating potential treatment sites and types, site-specific reconnaissance, and gathering local expertise (Figure 81). Coordination with the BLM resulted in the initiation of an Assistance Agreement between WGFD and the BLM anticipated to be completed in Spring 2017. NEPA analysis, cultural clearance, and grazing management options will be addressed in 2017 with implementation in 2018. Primary treatment options include aspen disturbance, mixed mountain shrub enhancement, cheatgrass and weed control, sagebrush thinning and livestock management. The higher elevation transitional and summer range of mule deer has been prioritized over winter range, but the entire landscape is being considered for management options.

Albert Creek Juniper Removal (Goal 2) – Jill Randall

In 2016, 271 acres of Phase 1 juniper encroachment was mechanically removed from important sage grouse and mule deer sagebrush habitat (Figure 82) through a partnership with Jim Collins and George Sears who lease Anadarko owned checkerboard land south of Kemmerer. Hand crews walked through the treatment polygons and used chain saws or loppers to cut the trees and leave them in place. This project is part of a larger SGI project through NRCS and in collaboration with USFWS Partners Program and the Kemmerer Field Office of the BLM. Other components of the project include water development, rest-rotation livestock management including deferment, and fence modification/removal. This is also part of a BLM juniper removal project in the same checkerboard vicinity which will increase the impact for wildlife. Financial partners include NRCS-SGI, USFWS Partners Program, and the lessees. The plan for 2017 is to complete an additional 311 acres of treatment and potentially treat BLM lands.

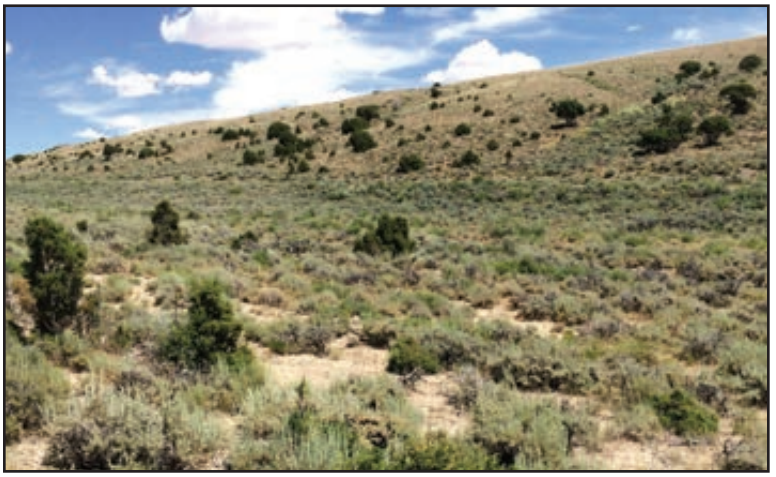


Figure 82. *Phase 1 Juniper Encroachement targeted for mechanical removal in the Albert Creek project.*

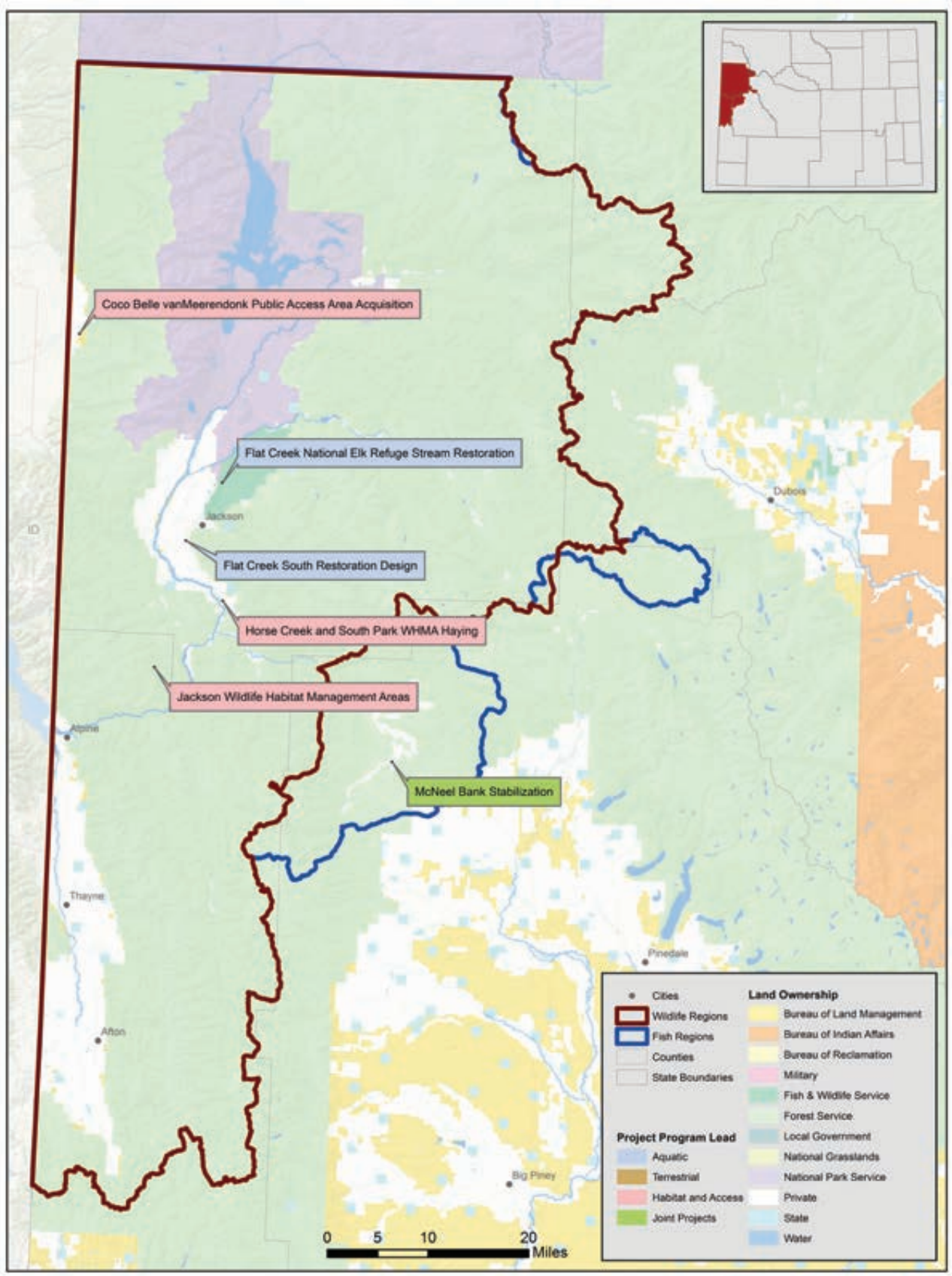
Circle B Land and Cattle – Mayfield Spring Development (Goal 2) – WLCI, Jim Wasseen

This project will benefit the landscape by allowing for the recovery of spring and riparian areas while still allowing livestock and wildlife access to water. The effort involves designing and installing catch basins, pipelines and water troughs for livestock and wildlife. Meanwhile, fencing will be installed around the Old Cow Camp, Mayfield Cabins, and Waterhouse Canyon springs and associated riparian areas to exclude larger animals. This fencing will protect these areas from further degradation, thus allowing recovery. Three spring developments, three water troughs, and an unknown amount of fencing was completed. Circle B contracted with Sunrise Engineering in September 2015 to provide engineering design for the Old Cow Camp, Mayfield Cabin and Waterhouse Canyon springs. The engineering design was completed in September 2016. Circle B applied for and received water rights for the Old Cow Camp, Mayfield Cabins and Waterhouse Canyon springs. Construction on the Mayfield Springs started on September 21, 2016 and was completed October 28, 2016. Spring rehabilitation, trough construction, and fencing were completed as designed and detailed on the Sunrise Engineering drawings. Due to freezing weather conditions at the time of construction the troughs were not filled. The project is supported by the Lincoln County Conservation District, WLCI, and the WWDC.

Halogeton Invasion and Restoration in Southwest Wyoming Salt-Desert Shrublands (Goal 2) – WLCI, Jim Wasseen

This project aims to restore salt-desert shrublands displaced by halogeton. To accomplish this, two enclosures were established in the Flaming Gorge National Recreation Area (FGNRA) within previously existing Gardner saltbush communities which have been invaded by halogeton. Information and results obtained from these two enclosures may be used as the basis for restoration of other Gardner saltbush communities displaced by halogeton. Test plot seedings of 2-5 acres were conducted outside of the two enclosures. A field visit was conducted by members of the USFS and USDA Agricultural Research Service (ARS) June 20, 2016. Two enclosures were visited along with several possible locations for future seeding treatments. Monitoring of these enclosures will continue along with monitoring of new seedings outside of enclosures. Work has been performed in cooperation with ARS who has provided technical information on restoration of high desert plant communities. Based on the results of various test plot seedings within the enclosures, a larger scale trial of approximately 2-5 acres outside the two enclosures were broadcast seeded with forage kochia and Russian wildrye during fall and winter 2016. The project is a partnership between Agricultural Research Service, Sweetwater County Weed & Pest, WLCI, and the USFS.

Jackson Region



Jackson Region

The Jackson Region encompasses the area along the western border of the state, south of Yellowstone National Park, south to Star Valley and LaBarge.

The most noteworthy aquatic habitat work involved the completion of a multi-year stream restoration project on Flat Creek within the National Elk Refuge. This stream is renowned, both locally and nationally, for its trophy Snake River cutthroat trout population. The project includes 3.5 stream miles of both bank stabilization and in-stream structures. In addition, a riparian fence exclosure was completed to protect bank vegetation from grazing elk. Two long-term monitoring stations have been established, one within the fenced exclosure area and the other outside of it.

A second aquatic habitat project of note involved restoration of another 1.4 mile section of Flat Creek on private property south of Jackson. This project will address channel and riparian habitat limitations, livestock grazing with temporary electric fencing and fish passage issues at irrigation diversion structures, all benefiting local fish and other aquatic species.

A third aquatic habitat project involved bank stabilization on a section of the upper Hoback River near Bondurant. Rip-rap was installed as a stop-gap measure to slow the bank erosion that was likely to reach nearby hay storage structures at the WGFD's McNeel Elk Feedground. A more comprehensive stream habitat restoration project is being undertaken through a partnership with Trout Unlimited.

In September of 2016, WGFC acquired the Coco Belle Public Access Area (PAA) through a cooperative effort between the vanMeerendonk family and the Rocky Mountain Elk Foundation. While only 44 acres in size, the property provides a new access point to thousands of acres of public land in the southwestern Teton Range near Alta, WY.

In addition to regular maintenance of fences and roads at regional Wildlife Habitat Management Areas (WHMAs), a haying operation was also conducted on the Horse Creek and South Park WHMAs in 2016. Approximately 171 tons of hay were produced and fed to elk on the two elk feedgrounds. The primary goal of haying on the WHMAs is to produce more nutritional standing forage on the ground as well as reduce the amount of hay that needs to be purchased to feed elk in the winter.

McNeel Bank Stabilization (Goal 3) – Anna Senecal, Miles Anderson, Kade Clark, Cordell Perkins and Derek Lemon

Figure 83. *The McNeel bank stabilization site before (left) and after (right) installing a rock toe to protect the bank and feedground structures until a more permanent solution can be implemented.*

The WGFD, in close partnership with TU, is working to restore function to a portion of the upper Hoback River that has been heavily impacted by historic willow removal and ongoing land management. The River Bend Ranch, just outside of Bondurant Wyoming, doubles as a Department elk feedground. Elk feeding began 1951 by Bob McNeel on the George Cull Ranch, the current location of what is now the River Bend Ranch and McNeel feedground. Feedgrounds throughout the state are located in floodplains and valley bottoms where growing conditions are conducive to forage production, and where feeding locations are accessible. Floodplains and valleys are also where streams transition from steep, bedrock-dominated, high-energy systems to low-gradient, gravel or cobble systems. Gravel and cobble streams that have access to wide valley bottoms keep their streambanks from eroding and maintain their channel locations from year to year by having thriving riparian woody shrub communities. When willows are removed and regrowth is hampered by wildlife browsing, the stream predictably devolves into a chaotic, unstable system. Swinging between the extremes of erosion and deposition both in space (upstream to downstream) and in time (year to year) makes the work of land managers and ranchers difficult and reduces fish and wildlife habitat quality.

The River Bend Ranch has struggled with maintaining pasture land and irrigation diversion locations due to the Hoback River's erosive power and shifting stream channels. There have been multiple attempts to tame the river through dykes and riprap, all meeting only marginal success and ultimately contributing to additional downstream problems. The most recent attempt occurred in December 2016 by WGFD personnel who designed, permitted and constructed a rip rap project on a high eroding bank located just tens of feet from a feedground fence and stackyard (Figure 83). This work has hopefully bought the department several years to design and construct a more comprehensive solution to increase stream stability and transition away from gravel push-up irrigation dams.

Flat Creek National Elk Refuge Stream Restoration (Goal 2) – Anna Senecal

The WGFD and project partners collaborated to complete the restoration of three and one half miles of Flat Creek on the NER, install two permanent monitoring locations and build 1,600 feet of riparian exclosure fencing. The portion of Flat Creek that flows through the NER is locally and nationally renowned as an iconic, wild and self-sustaining Snake River cutthroat trout fishery. This combined with road-side accessibility make it one of the most popular fisheries in Wyoming (Figure 84). Maintenance of instream and riparian habitats is critical for the persistence of a thriving population of wild spawning fish. 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 streambed and widened the channel. The

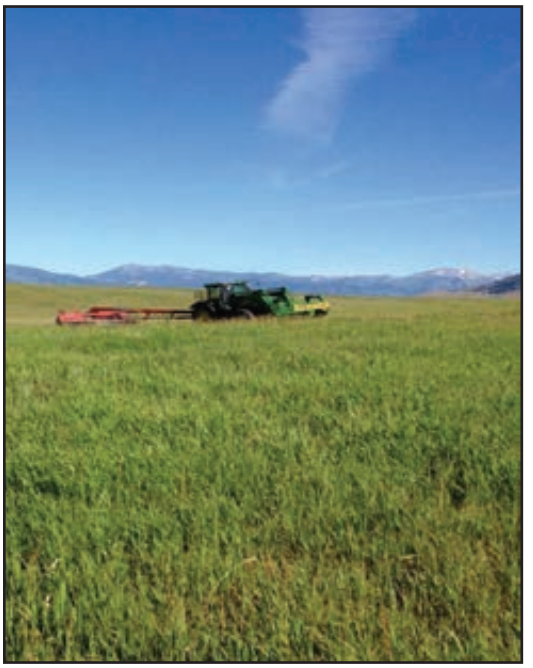
Figure 84. *Flat Creek Snake River cutthroat trout. Photo credit: Mark Gocke.*

Figure 85. *Tandem stream and riparian exclosure fence construction on Flat Creek during October 2016.*

stream lacks large woody debris and undercut banks that provide habitat diversity and overhead cover for fish.

The first mile of the total project reach was completed in 2013. An additional two miles were completed in 2015. The final half mile of stream construction, monitoring site installation and riparian fencing took place in 2016 (Figure 85). Currently there are two long-term monitoring sites within the project area footprint. One is fenced from ungulate browse and the other is not. Over the coming years, repeated data collection will show the effects of ungulate browse on riparian vegetation growth and stream channel maintenance.

Horse Creek and South Park WHMA Haying (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner



The Horse Creek and South Park WHMAs were hayed in 2016. In all, approximately 90 acres were hayed and the WGFD produced 171 tons of hay that was fed out on the Horse Creek and South Park feedgrounds (Figure 86). In 2016 an additional 11 acres were hayed on Horse Creek WHMA. 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 they are migrating to and from the elk 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, reduce commingling between elk and cattle on private land adjacent to elk feedgrounds, and reduce the amount of hay the WGFD purchases.

Figure 86. *Cutting hay on Horse Creek WHMA.*

Jackson WHMAs (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Annual maintenance and improvements continued on the three WHMAs in the Jackson Region in 2016. The Greys River WHMA received annual fence maintenance on all 13 miles of crucial winter range elk fence (Figure 87). The Wyoming Conservation Corps was hired to remove dead trees along the elk fence. The crew removed dead trees within 150' of the fence for approximately six miles of the fence. Annual fence maintenance continued on the South Park WHMA. Seven miles of boundary fence were maintained along with one mile of crucial winter range elk fence. The South Park elk feeding area was also harrowed in spring 2016 to break up elk scat and promote growth of new grasses. The Horse Creek WHMA received annual maintenance on one mile of crucial winter range elk fence. The 60 acres of grass meadows on Horse Creek WHMA were irrigated before and after haying from May through August. The irrigation after haying helps provide nutritious natural forage for the elk when they arrive on the Horse Creek feedground prior to fall feeding. Dog Creek Feedground received annual fence maintenance on approximately two and a half miles of fence. Approximately three quarters of a mile of lay-down fence was replaced with new wire. The Dog Creek elk feeding area was also harrowed in spring of 2016 to break up elk scat and promote growth of new grasses. The Jackson Region WHMAs and PAAs received noxious weed treatment from the Teton County and Lincoln County Weed and Pest Districts (Figure 88). In 2016, 31.8 acres of noxious weeds were treated on WGFC owned and managed lands.

Figure 87. *Repairing fence on Greys River WHMA.*

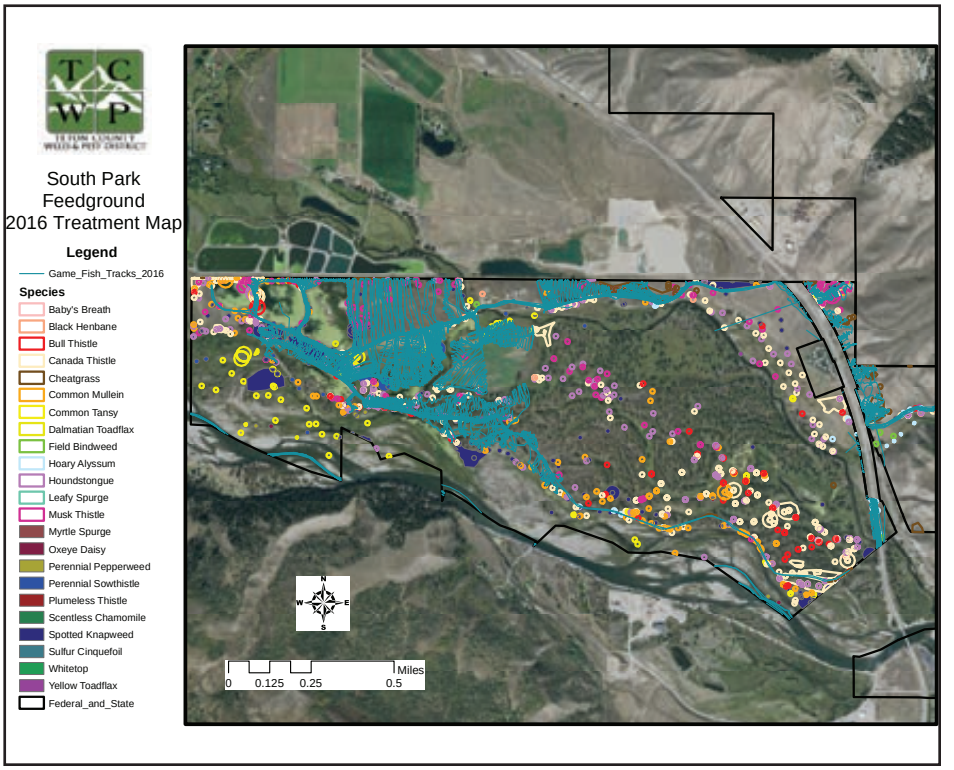


Figure 88. *Noxious weeds on South Park WHMA.*

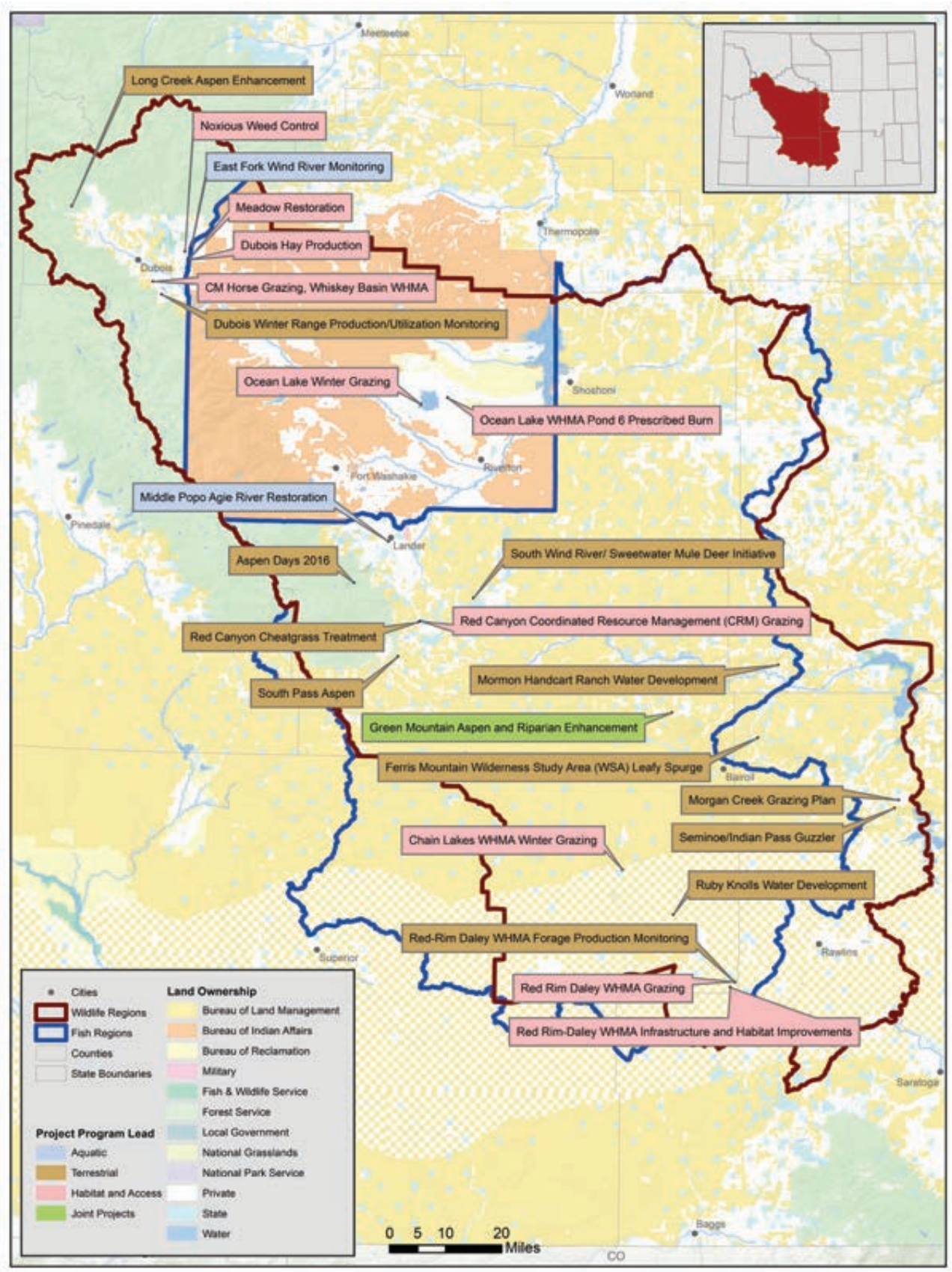
Flat Creek South Restoration Design (Goal 2) – Anna Senecal

Figure 89. *Flat Creek from 1945 (left) and 2015 (right) show channel straightening and willow removal.*

Flat Creek flows from its headwaters upstream of the NER, through the town of Jackson to eventually meet the Snake River at the South Park bridge, about six road miles south of town. Flat Creek is integral to the town of Jackson, the Snake River cutthroat trout fishery and the aquatic ecosystem. The creek provides multiple beneficial uses including fish habitat, irrigation water, aquifer recharge and municipal drinking supplies. The creek also provides a corridor of vital wildlife habitat through town, serves as a visual and recreational amenity for residents and tourists, and provides access for the angling and floating public. The creek is 305(d) listed as "threatened" by Wyoming DEQ for water quality and habitat degradation. Development and grazing have reduced or entirely removed willows from the riparian corridor, straightened the creek and produced an over-wide and shallow channel lacking spawning riffles and deep pools (Figure 89). These channel conditions reduce spawning activity and restrict seasonal habitat and movement through shallow depths, high summer temperatures, and unstable winter ice conditions.

The WGFD is partnering with a private landowner south of Jackson to restore stream function and cutthroat trout habitat value to 1.4 miles of Flat Creek. Restoration designs are anticipated in early spring 2017 and will address channel and riparian habitat limitations, grazing management and temporary fencing, and fish passage at diversion structures. Construction is anticipated during winter 2018-19. Benefits to stream connectivity and increased Snake River cutthroat trout spawning habitat availability throughout lower Flat Creek will ultimately benefit the fishery drainage-wide.

Lander Region



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 with points between. A wide variety of habitats are found here and therefore a wide variety of habitat projects were completed in 2016.

A project with multiple years of planning and many partners was finally implemented this year. The Middle Fork of the Popo Agie River saw 2,700 feet of completed restoration. The stretch that runs through Lander City Park was restored to improve low flow habitat while meeting flood prevention goals.

Also this year, much attention and effort was put into implementing recommendations made by the South Wind River/Sweetwater Mule Deer Initiative Working Group. Habitat improvement is one of the main goals working group members identified. Projects were identified to address late summer and transitional habitats, crucial winter ranges, and year-long habitats for mule deer. The on-going South Pass Aspen Project, proposed Red Canyon Cheatgrass Treatment, and Green Mountain Aspen and Riparian Enhancement are projects directly addressing the priority areas identified by the working group.

Another large area of effort was managing the 210,000 plus acres of Commission administered lands in the region including lands around Dubois on the Spence and 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.

Dubois Winter Range Production/Utilization Monitoring (Goal 2) – Amy Anderson

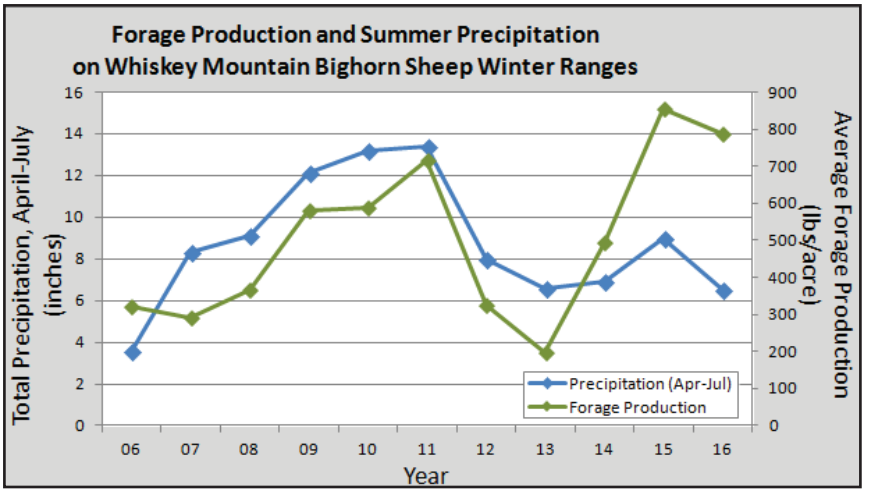


Figure 90. *Average herbaceous production and precipitation on Whiskey Basin WHMA. 2014 herbicide and 2015 fertilizer treatments likely contributed to well above average production despite declines in precipitation in 2016.*

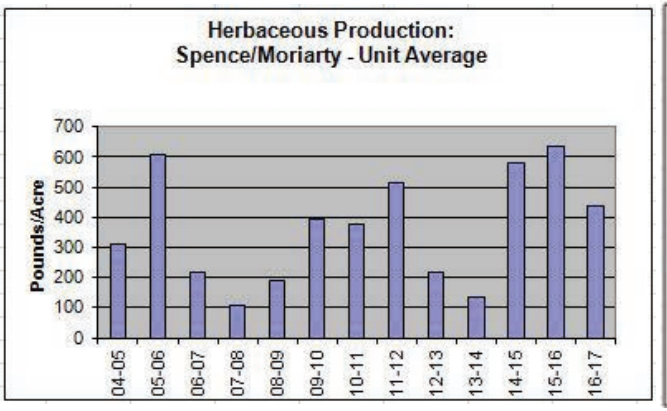


Figure 91. *Average herbaceous production on Spence and Moriarty WMA.*

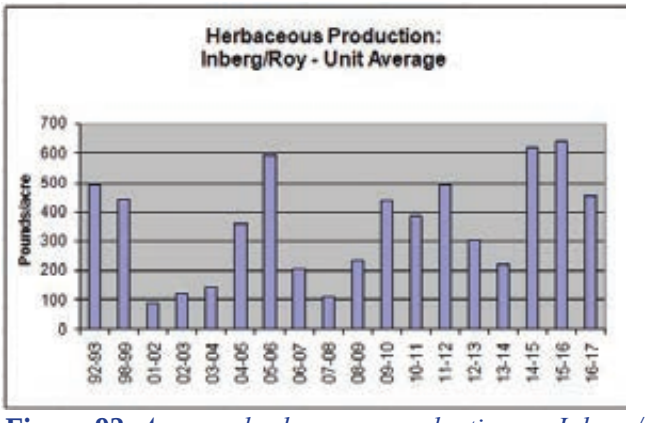


Figure 92. *Average herbaceous production on Inberg/Roy WHMA.*

Annual production and utilization clipping took place on Whiskey Basin WHMA, Spence and Moriarty WMA and Kirk Inberg/Kevin Roy WHMA again in 2016 with assistance from BLM and USFS biologists. Early spring precipitation encouraged a good start to the production year, but dry summer months caused plants to cure out early leaving production down slightly from 2014 and 2015. Overall average production across the Dubois habitat units was still well above 10 year averages.

CM Horse Grazing, Whiskey Basin WHMA (Goal 2) – Miles Proctor

Approximately 15 horses (37.5 AUMs) from the CM Ranch grazed the Basin Meadow on Whiskey Basin WHMA from November through December 2016. This agreement allows CM Ranch to graze an irrigated hay meadow in lieu of their BLM allotment on the face of Whiskey Mountain. CM Ranch's BLM allotment occupies a core area of crucial bighorn sheep winter range. This agreement results in increased winter forage availability for bighorn sheep on Whiskey Mountain.

Dubois Meadow Restoration and Hay Production (Goal 2) – Miles Proctor

Figure 93. *Baled hay on Spence and Moriarty WMA.*

Figure 94. *Cutting hay on Spence and Moriarty WMA.*

As part of the Spence & Moriarty 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.

Lander Habitat and Access staff continued expanding farming and haying operations across Dubois area WHMAs, with specific focus on Spence and Moriarty WMA. During the 2016 field season, a 1,500 foot pivot was constructed on Sideroll Meadow in order to effectively irrigate this 95 acre field for hay production. Dubois staff hayed 826 acres on Spence and Moriarity WMA and Whiskey Basin WHMA, producing 700 tons of hay, which was shipped to Bench Corral feedground. The hay operation allows WGFD to generate hay for use at elk feedgrounds, while simultaneously providing supplemental winter forage for elk in the Dubois area.

Morgan Creek Grazing Plan (Goal 2) – Brian Parker and Amy Anderson

In 2016, the WGFD developed a grazing plan with an adjacent ranch to potentially graze portions of the Morgan Creek WHMA. The WHMA is home to bighorn sheep, elk, and mule deer, among other wildlife. The grazing plan was set up to target cheatgrass and basin wildrye very early in the spring in only the Cottonwood Creek and Marking Pen Creek drainages of the Morgan Creek Unit for a short duration. Monitoring transects were set up to ensure these goals would be met, and over-utilization of other native beneficial species would not occur (Figure 95). Using Mule Deer Working Group guidelines, less than 35% utilization rate on willow, bitterbrush, and aspen was developed for riparian habitats important to wildlife. In the end, the grazing plan did not meet the goals of the adjacent ranch, and was therefore never implemented. However, there is now a plan and monitoring protocol in place should the potential for a grazing lease on Morgan Creek WHMA arise again in the future.

Figure 95. *Monitoring transects were set up in upland and riparian areas.*

Mormon Handcart Ranch Water Development (Goal 2) – Amy Anderson

The Mormon Handcart Ranch has updated their grazing regime to include rotations that are more adaptive, with changes in season of use and timing. With those updates comes the need for additional water sources to achieve improved distribution of cattle grazing. Adding water sources in the uplands at the base of Sweetwater Rocks takes pressure off riparian habitats along the Sweetwater River (Figure 96). One well, currently in disrepair due to a non-functioning windmill, was converted to solar with an in-ground tank. This area of the pasture, near the base of the Sweetwater Rocks, has potential to provide a water source for wildlife including mule deer, pronghorn and sage grouse. The water will be available year-round, whether livestock are present in the pasture or not. This will allow both summer and winter water for wildlife. Funding was provided by the WFW and the Mormon Handcart Ranch. A trail cam will be placed near the tank to monitor wildlife use.

Figure 96. *Conversion of a dilapidated windmill to a solar pump with a new tank near Sweetwater Rocks to benefit mule deer, sage grouse, and pronghorn.*

Aspen Days 2016 (Goal 5) – Amy Anderson

Aspen Days is an annual workshop bringing aspen managers together from across the state to learn about current science and techniques for restoring aspen. In 2016, TNC provided their Red Canyon meeting facility for an evening of presentations from noted aspen researchers Paul Rogers (Utah State University), Dale Bartos (retired USFS aspen researcher), Kevin Krasnow (Teton Science School), Tim Assal (USGS, Colorado), and Richard Keigley (retired USGS ecologist, Montana). A chainsaw was donated by Stihl and Lander ACE Hardware, and was raffled off to fund future Aspen Days events.

Figure 97. *Aspen Days attendees discussing aspen restoration on drier sites using fire and/or mechanical conifer removal on the Loop Road near Lander, WY.*

Day two of the workshop included a full day tour of aspen restoration work occurring on the Shoshone National Forest, BLM and State lands on South Pass and the Louis Lake Loop Road. Participants discussed treatment methods, successes, and challenges. The tour ended with a facilitated session by Kevin Krasnow addressing questions posed by attendees.

Day three ended the workshop with a field tour to Green Mountain to look at challenging aspen sites where browse by multiple species is occurring. Richard Keigley led a discussion on determining whether browse is detrimentally impacting the health of aspen utilizing the L-D Index. Approximately 50 people (Figure 97) attended the three day workshop. Funding was provided by Wyoming Wildlife Foundation, WGFD, USFS, BLM, and Popo Agie Conservation District.

Red Rim-Daley WHMA Infrastructure and Habitat Improvements (Goal 2) – Matt Pollock and WLCI, Jim Wasseen

The goal of this project is to spread livestock out among the riparian areas along Separation Creek and across the entire Red Rim-Daley WHMA. As the livestock move out, wildlife such as pronghorn, mule deer, sage grouse, and elk will move in due to better forage and cover within these areas. This project develops, enhances, and maintains water infrastructure across Separation Creek and the WHMA. Throughout the Red Desert rangeland, access to water is often the limiting factor in the carrying capacity for livestock or wildlife. The Red Rim-Daley WHMA currently has several non-functioning water wells and water is seldom consistent in most of Separation Creek. One well was decommissioned, three wells were upgraded, and one new well was developed in 2016. After completing the formal bid process, a contract was awarded to accomplish three improvements. First, the contractor de-commissioned an existing well. Second, the pump and solar array from that well was used to upgrade a non-functioning windmill and construct a tire stock tank. Finally, an existing water well on BLM land was further developed to utilize a solar well system and tire stock tank. The contract was then amended to add a ~16,000 gallon storage tank to an existing water well and to upgrade a pump from wind to solar, and add another stock tank and ~16,000 gallon storage tank (Figure 98) to an additional well. This is a partnership between the BLM Rawlins Field Office, grazing lessees, and WLCI.

Figure 98. *Well #2 windmill was replaced with solar power, stock tank and ~16,000 gallon storage capacity.*

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

Red Rim-Daley WHMA is comprised of OSLI, BLM and WGFC owned property. Two operators annually graze the Red Rim - Daley WHMA, collectively consuming approximately 1,650 AUMs. In exchange for grazing on Red Rim - Daley, the grazing lessees defer grazing on important wildlife habitats on private lands.

East Fork Wind River Monitoring (Goal 2) – Betsy Morgan

A monitoring reach located upstream from Wiggins Fork on the East Fork Wind River was resurveyed in 2016 to evaluate channel stability and habitat conditions for aquatic species, primarily Yellowstone cutthroat trout (YSC). The site was identified in 2010 as an impaired reach with severe bank erosion, channel enlargement, decreased sediment transport, and minimal pool habitat. A survey completed after high flows in 2011 confirmed excessive bank erosion and degradation of habitat features.

Figure 99. *Looking upstream in 2011 at an eroded and trampled bank.*

550 feet of recent cross section survey data show that channel stability and quality of habitat features have naturally improved over the past five years in lieu of intensive restoration activities. Compared to post flood conditions in 2011, recent cross section profiles show enhanced pool development and improved lateral stability within the channel. For example, a bank that eroded six feet in 2011 (Figure 99) has since maintained position and is now developing a vegetated bench that will help absorb impact from high flows (Figure 100). Recent photos also depict an increase in riparian vegetation growth, likely related to recent wet years and management of trespass livestock through continual fence maintenance by WGFD personnel. These results suggest that the East Fork Wind River has the capacity to recover in a relatively short time period using a passive management approach.

Figure 100. *Looking downstream in 2016 at the same bank developing a vegetated bench.*

South Wind River / Sweetwater Mule Deer Initiative (Goal 2) – Amy Anderson and Stan Harter

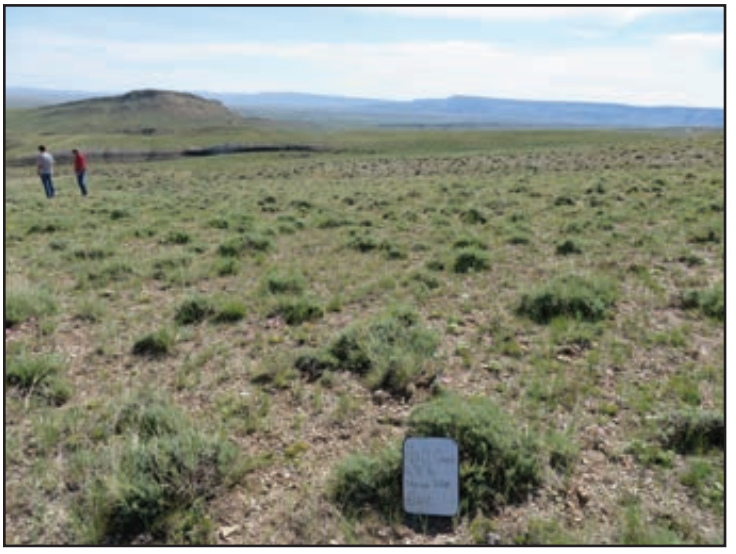


Figure 101. *Conducting shrub and rangeland RHAs within the South Wind River Mule Deer Herd Unit.*

The South Wind River/Sweetwater Mule Deer Initiative Working Group finalized recommendations to the WGFD relating to population and habitat management of these two mule deer herds. Habitat improvement is one of the main goals working group members identified through the process. Projects were identified across the herd units to address late summer and transitional habitats, crucial winter ranges, and year long habitats for mule deer. The on-going South Pass Aspen Project, proposed Red Canyon Cheatgrass Treatment, and Green Mountain Aspen and Riparian Enhancement are projects directly addressing the priority areas identified by the working group. Funding was acquired and planning has taken place to implement these projects in 2017. A Habitat Management Plan is being developed to describe specific habitat concerns, set up monitoring objectives, and identify future habitat treatments. Rapid Habitat Assessment protocols were initiated on several winter range sites, (Figure 101) and will continue in 2017 in shrub/rangeland and aspen and riparian habitats to direct future habitat projects.

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

Figure 102. *Chain Lakes water well #11.*

Figure 103. *Chain Lakes water well #1.*

Domestic sheep graze on Chain Lakes WHMA from December through April each year. During 2015-2016, the grazing lessee utilized approximately 900 AUMs. In exchange for grazing, the lessee entered into an Area Improvement Project Agreement (AIPA). The lessee hired a well pump contractor to re-develop an existing, but non-functioning water well in the NW corner of the WHMA (well #1). This included setting a solar pump, solar panel array, a tire stock tank, and excavating an overflow pit. The contractor also set a tire stock tank at an existing artesian well, and conducted repairs to another water well. The water wells benefit wildlife and livestock. The overflow from the wells support small riparian areas that are very productive in the desert environment.

Ocean Lake WHMA Pond 6 Prescribed Burn (Goal 2) – Derek Lemon

A prescribed burn was conducted at Pond 2, 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 open water for waterfowl nesting and foraging. In addition to the prescribed burn, a new water control structure was installed to regulate water level in Pond 5. Pond water depth manipulation can result in increased open water, vegetative diversity and increased forage availability.

Figure 104. *Ocean Lake prescribed fire line perimeter.*

Figure 105. *Ocean Lake cattail prescribed burn at Pond 2.*

Middle Popo Agie River Restoration (Goal 2) – Betsy Morgan

Restoration work was completed on 2,700 ft. of the Middle Popo Agie River through Lander City Park. This project enhanced low flow habitat for aquatic species and improved river stability through town while flood channel capacity work was being conducted. During spring 2016, Environmental Quality Resources and Eco-Hydro teamed up to implement a restoration design by Intermountain Aquatics Inc. out of Driggs, ID. Contractors worked for four weeks adding habitat enhancement features throughout the reach and removing over 3,200 cubic yards of material to create a low flow channel (Figure 106). Nearly 425 boulders were placed within the stream and used to create grade control structures (j-hooks and cross vanes), boulder clusters, and toe stabilization. Additional components included the planting of 2,200 willow/cottonwood stakes and the construction of a juvenile backwater channel with cover logs. These features, while providing deep pools and cover for trout, reduce flood risk by improving channel stability and sediment transport.

Figure 106. *An excavated low flow channel and boulder features enhance trout habitat on the Middle Popo Agie River.*

Figure 107. *Surveying a cross section upstream from a structure that will receive maintenance in 2017.*

Although erosion occurred to areas following high spring runoff, the majority of the project was able to withstand high flows. WGFD, with assistance from the Popo Agie Conservation District and DEQ, collected monitoring data during fall 2016 to document conditions following one runoff season (Figure 107). Data will be collected again in 2017 and used to inform future work on the Middle Popo Agie River. Stakeholders are working with Intermountain Aquatics to design and implement maintenance repairs, currently projected for spring 2017.

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 2016 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.

South Pass Aspen (Goal 2) – Amy Anderson

The South Pass Aspen Project completed its second year of on-the-ground treatment in 2016. The objectives are to reduce conifer encroachment into aspen stands, improve age class and understory diversity for the benefit of mule deer in the South Wind River Herd Unit, while decreasing fuels in the Wildland Urban Interface surrounding Atlantic City. The project will utilize various treatment methods to enhance aspen communities over a ten-year timeframe through a collaborative effort between WGFD, BLM, USFS, OSLI, Wyoming State Forestry, and private landowners.

Figure 108. *Conifer removal from aspen stands consisted of lop and scatter (above) and cut and hand pile (below).*

In 2016, mechanical conifer removal within aspen stands occurred on 344 acres of BLM and State lands (280 acres and 64 acres, respectively) using Summitt Forestry hand crews. The USFS removed conifers from an additional 35 acres of aspen using their own hand crews. Two miles of unnecessary fencing was removed from USFS land coordinated by USFS and Wyoming Wildlife Federation.

Additional planning took place to delineate 545 treatment acres for 2017 on USFS lands, as well as identifying treatment areas on BLM and State lands for 2018. Funding comes from WWNRT, WGBGLC, RMEF, WGFD Trust and MDI, USFS, BLM, MFF, MDF, and Popo Agie Conservation District (PACD).

Red Canyon Cheatgrass Treatment (Goal 2) – Amy Anderson

The Red Canyon Cheatgrass Project was originally developed to treat cheatgrass on the Red Canyon WHMA and adjacent TNC Red Canyon Ranch property utilizing a variety of treatment methods. The bacteria *Pseudomonas fluorescens* has shown promise in small-scale trials across the West in decreasing cheatgrass prevalence. This project will apply a strain of the bacteria alone and in conjunction with the herbicide Imazapic (Plateau® or Panoramic) to

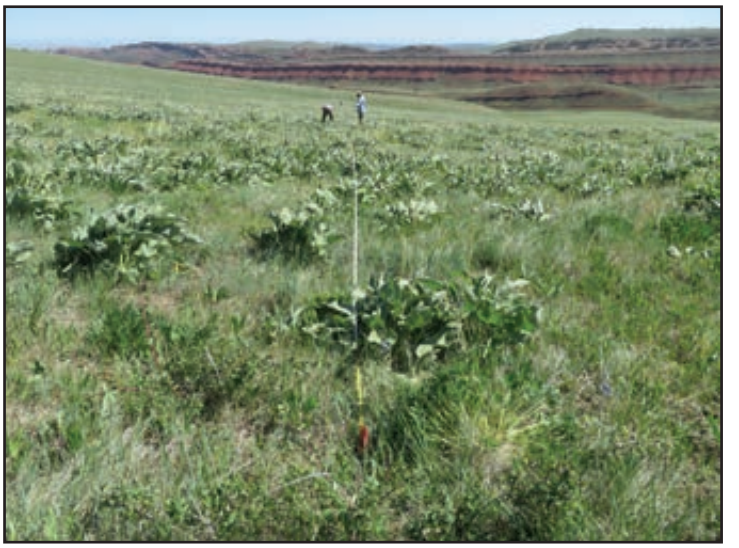


Figure 109. *Pre-treatment sample point transects document cheatgrass prior to treatment.*

treat cheatgrass on approximately 1,500 acres of crucial elk winter range and mule deer winter year long habitats in Red Canyon.

Currently there is not a strain of the bacteria readily available with the proper clearances from the EPA to be applied on a larger scale. The D7 strain is projected to be available for purchase in fall 2017. Due to this delay, a partial treatment of approximately 500 acres will occur on the open slope of Red Canyon where the cheatgrass infestation appears to be the most prominent. This treatment will be an aerial application of Imazapic herbicide. It is important to slow the spread of cheatgrass on this slope as soon as possible to maintain native vegetation for wintering elk. When the bacteria is cleared for use, a follow-up application of bacteria only will occur on the entire 1,500 acre treatment area.

In 2016, pre-treatment Sample Point transects (Figure 109) were conducted by TNC, Fremont County Weed and Pest, and WGFD personnel to determine the prevalence of cheatgrass on the treatment and control sites prior to application. These transects will be repeated in 2017, and then every 2-5 years post treatment to track changes in cheatgrass cover and determine efficacy of both Imazapic and *Pseudomonas* bacteria in controlling cheatgrass.

Seminoe/Indian Pass Guzzler (Goal 5) – Ryan Amundson

In mid July, a group of sportsmen and women representing several wildlife conservation organizations assisted personnel from the WGFD and BLM (High Desert District) with construction of a guzzler in the Seminoe Mountains (Figure 110). The guzzler and precipitation catchment apron were installed by hand on a hot and windy day. The 2,000 gallon tank will provide a reliable water source for bighorn sheep, elk, and mule deer. Funding was provided by WWSF, WFW, and BLM. Groups represented at the installation included RMEF, BOW, Wyoming Wildlife Federation, WFW Foundation, and WWSF.

Figure 110. *Agency personnel and volunteers create a reliable water sources for wildlife high on the mountain.*

Green Mountain Aspen and Riparian Enhancement (Goal 2) – Amy Anderson and Betsy Morgan

Green Mountain planning, fund raising, permitting, and pre-treatment monitoring occurred in preparation for on-the-ground work beginning in 2017. This location was visited during the 2016 Aspen Days field tour and despite evidence of browse pressure on aspen, allowing these aspen stands to become further degraded due to conifer encroachment was not a viable option. Therefore, planning and implementation of mechanical conifer removal will proceed with the intention of leaving cut conifers hinged and jack-strawed to inhibit movement by browsing ungulates such as cattle, elk and free-ranging feral horses.

Locations were selected for seven Beaver Dam Analogues (BDA's) on private lands along the West Fork of Cottonwood Creek. These BDA's will mimic historic beaver dams and trap sediment to reduce stream incision and raise water tables to benefit riparian trees and shrubs. The landowner would like to eventually re-introduce beaver, if they do not return on their own once the BDA's are constructed. Channel cross-section transects were conducted in 2016 to document pre-treatment channel features. Additional monitoring will occur in 2017 to document changes in the stream channel and water table. If benefits are discovered due to installation of BDA's, they may be used in other areas of Green Mountain to decrease sedimentation, improve water quality and increase riparian water tables.

Figure 111. *Setting up channel cross section transects at BDA locations.*

Steel jack fencing will be built through the winter for installation on a large high-producing spring, and around a section of West Cottonwood Creek to protect important riparian areas from impacts by livestock and wildlife.

BLM mechanically treated approximately 40 acres of conifer encroached aspen using hand crews within the project area to demonstrate to adjacent private landowners the type of treatment planned.

Figure 112. *Mechanical conifer removal from 40 acres of BLM land on West Cottonwood Creek. Slash was jack-strawed to inhibit cattle and feral horse movement through aspen stands to allow aspen suckers to establish.*

Funding sources include WGFD Trust and MDI, RMEF, BLM, WWNRT, Popo Agie Conservation District, and WGBGLC.

Long Creek Aspen Enhancement (Goal 2) – Amy Anderson

Most aspen stands in the Long Creek watershed are experiencing natural succession and are transitioning toward conifer as they shade out aspen in the absence of fire. Removal of conifers and follow-up burns will release aspen from competition and encourage regeneration, as well as create better understory conditions including improved forb, grass and shrub productivity.

Figure 113. *Example of pre-treatment aspen succession to conifer in the Long Creek drainage near Dubois, WY.*

Figure 114. *Cut and hand pile treatment with selective aspen coppicing on Long Creek near Dubois.*

On-the-ground work began in 2016 with 100 acres of treatment occurring in aspen stands in the Long Creek drainage. These treatments included 61 acres of mechanical cut and hand piling and 39 acres of lop and scatter. An additional 714 acres were laid out for treatment in 2017 and 2018, with a plan to treat more than 1,300 acres of aspen over five years using hand crews and prescribed fire.

Partners for the Long Creek Project include USFS - Shoshone National Forest, WGFD, RMEF, MDF, MFF and WGBGLC.

Noxious Weed Control (Goal 2) – Miles Proctor

Rocky Mountain Agronomy applied herbicide in early June and July across approximately 400 acres of irrigated meadows on Spence and Moriarity WMA to control noxious weeds, largely white-top and Canada thistle. Additionally, Fremont County Weed & Pest sprayed a variety of noxious weed species on irrigated meadows and rangeland starting in July and continuing through fall 2016. Habitat and Access personnel also constructed a spray trailer and dedicated substantial AWEC time to noxious weed control.

Ruby Knolls Water Development (Goal 2) – Amy Anderson

Ruby Knolls is an area within the Red Desert north of Rawlins, WY, and adjacent to Chain Lakes WHMA. A private landowner, Jerry Newmeyer, approached WGFD to inquire about developing a well on his property for the benefit of wildlife (Figures 115-116). There is very little water in the vicinity, so funding was acquired through WFW and the USFWS Partners for Fish and Wildlife Program to install a solar pumping station on an existing well. The SERCD cost-shared on a large tire tank, and USFWS

Partners for Fish and Wildlife Program provided fencing materials to build an exclosure to maintain the water development strictly for wildlife. The water is pumped into the tire tank, and overflows into a shallow depression. Due to past livestock use, very little vegetation remains on the site. The plan is to seed the area inside the fence to create cover for birds and small mammals, and forage for wildlife that visit the watering facility. The project was installed by a pump contractor, the landowner, USFWS personnel, WGFD personnel, and Alex Hogan and Rebecca Burton, interns from a jointly developed Water For Wildlife / WGFD summer program.

Figure 115. *Installation day at the Ruby Knolls water development site in the Red Desert.*

The Ruby Knolls project occurs in pronghorn winter year long and spring/summer/fall habitat, and on the edge of sage grouse core area.

Figure 116. *A water development originally planned for pronghorn and Sage-grouse is showing benefits for mule deer and elk as well.*

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

Figure 117. *Lander-Rawlins boundary fence prior to fence conversion. Photo courtesy of BLM.*

The project goal is to facilitate the movement of big game across existing allotments, thus ensuring that migration corridors and day-to-day movement of animals seeking food, water or shelter are accomodated. The project will convert fences that were once intended to control domestic sheep to wildlife-friendly fencing. The majority of the allotments have been converted from domestic sheep to cattle grazing. Because of this change in use, BLM is able to switch from non-wildlife-friendly fence (e.g. mesh with barb wire or 5-6 strand barbed wire) to those that are wildlife-friendly (e.g. 3-4 strand barbed wire). The project converted 1.6 miles of fence to wildlife-friendly specifications. The focus of this fence conversion is to work with willing private landowners south and west of Rawlins. A new project will provide labor for fence conversion and complete additional projects primarily

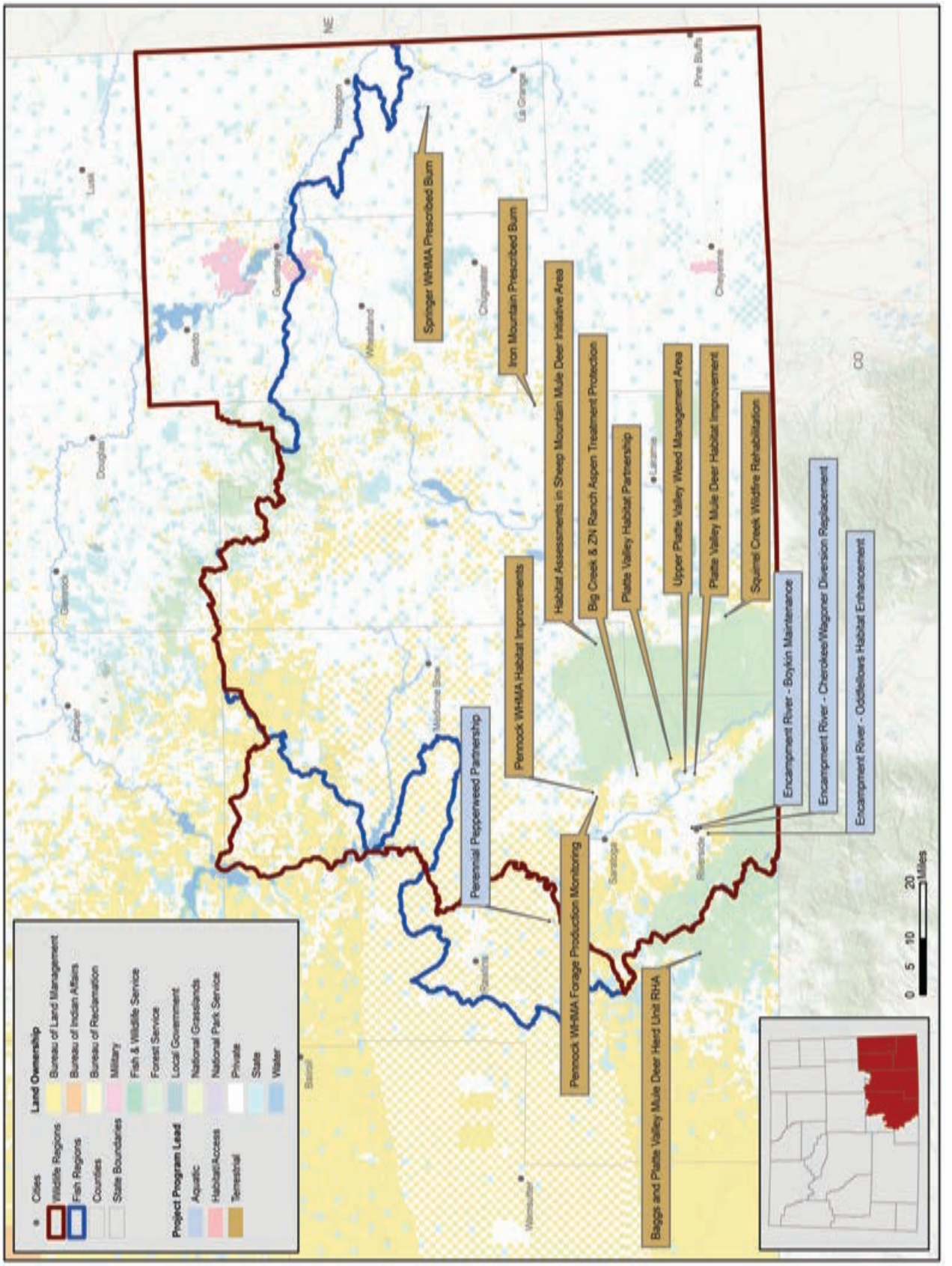
in the Bairoil and Baggs area. This project resulted in reconstruction of about 1.6 miles of fence to mostly wood post and rail-top design with three wires below, including a ⅛-mile stretch of let-down fence coming off Stratton Rim (Figures 117-118). The two grazing permittees will be responsible for the remainder of the fence reconstruction on 3.5 miles to a 3 or 4 wire fence design. Partners for this project are the BLM Rawlins Field Office, permittees, RMEF, and WWNRT.

Figure 118. *Fence was converted to a wood post/rail top design with two barbed and one smooth wire to improve wildlife movement and hold up to cattle/wild horse pressure. Photo courtesy of BLM.*

Ocean Lake Winter Grazing (Goal 2) – Derek Lemon

Approximately 260 AUMs were utilized at Ocean Lake WHMA 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.

Laramie Region



Laramie Region

The western portion of the Laramie Region, which encompasses the Platte Valley, eastern half of the Sierra Madres and the Snowy Range, was the focal point for many habitat projects in 2016. Mule deer will benefit from habitat projects in the Platte Valley, including enhancing 16 acres of aspen through the installation of steel-jack fencing and converting 4.5 miles of existing fence to a wildlife-friendly design. Chemical treatments were conducted on over 5,100 acres to combat invasive weeds.

More than 10,000 feet of the Heward Ditch was converted into pipe on the Wick Beumee WHMA to increase water delivery to irrigated hay meadows that provide forage for wintering elk and other wildlife. The project should be completed in the summer of 2017.

Trout in the Encampment River will benefit from the addition of deep pool habitat along 1,600 feet of the river, the replacement of two cobble/boulder push-up dams with engineered grade control structures to allow for water delivery, trout passage and improved sediment transport, repairing a riffle structure and 250 feet of toewood, and modifying the channel width/depth ratio on another 1,100 feet of the river.

Public outreach habitat efforts include continuation of the Platte Valley Habitat Speaker Series, education programs for 114 grade school children, and articles and photographs in the Laramie Region newsletter.

Springer WHMA Prescribed Burn (Goal 3) – Ryan Amundson

Approximately 300 acres of Dense Nesting Cover (DNC) was maintained through prescribed burning on the Springer WHMA in March. Years of accumulated plant growth had reduced stand diversity. Goshen County's Incident Management Team, in conjunction with all of Goshen County's Volunteer Fire Department districts were present to assist with containment. The project served as a valuable training exercise for volunteer firefighters in addition to habitat enhancement. Twenty acres of inter-seeding grasses and legumes was completed post-fire in areas where weed pressure had dominated previous perennial seeding attempts. Funding for enhancement was provided by the Terry Killough Fund and PF.

Figure 119. *Prescribed burning of 280 acres of DNC on the Springer WHMA in March 2016.*

Encampment River - Cherokee/Wagoner Diversion Replacement (Goal 2) – Christina Barrineau and WLCI, Jim Wasseen

The Cherokee/Wagoner diversion replacement was initiated as part of the larger river restoration and fish passage efforts in the lower Encampment River watershed. Both diversions were annual cobble and boulder push-up dams that led to channel instabilities and decreased fish passage and sediment transport competency. The structures also created boating hazards during the recreational floating season. About 800 ft of river channel separates the two diversions. The goal was to replace the two cobble/boulder push-up dams (Figure 120) with a series of engineered grade control structures that allow for water delivery, adult brown trout and rainbow trout passage and improved sediment transport (Figure 121). Over the 1,600 ft reach, one log vane, two cross vanes, one j-hook, and two constructed riffles (four mini-vanes each) were constructed to provide grade control. With the removal of the push-up dams, approximately 12 feet of grade was adjusted through the reach with the new structures. Enhanced water delivery to the irrigation ditches was accomplished with the installation of the two cross-vane structures. Shaping to the design channel dimensions was also conducted throughout the 1,600 ft reach. The diversion replacements were constructed over three weeks in September and early October. Project partners included SERCD, WGFD, WWNRT,

Figure 120. *Wagoner Diversion on the Encampment River before replacement.*

BLM Rawlins Field Office, TU, NRCS Resource Conservation Partnership Program, WLCI, USFS Resource Advisory Council, Wyoming Flycasters, USFWS, water users, North State Environmental, and Green Watershed Restoration LLC.

Figure 121. *Wagoner Diversion on the Encampment River after replacement.*

Encampment River - Boykin Maintenance (Goal 2) – Christina Barrineau and WLCI, Jim Wasseen

The Boykin Restoration project was constructed from 2011-2013. High flows over the past few years have triggered maintenance needs for the lower reach of this project. This restoration was the first major project on the Encampment River, and lessons have been learned regarding design elements for sediment transport on this river. During 2016 spring flows, a considerable portion of bank eroded on the project reach downstream end which began to compromise the integrity of the adjacent restored reach, Peryam Restoration. During the initial construction, floodplain connectivity was not adequately addressed at this location, which led to the increased erosion.

Figure 122. *Reconstructing rock constructed riffle structure for the Encampment River - Boykin maintenance.*

Maintenance activities occurred over one week in August and included rebuilding a rock constructed riffle structure (4 mini vanes) (Figure 122), reconstructing approximately 250 ft of toewood, and modifying the channel width/depth ratio through the 1,100 ft reach. Over 70 willow clumps were transplanted on the banks of the maintenance reach (Figure 123). Partners for the Boykin maintenance included WWNRT, WLCI, TU, WGFD, SERCD, the private landowner, North State Environmental and Green Watershed Restoration LLC.

Figure 123. *Upstream end of reconstructed rock constructed riffle with newly transplanted willows on riverbank at the Encampment River - Boykin maintenance.*

Wick WHMA - Heward Ditch, Headgate, Electronic Flow Meter & Solar Panel (Goal 2) – Micah Morris, Todd Grosskopf and Jerry Cowles

Figure 124. *Old headgate.*

Figure 125. *New dry wagonhound headgate.*

The WGFD Habitat and Access Crew have converted approximately 10,100 feet of the total 10,600 foot open Heward Ditch on steep-side hills into 42” Duromaxx HDPE pipe in the foothills of the Snowy Range Mountains (Figures 124-125). The nearly two-mile long pipeline being installed at the Wick Beumee WHMA will increase water delivery to irrigated hay meadows that provide forage for wintering elk and other abundant wildlife. The Habitat and Access crew installed 6,400 linear-feet of 42” Duromaxx pipe during the summer of 2016, and 3,700 linear feet during the summer of 2015. In addition to installing 10,100 feet of linear pipe, a 42” Femco headgate structure (Figure 126) was installed to ensure correct water distribution between WGFD and other water rights holders. Also, during the 2016 field season the WGFD installed a solar powered electronic flow-meter and data-logger (Figure 127) which uses ultrasonic pulses to measure the depth and velocity of water discharge calculation. The remaining 500 linear-feet of 42” Duromaxx HDPE pipe installation will be completed during the 2017 summer field season along with a steel corrugated metal outlet structure. The outlet will be placed on a concrete pad with a 48" x 30" flume with grating for wildlife and human protection to ensure water is correctly transported to meadows.

Figure 126. *Heward pipe coming out of new headgate.*

Figure 127. *Flow meter.*

Encampment River - Oddfellows Habitat Enhancement (Goal 2) – Christina Barrineau and WLCI, Jim Wasseen

Figure 128. *Constructing woody debris trout habitat cover in the newly shaped Encampment River channel at Oddfellows.*

Habitat enhancements to improve adult trout habitat at the BLM Encampment River Campground reach (also known as Oddfellows) were completed in 2016. The Oddfellows reach is located within a transitional area where the river flows out of a canyon and onto a wide valley. The lack of deep pool habitat and cover for adult trout in the reach is a legacy of historic tie drives and mining.

To improve stream channel diversity and adult brown trout and rainbow trout habitat in the campground reach, the low flow channel was narrowed and deepened throughout the 1,600 ft project reach. Two rock vane structures were installed to enhance pool habitat and provide a platform to aid river access. Numerous boulder clusters and woody debris enhancements were placed to create trout cover and holding habitat (Figure 128). A log vane and 250 ft of toewood were installed at the downstream project end to protect an eroding bank and the campground access road.

Construction occurred over three weeks in September and early October 2016. Daily construction oversight was shared between the Aquatic Habitat Biologist, BLM Hydrologist, and project engineer. Project partners included BLM Rawlins Field Office, WGFD, WWNRT, Platte Valley TU, SERCD, WLCI, Olson Excavating, and Green Watershed Restoration LLC.

Rawhide WHMA Russian Olive/Salt Cedar Removal (Goal 1) – Jerry Cowles

Figure 129. *Rawhide WHMA. Photo by Gary Stone/UNPRMA.*

This project at the Rawhide WHMA, located along the North Platte River, has an objective to remove all Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix ramosissima*), using mechanical treatments and herbicide treatment on re-sprouts. Rawhide WHMA provides a variety of wildlife species with food, shelter, and safe stopover sites. The Wyoming Weed and Pest Council placed Russian olive on the noxious weeds list in 2007. This multi-year project will improve riparian habitat and restore native riparian vegetation. In spring 2016, a contractor using WWNRT grant funds removed 120 acres of Russian olive and tamarisk with a trackhoe. The contractor removed the trees including the roots and piled them in windrows for wildlife. In March 2016, a second contractor using NWTF and WWNRT grant funds performed a follow-up treatment of Basil Bark Oil and Element 4 herbicide on 150 acres of re-sprouts from the 2015 removal. Removal of Russian olive and tamarisk along the North Platte River will help restore native grasses, forbs, trees, and shrubs.

Figure 130. *Rawhide WHMA after removal. Photo by Gary Stone/UNPRMA.*

Figure 131. *Rawhide WHMA after herbicide treatment. Photo by Gary Stone/UNPRMA.*

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

The Perennial Pepperweed Partnership intends to reduce noxious weeds within the checkerboard ownership pattern that encompasses the majority of the Overland Trail Ranch. The project area contains general Greater sage-grouse habitat as well as year-round habitat for pronghorn and mule deer, and winter range for elk. In 2016, 150 acres were inventoried, 300 acres monitored, and 300 acres treated. Monitoring and treatment on the western third of the ranch was completed in late July through the first week of August. The ranch did not allow access to conduct treatments on the remainder of the project this year. It is unknown whether the ranch conducted its own treatments. A buffer outside the ranch was treated to contain and prevent any infestation from spreading off the ranch. Previously treated sites are monitored by the treatment crews and noted on their application records. This is an ocular method, but works well for tracking density and extent of infestations from year to year. Project partners are the BLM Rawlins Field Office and the Overland Trail Ranch.

Rapid Habitat Assessments in Sheep Mountain Mule Deer Initiative Area (Goal 1) – Ryan Amundson

RHAs were completed in all seasonal ranges utilized by mule deer within the Sheep Mountain MDI area. Nearly 8,800 acres were assessed to determine if mule deer habitat requirements were being met by current habitat conditions and identify potential treatment options for habitats (Figure 132).

Considerable effort was put toward finalization of the RHA worksheets in Winter 2016 by numerous WGFD personnel. Three worksheets, Aspen, Shrub and Rangeland, and Riparian, were completed and utilized by field personnel throughout Wyoming, particularly within MDI focus areas.

Figure 132. *RHAs were completed by teams of WGFD personnel, including wildlife biologists, game wardens and habitat biologists.*

Baggs and Platte Valley Mule Deer Herd Unit Rapid Habitat Assessments (Goal 1) – Katie Cheesbrough

Figure 133. *RHA site in the Platte Valley.*

Figure 134. *WGFD personnel assessing mule deer habitat in the Platte Valley.*

RHAs were continued for the MDI herds across the state to more fully assess habitat conditions in all mule deer seasonal ranges for each herd unit. These RHAs are a priority for the MDI herds and, as such, this monitoring receives participation from Habitat Biologists, Wildlife Biologists, Wardens, and members of the public. For the Baggs mule deer herd, four shrub and rangeland assessments, two aspen assessments, and one riparian assessment were conducted (~2,500 acres). For the Platte Valley mule deer herd four shrub and rangeland assessments, six aspen assessments, and one riparian assessment were conducted (~1,780 acres, Figures 133-134). Information from these assessments will be used for objective reviews (every five years) and JCRs (annually), providing wildlife managers and the public with information on the state of mule deer habitat conditions in relation to fluctuations in population.

Table Mountain WHMA Water Delivery Enhancements II (Goal 5) – Jacob Sorensen and Jerry Cowles

The Water Delivery Enhancement II project allows the WGFD to better apply and control available water supplies throughout the eight impoundments located on the Table Mountain WHMA. Habitat and Access performed one mile of dike maintenance that included hauling 1,600 yards of fill material donated by area landowners. Working with Ducks Unlimited and contractors, 1,000 feet of 24" water transport pipe and five new agri-drains were installed during 2016. Pond water depth manipulation can result in increased open water, and vegetation diversity management for more waterfowl species variety. Water levels provide land managers the opportunity to develop wetland plant communities by fluctuating water levels in the impoundments, and in return provide waterfowl habitats throughout the Table Mountain WHMA. Funding partners include WWNRT, DU, and WGFD.

Wick Meadow Enhancements (Goal 2) – Micah Morris and Jerry Cowles

Laramie Habitat and Access biologists started expanding meadow enhancements and haying operations across the Wick WHMA. During the 2016 field season, the crew worked with a neighboring landowner to remove the decadent vegetation and promote vigor and palatability of meadow vegetation for wintering wildlife. With the 300 acres harvested, 295 tons of grass hay was removed and re-seeded with a wildlife mixture. The hay operation allows WGFD, working with neighboring landowners, to generate one cutting of hay, while simultaneously providing nutritious and palatable winter forage for wintering big game at the Wick WHMA.

WHMAs and PAAs (Goal 2) – Mark Cufaude, Micah Morris, Jacob Sorensen and Jerry Cowles

Annual maintenance and improvements continued on 11 Laramie Region WHMAs and 40 PAAs.The Laramie crew completed 203 miles of fence maintenance while converting six miles of woven wire to wildlife friendly four strand barbed and smooth wire. In 2016, 894 acres were irrigated several times including hay meadows, corn, sunflowers, grain sorghum, milo, and dense nesting cover fields. Dense nesting cover consists of green needlegrass, Canada wildrye, tall and intermediate wheatgrass, sweetclover, alfalfa, and prairie clover. The crew farmed 295 acres, including a contract farmer's 205 acres with 20% standing for wildlife benefits. The crew added wildlife food plots in the other 90 acres which consisted of sorghum, sudan grass, black oil seed sunflower, buckwheat, German millet, foxtail millet, and sweet clover. These were donated by Pheasants Forever-Pine Bluffs Chapter. Seven acres of corn was planted, irrigated and harvested through an Exchange of Use Agreement with an adjacent landowner.

The crew worked with private contractors to spray 563 acres of noxious weeds. Road maintenance entailed installation of one cattle guard, nine culverts, and 43 miles of road blading in which the crew hired private contractors to complete 29 miles.

Platte Valley Mule Deer Habitat Improvement (Goal 2) – Katie Cheesbrough, Ryan Amundson and WLCI, Jim Wasseen

This project implements large-scale aspen habitat improvements within high-use, seasonal mule deer ranges throughout the Platte Valley. This will be accomplished through erecting steel-jack fencing and converting existing fences to wildlife-friendly designs. Steel-jack fencing will improve aspen stand conditions by excluding larger herbivores, such as elk, from over-browsing younger trees. Converting existing fences to wildlife-friendly designs will aid in the movement of big-game throughout the landscape. A secondary gain has been realized through increased interest and participation in the Platte Valley Habitat Partnership (PVHP) which is now attracting future funding partners and thus creating the opportunity for further landscape-level conservation efforts throughout the Platte Valley. The project enhanced 16 acres of aspen through the installation of steel-jack fencing and converting 4.5 miles of existing fencing to a wildlife-friendly design. Steel jack fencing for the ZN Ranch was constructed in June 2016 during the annual Platte Valley Volunteer Fence Day. This fencing project protected six acres of recovering vegetation. The Big Creek Ranch fencing was assembled in August 2016 by Game and Fish personnel and other volunteers, and was used to enclose and protect ten acres of vegetation. Pre- and post-treatment monitoring has been conducted for aspen treatments and will continue long-term to monitor stems per acre, browse pressure, and determine when regeneration has passed browse height so fencing can be removed and used on other projects (Figure 135). Additionally, the project funded contractors to complete the Barcus Peak fence conversion where 4.5 miles of fence was converted to a wildlife-friendly design. The Barcus Peak fence will be maintained by the landowner and checked annually. The project is a partnership between the BLM Rawlins Field Office, MDF,

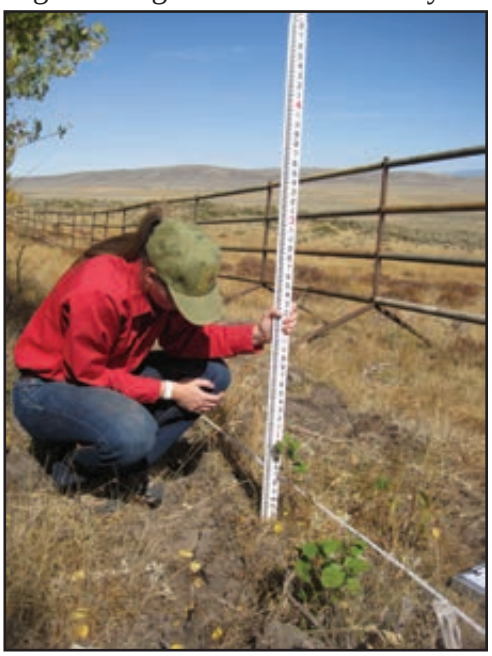


Figure 135. *Post-treatment monitoring of aspen after the Big Creek aspen ripping and steel jack fence construction.*

private landowners (including the Big Creek Ranch and ZN Ranch), SERCD, USFS, WGFD, Platte Valley Habitat Partnership, and WWNRT.

Figure 136. *Steel jack fencing protecting resprouting aspens on the ZN Ranch, north of Saratoga.*

Squirrel Creek Wildfire Rehabilitation (Goal 2) – Ryan Amundson

Figure 137. *Helicopter application of herbicide to control cheatgrass on USFS lands post-fire west of Laramie.*

3,166 acres of rangelands impacted by a 10,587 acre wildfire in 2012 were treated with imazapic herbicide to control cheatgrass infestations (Figure 137). Areas requiring herbicide were mapped via remote sensing technology combined with ground monitoring and treatment polygons were built with this information. Slopes with >40% probability of cheatgrass dominance were identified for treatment. Helicopter application was necessary due to ruggedness of the terrain. Seasonal ranges threatened by cheatgrass include crucial winter range, parturition areas, and areas utilized yearlong by mule deer, elk, and moose. Remote sensing imagery and on-the-ground monitoring will be utilized to track success of the herbicide application in 2017 and 2018. Remote sensing technology helped to better define which areas required treatment and areas to avoid, saving project partners tens of thousands of dollars. Total project costs were $107,000 with USFS, WGFD, WWNRT, MDF, MFF, RMEF and WGBGLC contributing.

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

This project entails inventory, monitoring, and treating the Ferris Mountain Wilderness Study Area and the adjacent hogback ridges for invasive weeds; mainly leafy spurge, whitetop, and Russian knapweed. Treatment consists of herbicide application to control weeds in this extremely rugged area. The main goal is to restrict weed infestations to the currently affected landscape. A secondary goal is to remove or contain other noxious weeds where possible to prevent further degradation and improve the quality of wildlife habitat and livestock forage. The project completed 500 acres of chemical treatments, 160 acres of inventory, and 400 acres of monitoring (Figure 138). Previous treatments in this area have thinned infestations to the point that aerial treatments may not be necessary in the future. To continue to reduce infestation density on the ground maintenance must carry on. Treatments were also implemented by the ranch owners. Previously treated sites are monitored and photographed by treatment crews and noted on their appli-

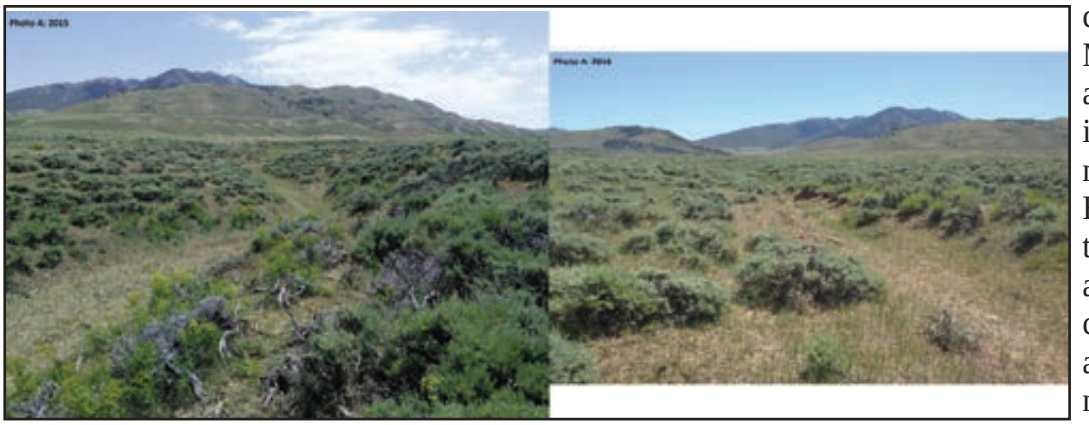


Figure 138. *Before and after herbicide treatments to control Leafy Spurge. Note, Leafy Spurge is the yellow flowered plant in the left photo. Photos courtesy of Carbon County Weed and Pest District.*

cation records. Many sites are also ocularly inventoried and monitored by BLM staff prior to treatment to avoid sending crews into an area that does not need treatment.

Big Creek & ZN Ranch Aspen Treatment Protection (Goal 2) – Katie Cheesbrough and Ryan Amundson

Figure 139. *New aspen regeneration stimulated by ripping treatment on the Big Creek Ranch.*

Figure 140. *WGFD and volunteers assemble steel jack fencing to protect aspen.*

In spring 2015 approximately 600 acres of upland shrub were treated with a prescribed burn, including a pocket of aspen on Hat Creek of the ZN Ranch. The aspen have responded well to the burn, however, wildlife herbivory is hindering successful regeneration and recruitment of new aspen. A heavy duty steel jack fence made from welded drill stem pipe was assembled around the aspen stand. This type of steel jack fence is both tall and sturdy enough to exclude elk from the treatment areas and can also be reused at future project sites. Similarly, ripping treatments done within an aspen stand in 2015 on the Big Creek Ranch resulted in aspen regeneration that also needed temporary protection from wildlife pressure (Figure 139). The ZN fencing was constructed in June 2016 during the annual Platte Valley Volunteer Fence Day and the Big Creek fencing was assembled in August 2016 by WGFD personnel and other volunteers (Figure 140).

Platte Valley Habitat Partnership (Goal 5) – Katie Cheesbrough

Figure 141. *Platte Valley Habitat 2016 education flyers.*

In partnership with PVHP, the USFS continued their weed control efforts in mule deer high-use areas in both the Snowy Range and Sierra Madres. In 2016, 164 acres of musk thistle, oxeye daisy, and Canada thistle treatments were implemented with PVHP funds. Additional acres of noxious weeds were also targeted by Carbon County Weed and Pest. In spring 2016, two of the USFS Divide Peak Prescribed Burn units were successfully implemented, achieving a mosaic burn on 40 acres of shrubland with PVHP funds. Fuel breaks were created for the aspen burn units which will be attempted in 2017.

In 2016, the BLM and SERCD fence conversion and water development project continued with the conversion of another 1.8 miles of fence in mule deer high use areas and completed the 4.5 miles of fence conversion for the Barcus Peak Fence project. The BLM also continued their large-scale Platte Valley Conifer Encroachment project in the Barrett Ridge area. In 2016, 206 acres of juniper that were encroaching into sage communities were removed, either through lop and scatter methods or thinning and piling. These juniper treatments were accompanied with 10 acres of invasive weeds treatments.

The WGFD continued several PVHP projects in 2016 including the Pennock WHMA irrigation improvements and meadow interseeding, protection of aspen enhancements on the ZN and Big Creek Ranches with steel jack fencing, the Faerber property was prepped for timber sale in coordination with Wyoming State Forestry, and future projects continue to be developed. The WGFD also helped sponsor the 10th Annual Platte Valley Winter Workshop and Annual Platte Valley Volunteer Fence Day (Figure 141).

Pennock WHMA Habitat Improvements: Cheatgrass Treatments & Meadow Interseeding (Goal 2) – Katie Cheesbrough

The Pennock WHMA contains important habitat for elk, mule deer, pronghorn, sage grouse, and other wildlife. Habitat improvement projects proposed for this WHMA include cheatgrass control, irrigation infrastructure improvements, meadow interseeding, and road decommissioning/reclamation. Cheatgrass treatments were implemented in 2015 along with granular herbicide trials in conjunction with the Univeristy of Wyoming and bacterial cheatgrass control (D7) trials in cooperation with the BLM. Extensive post-treatment monitoring of

Figure 142. *WGFD personnel interseeds a mix of grass and legumes into an irrigated meadow on the Pennock WHMA.*

the cheatgrass trials were conducted in the summer of 2016 and results are currently being analyzed.

Meadow interseeding began on the north meadow in October 2016. Approximately 18 acres of irrigated meadow were interseeded with a mix of grass and legumes using a Truax seed drill (Figure 142) and will be compared to future seedings that will include an herbicide treatment on the smooth brome and crested wheatgrass that is currently present. Additionally, construction began on the irrigation improvements in spring 2016 with the installation of a legal head gate and a cutoff wall for the north meadow. This will allow better control of water being diverted from the creek onto the meadows as well as allowing more water to remain in the creek.

Upper Platte Valley Weed Management Area (Goal 2) – WLCI, Jim Wasseen

The Upper Platte Valley Weed Management Area project entails inventory, monitoring, and treatment for noxious weeds, including leafy spurge, musk thistle, Canada thistle, and spotted knapweed. Treatment consists of herbicide application and manual treatments to control weeds. One of the main goals is to prevent weed encroachment onto adjacent Forest Service and private lands and contain known weed infestations to the currently affected areas. A secondary goal is to remove or contain other noxious weeds where possible to prevent further degradation and improve wildlife habitat quality and livestock forage. The Upper Platte Valley area provides crucial winter and seasonal habitats for elk, deer, pronghorn and bighorn sheep. The majority of this area falls within core habitat for the Greater sage-grouse, is used for livestock grazing, and is heavily used for recreation and hunting. The project treated and monitored 500 acres – or, half of the known infestations on BLM land. More than half of the 234 sites treated and monitored in 2016 were reported as clean. Only 3 new infestations were identified: 2 leafy spurge infestations in the Bennett Peak area, and a houndstongue infestation found in the Encampment River Campground. Most of the 500 acres treated were in the Bennett Peak area which continues to have the greatest concentration of weed infestations. Chemical treatments, inventory, and monitoring were carried out on state, federal, and private lands in June, July, September and October 2016. Regularly treating this area in the past has thinned infestations to the point that aerial treatments are no longer necessary. To continue to reduce infestation density, on the ground infestation maintenance must continue. Treatments were also completed by the ranch owners and Carbon County Weed & Pest. This project is an informal partnership between the BLM Rawlins Field Office, Carbon County Weed & Pest District, and multiple land owners.

Red-Rim Daley WHMA Forage Production Monitoring (Goal 2) – Katie Cheesbrough

In coordination with the Rawlins BLM Field Office, SERCD, and WGFD, forage production monitoring on the Red Rim-Daley WHMA continued. On October 24, 2016, personnel from the BLM, SERCD, and WGFD clipped herbaceous vegetation from 7 established sites across the unit and found an average production value of 564 lbs/acre in 2016. Data from the past 12 years shows that forage production values have ranged from a low 170 to 960 lbs/acre. As such, 2016 was a relatively good production year which correlates with relatively high levels of precipitation.

Pennock WHMA Forage Production Monitoring (Goal 2) – Katie Cheesbrough

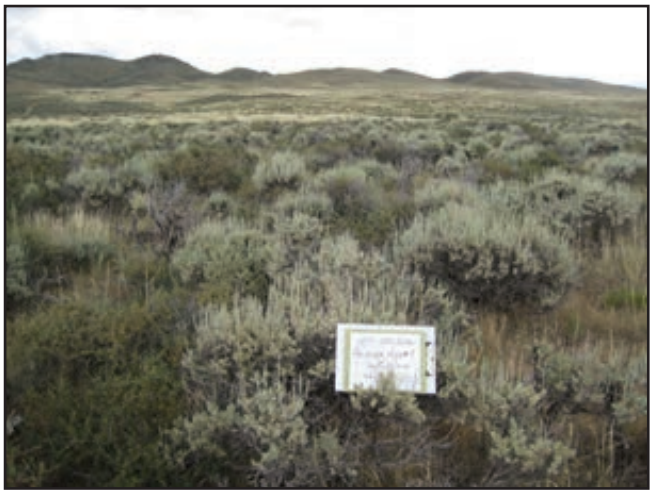


Figure 143. *A high elevation vegetation production site on the Pennock WHMA.*

Based on collaborative PVHP discussions with local stakeholders, the Pennock WHMA has been identified as an area that could be potentially 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 2014 on the Pennock WHMA to determine forage capacity for both wildlife and livestock. Plot sites were selected to capture the different vegetation types that exist within elevational ranges as well as on the irrigated meadows.

Above average precipitation was experienced in the Platte Valley in both 2014 and 2015 which influenced production values found on the Pennock WHMA. The total average production across the WHMA, based on total acres in each elevational range, was approximately 504 lbs/acre for 2016 (Figure 143), with a three year average production value of 562 lbs/acre.

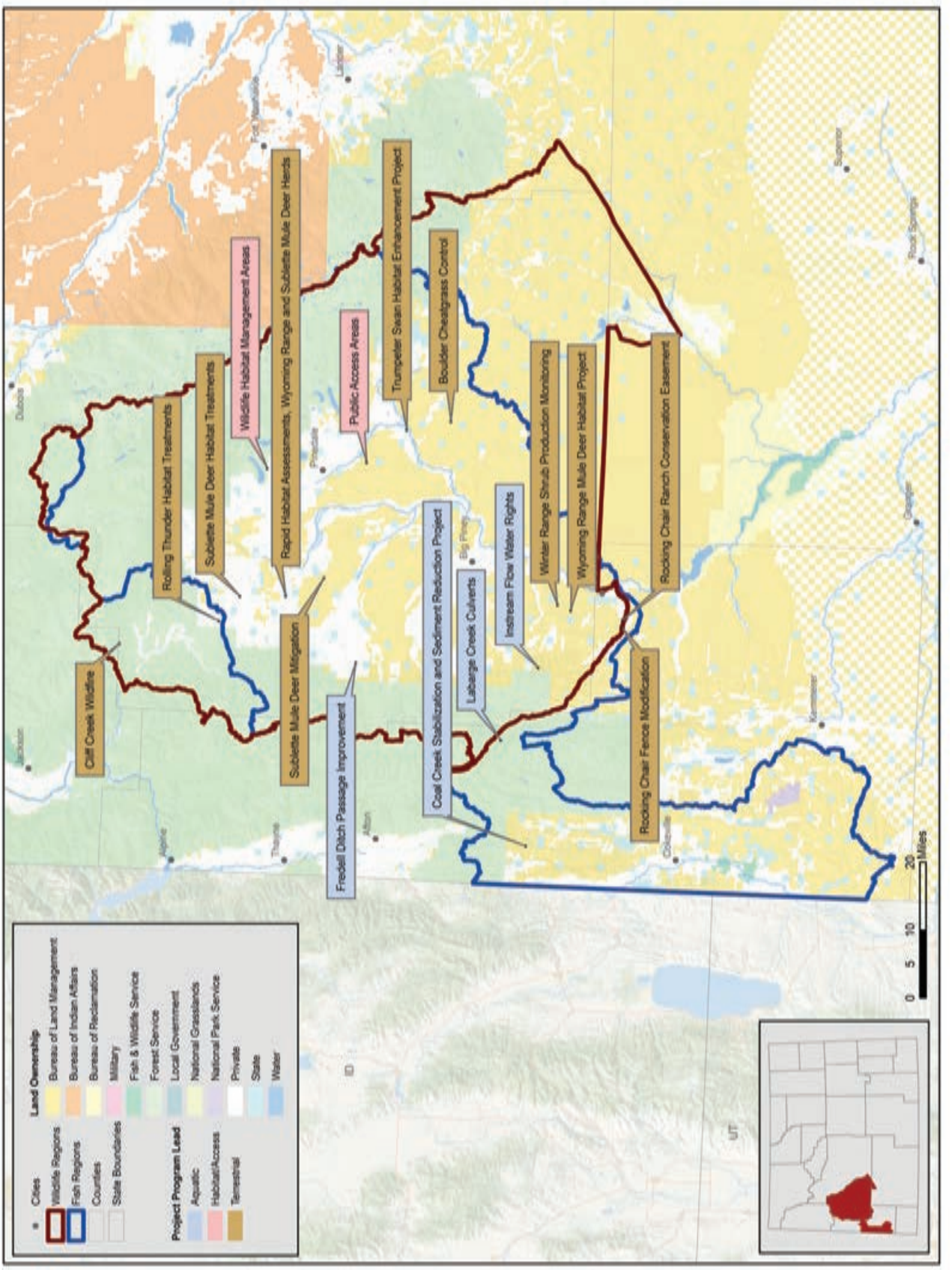
Iron Mountain Prescribed Burn (Goal 3) – Ryan Amundson

Mixed mountain shrub habitats on Iron Mountain, located northwest of Cheyenne, were treated with prescribed burns in Spring and Fall 2016 (Figures 144-145). BLM (High Desert District), USFS (Medicine Bow), and area volunteer fire departments worked cooperatively to treat 700 acres. The mountain is used by wintering mule deer, a resident herd of bighorn sheep (25 – 30 animals), and elk. Prescribed burning in this location was initiated in 2010, with this being the last phase. Shrub resprouting has been excellent following previous treatments, and we expect similar results with this effort, resulting in improved forage values and productivity of key shrubs and grasses.

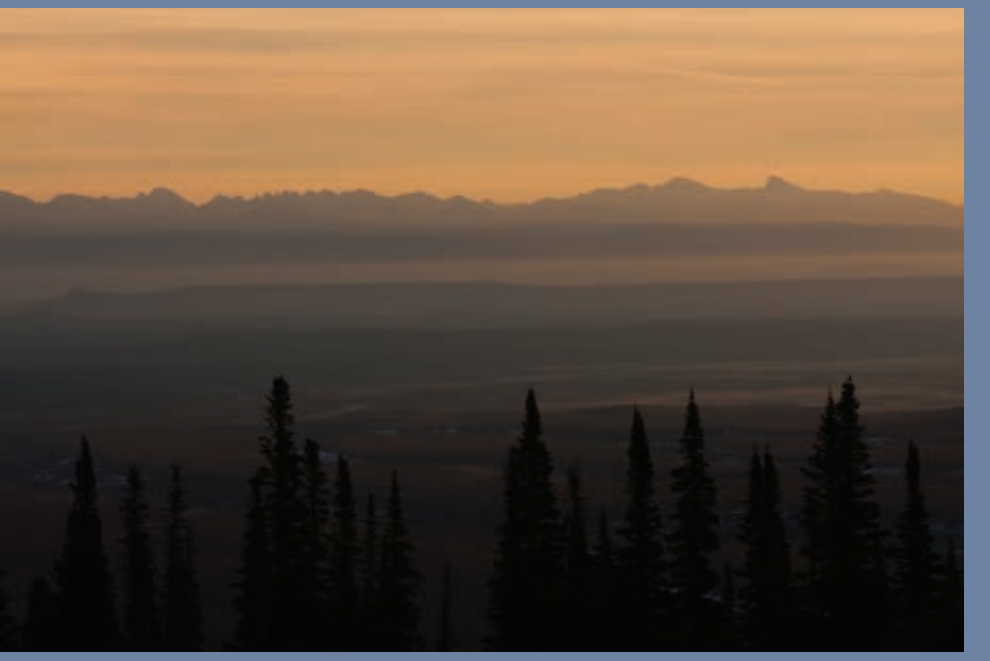
Figure 144. *Prescribed burn crews work into the night to build fire containment lines prior to broadcast ignitions scheduled for the next day.*

Figure 145. *Ideal conditions resulted in greater than 70% of the targeted area being burned.*

Pinedale Region



Pinedale Region



The Pinedale Region essentially encompasses the area between the Wyoming, Gros Ventre and Wind River mountain ranges in western Wyoming. It includes a diversity of habitats and thus a variety of habitat improvement projects as well.

The Wyoming Mule Deer Initiative is a statewide framework designed to address declining mule deer populations, particularly over the last decade. Both the Wyoming Range and Sublette Mule Deer Initiatives have since been developed under the statewide initiative. Habitat improvement is a major component of both plans and they continue to be the focus for a large portion of the terrestrial habitat work being done in the Pinedale Region.

There have been several projects completed to improve grasses, forbs, shrubs and aspen on both public and private lands, which are home to important mule deer habitat. Additional work has been focused on managing livestock grazing and treating noxious weed invasions.

In addition to the extensive habitat treatments, Game and Fish and many partners are in the midst of acquiring a conservation easement on approximately 2,400 acres of the Rocking Chair Ranch near La-Barge. The easement will retain the property's agricultural character while conserving its high-value wildlife habitat by prohibiting future surface development.

Much of the aquatic habitat related activities centered on riparian habitat improvement and the development of wetlands. Riparian habitats have been improved through channel improvements to allow fish passage, sediment reduction and livestock grazing management. The wetland developments are part of a large-scale, multi-year effort between the Game and Fish and multiple partners to create additional habitat for trumpeter swans and other associated waterbirds and wildlife.

A considerable amount of time has been dedicated to work on fences and roads at regional Wildlife Habitat Management Areas (WHMA), including the new Luke Lynch WHMA that was acquired by the Wyoming Game and Fish Commission through a partnership with the Conservation Fund. The property is a key parcel within the Hoback to Red Desert mule deer migration route, determined to be the longest big game migration in the contiguous 48 states. Many obsolete fences have been removed and others modified to be wildlife-friendly, several utilizing old drill-stem pipe donated by local energy companies.

Cliff Creek Wildfire (Goal 2) – Jill Randall

Figure 146. *The Cliff Creek Wildfire burned in a mosaic as was observed from a reconnaissance flight in August 2016.*

In 2016, the 34,000 acre Cliff Creek Wildfire occurred in the vicinity of Cliff Creek and Granite Creek in the Gros Ventre Range. This event has the potential to provide both short and long term benefits to wildlife habitat, livestock forage production, and overall watershed health (Figure 146). Key partnerships are in place to implement management actions similar to those following a prescribed fire to promote forest health. In 2017 and 2018 weed control and livestock rest through the use of range riders and temporary electric fencing will occur within the perimeter of the Cliff Creek Wildfire. Coordination has occurred with 10 livestock permittees on 4 federal allotments to make adjustments to annual operating plans to facilitate this restoration effort. Additionally, aspen monitoring will occur to assess recovery and browse levels.

Coal Creek Stabilization and Sediment Reduction (Goal 2) – Floyd Roadifer and WLCI, Jim Wasseen

This project intends to improve water quality for Colorado River cutthroat trout and other fish species. This project is designed to reduce sediments entering Coal Creek by improving or replacing bridge and culvert crossings, engaging in road and stream realignment, stabilizing bank slopes and toe slopes along the road, and reestablishing vegetation throughout these areas. The WLCI agreement with the WGFD expired September 15, 2016, which has delayed funding. Additionally, the project manager for the Wyoming Game and Fish has retired, further delaying project implementation. These issues will be resolved in 2017 with construction bidding planned for fall 2017. The WGFD-WLCI Coordinator gave funding presentations to the Wyoming DEQ 319 Grant Task Force and WWNRT. Partners include USFS, WGFD, and WWNRT.

Rocking Chair Fence Modification (Goal 2) – Jill Randall

Fences on the Rocking Chair Ranch on LaBarge Creek have been identified to cause mortality to moose and mule deer annually. This mortality can be significantly reduced, if not eliminated, by conversion of several miles of fence to wildlife-friendly standards with a pole top (Figure 147). Fences were prioritized based on known mortality locations and existing fence condition. The first phase of the project was completed in 2016 to include 1.25 miles of fence replacement. Additionally, 2.54 miles of fence have been identified for modification in 2017 on this ranch as well as an additional 3.33 miles on two additional properties due to the success exhibited with this project. Funding partners included WWNRT and WGBGLC.

Figure 147. *New fence constructed on Rocking Chair Ranch to decrease fence-related mortalities in the LaBarge Creek corridor.*

Public Access Areas (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Figure 148. *Newly installed gates and access parking improvements at Sommers Boat Launch PAA.*

Figure 149. *Access improvements to address parking drainage at New Fork Boulder Bridge PAA.*

Personnel from Habitat and Access performed annual maintenance and monitoring of regional PAAs. Green River Daniel PAA boundary fence at 40 Rod Creek was replaced with wildlife friendly top rail. All public access boundary fences were maintained to protect riparian habitat. On Airport PAA, a handicap parking pad was completed. Sommers Boat Launch PAA on the Green River had access gates replaced and parking area improvements completed (Figure 148). On the New Fork Boulder Bridge PAA, parking and drainage issues were improved for public access and to reduce sediment load during spring runoff (Figure 149).

Rapid Habitat Assessments (RHA), Wyoming Range and Sublette Mule Deer Herds (Goal 5) – Jill Randall

Figure 150. *An aspen stand located in the Sublette MDI herd in need of treatment to reduce conifer encroachment.*

This was the second year of implementing the new RHA methodologies for assessing important habitats in the MDI herds throughout the state, of which two are in the Pinedale Region: Sublette and Wyoming Range. In the Sublette Herd we completed 14 Aspen RHAs (2,559 acres) and 5 Rangeland RHAs (6,925 acres). In the Wyoming Range Herd we completed 4 Aspen RHAs (759 acres) and 1 Rangeland RHA (101 acres). These assessments will be compiled with five years worth of data to be used for the herd unit objective reviews. Overall conditions in both herds include a dominance of older age class vegetation that would benefit from treatments to increase age class diversity, promote vigorous new growth and increase vegetation production (Figure 150).

Trumpeter Swan Habitat Enhancement (Goal 2) – Susan Patla and WLCI, Jim Wasseen

The objective of this project 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 and other waterbirds and wildlife. Shallow, open water wetland habitat is one of the rarest habitat types in southwestern Wyoming. Wetland ponds are being created that provide summer habitat and potential nesting habitat for trumpeter swan, the largest waterfowl in North America. The project completed a total of 111 acres of monitoring across: one wetland (20 acres), two ponds (six and 12 acres), and one reservoir (73 acres). At the Rimfire Ranch Pond, proponents conducted three site visits and had discussions with the landowner about the work needed to make the necessary repairs to have the pond function correctly. The landowner purchased a new control structure for the trumpeter swan pond which was installed late October. Additional work completed included fortifying the dike where slumping occurred. In fall 2016, work was completed on building up the dike at the north end of the ponds. The landowner inspected the work and is pleased with the result. This year, record low flows in the New Fork River resulted in a lack of inflow to the Lazy River Ranch Pond in mid-summer. Additional survey work was completed in August and planning is ongoing to address problems with water inflow and water retention. Monitoring of project ponds and all existing swan nest sites in the Green River basin occurred from the air three times in early June, July and September. The WLCI wetland sites monitored from the air included: Rimfire Ranch, Lazy River Ranch (Figure 151) and the Circle Nine Ranch ponds. Also, on September 7, ground surveys of four ponds on the Rimfire Ranch and photos at pre-established photo points were conducted. Partners on the project are the private landowners (Rimfire Ranch, Circle Nine Ranch, and Lazy River Ranch), USFWS Partners Program, WLCI, and WWNRT.

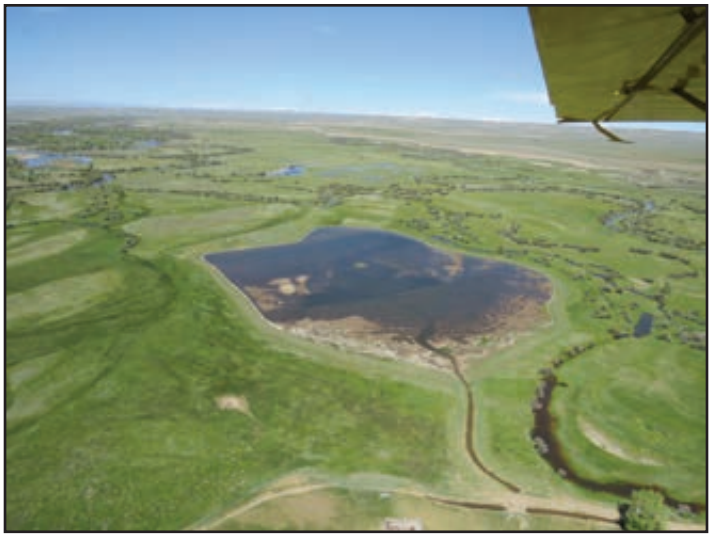


Figure 151. *Homestead Pond at the Lazy River Ranch.*

Sublette Mule Deer Mitigation (Goal 2) – Phil Damm (PAPO) and Jill Randall

This project is a direct response to declining mule deer populations in the Pinedale Anticline Project Area in Pinedale, WY and overall population declines across the Sublette Mule Deer Herd range. Primary partners are WGFD, PAPO, grazing permittees/landowners, and BLM. The project entails roughly 3,500 acres of habitat treatments, primarily in decadent sagebrush and mountain shrub communities, with objectives of improving habitat forage quality and quantity for mule deer. All treatments occur in mule deer winter and transition ranges. Extensive NEPA planning efforts were completed in 2015, and a final decision to proceed was issued by the BLM in late summer 2016. This decision allowed for implementation to begin in the fall, where big sagebrush was mechanically thinned by WGFD on nearly 1,600 acres of key mule deer habitats (Figure 152), 210 serviceberry/chokecherry seedlings were planted (Figure 153), and a livestock exclusion fence was constructed around an important spring source. The project's habitat treatments will continue to be implemented over the next three years. Pre-treatment monitoring efforts from 2014 and 2015 were expanded in 2016 to more effectively measure vegetation response to the proposed treatments. In addition to habitat treatments, a large com-

Figure 152. *Mosaic big sagebrush thinning treatment with four wheel drive tractor and large brush mower.*

ponent of the project involves rehabilitating several reservoirs and water sources to improve livestock distribution and facilitate rest post-treatment. Progress to date includes five rehabilitated reservoirs and two completed water pipelines. A huge "thank you!" goes out to Dylan Bergman (WGFD Game Warden) for ensuring this project's success by laying groundwork for initiation of 2016 implementation activities through spearheading the extensive NEPA planning effort and developing post-treatment livestock rest strategies.

Figure 153. *Serviceberry/chokecherry plantings with tube protectors.*

Wildlife Habitat Management Areas (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Annual maintenance and improvements continue on Pinedale regional WHMAs. The Soda Lake WHMA had 36 miles of crucial winter range habitat boundary and elk fence maintained and repaired. Members of the Wyoming Conservation Corps were contracted to remove beetle killed trees along six miles of elk fence to protect fence integrity along the USFS boundary. The Soda Lake recreational use plan was updated and campsites were improved and established to prevent resource damage on Soda Lake WHMA. On Muddy Creek feedground, one and a quarter miles of crucial winter range elk fence was maintained. On Fall Creek WHMA, one and a half miles of crucial winter habitat boundary fence was replaced with wildlife friendly top rail fencing constructed with used drill stem pipe donated by QEP and Chevron corporations (Figure 154). The remaining three miles will be completed the summer 2017. On Half Moon WHMA, 11.6 miles of crucial winter habitat boundary fence was maintained. Gravel was added to WHMA roads and annual road maintenance performed. On Black Butte WHMA, livestock grazing of 335 AUMs (525 acres) were used to improve nutritional quality of rangeland and forage. One half mile of pole top fencing was replaced and 3.9 miles of crucial winter habi-

Figure 154. *Partially constructed wildlife friendly drill stem pipe fence surrounding Fall Creek WHMA.*

tat boundary fence was maintained (Figure 155). On the recently acquired Luke Lynch WHMA, one and a quarter miles of elk migration fence was relocated, a quarter mile of stock fence was replaced with wildlife friendly pole top fence, and cross – buck interior fences were removed to enhance the Red Desert to Hoback Deer Migration Corridor. In Sublette County, 4.47 acres of noxious weeds were sprayed on PAAs, WHMAs and feedgrounds.

Figure 155. *Construction of wildlife friendly pole top fence on the Black Butte WHMA.*

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

Figure 156. *Aerial application of herbicide to control cheatgrass in the Boulder area.*

The project is intended to control cheatgrass found throughout crucial elk, mule deer, pronghorn, and sage-grouse habitat. Herbicide treatments have been administered during the fall with aerial (Figure 156) and ground application techniques at a rate of 8 oz/acre of Imazapic. 2,443 acres of cheatgrass were treated in the north and east portions of Sublette County in 2016. Monitoring occurs annually on permanent transects and photo points via a collaborative effort of the WGFD and the Sublette County Weed and Pest (SCWP). Partners include the BLM Pinedale Field Office (including JIO/PAPO), NRCS, Sublette County Weed and Pest (SCWP), BTNF, Upper Green River Basin Sage-Grouse Local Work Group, and WLCI. Additionally, experimental plots were established in 2016 on BTNF and the Half Moon WHMA to test the efficacy of Esplanade 200SC (*indaziflam*) with Bayer, which is a different chemical undergoing testing for control of cheatgrass. It does not yet have a grazing label but these studies should help the permitting process if data is favorable. The bacteria *Pseudomonas fluorescens* was also applied at Half Moon WHMA and along several county roads to test how it affects cheatgrass and if it can thrive in our climate. Monitoring of all trial locations will be ongoing and is led by SCWP.

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

This project will improve overall vegetation health in crucial mule deer winter, transition and parturition ranges as part of the Wyoming Range MDI. Implementation of a 30,000+ acre project began in 2014 which will benefit the landscape by increasing the health of sagebrush communities, increasing aspen cover on the landscape, improving mixed mountain shrub communities and reducing noxious weeds including cheatgrass. Accomplishments during 2016 included treating approximately 3,348 acres of sagebrush with a mower as well as mechanically prepping 976 acres of conifer-encroached aspen for future prescribed burns. Conifer slash from 2014 was burned across 683 acres for the benefit of aspen. Approximately 1,499 acres of cheatgrass were aerially treated with an additional 1,970 acres of cheatgrass that was hand-picked by a grubbing crew. Additionally, three range riders were hired to assist with resting the previously treated areas from livestock use. Pre-monitoring of vegetation was conducted in representative sites for treatments implemented this year. Post treatment monitoring was conducted on treatments completed in 2014 and 2015. Partners include the BLM Pinedale Field Office, WWNRT, WLCI, Denbury Energy, Exxon/Mobil, MDF, MFF, RMEF and WBGBLC.

Figure 157. *Dutch George Creek Prescribed Fire in June 2016.*

Figure 158. *Aspen suckers three months after prescribed burning Dutch George Creek.*

Aspen Treatments

In 2014 aspen stands were slashed and cut-piled for future prescribed burns. Aspen slash provides the best fuel bed when allowed to cure/dry for two winters before burning. Therefore the first prescribed burns occurred in June 2016 in the Dutch George Creek area of

Figure 159. *Pine Grove aspen monitoring point taken in 2015 before slashing and in 2016 after slashing, but before prescribed burning occurred.*

Miller Mountain in the South LaBarge allotment (Figure 157). Although summer growing conditions were lacking in moisture, excellent aspen suckering was observed in the unit three months after fire was applied to the 683 acre unit (Figure 158). Slashing occurred in Pine Grove in 2015 and will provide an excellent fuel source for burns anticipated in June 2017 (Figure 159).

Sagebrush Treatments

Sagebrush mowing began in 2014 and has continued in 2015 and 2016 in different areas which provides an opportunity to compare this treatment in different soil types, aspects, precipitation zones and under different livestock management regimes. Pre-treatment monitoring has occurred and includes line point intercept (species composition by canopy cover), shrub belts (shrub density by age class), shrub production and utilization transects, and photo points (Figure 160).

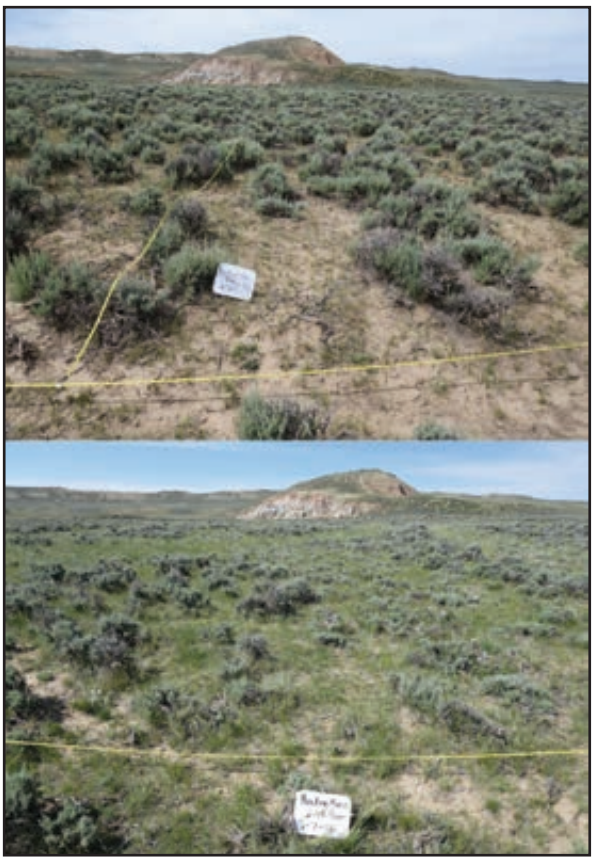


Figure 160. *Pre- and post-treatment monitoring of sagebrush mowing in South LaBarge indicating a positive response from grasses and forbs due to removal of old Wyoming big sagebrush.*

Other implements have been used to mechanically thin sagebrush in this treatment. In 2014, the Dixie harrow was used to thin decadent Wyoming big sagebrush and followed up with seeding a variety of forbs, grass and shrubs into the interspaces created by the thinning. In this treatment, sagebrush annual leader production was compared between plants that persisted post-treatment with those in a non-treated control stand 300 yards away to determine if we were improving available forage for wintering mule deer. In 2015 (1 year post with great growing conditions), annual production was 8 times greater than the control area; in 2016 (2 years post with average growing conditions), annual production was almost 4 times greater than the control area.

Lawson aerator treatments were also utilized in order to incorporate a seeding into the mechanical treatment on a large stand in the Little Colorado Desert in 2015. This stand was targeted for cheatgrass treatment in 2016 due to cheatgrass presence in the seed.

Figure 161. *Pre- and post-treatment monitoring photo point showing good control of cheatgrass in a true mountain mahogany stand on a southern aspect in the Calpet area of North LaBarge.*

Cheatgrass Control

Cheatgrass control primarily involves fall aerial application of the herbicide Imazapic at a rate of 8 oz/acre. There is a concerning level of cheatgrass in the North and South LaBarge area on south facing aspects associated with oil and gas disturbance that we are strategically treating in coordination with SCWP (Figure 161). Because these infestations are still co-dominant with native species and natural fire regimes have not been altered, we are aggressively treating areas to prevent crossing a threshold when management options become more costly and less effective. An additional tool that was utilized in 2016 included hiring a grubbing crew to grid and hand pick new cheatgrass plants that invaded disturbed rangelands with the seed mix we used in the Little Colorado Lawson aerator treatment. Within the 1,970 acres grubbed, 1,006 plants were pulled prior to seed setting and bagged for disposal. This is not a traditional technique, but it is cheaper/acre than aerial application (due to low levels of infestation) and was a strategy we planned to use when deciding to incorporate seeding into the treatment because of the known occurrence of cheatgrass seed in all seed mixes. Grubbing crews will be hired for a second year in 2017 and future needs will be reassessed based on how much cheatgrass is found in year two.

Rocking Chair Ranch Conservation Easement (Goal 1) – Kerry Olsen and WLCI, Jim Wasseen

The goal of the project is to obtain a conservation easement across approximately 2,393 acres of private lands on the Rocking Chair Ranch. The conservation easement will retain the property's agricultural character while conserving a high-value wildlife habitat by prohibiting future surface development. The easement will be held by WGFD who already holds two other easements related to this landscape.

The primary benefit will be realized through the permanent conservation of an area comprised principally of wetland and riparian areas associated with LaBarge Creek, xeric forest, desert shrubland, and sagebrush shrubland habitat types. The riparian zones provide important connective areas for surrounding upland sagebrush and forest habitat types. The Rocking Chair Ranch is considered sage grouse habitat. The property also provides important habitat for a variety waterfowl, songbirds, and raptors including bald and golden eagles. Fontenelle Creek, which bisects the property, provides habitat for numerous fish and amphibian species including tiger salamander, Colorado River cutthroat trout, brook trout, brown trout, mountain whitefish, speckled dace and others. The area supports crucial winter ranges, crucial summer year-long range, and parturition areas in various respects for moose, elk, mule deer, and pronghorn. A secondary benefit will occur from the protection of mule deer migration corridors from future development. The conservation easement itself is still in the process of being obtained. The contracting process is ongoing while awaiting completion of the easement appraisal. This partnership includes the North American Wetland Conservation Act grant program, RMEF, WGBGLC, WLCI, and WWNRT.

Rolling Thunder Habitat Treatments (Goal 2) – Jill Randall and Phil Damm (PAPO)

Rolling Thunder and Rim Ranches are entirely encompassed by important mule deer habitats including transition and spring-summer-fall ranges, as well as the recently WGFD-designated Sublette Mule Deer Herd crucial migration corridor. In 2016, the owner continued partnerships and cooperation with WGFD/MDI, PAPO, NRCS, WLCI, WWNRT, WGBGLC, Red Desert to Hoback Partnership, and USFWS Partners Program to implement aspen treatments in conjunction with wildlife objective-

Figure 162. *Pre- (above) and post- (below) treatment conditions of typical conifer-encroached aspen stands on Rolling Thunder Ranch in 2016.*

Figure 163. *Willow cutting planting (foreground) along Middle Beaver Creek on Rim Ranch and wildlife friendly high tensile electric fence constructed in 2014 (background).*

driven livestock management, in addition to extensive wildlife friendly fence conversions and riparian restoration. Aspen stands were prioritized for treatment to address conifer encroachment with high wildlife values and feasibility in mind. In addition, stands with a dense old-growth aspen overstory were selected for aspen parent tree removal to stimulate additional suckering. A contracted chainsaw crew completed all identified medium to high priority aspen treatment areas in 2016, totaling 640 acres (Figure 162). These aspen treatments were a continuation of past years' habitat projects on the ranch, which total nearly 600 acres, and include aspen root ripping, conifer removal from aspen stands, large patch conifer removal for aspen stand regeneration, and Lawson aerator sagebrush thinning. Lawson aerator treatments were evaluated, and herbaceous response was excellent from several species, including geranium, lupine, and elk thistle; remaining sagebrush within treated areas displayed vigorous leader growth. In 2015, ranch personnel initiated a willow re-vegetation project along Middle Beaver Creek. Those efforts were expanded significantly in 2016 to include planting around 1,000 willow cuttings on about 1,000 linear feet of creek (Figure 163), in addition to initial planning for a larger scale riparian restoration project. Alongside the habitat treatments, a parallel project has been occurring to convert all fences across both ranches to wildlife friendly standards. Prior to 2016, about six miles of existing livestock fence had been reconstructed to wildlife friendly standards; in 2016, an additional six miles were added to that total.

Sublette Mule Deer Habitat Treatments - Roberts Phase; and Hoback Rim Wildlife Friendly Fence (Goal 2) – Phil Damm (PAPO)

These projects are a direct response to population declines across the Sublette Mule Deer Herd and are a response to declining mule deer populations on the Pinedale Anticline Project Area just outside Pinedale, WY (a segment of the Sublette Herd). The projects are considered an expansion of the ex-

tensive fencing and habitat treatments occurring as part of the "Rolling Thunder Habitat Treatments" project on adjacent Rolling Thunder/Rim Ranches referenced elsewhere in this document. WGFD allocated considerable time to these projects in 2016 for assessing site-wide habitat conditions, inventorying fences, and coordinating and collaborating with partners, including NRCS and the two landowners. These foundational steps resulted in development of proposals for about 30 miles of wildlife friendly fence conversions and nearly 1,900 acres of big sagebrush/antelope bitterbrush habitat treatments (Figure 164), which are nearly all located in the WGFD-designated Sublette Mule Deer Herd Crucial Migration Corridor as well as in spring-summer-fall habitats. This groundwork set the stage to apply for several significant grant requests, as well as to assist NRCS and the landowners in applying for Farm Bill contracts for the wildlife friendly fence work. Continued relationship building efforts with additional landowners throughout the Pinedale-area range of the Sublette Herd will likely yield complementary projects in the near future.

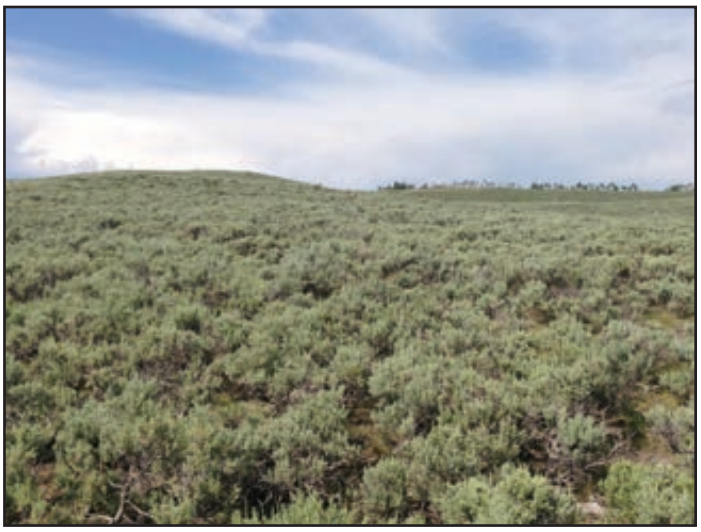


Figure 164. *Dense mountain big sagebrush stand representative of conditions across the "Sublette Mule Deer Habitat Roberts Phase" project site.*

Winter Range Shrub Production Monitoring (Goal 5) – Jill Randall

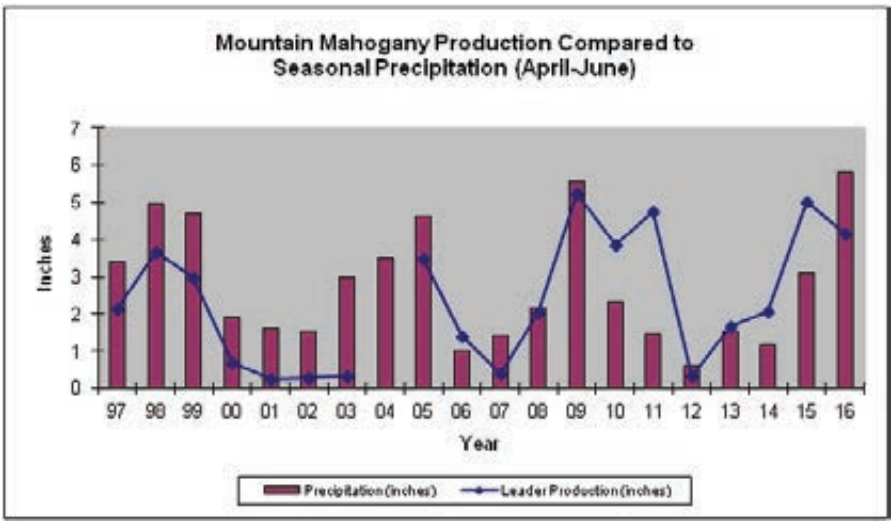
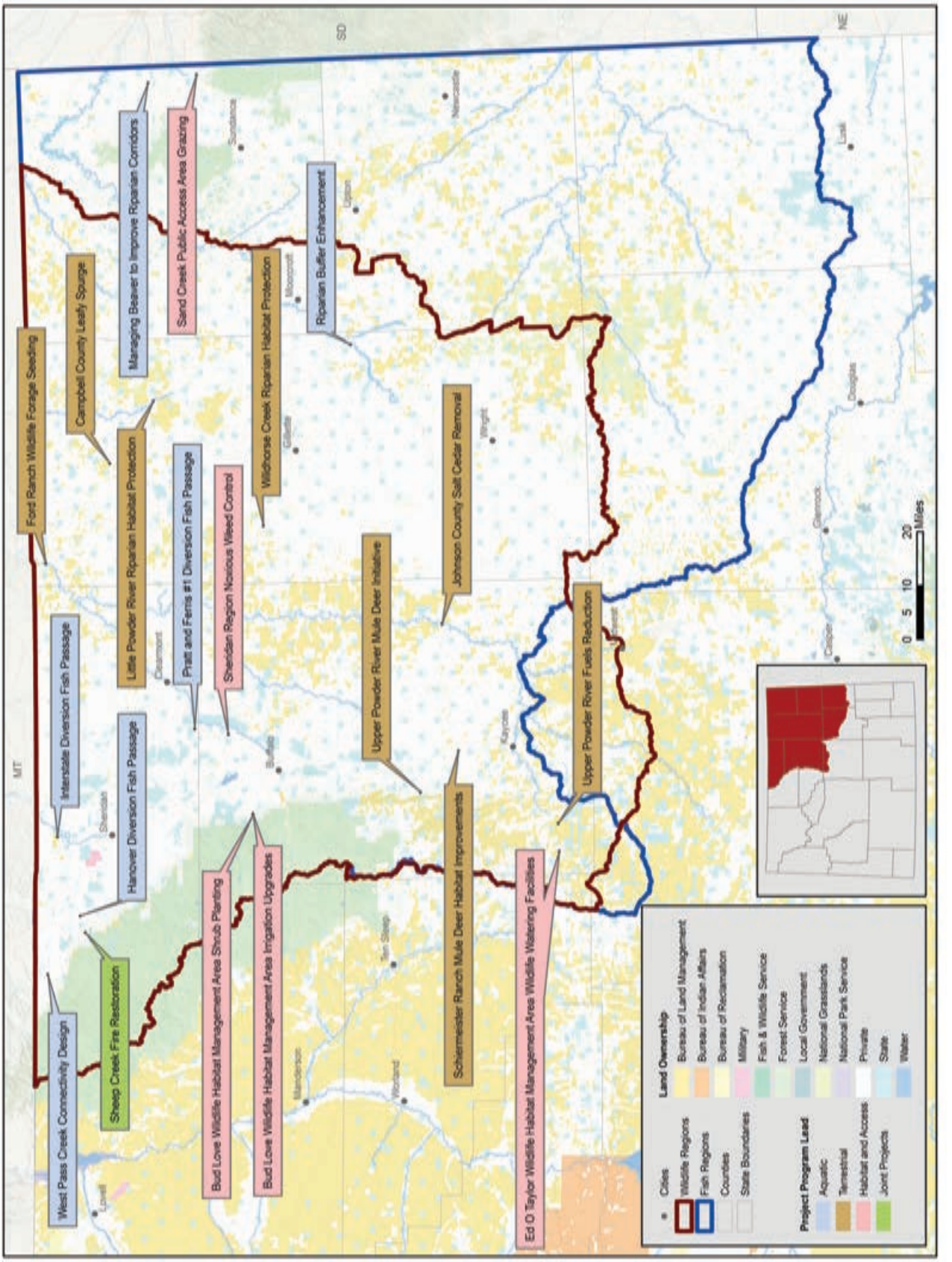


Figure 165. *Production on true mountain mahogany compared with precipitation total for the months of April through June annually, as collected in the Calpet winter range.*

The growing conditions for shrubs on winter ranges in the Pinedale Region started out excellent. The quantity of precipitation was above average during the growing season (April through June) with an outstanding amount of moisture falling in May (four inches) in parts of the region. In the months following, however, the amount of precipitation dropped dramatically resulting in a hot and dry summer. True Mountain Mahogany production dropped slightly from last year, even with an increase in overall precipitation, likely due to the drop in moisture following May (Figure 165). This brings up an important point about how the timing of precipitation is just as important as the amount received in terms of plant production. Seed production likely suffered some from the lack of summer rains.

Sheridan Region



Sheridan Region

The Sheridan Region extends from the top of the Bighorn Mountains east to the Black Hills and from the Montana/ Wyoming stateline south to the Teapot Dome Oil Field in northern Natrona County.

Aquatic and terrestrial wildlife habitat enhancements in northeast Wyoming focused on streams and their associated riparian areas. Attention toward managing rangelands to meet the needs of mule deer and sage-grouse for food and cover are given high priority as is reconnecting streams with structures to aid fish passage.

Maintaining the diverse habitat quality of riparian areas in northeast Wyoming is critical. Major concerns for riparian habitats are lack of native grass and forb and communities, weed infestations, loss of woody species that stabilize stream banks and shade stream corridors, and alterations that reduce the capacities of riparian areas to retain water. Many perennial streams have several irrigation diversions along their courses. The diversions have fragmented stream courses into sections where fish movements are restricted or eliminated. As opportunities become available, efforts 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. Fish passage around barriers expands available habitat for fish to meet their seasonal needs such as spawning and seeking thermal refuges during low flow conditions - meaning healthier fish populations and better angling.

Other rangeland habitat concerns in this region include the decline or loss of sagebrush stands, invasion of non-native grasses and weeds, conifer encroachment, and wildfire. Efforts to deal with these concerns involve maintaining rangelands that provide a diversity of native grasses and forbs as well as an intact sagebrush component which is essential for numerous wildlife species. Work on all of these fronts took place in 2016.

Schiermeister Ranch Mule Deer Habitat Improvements (Goal 2) – Todd Caltrider, Ryan Amundson and Seth Roseberry

Figure 166. *Mesic draw after harrowing.*

Two different projects were completed on the Schiermeister Ranch in 2016 to improve mule deer habitat. One project involved dixie harrowing 14 acres of a mesic draw. The landowner harrowed the draw during the late winter of 2016 (Figure 166). After harrowing, the landowner seeded the area with a variety of native grasses, forbs and legumes to reduce the disturbed areas in the draw bottom from becoming infested with invasive plants and provide desirable forage for mule deer.

In addition to the harrowing project, the landowner also planted a mixture of deciduous shrubs in mesic draw bottoms. The Schiermeister Ranch has very little deciduous browse plant species. To improve mule deer forage on the ranch, the landowner planted 10 plants in three different mesic locations (Figure 167). Although the size of this planting is small, the purpose was to see if planting nursery stock in a wildland setting could be successful. If these planting survive, additional plantings on the Schiermeister Ranch will be planned in the future.

Figure 167. *Deciduous shrub planting on the Schiermeister Ranch.*

Bud Love WHMA Irrigation Upgrades (Goal 2) – Seth Roseberry

Two irrigation diversion boxes were installed on Bud Love WHMA to better facilitate water distribution and allow for mini gun sprinkler systems to be utilized for shrub planting enclosures. The irrigation system is being revitalized to enable greater forage production on the historic hay meadows utilized by a variety of wildlife. Funding for the diversion boxes was provided by the Wyoming Sportsmen Group of Gillette, WY (Figure 168).

Figure 168. *Bud Love WHMA irrigation system diversion boxes.*

Hanover Diversion Fish Passage (Goal 2) – Travis Cundy

The Sheridan County Conservation District, NRCS, WWNRT, Hanover/Oz Ditch Company and the Department cooperated to improve fish passage through the Hanover Diversion structure on the Tongue River. The existing cross vane structure was converted to a roughened ramp (Figure 169). Trout and mountain whitefish will find their way over the roughened ramp much more readily than over the steps of the previous boulder cross vane structure. Additional work is planned to retrofit the check board sluiceway with a smaller-sized lift gate to improve the function of the irrigation diversion and long-term stability of the ramped vane.

Figure 169. *Before (above) and after (below) views of the fish passage renovations completed at the Hanover Diversion structure on the Tongue River.*

Little Powder River Riparian Habitat Protection (Goal 2) – Todd Caltrider

A new CCRP contract was initiated on Little Powder River, just northeast of Gillette, WY. This new contract will protect 119 acres of riparian habitat from heavy livestock use and allow for riparian vegetation recovery (Figures 170-171). This project was funded by the WGFD and the NRCS/FSA.

Figure 170. *Little Powder River CCRP, Campbell County.*

Figure 171. *Another view of Little Powder River CCRP, Campbell County.*

Interstate Diversion Fish Passage (Goal 2) – Travis Cundy

WGFD and TNC funding were secured in 2015 to explore alternatives for developing fish passage, diversion screening, and floater passage or portage at the Interstate dam and diversion on the Tongue River. WWC and Wild Fish Engineering completed concept design alternatives in March. The ditch company declined to consider diversion screening and float passage alternatives further, but was willing to consider options for a fish bypass provided the passage could be shut off when it came into conflict with the irrigation diversion. Subsequently, the design team completed more advanced designs for a vertical slot ladder and a rock weir bypass channel option for fish passage. Further feedback is being requested on these options. Developing passage at the dam will allow fish to move from 23 river miles downstream of the dam (down to Tongue River Reservoir) and upstream of the dam 26 miles in the Tongue River and 10 miles in Goose Creek. Project planning will continue in 2017.

Bud Love WHMA Shrub Planting (Goal 1) – Seth Roseberry

The Bud Love WHMA provides critical habitat for elk, mule deer, whitetail deer, turkey, pheasant and grouse. The lower lands of the Bud Love WHMA along North and South Sayles Creek were once harvested hay meadows but have been transitioning back into a more sustainable natural habitat. Following initial improvements to the existing irrigation system three wildlife exclosures were constructed to increase shrub forage availability through bare root plantings. Initial plantings in 2015 resulted in only a 10% survival success likely due to delayed planting and lack of late season moisture. Planting of 105 individual trees/shrubs in 2016 showed greater survival success nearing 35%. Plantings are planned again for 2017 along with installation of a small scale irrigation system in an effort to increase survival success. Planned plantings include black currant, caragana, chokecherry, nanking cherry, native plum and wood rose. The project objective is to establish forage for wildlife and birds, increase snow accumulation along plantings and improve hiding cover for all species.

Riparian Buffer Enhancement (Goal 2) – Todd Caltrider and Travis Cundy

Aquatic and terrestrial habitat personnel worked with landowners to plant plains cottonwood and coyote willow cuttings at two previously completed riparian buffer fencing project sites (Figure 172). The existing abundance of woody plant communities was less than what had occurred in the past at both sites. The cuttings were collected at available sources and planted using a waterjet stinger. About 100 plains cottonwood and 150 coyote willow cuttings were planted at each buffer site. The goals were to provide seed stock to increase woody plant abundance along the fenced buffers.

Figure 172. *Department personnel planted cottonwood and willow cuttings at fenced buffers on Wild Horse Creek in Campbell County (top) and Beaver Creek in Weston County (bottom).*

Campbell County Leafy Spurge (Goal 2) – Todd Caltrider

The Campbell County Weed and Pest District (CCWPD) has been working to control the spread of Leafy spurge in Campbell County. Past efforts have reduced large infestations of this weed to just a few drainages in Campbell County. WGFD provided funding to CCWPD to assist with treating the remaining leafy spurge infested acres. In 2015 CCWPD was able to treat 24 acres and used the remaining funds from the grant to treat 14 acres in 2016 (Figure 173).

Figure 173. *Campbell County Weed and Pest District weed control crew treating leafy spurge in Campbell County.*

West Pass Creek Connectivity Design (Goal 2) – Travis Cundy

Funding was secured through the WGFD Habitat Trust fund to explore options for developing fish barriers on the North Fork, South Fork, and mainstem of West Pass Creek and screening fish from the Acme Diversion ditch on the North Fork tributary. These options are being investigated to facilitate future Yellowstone cutthroat trout restoration efforts in the watershed. Potentially, up to about eight stream miles could be secured for cutthroat trout. WWC and Wild Fish Engineering were contracted to develop concept design alternatives. The design options developed for fish barrier infrastructure and screening will be used to inform stakeholders and develop future plans. Upon completion, preferred alternatives will be identified with stakeholders.

Ford Ranch Wildlife Forage Seeding (Goal 2) – Todd Caltrider

A total of 26 acres were planted with a wildlife forage seed mix during spring 2016 in Campbell County. The plantings are intended to provide high quality forage for mule deer, whitetail deer, and upland game birds (Figure 174). This project was funded through the statewide WGFD Grass and Legume Seeding Program. Shortly after planting season, growing conditions became unsuitable for seed germination in the planting area, with high temperatures and little moisture occurring. Little to no seed germinated during the spring. Hopefully the seed remained dormant and we will see some germination in 2017.

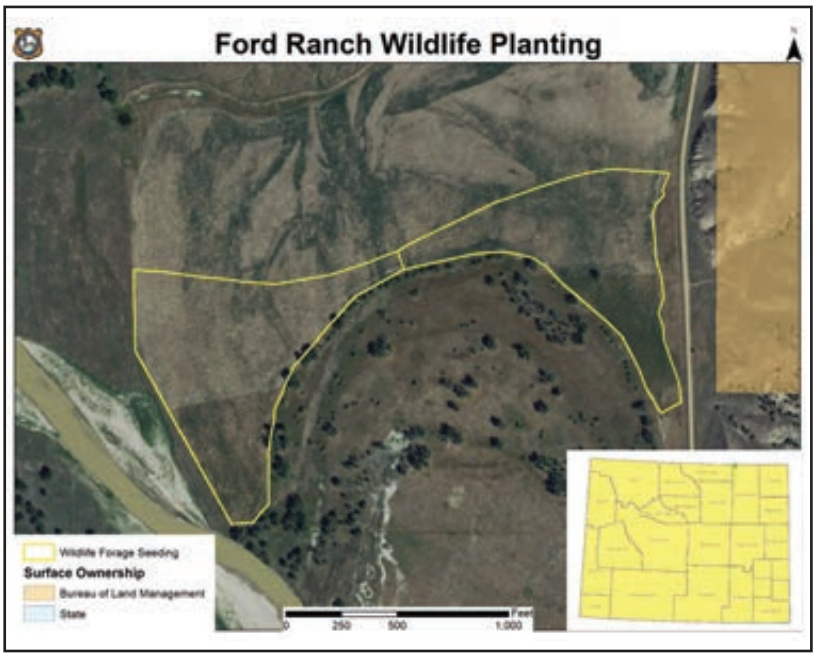


Figure 174. *Ford Ranch wildlife forage seeding.*

Johnson County Salt Cedar Removal (Goal 2) – Todd Caltrider

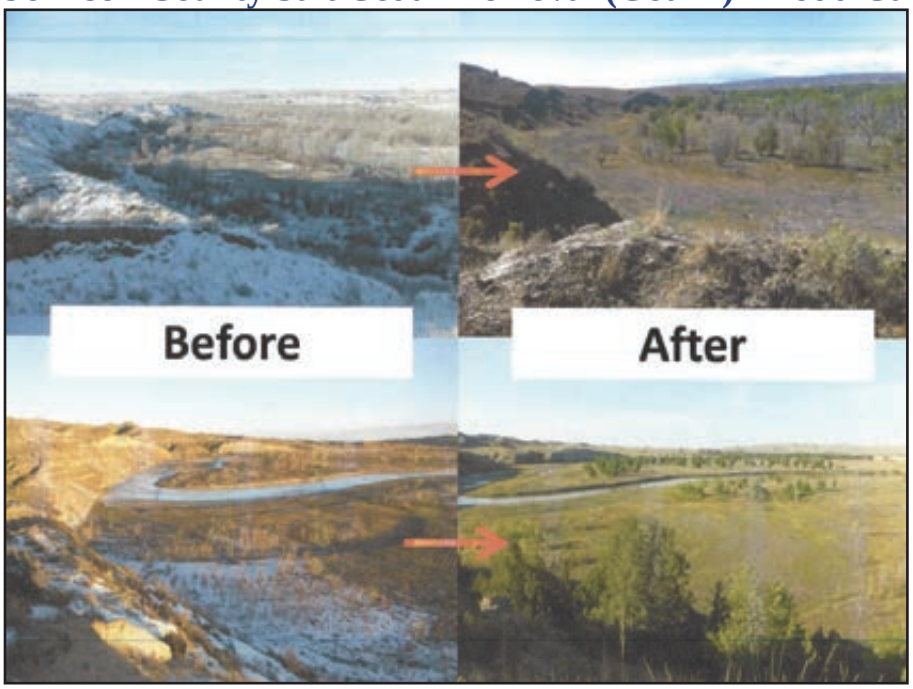


Figure 175. *Before and after pictures of salt cedar removal on the Powder River in Johnson County.*

Since 2007, the Johnson County Weed and Pest (JCW&P) has successfully implemented an aggressive salt cedar removal program on the Powder River. To date, the JCW&P has treated 3,200 acres of salt cedar on the Powder River on 13,500 acres of riparian habitat. Roughly 8,700 acres of riparian habitat remain on the Powder River that has untreated salt cedar infestations. The JCW&P is looking to treat these remaining acres to control the infestation of salt cedar on the entire Powder River. WGFD provided funding to allow JCW&P to increase the amount of cost share extended to landowner's participating in the program, hopefully enticing greater participation in salt cedar removal and allowing the JCW&P to get access to some of the last areas infested with salt cedar. In 2016, JCW&P was able to remove a total of 332 acres of salt cedar (Figures 175-176). Work will continue into 2017. Funding was provided by the JCW&P District and WGFD.

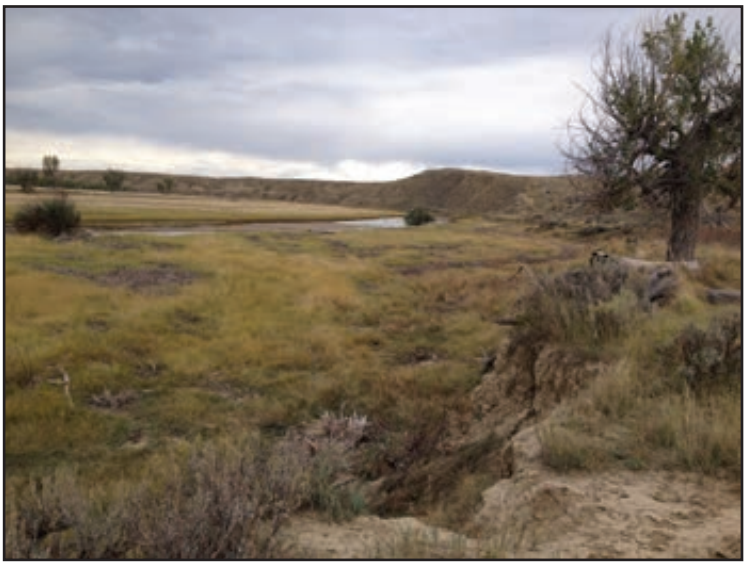


Figure 176. *Riparian herbaceous recovery after salt cedar removal on the Powder River in Johnson County.*

Pratt and Ferris #1 Diversion Fish Passage (Goal 2) – Travis Cundy

The Apache Foundation, WWNRT, USFWS and the Department partnered to build a dual vertical slot fish ladder (Figure 177) and rotating drum fish screen (Figure 178) at the Pratt and Ferris #1 dam and diversion on Piney Creek. The dam occurs about 2.5 miles above Piney Creek's confluence with Clear Creek. Brown and rainbow trout, rock bass, stonecat, longnose dace, creek chub, longnose and white sucker and shorthead redhorse occur in the project reach. The fish ladder combined with the previous ramped diversion structure completed at the Dunlap Diversion on Piney Creek reconnected about 30 contiguous miles of Piney and Clear creeks. The screen directs any fish that enter the diversion ditch to a bypass pipe that leads back to Piney Creek. The Department and TU are assisting the Apache Foundation to monitor fish movements through the new fishway.

Figure 177. *Dual vertical slot fish ladder (left) located between the Pratt and Ferris #1 dam and diversion ditch. Photo on right depicts a close-up view of the operating ladder.*

Figure 178. *Rotating drum fish screen in the Pratt and Ferris #1 diversion ditch prior to full operations. The rotating drums pass fine debris down the ditch and redirect fish to a bypass pipe back to Piney Creek.*

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

A landowner requested assistance to capture and release beaver on the South Fork of Hay Creek east of Aladdin, WY (Figure 179). The goals for the release were to establish a stable colony and encourage dam-building to raise streamside water tables and enhance riparian plant communities. Three beaver, which appeared to include a mated pair, were live trapped by a contract trapper in Sheridan County during September to complete the release.

Figure 179. *Beaver transplant site located on the South Fork of Hay Creek.*

Upper Powder River Fuels Reduction (Goal 2) – Todd Caltrider

Figure 180. *Spraying cheatgrass on the Middle Fork Powder River Management Area.*

Figure 181. *Looking across the Middle Fork Powder River at the cheatgrass treatment area.*

The Middle Fork Powder River Management Area is located 17 miles east of Kaycee, Wyoming. The area is an important mule deer and elk wintering range due to abundant stands of curl-leaf mountain mahogany. In 2005 and 2006, a large wildfire destroyed 815 acres of curl-leaf mountain mahogany, resulting in a 7% decrease in available mule deer forage in this winter range. Curl-leaf mountain mahogany loss was due, in part, to high densities of conifer encroachment in the mahogany stands. In 2011, the BLM and WGFD partnered to begin removing conifers from mahogany stands. To date, approximately 4,359 acres of fuels reduction treatments have occurred to improve the resistance of mahogany stands to catastrophic wildfire. In addition to conifer removal, BLM initiated treatments to control cheatgrass infestations. Cheatgrass has become more common in the area due to high recreational use and previous wildfires. On August 28, 2015, the BLM sprayed approximately 600 acres of cheatgrass in the Middle Fork Powder River Management Area (Figures 180-181). On September 6, 2016, another 998 acres of cheatgrass were treated. Funding was provided by WGFD, BLM, WWNRT, and JCWPD.

Wildhorse Creek Riparian Habitat Protection (Goal 2) – Todd Caltrider

A new CCRP contract was initiated on Wildhorse Creek, northwest of Gillette, WY. This new contract will protect 113.5 acres of riparian habitat from heavy livestock use and allow for riparian vegetation recovery (Figures 182-183). This new CCRP is immediately downstream from a different CCRP that was initiated in 2007. With the addition of this new CCRP, a total of 195 acres of riparian habitat will be protected. This project was funded by the WGFD and the NRCS/FSA.

Figure 182. *Wildhorse Creek CCRP, Campbell County.*

Figure 183. *Another view of Wildhorse Creek CCRP, Campbell County.*

Upper Powder River Mule Deer Initiative (Goal 2) – Todd Caltrider, Grant Gerharter, Dan Thiele and Jim Seeman

Figure 184. *Gathering habitat information on the Lower Middle Fork Powder River.*

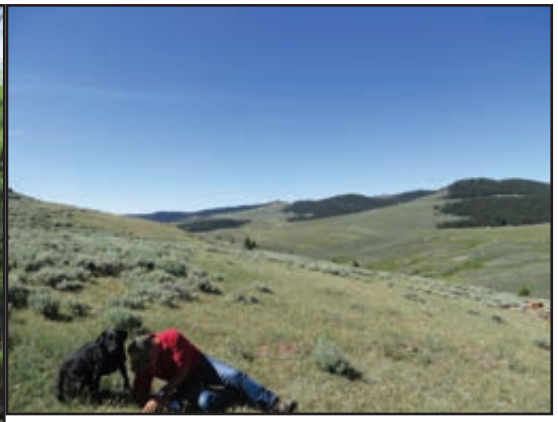


Figure 185. *Assessing rangeland conditions in the Beartrap area of the Bighorn Mountains.*

Sheridan regional personnel began to conduct Rapid Habitat Assessments (RHA's) on key mule deer habitats in the Upper Powder River mule deer herd unit. During 2016, a total of 15 RHA's were completed in the Upper Powder River mule deer herd unit. Eight riparian RHA's were completed, covering 443 acres of riparian mule deer habitat (Figure 184). Eight shrub/rangeland RHA's were completed in the Upper Powder River mule deer herd unit, covering 2,052 acres of shrubland and rangeland mule deer habitat (Figure 185).

Sheep Creek Fire Restoration (Goal 2) – Todd Caltrider and Seth Roseberry

On August 2, 2015 the Sheep Creek Fire, a human caused wildfire, started in the Tongue River Canyon adjacent to the Amsden Creek WHMA. Approximately 1,300 acres of the Amsden WHMA was burned. To maintain the integrity of the rangelands on Amsden WHMA, WGFD quickly obtained funding to conduct cheatgrass treatments following the fire. On September 10-15, 2015, WGFD facilitated the aerial treatment of cheatgrass on 620 acres of rangeland (Figure 186). Funding was also obtained to treat noxious weeds and to buy seed to reclaim fire lines and other areas disturbed by the fire and suppression activities. In 2016, WGFD personnel monitored the area for cheatgrass and noxious weeds following the 2015 treatment and continued small scale spot spraying to further control weeds (Figure 187). In

Figure 186. *Amsden Creek WHMA 10 months after Sheep Creek fire and cheatgrass spraying.*

Figure 187. *The difference between a treatment site and a strip of cheatgrass that was missed.*

2017, additional herbicide treatments have been contracted to focus on cheatgrass spraying within areas identified in the 2016 monitoring. Funding was provided by WWNRT, WWSF, RMEF, and WSG.

Ed O. Taylor WHMA Wildlife Watering Facilities (Goal 1) – Seth Roseberry

Figure 188. *Upgraded solar well setup and distribution lines.*

Figure 189. *Herd of mule deer utilizing the new water tanks.*

The Ed O. Taylor WHMA comprises 10,215 acres of crucial wildlife habitat on the southeast slope of the Bighorn Mountains west of Kaycee, WY. Four 1,500 gallon BOSS watering tanks and one 4,500 gallon water storage distribution tank were installed on the Ed O. Taylor WHMA to increase water availability and reliability for wildlife (Figure 188). An upgraded solar pump and panels were installed to distribute water through 18,500 feet of two inch poly pipe to the four watering tanks and one storage tank. The project objective is to increase usable habitat within the region by decreasing the distance wildlife must travel to a reliable water source (Figure 189). Through the first phase of this project 5,499 acres have been affected by increased water distribution. Funding was provided by WWNRT, RMEF, MDF, WFW, and WGFD.

Sand Creek PAA Grazing (Goal 3) – Seth Roseberry

Cattle from the Ox Yoke Ranch graze on the Sand Creek PAA annually from mid May to mid June. During 2016, 324 pairs grazed the area from June 1 through June 11 totaling 108 AUMs utilized. The grazing on Sand Creek PAA is part of an Exchange of Use Agreement that results in an additional two miles of public fishing access adjacent to Sand Creek PAA and works in conjunction as a multi aspect weed management plan for the area. Sand Creek PAA is treated annually for noxious weeds by a licensed applicator.

Sheridan Region Noxious Weed Control (Goal 2) – Seth Roseberry

Approximately 68 acres of invasive plants were treated by Sheridan Region Habitat and Access personnel and private contractors during 2016. The invasives were treated using chemical and mechanical methods to stress the plants during growing seasons. Controlling these noxious weeds will enhance habitat for wildlife while allowing native plants to thrive (Figure 190).

Figure 190. *Spotted Knapweed treatment on Kerns WHMA.*

Mule Deer Legume Seeding (Goal 2) – Todd Caltrider

A total of 274 acres of alfalfa were planted in spring 2016 in Crook County on the McDonald Ranch. The plantings will provide high quality forage for mule deer (Figure 191). This project was funded, in part, through the statewide WGFD Grass and Legume Seeding Program.

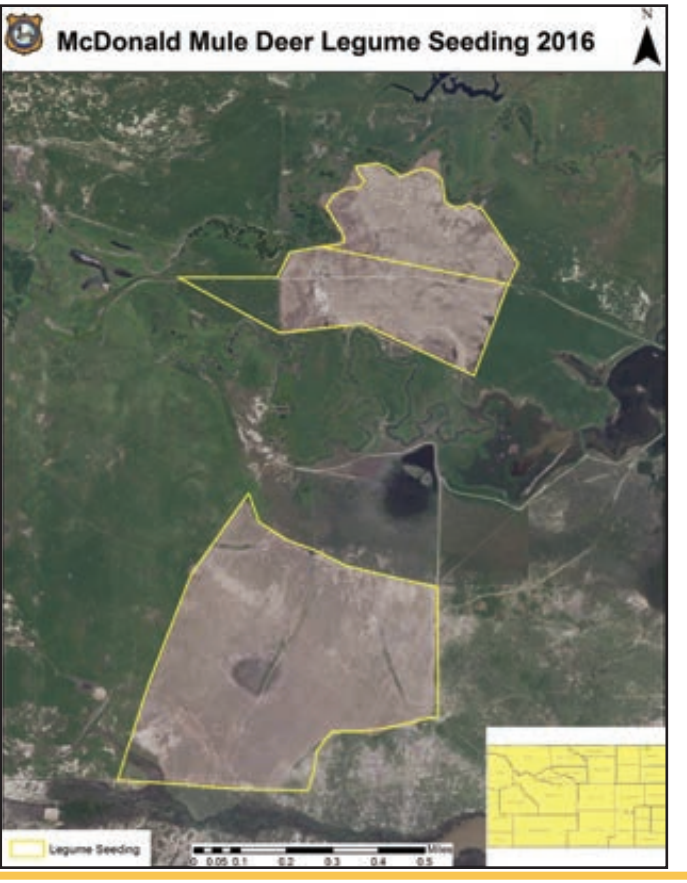


Figure 191. *McDonald Mule Deer Legume Seeding 2016.*

Personnel Directly Implementing The Strategic Habitat Plan

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Brucellosis-Feedground-Habitat

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List of Acronyms

AHAB – Aquatic Habitat Biologist
AIPA – Area Improvement Project Agreement
AMA – Agricultural Management Assistance
AMP – Allotment Management Plan
AUM – Animal Unit Month
BDA – Beaver Dam Analogue
BPS – Budget Planning System
BEHI – Bank Erosion Hazard Index
BLM – Bureau of Land Management
BNF – Bighorn National Forest
BOR – Bureau of Reclamation
BOW – Bowhunters of Wyoming
BTNF – Bridger-Teton National Forest
CCRP – Continuous Conservation Reserve Program
CE – Conservation Easement
CMR – Cokeville Meadows Refuge
CRM – Coordinated Resource Management
CRP – Conservation Reserve Program
DU – Ducks Unlimited
EA – Environmental Assessment
EIS – Environmental Impact Statement
EQIP – Environmental Quality Incentive Program
FSA – Farm Services Agency
GIS – Geographic Information System
GPS – Global Positioning System
GTNP - Grand Teton National Park
GVID – Greybull Valley Irrigation District
I&E – Information and Education
JIO – Jonah Interagency Office
JCWPD – Johnson County Weed and Pest District
L-D – Live-Dead Index
LCWP – Lincoln County Weed and Pest
LDCD – Lake DeSmet Conservation District
LSRCD – Little Snake River Conservation District
MDF – Mule Deer Foundation
MDI – Mule Deer Initiative
MFF- Muley Fanatic Foundation
MIM – Multiple Indicator Monitoring
NEPA – National Environmental Policy Act
NER – National Elk Refuge
NRCS – Natural Resources Conservation Service
NWR – National Wildlife Refuge
NWTF – National Wild Turkey Federation
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
RHA – Rapid Habitat Assessments
RMEF – Rocky Mountain Elk Foundation
RMP – Resource Management Plan
ROD – Record of Decision
SAFE – State Acres for Wildlife Enhancement
SCCD – Sublette County Conservation District
SCWPD – Sublette County Weed and Pest District
SEO – State Engineers Office
SERCD – Saratoga-Encampment-Rawlins Conservation District
SGI – Sage Grouse Initiative
SHP – Strategic Habitat Plan
TCD - Teton Conservation District
THB – Terrestrial Habitat Biologist
TNC – The Nature Conservancy
TSS – Teton Science School
TU – Trout Unlimited
UCCD – Uinta County Conservation District
UCWP – Uinta County Weed and Pest District
USDA-ARS – United States Department of Agriculture -Agriculture Research Service
USFS – US Forest Service
USFWS – US Fish and Wildlife Service
USGS – US Geological Survey
UW – University of Wyoming
VIT – Vaginal Implant Transmitter
WDA – Wyoming Department of Agriculture
WFW – Water For Wildlife Foundation
WGBGLC – Wyoming Governor's Big Game License Coalition
WGFC – Wyoming Game & Fish Commission
WGFD – Wyoming Game & Fish Department
WHAM – Watershed Habitat Assessment Methodology
WHMA – Wildlife Habitat Management Area
WIA – Walk-in Area
WID – Watershed Improvement District
WLCI – Wyoming Landscape Conservation Initiative
WMA – Wildlife Management Area
WRP – Wetland Reserve Program
WSA – Wilderness Study Area
WSG – Wyoming Sportsmans' Group
WSGALT – Wyoming Stock Growers Agricultural Land Trust
WWDC – Wyoming Water Development Commission
WWNRT – Wyoming Wildlife and Natural Resource Trust
WWSF – Wyoming Wild Sheep Foundation
WYDOT – Wyoming Department of Transportation