

Annual Report 2017

Strategic Habitat Plan



Wyoming Game and Fish Department
April 2018

*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

Strategic planning is becoming a much more significant part of how we operate at the Wyoming Game and Fish Department. We are building an agency-wide plan in 2018. This is intended to provide a clear direction and vision for Game and Fish over the next 5-10 years.

The Department has employed this type of planning effort before at a program level. The Strategic Habitat Plan (SHP), which was first approved by the Wyoming Game and Fish Commission in 2001 is an example of this planning. The SHP is updated in five year increments and is the document that this annual report ties to. The SHP has remained the cornerstone of habitat management in the state and the projects found in this annual report were subject to intense scrutiny and planning in order to get to the point where they are implemented on the ground and can begin making a difference for wildlife.

Throughout this year's Department-wide strategic planning we have sought out public input and that feedback has been clear. The importance of habitat has not waned with our constituents. The public has told us loud and clear they want the Department to continue to conserve and manage all wildlife and the habitats that support them. Facilitating and implementing habitat work to benefit wildlife remains a priority for the Department.

As an example, in 2017, our Strategic Habitat Plan helped direct restoration, monitoring and enhancement activities aimed at improving 124 stream miles and over 700,000 acres of terrestrial habitats including planting nearly 37,000 native trees and shrubs. Simply incredible!

None of this would be possible without the wide-ranging support of the people of this state to ensure we leave Wyoming a better place. I want to thank all project partners who invested in Wyoming's wildlife habitats in 2017. Over the course of the year, Game and Fish contributed \$1.2 million to habitat improvements and our invaluable partners put forward over \$4.6 million in direct, on-the-ground contributions.

This report highlights real projects that made a difference. We are proud to share these success stories with you and simply put, these projects would not have been possible without public support. The investment of time, money and resources from countless volunteers and folks who care about Wyoming's wild places is energizing and encouraging. In this year's annual report we implemented a "partner profile" to highlight the work of our great partners. The Wyoming Wildlife and Natural Resource Trust (WWNRT) staff and board, comprised of volunteer citizens, have been instrumental in achieving on-the-ground results. I'd like to thank the WWNRT and all of our great partners for your dedicated work to ensure Wyoming's future – it is making a difference.

Scott Talbott



Director
Wyoming Game and Fish Department



Table of Contents

Message from the Director.....	i
Habitat Vision	1
Mission.	1
Goals	1
Habitat Program Expenditures	2
Habitat Program Accomplishments: The Numbers	3
Kudos to Our Partners!	6
Partner Profile	7
Aquatic Habitat Program	8
Habitat and Access Branch	14
Lands Administration Branch	14
Terrestrial Habitat	17
Wyoming Landscape Conservation Initiative.....	18
Casper Region.....	19
Cody Region	26
Green River Region	40
Jackson Region	52
Lander Region.....	59
Laramie Region.....	72
Pinedale Region	88
Sheridan Region.....	107
Personnel Directly Implementing The Strategic Habitat Plan.....	I
List of Acronyms	IV

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 promotes a holistic approach to habitat management, integrating management and various land uses through collaborative efforts with the 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 the 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 2017 (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: **\$1,224,100**

- II. Non-WGFD funds expended for implementation of SHP goals for calendar year 2017 from or in collaboration with various sources including: 1) Wyoming Wildlife and Natural Resources Trust Fund (WNNRT), 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: **\$4,559,700**

Grand Total for SHP Goals: \$ 5,783,800

WGFD applied funding from outside sources amounting to approximately **\$3.72** for each WGFD dollar expended for on-the-ground fish and wildlife habitat activities. This outside funding is critical for implementing the SHP and conserving our wildlife resources. Overall, personnel directly involved in implementing SHP goals oversaw spending of approximately **\$10,805,000** of WGFD regular maintenance and operating funds, State Wildlife Grants from US Fish and Wildlife Service and WGFD Trust Fund monies. This figure includes wages, benefits, equipment, operation expenses, supplies and on-the-ground improvement material expenses allocated as follows: approximately 47% 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: 4% for vehicles and heavy equipment and 49% for materials and supplies.

Personnel overseeing the WGFD Education, Information and Publications Programs spent approximately 12.5% of their time in 2017 on SHP goal 4 “habitat” activities totaling approximately **\$293,000** 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 2017 totaled approximately **\$531,300**. These taxes include WGFC owned state offices, fish hatcheries, bird farms, houses, Wildlife Habitat Management Areas (WHMA) and Public Access Areas (PAA). During 2017, WGFD costs for leases totaled approximately **\$153,700**. 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 and promotion of collaborative habitat efforts, directed toward the habitat program during calendar year 2017 are summarized below:

Activity	2017 Accomplishments	5 Year Average Accomplishments
Watershed stream assessments	5 on 12.1 miles	13 on 30 miles
Detailed stream assessments	13 on 12.5 miles	17 on 5.2 miles
Stream restorations or bank enhancements	5 on 1.4 miles	20 on 2.2 miles
Instream structures	42	42 on 4.5 miles
Instream flow segments	none	2 on 8.6 miles
Fish screens installed	1	2
Fish passage structures installed	7	6
Fish passage upstream miles connected	92.9	39
Fish passage structures monitored	14	10
Fish passage structures maintained	12	7
Fish tracking or entrainment investigations	6	6.4
Project monitoring - detailed stream channel	8 on 2.4	9 on 2.6
Management monitoring - detailed riparian	5 on 2 miles	11 on 0.8 miles
Stream temperature or flow monitoring sites	38	51
Project monitoring sites using photos	none	31 on 27.9 miles
Aspen/cottonwood browse monitoring	8	33
Beaver transplanted	7 on 1 mile	7 on 0.5 miles
Riparian assessment	4 on 1,101 acres	7 on 12.4 miles
Riparian protection, enhancement, management	5 on 1,410 acres	13 on 773 acres
Private landowner contacts	176	291
Technical assistance requests	71	99
Conservation easements in process	7	6
BLM RMP or USFS Cooperator Status	10	5
Trees or shrubs planted	36,824	28,382
Herbicide weed treatments	40,080 acres	25,929 acres
Herbicide vegetation to thin sagebrush	568 acres	668 acres
Mechanical tree removal	3,852 acres	3,449 acres
Mowing, chopping, aerator treatments	5,607 acres	3,876 acres
Upland grass, forb and food plot seeding	100 acres	826 acres
Water wells drilled	none	1
Water guzzlers or water tanks installed	4	10
Water pipelines installed	0.4 miles	2.4 miles

Activity	2017 Accomplishments	5 Year Average Accomplishments
Spring developments	5	3
Water wells converted to solar pumps	none	3
Fences installed	62 miles	45.6 miles
Wetland development or major renovation	3 on 1,967 acres	6 on 762 acres
Prescribed burns	1,332 acres	2,945 acres
USDA Farm Bill contract involvement	3	11
Livestock Grazing Management Plans	5 on 75,350 acres	10 on 103,662 acres
Wildlife Habitat Stewardship Plans	2 on 3,934 acres	2 on 1,487 acres
Upland and rangeland inventories, intensive scale	89,289 acres	33,700 acres
Upland vegetation/habitat treatment monitoring sites	128	153
Annual vegetation production/utilization sites	52	90
Field cooperative research projects	12	7
WGFC managed lands intensive livestock/forage reserve/meadow rejuvenation and grazing administered	12 on 48,762 acres	10 on 76,543 acres
WGFC managed lands fence maintained	649 miles	640 miles
WGFC managed lands irrigated	5,448 acres	4,891 acres
WGFC managed lands noxious weed control	3,032	2,976
WGFC managed lands meadow mowed/farmed	2,824 acres	2,195 acres
WGFC managed lands farming contracts	1,152 acres	2,253 acres
Public fish access projects	7 on 2 miles	9 on 1.4 miles
Public hunting access projects	none	3
WGFC property right monitoring	89 on 135,091 acres	109 on 162,329 acres
Funding sources/contracts/grants administered	100	130
Funding applications prepared for other entities	17	30
Beaver colony activity monitoring	9 miles	NA
Timber harvest evaluations	2	NA
BDA maintenance	6	NA
Comfort station vents installed	85	NA

Miles of stream and riparian habitat and acres of riparian and upland habitat directly impacted by habitat work in 2017 are tallied below:

Stream and Riparian Activity	Stream Miles
Watershed stream assessments	12.1
Detailed stream assessments	12.5
Stream restorations or bank enhancements	1.4
Beaver restoration	1
Instream structures	0
Fish passage upstream miles connected	92.9
Project monitoring - detailed stream channel	2.4
Project monitoring sites using photos*	2
Riparian aspen, cottonwood, willow browse monitoring**	0
Riparian assessment**	0
Riparian protection, enhancement and management**	0
Total	124.3

*Stream reach distances associated with photos were not tallied in 2017.

**Recorded only as acres and displayed in table below.

Riparian and Upland Activity	Acres
Riparian aspen, cottonwood, willow browse monitoring	6,400
Riparian assessment	1,101
Riparian protection, enhancement and management	1,410
Conservation easements in process and coordinated with partners	9,766
Conservation easements acquired	1,900
Trees or shrubs planted	433
Weed treatments	40,080
Mechanical tree removal	3,852
Mowing, chopping and Lawson Aerator	5,607
Upland grass, forb, and food plot seeding	100
Prescribed burns	1,332
Wetland development or renovation	1,967
Livestock grazing management plans	75,350
Upland habitat inventory, landscape evaluation scale (e.g. GIS)	411,401
Upland and rangeland intensive inventory (e.g. Rapid Habitat Assessments)	89,289
WGFC managed lands forage reserve/ meadow rejuv. grazing administered	48,762
WGFC managed lands irrigated	5,448
WGFC managed lands noxious weed control	3,032
WGFC managed lands meadows mowed/farmed	2,824
WGFC managed lands farming contracts	1,152
Fee title acquisition	408
Total	711,614

Kudos to Our Partners!

The 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 2017. 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 2017 (rounded to nearest \$100)
Bureau of Land Management	\$120,000
Chesapeake Energy	\$92,600
Ducks Unlimited	\$27,900
Federal USDA Farm Bill Program Funds (NRCS and FSA)	\$184,800
Fremont County Weed and Pest	\$2,600
Goshen County Weed and Pest	\$6,100
Jonah Interagency Office	\$86,300
Lander Economic Development Association (LEDA)	\$1,000
Little Snake River Conservation District	\$10,200
Mule Deer Foundation	\$28,000
Muley Fanatic Foundation	\$34,900
National Fish and Wildlife Foundation	\$73,700
National Park Service	\$7,500
Natural Resource Conservation Service - RCPP	\$29,600
Pacificorp	\$74,700
Pheasants Forever	\$12,100
Pinedale Anticline Project Office	\$172,600
Platte Valley Habitat Partnership	\$28,900
Popo Agie Anglers	\$7,500
Popo Agie Conservation District	\$11,500
Private Landowners	\$150,800
Rocky Mountain Elk Foundation	\$178,400

Saratoga-Encampment-Rawlins Conservation District	\$3,000
Teton Conservation District	\$600
Trout Unlimited	\$3,000
Trout and Salmon Foundation	\$4,000
Ultra Resources	\$10,700
US Forest Service	\$397,100
Water for Wildlife Foundation	\$9,500
Wyoming Department of Transportation	\$36,200
Wyoming DEQ 319 Funds from EPA	\$100,000
Wyoming Flycasters	\$15,000
Wyoming Governor's Big Game License Coalition	\$75,600
Wyoming Landscape Conservation Initiative	\$5,300
Wyoming Sportsman's Group	\$10,000
Wyoming Wild Sheep Foundation	\$11,000
Wyoming Wildlife and Natural Resource Trust	\$2,535,600
Wyoming Wildlife Foundation	\$1,000
GRAND TOTAL	\$4,559,700

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

This report can be viewed on the WGFD website at: <https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports>.

2017 Partner Profile

We want to make a special recognition of the Wyoming Wildlife and Natural Resource Trust. It is the largest outside contributor to the habitat projects included in this report and it does additional work to benefit wildlife and habitat with many other partners.

The Wyoming Legislature created the Wildlife and Natural Resource Trust in 2005. Funded by interest earned on a permanent account, donations and legislative appropriation, the purpose of the program is to enhance and conserve wildlife habitat and natural resource values throughout the state. Any project designed to improve wildlife habitat or natural resource values is eligible for funding.

The Wildlife and Natural Resource Trust is an independent state agency governed by a nine-member citizen board appointed by the Governor. Legislative oversight is guided by a select committee of six members, three each from the House and Senate. Their office is located in Cheyenne, Wyoming.



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 (WLCI) coordinator, an aquatic habitat supervisor, an aquatic habitat program manager, a water management supervisor and a water management instream flow biologist. One contract employee worked for the section in Lander. Seasonal biologist technicians assisted the section out of the Buffalo/Cody/Sheridan offices.

During calendar year 2017, the aquatic habitat section was involved in 37 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 \$1.27 million toward aquatic projects. Department aquatic habitat dollars spent on contracts or grants in calendar year 2017 totaled over \$510,000. 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 partners. 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 (37) has been similar the last five years with project numbers ranging from 37 to 42. This level of project management and engagement likely represents a maximum effective level given the number of full time permanent aquatic habitat biologists engaged in project management. Approximately seven positions (six aquatic habitat biologists and one fish passage coordinator) are fully devoted to project development and management which equates to an average of about four to five projects involving significant funds per individual biologist (occasional additional aquatic habitat-related projects are coordinated by other individuals such as fisheries management biologists). Should permanent full time aquatic habitat biologist positions be added in Casper and Lander, an additional eight to ten projects involving significant funding can be expected annually. Based on current percentages, these projects would involve about an additional \$150,000 in Department expenditures matched against at least \$370,000 in partner contributions.

Fish Passage Program

Labarge Creek Culverts (Goal 2) – Nick Scribner

Upper Labarge Creek has been a focus area over the past decade for Colorado River Cutthroat Trout (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 lies 11 road crossings of Labarge Creek and its tributaries that are being improved to allow fish passage and enhance stream function. Five of the crossings have been improved since 2009 with three more being addressed in 2017. Engineers also finalized designs on the remaining four sites to be improved in 2018. Undersized and perched culverts at Crystal Creek and Spring Creek were replaced with concrete bottomless arch culverts in October 2017 to allow fish passage, improve stream function, and reconnect five miles of habitat (Figures 1 and 2). Work also started on Indian Creek before weather conditions shut down construction for the season. The entire 58 miles of stream above the fish barrier will be reconnected once all 11 crossings are improved. This connected series of tributaries should allow CRC to persist through low and high flow years in Labarge Creek.



Figure 1. *Crystal Creek before replacement of undersized culvert.*



Figure 2. *Crystal Creek after bridge installation.*

Big Warm Springs Creek Crossing (Goal 2) – Nick Scribner

Big Warm Springs Creek is a tributary to the Wind River and supports native fish including a small population of Yellowstone Cutthroat trout (YSC). A road crossing on USFS land was improved in 2017 to enhance passage and improve stream function (Figures 3 and 4). WGFD secured \$20,000 from the habitat trust in 2016 for assisting USFS on replacing three small pipes (42 in x 66 in) with a metal plate box culvert that spans nearly 28 ft, and is 16 ft wide for the road surface. Existing culverts were undersized, slightly perched, and one was completely plugged with sediment because this crossing was located on a bend of the river and sediment naturally deposits on the inside of the bend. As a result, a large bankfull channel spanning structure was selected to allow for sediment deposition, yet be able to handle 100-year flow events. This will reduce long-term maintenance and allow the river to function as if the crossing was not in place. Construction began in August and was finished in late September. Photo points were established upstream and downstream of the crossing to capture conditions pre- and post-construction. These improvements will enhance passage to 8.4 miles of habitat upstream, improve sediment transport, and reduce future maintenance.



Figure 3. *Big Warm Springs Creek Crossing before construction.*



Figure 4. *Big Warm Springs Creek crossing after construction.*

Bear Creek Diversion Passage (Goal 2) – Nick Scribner and Betsy Morgan



Figure 5. Lower rock ramp since 2014 and prior to construction.



Figure 6. Lower rock ramp after construction.

The Bear Creek Diversion and Fosher Ditch are located on Bear Creek, a tributary to the East Fork Wind River on the Spence and Moriarity Wildlife Management Area. In 2010 and 2011 the diversion was improved by adding two grouted rock ramps, a sediment sluice, and an irrigation canal fish screen to improve fish passage and eliminate entrainment of Yellowstone Cutthroat Trout. Maintenance and replacement of infrastructure have been ongoing and necessary to maintain fish passage and proper diversion function in a laterally unstable system. High flows in 2014 caused a 200 ft meander cutoff downstream of the diversion and prompted bed and water surface elevations to drop two feet at the base of the lower rock ramp. The drop in water surface elevation exposed the end of the fish return pipe, dramatically increased the slope over the rock ramp, and caused additional scour at the base of the ramp, collectively impacting passage at the diversion. Adult trout were seen struggling to pass the structure during site visits in 2014 after the meander cutoff occurred. Longitudinal profiles and cross sections were surveyed in 2014, 2015, and 2017 and displayed little change between years, suggesting a new equilibrium has been established below the diversion. Designs of two constructed riffles downstream of the diversion were developed in 2016 and installed in October 2017 by Statewide Habitat and Access personnel. Each constructed riffle was built using four mini cross vanes spaced equidistant throughout the riffle. A total of 150 cubic yards of boulders were hauled to the site from Whiskey Mountain Wildlife Habitat Management Area and used for vane construction. Two hundred cubic yards of cobble were harvested from pools and depositional areas through the project reach and redistributed throughout each constructed riffle to elevate the bed between vanes and create a bankfull bench. Project goals were to raise the water surface elevation by two feet at the base of the downstream rock ramp, improve channel stability, and create deeper pools. Post-construction pictures (Figures 5 and 6) and monitoring confirmed the goal.

Trout Creek Flow Monitoring (Goal 2) – Erin Leonetti

A flow study was conducted on Trout Creek, a tributary to the North Fork of the Shoshone River. Trout Creek runs through Trout Creek Ranch west of Cody, WY. Stream flows were monitored to identify flow levels that would maintain adequate habitat for trout, while still irrigating. The ranch maintains three fish screens on their three diversions and strives to balance water needs of the stream and their irrigated meadows and will use this information to inform their water management strategy. The flow study was conducted by placing two staff gages in the stream (Figure 7); upstream (Site 1) and downstream (Site 2) of the three diversions. Eight flow measurements and gage readings were taken throughout

July, August, and September at both sites. A stage-discharge relationship was developed from these measurements (Figure 8). Flow estimates between measured values were determined using the linear equation from the regression analysis.

An instream flow study was completed in 2004 on Trout Creek just upstream from Trout Creek Ranch on USFS land. The report provides flow recommendations to maintain trout habitat in Trout Creek.



Figure 7. Trout Creek staff gage and habitat personnel measuring flow.

The report provides flow recommendations to maintain trout habitat in Trout Creek. During the irrigation season (April - mid October), flows between 15 - 26 cfs maintain adequate aquatic habitat. At Site 1, 15-26 cfs corresponds to a stage reading of about 0.56 ft - 0.62 ft. At Site 2, 15 - 26 cfs corresponds to stage readings of about 0.15 ft - 0.23 ft.

Overall, 2017 flows were adequate in Trout Creek to maintain aquatic habitat for trout during the irrigation season. There was only one flow measurement, 12.8 cfs at Site 2 in late September that was below recommended instream flows. Flow monitoring will continue in 2018 after spring run off to provide an accurate stage discharge table to the ranch.

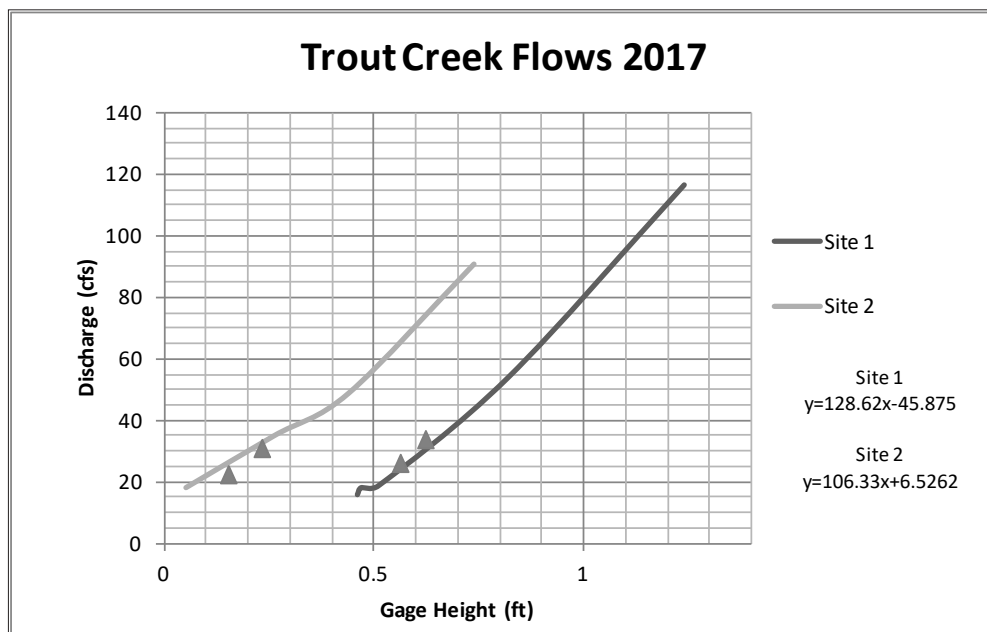


Figure 8. Gage height (ft) and discharge (cfs) in Trout Creek. The flow recommendations (15-26 cfs) for short term fishery maintenance are indicated with triangles.

Timber Creek PIT Tag Study (Goal 2) – Erin Leonetti

Timber Creek is a tributary to the Greybull River west of Meeteetse, WY. The Greybull River drainage is an important stronghold for genetically pure Yellowstone Cutthroat Trout (YSC). Yellowstone Cutthroat Trout are a Species of Greatest Conservation Need in Wyoming and use Timber Creek for spawning. Multiple passage improvement projects have been completed on Timber Creek over the past 10 years to remove all man-made fish barriers. The last project completed in 2014 consolidated four irrigation diversions into one diversion with a fish screen to prevent fish entrainment into the canal. The previous four points of diversion pulled water out of Timber Creek by using drop boards in concrete boxes located within the stream channel to back water up, so that water would flow into the canal. The drop boards presented a fish barrier for upstream and downstream movement. To ensure fish passage through the concrete boxes, rock cross vanes were constructed just downstream from each of the four boxes (Figure 9).



Figure 9. *Cross vanes installed downstream of a concrete box diversion structure assist with upstream fish passage.*

Post-monitoring began in May 2017 with the capture of 435 fish by means of a weir trap and backpack electrofishing. Of the 435 captured fish, 207 were individually tagged with a uniquely numbered PIT tag (Passive Integrated Transponder) implanted into their peritoneal cavity. Five Mountain Suckers, one Mountain Whitefish, one Snake River Cutthroat Trout and 200 YSC received a PIT tag. The post monitoring goal is to determine the effectiveness of the fish passage structures by addressing three objectives. First, identify the proportion of tagged fish making it upstream past all four modified diversions and determine if fish from the Greybull River are migrating up Timber Creek to spawn. Second, estimate the number of tagged fish from Timber Creek that are being prevented from canal

entrainment by the fish screen. Third, estimate the proportion of tagged, resident fish that emigrate below the most downstream antenna. In 2018, monitoring will continue by tagging additional fish and setting up antennas to record fish movements over the next 2-3 years.

Harmony Ditch Diversion Fish Passage (Goal 2) – Nick Scribner and Erin Leonetti



Figure 10. *Toewood/bankfull bench to stabilize a highly erodible terrace and stabilize the river upstream of the POD.*

The Harmony Diversion is located on the Nowood River east of Manderson in Big Horn County. Work continued on this project as phase III began in 2016. Phase I included construction of a new headgate and installation of two cone screens in spring 2014. The screens have operated well though they are turned off for part of the season when water levels drop too low for them to function. The construction of a dam, fish ladder, and sluiceway were part of phase II that would allow the screens to function year round since water levels would be raised. However, concerns with phase II came forward in 2015 including shovelnose sturgeon passage, sediment transport, and potential maintenance issues with the adjacent highway and bridge. As a result, WGFD asked WWC Engineering to reassess designs and bring Five Smooth Stones consulting on board to help with potential natural channel design assessments.

A total of nine options were developed to meet project goals and partners decided that moving the point of diversion (POD) upstream 2,600 ft from its current location was the best option. Moving the POD has several benefits including reduced maintenance for the water user and WYDOT, increasing head in the new irrigation canal, and improved sediment transport.

Construction began in late October on several tasks including a new intake structure to hold the existing fish screens and a trash rack, 1,500 ft of buried pipe, 1,500 ft of dirt ditch construction, and reclaiming nearly 1,700 ft of irrigation canal no longer needed. In addition, significant river work consisting of a constructed riffle with four cross vanes, 375 ft of toewood/bankfull bench construction (Figure 10), removal of the existing diversion dam (Figure 11), and channel grading/bank stabilization measures upstream of HWY 31 will be done. Construction is slated to be complete by May 2018. Post-construction surveying and monitoring will occur to ensure the project functions as intended and document maintenance needs.



Figure 11. *Before (left) and after (right) removal of the old diversion dam downstream of the Highway 31 bridge.*

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 2017 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 38 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 450,000 acres, 95 wetlands, 140 miles of ditches/drains, 5,100 acres of irrigated meadows, 2,400 acres of farmland, 250 acres of food plots and more than 1,000 miles of fence for wildlife habitat purposes. To assist hunters and fishermen, another 1,100 miles of road, 395 parking areas, 67 boat ramps, 25 docks, 199 outhouses, and more than 6,000 signs are maintained.

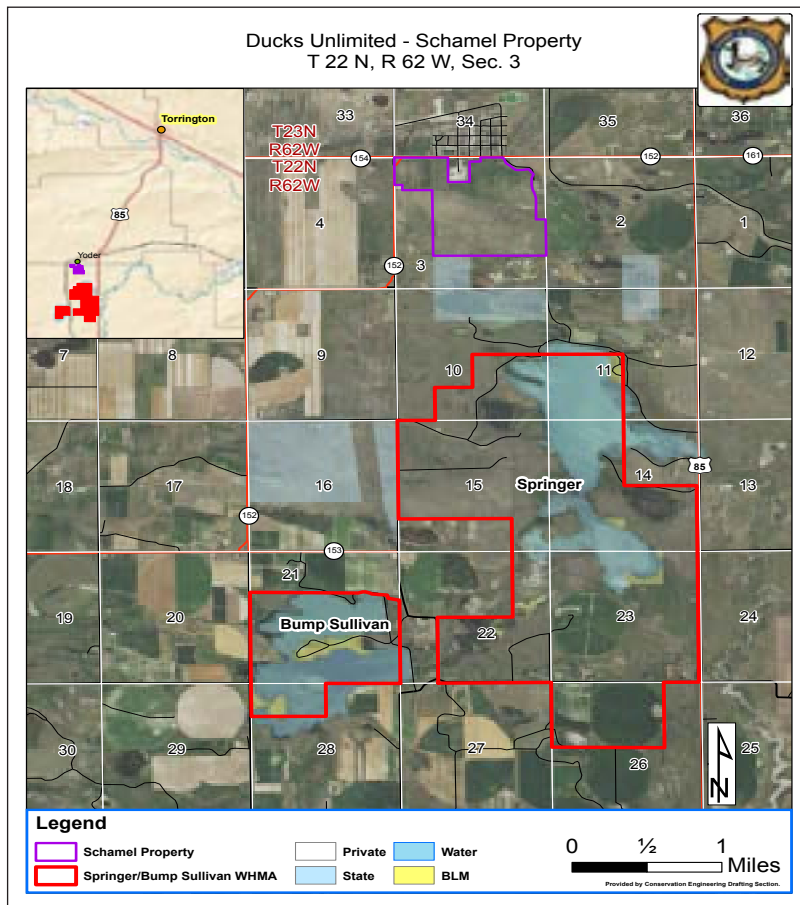
During 2017, the branch also worked on other habitat development projects, including Mule Deer Initiative (MDI) projects, aeration, harrowing, mowing, meadow improvements, wetland developments and riparian projects. Grants provided projects with \$1,311,516 in on-the-ground expenditures. These projects 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 Wildlife Habitat Management Areas (WHMAs), Public Access Areas (PAAs), conservation easements, and administrative facilities. During calendar 2017, a new branch supervisor, Sean Bibbey, and lands coordinator, Daryn Kramer, were hired to fill previously vacated positions. The Lands Branch generally consists of a branch chief located in Cheyenne and two lands coordinators located in Cheyenne and Lander. The state is divided into two land administration regions with one coordinator 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 2017 monitoring property rights and communicating lands issues with coworkers, state and federal agencies, and various non-governmental agencies including Rocky Mountain Elk Foundation (RMEF), The Nature Conservancy (TNC) and others.

Schamel Property - Addition to Springer/Bump Sullivan WHMA (Goal 1) – Sean Bibbey and Daryn Kramer



Ducks Unlimited (DU) was able to purchase the Schamel property in early 2017 with the intention of conveying the property to the Wyoming Game and Fish Commission (WGFC) upon full reimbursement of the purchase price. The acquisition perpetually conserves 342 acres south of Yoder, Wyoming that will become part of the Springer/Bump Sullivan WHMA and secures 1/3 of the water rights associated with Bump Sullivan Reservoir. The acquisition also provides access to 160 acres of Wyoming Office of State Land and Investments property which will not only increase the amount of land open to public use but will also secure crucial water rights improving wildlife habitat and recreational opportunities. The Lands Branch is actively assisting DU with obtaining the remaining funds to cover the balance of the purchase price (Figure 12).

Figure 12. Schamel property addition to Springer/Bump Sullivan WHMA.

Antelope Ranch Conservation Easement (Goal 1) – Sean Bibbey, Daryn Kramer and Brian Rognon

The Antelope Ranch at Alcova is a 393 acre property located approximately 35 miles southwest of Casper, Wyoming and overlooks Alcova Reservoir located in the southwestern portion of Natrona County. Private lands in the area are rapidly transitioning from open space to small tract recreational home sites. The property is important for a variety of wildlife including song birds, big and small game species, and numerous species identified in the Wyoming State Wildlife Action Plan. The WGFC has agreed to accept the donation of a conservation easement on the property. The Lands Branch has completed the Deed of Conservation Easement and associated paperwork to prepare for final execution of the easement.

Ocean Lake Exchange (Goal 1) – Brian Rognon

The proposed Table Mountain Conservation Easement is five miles south of Lander including 1,882 acres within the Popo Agie Crucial Habitat Area and provides crucial winter range for mule deer and habitat for game birds, including partridge and sage grouse. Table Mountain is considered the most important mule deer winter range along the Lander Front. Permanent public non motorized, big game hunting access is included.

The landowner will grant the conservation easement in exchange for a 240-acre isolated parcel of the Ocean Lake WHMA known as the Maxon parcel. The Maxon parcel would be transferred in fee title with reservations for permanent public bird and small game hunting access. Additionally, administrative access would be retained for the Department's pheasant release program.

Appraisals and landowner negotiations have been completed and Lander region personnel have conducted extensive public outreach efforts to involve interested parties. The disposal parcel will retain public hunting access during the fall hunting seasons. The acquired conservation easement will allow public hunting access during big game seasons. Since the disposal property was originally acquired with Federal funding, the proposed property right exchange must be approved by the USFWS. The proposed transaction has met all initial USFWS approvals and is now being presented on the Federal Register for public comment. At the November 2017 Commission meeting final authorization was granted for the exchange and once the USFWS amends the acquisition grant, the legal documents will be executed to complete the exchange.

Lander Front Conservation Easement (Goal 1) – Brian Rognon

Negotiations with a Fremont County landowner for a 400 acre conservation easement have been proceeding. The proposed easement property is located within the Popo Agie Crucial Habitat Area and provides high value ungulate habitat, including crucial winter range for mule deer, elk, and summer range for mule deer. The property also has high value habitat for upland bird species including chukar and Hungarian partridge. The



Figure 13. *View of Lander Front.*

potential easement property adjoins a large existing conservation easement held by TNC. Acquiring conservation easements (CE) near already existing CE's helps leverage conservation efforts and maximizes annual monitoring efficiencies. The negotiations are pointing to the landowner donating a conservation easement restricting future development of the 400 acres. An appraisal of the easement will be completed in the coming months.

Terrestrial Habitat

The Statewide Terrestrial Habitat Program 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 2017, Terrestrial Habitat Program personnel were heavily involved with on-the-ground implementation, oversight or verification of expenditures on 52 projects concerning Game and Fish trust funds and funds granted to the WGFD from sources such as: WWNRT, various conservation organizations, local, county, state and federal agencies, conservation districts, weed and pest districts, private landowners, and others. These sources provided approximately \$2,687,400 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 2017, Terrestrial Habitat personnel continued to refine and implement 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. The Terrestrial Habitat Program worked to bring this effort into the 21st century through development of a new database designed by the Wyoming Geographic Information Science Center (WYGISC) to store and query habitat data for all WGFD projects. 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.

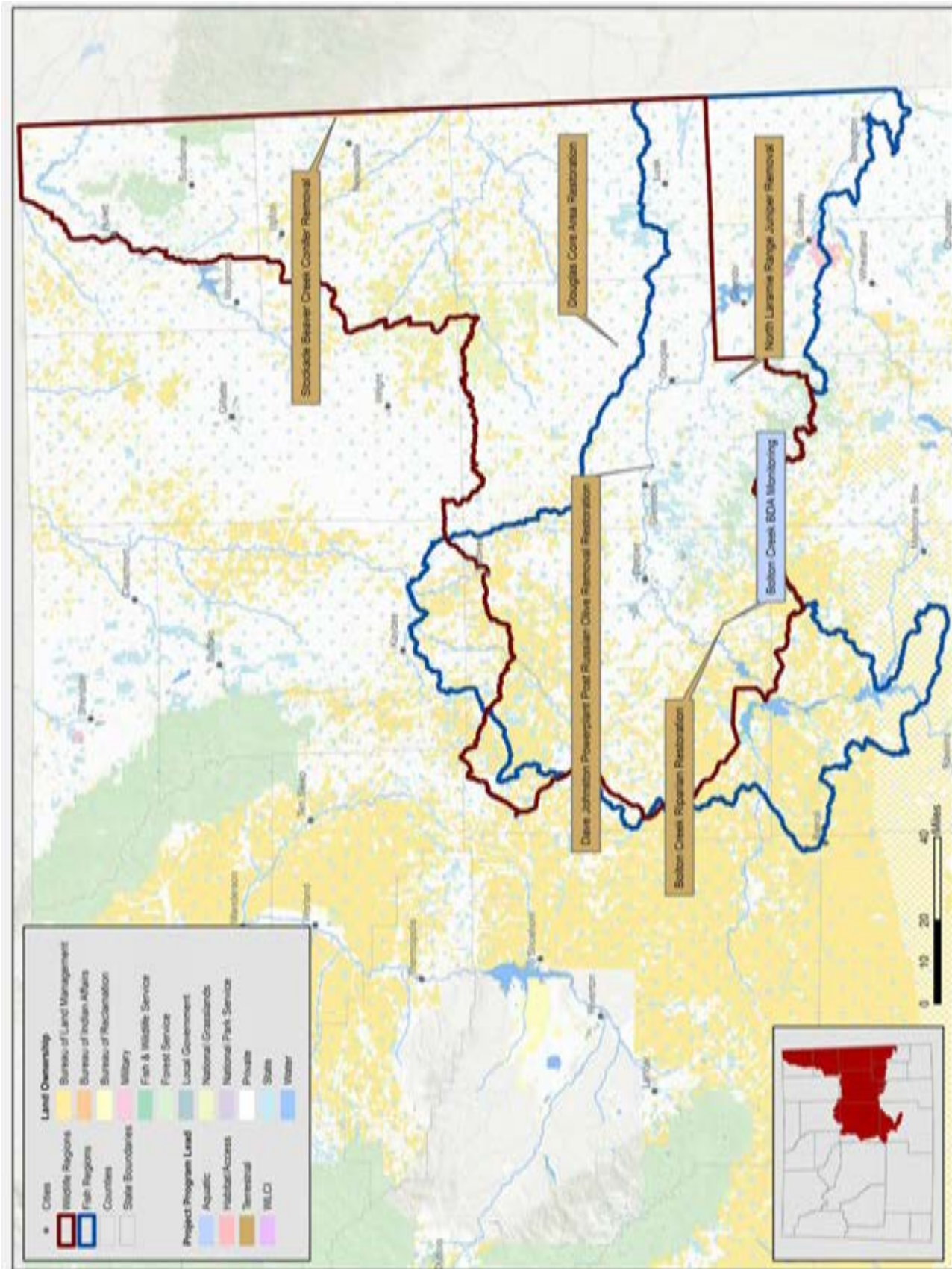
Wyoming Landscape Conservation Initiative

The Wyoming Landscape Conservation Initiative (WLCI) is a long-term science-based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in southwest Wyoming, while facilitating responsible development through local collaboration and partnerships. The WLCI had an interesting year in 2017. The Executive Committee (EC) met in March and approved a Grant Steward position to coordinate, write, submit, and manage external grant funding opportunities for WLCI. The grant steward will work closely with the WLCI Coordination Team (CT) to combine projects and submit funding applications to granting entities. The CT envisions submitting applications to non-typical grant entities that won't compete with WLCI project proponents. At the end of March the WLCI community mourned the loss of Mark Fowden, WGFD representative to the EC. Mark retired in January 2017 and very soon afterwards was diagnosed with cancer. With the inauguration of a new administration, WLCI's Department of Interior agencies (BLM, USGS, and USFWS) were under a Secretarial Order to suspended all Resource Advisory Boards, including WLCI, until the Secretary could assess whether they were achieving their purpose. The suspension of the various advisory boards began in May and WLCI was released from the Order in September. In December, the BLM's coordinator resigned to undertake the challenge of Deputy District Ranger for the US Forest Service.

In spite of the losses and challenges, WLCI had another successful year working with partners. Again, WLCI found itself operating on a reduced budget; however, WLCI was able to fund many projects through unobligated funds from other BLM sources. In 2017, WLCI allocated \$623,000 to 23 projects and estimated WLCI partner contributions were about \$5,250,000. In other words, for every dollar WLCI contributed, project proponents had \$8.42 in matching funds. These projects and associated activities were accomplished through numerous coordination meetings, field trips, and work sessions. The WLCI CT members met with NGOs, permittees, landowners, other agencies, and entities to coordinate WLCI activities. The 23 projects encompassed all but one of WLCI's focus communities: aspen, mountain shrub, riparian and sagebrush. Eight projects addressed control of invasive species. Six projects involved erecting wildlife friendly fencing to reduce barriers along pronghorn and mule deer migration corridors or involved steel jack fence to protect riparian vegetation. Three projects in riparian communities included stream enhancements, riparian tree and shrub plantings, and improving fish passage by replacing a push-up diversion and installing a new irrigation diversion structure. Three other projects enhanced the sagebrush ecosystem through juniper removal. WLCI funded two projects within the aspen community. Both projects removed conifers through mechanical means. This was the final year for the Sibert Ecosystem Services Project, which was a "pay for performance" type project. The landowner reduced stocking rates, left portions of hay meadows uncut, planted riparian vegetation, and applied herbicide to improve habitat primarily for mule deer and sage grouse.

In November the WLCI EC met to discuss, among many topics, the future of WLCI. The WLCI has a grant steward position; however, a new foundation was needed to hold funds. The CT introduced the Wyoming Mining and Natural Resource Foundation (WMNRF) as a fairly new foundation that has 501c3 status and can hold funds for WLCI projects. The EC approved the development of an agreement with the WMNRF to hold and distribute funds granted to WLCI. The EC is interested in meeting with industry representatives and going to Washington DC to meet with congressional representatives and agency heads in 2018. These meetings are an effort to garner support and increased funding for WLCI's endeavors to improve and enhance habitats in southwest Wyoming for wildlife and livestock.

Casper Region



Casper Region



Partnerships and cooperation were once again the foundation of the Casper Region 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. Game and Fish 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 and many NGO partnerships; habitat projects designed to benefit mule deer in addition to other wildlife were a focal point. Conifer removal to promote more herbaceous and browse habitat was done in Bates Hole, North Laramie Range, and Black Hills areas of the region. Reducing competition and opening up more of the understory will increase water availability and will greatly enhance grass and forb production. This provides nutrition for a wide variety of wildlife.

Monitoring the 2014 removal of invasive Russian olive trees continued near the Dave Johnston Power Plant. Re-sprouts have been controlled and a diversity of native trees and shrubs, including cottonwoods, buffaloberry, golden currants, peachleaf willow, chokecherry and woods rose were planted in the Dave Johnston Access Yes Walk-In Area. These plantings should assist in providing high-quality browse and cover for wildlife.

Game trail cameras have helped monitor beaver work on the Bolton Creek watershed. Beavers were observed using Christmas trees that had been hauled out to build Beaver Dam Analogues, or man-made dams. These dams continue to trap sediment and provide habitat for willows and cottonwoods that will hopefully begin to change the Bolton Creek plant community.

Bolton Creek Riparian Restoration (Goal 2) – Keith Schoup



Figure 14. *Willow stakes placed in sediment.*

In April 2017, WGF D planted 1,005 willow stakes and 74 narrowleaf cottonwood stakes along Bolton Creek. The willows and cottonwoods were planted in sediment trapped by the man-made beaver dams built over the past several years (Figure 14).

The objective is to use willows and cottonwoods to hold the sediment in place for years to come. In addition to holding the sediment, these deciduous species should begin to change the Bolton Creek riparian area from a undesirable big sagebrush, greasewood and rabbitbrush dominated plant community to the desired willow and cottonwood plant community.

In October and November 2017, three nuisance beavers were relocated into the riparian restoration project area on Bolton Creek. Several days following the release, these beavers have shown how resourceful they can be at creating dams by using Christmas trees that were stock piled nearby. This activity will help with the riparian restoration effort by increasing the number of dams, providing additional structures that will dissipate flood water energy, trap additional sediment, and expand the riparian habitat community. The expansion of the riparian habitat community will benefit several wildlife species, including but not limited to, mule deer, waterfowl and various species of non-game birds and amphibians. Since early November, three pick-up loads of aspen and cottonwood branches have been hauled to the release site. Two game cameras were installed to verify beaver activity (Figure 15). As of late December, at least two of the three nuisance beavers were still in the release site area.



Figure 15. *Beaver activity captured on game camera.*

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

A comprehensive monitoring effort continued on Bolton Creek to quantify the influence of woody debris structures, or beaver dam analogues (BDAs), on the channel and surrounding riparian area. The BDAs were placed in Bolton Creek between 2014 and 2015 to initiate benefits similar to those observed with natural beaver dams, such as trapping sediment, dissipating flood energy following precipitation events, and improving floodplain connectivity. Although the Bolton Creek BDAs have a different design than those currently permitted by the Army Corps of Engineers, data show that they are still producing desirable changes to the stream and surrounding riparian area. Cross sections surveyed in a reach containing two BDAs averaged 11 inches of sediment accumulation over the past year, which is equivalent to seven dump truck loads of sediment (Figure 16).



Figure 16. *Surveying a cross section upstream from a BDA, one year after construction in 2016 (left) and two years after construction in 2017(right).*

The accumulation of sediment is enabling the stream to access adjacent terraces at high flows, thereby dissipating flow energy and enabling additional sediment deposition across the floodplain. Photo points and vegetation surveys completed in 2017 also show lateral expansion of riparian vegetation and reduced encroachment by upland species, namely Greasewood and Sagebrush. In addition to gaining insights on BDA effects to an arid and incised system, biologists have used Bolton Creek as a pilot project to understand aspects of BDA implementation, such as in-stream structure placement, expected lifespan, maintenance requirements, and construction techniques. These insights will help inform future BDA projects and restoration efforts throughout Wyoming.

North Laramie Range Juniper Removal (Goal 2) – Willow Bish

Department personnel removed junipers from three miles of Trail Creek during summer 2017 (Figure 17). Trail Creek flows into LaBonte Creek south of Douglas, WY. The creek flows through publicly accessible State of Wyoming Trust Lands. The riparian area hosts woody native species with a diversity of age classes and provides quality wildlife habitat. The water source is reliable, with good water quality as indicated by the presence of sensitive species of aquatic invertebrates.

Junipers have encroached into the riparian area due to the loss of historic fire regimes and now compete with more desirable vegetative species, such as cottonwoods, fruit-bearing trees and shrubs and understory forbs and grasses. Junipers are aggressive plants which can out-compete these species for water, space, sunlight, and available soil nutrients. Once junipers occupy favorable sites like riparian areas, they will slowly, but consistently increase. While junipers provide some cover value, their forage value is very low, and they displace vegetation that provides high forage value for livestock and wildlife, particularly mule deer. The goal of this project is to improve habitat quality and water availability, and to protect the long-term integrity of the site by addressing the encroachment issue at an early stage. Three additional juniper removal sites totaling 182 acres were identified in 2017 and will be treated in 2018 and 2019.



Figure 17. Chainsaw cutting of juniper trees in Trail Creek.

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

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 route 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 is mature and decadent. In an effort to improve nutritional condition for mule deer in the Stockade Beaver Creek drainage, WGFD initiated work 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 and Wyoming State For-

Figure 18. Pre- and post-treatment conifer removal in Stockade Beaver Creek.

ectomy to thin areas that are becoming dominated by both juniper and ponderosa pine to promote more herbaceous and browse habitat for mule deer (Figure 18).

In addition to conifer removal, WGFD is also mowing large stands of decadent and mature true mountain mahogany to increase leader growth and production (Figure 19). In 2016, a total of 123 acres of conifer removal/mountain mahogany mowing was completed. In 2017, an additional 318 acres of conifer removal/mountain mahogany mowing was completed. During the winter of 2018, an additional 51 acres of conifer removal/mountain mahogany mowing is planned. Funding was provided by the WGFD, WWNRT, RMEF, Bowhunters Of



Figure 19. Contractor removing conifers from a mixed mountain shrub stand in Stockade Beaver Creek.

Wyoming (BOW), Wyoming Sportsman's Group (WSG), Mule Deer Foundation (MDF), Wyoming Governor's Big Game License Coalition (WGBGLC), and National Wild Turkey Foundation (NWTF).

Dave Johnston Powerplant Post Russian Olive Removal Restoration (Goal 2) – Willow Bish

Russian olives were removed from the North Platte River near Glenrock, WY in 2014. Since this time on-going management to control re-sprouts has been implemented. In 2017, a diversity of native trees and shrubs including cottonwoods, buffaloberry, golden currants, peach-leaf willow, chokecherry and woods rose were planted in the Dave Johnston Hunter Walk-In Area (Figure 20). These plantings should assist in providing long term high-quality browse and cover for wildlife.

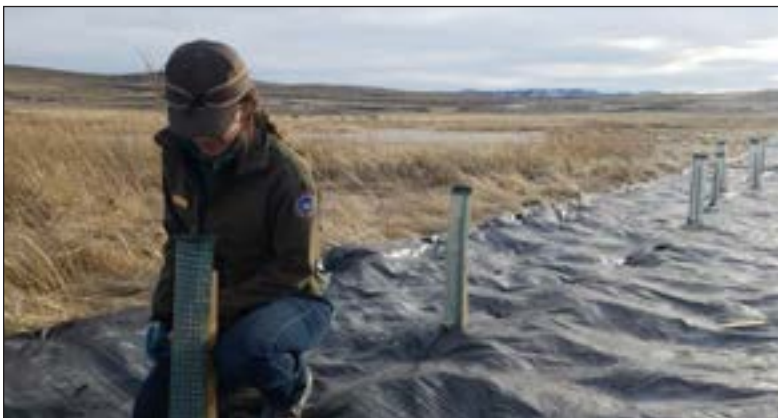


Figure 20. Tree and shrub plantings in the walk-in area.

Bates Hole/Hat Six MDI Rapid Habitat Assessments (Goal 2) – Keith Schoup

Casper Region Wildlife Division personnel collected three aspen, twenty rangeland and eighteen riparian RHAs totaling 19,548 acres. These surveys describe current habitat conditions and will be compared to ecological site descriptions (ESDs), which describe the potential of the site. The potential habitat conditions outlined in ESD's are primarily determined by soil characteristics, but also outline possible environmental conditions that could change given fluctuations in precipitation, timing of precipitation, and temperature fluctuations. Moreover, the ecological site descriptions provide a synopsis of possible outcomes if various vegetation treatments were to be implemented, which may be beneficial to managers as they collaborate on means to modify existing habitat conditions for mule deer. Therefore, it is our intention to collect as many RHAs as possible, in as many different vegetative communities across the entire herd unit as possible, so that when the Bates Hole/Hat Six mule deer herd unit objective review process is implemented, managers will have the most up-to-date habitat condition information available.

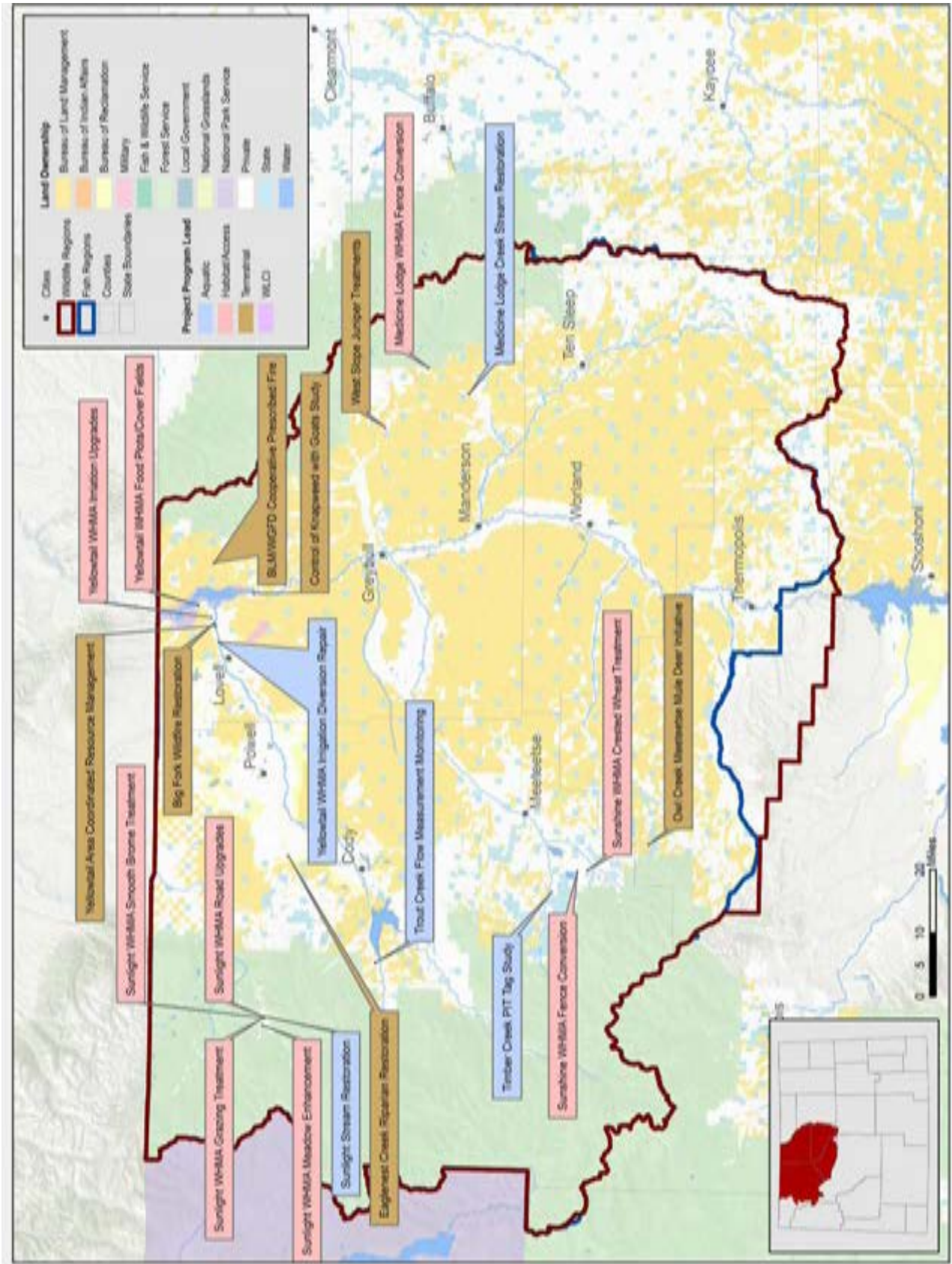
Douglas Core Area Restoration (Goal 2) – Willow Bish



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 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 by the state in 2013. Combined Department and RT efforts in the DCA have resulted in planting over 100,000 seedling sagebrush plants within areas previously exposed to wildfire. In 2017, 20,000 sagebrush plants were planted and some of the original projects were deemed stable enough that supporting materials including fencing and weed barrier were removed (Figure 21).

Figure 21. *Removing weed barrier from a sagebrush enclosure.*

Cody Region



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 Game and Fish Commission-owned lands in the Cody Region continue to have a common thread, they

are collaborative efforts involving diverse partners including sportsmen, conservation partners, private landowners and land management agencies.

In 2017, terrestrial habitat efforts within the Cody Region focused on improving and managing wildlife habitats throughout the Big Horn 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 and salt cedar on Yellowtail Wildlife Habitat Management Area near Lovell and as part of the ongoing Owl Creek/Meeteetse Mule Deer Initiative, a treatment to remove conifers from 120 acres of aspen in the Grass Creek drainage south of Meeteetse began in 2017.

Aquatic habitat restoration efforts focused on improvement of Wyoming Game and Fish Commission-owned lands. In the Medicine Lodge Wildlife Habitat Management Area, a restoration project on .73 miles of Medicine Lodge Creek was completed to provide year-round fish passage at two irrigation diversions and to allow for sediment transport, floodplain connectivity and fisheries habitat. Planning is also underway for a stream restoration and meadow enhancement project on Sunlight Wildlife Habitat Management Area with construction slated for fall 2018.

Improvements to infrastructure on wildlife habitat management areas throughout the Big Horn Basin has also been a strong focus. Most notably, irrigation infrastructure was upgraded on Yellowtail WHMA thanks to donations by two local sportsman's groups, Wyoming Outdoorsmen and Pheasants Forever. Wildlife friendly fence was also installed to replace old fencing on Medicine Lodge and Sunshine WHMAs.

Knapweed Control Using Goats (Goal 2) – Eric Shorma and Jerry Altermatt

Department personnel, in cooperation with University of Wyoming Extension and Big-horn Canyon National Recreation Area continued the second year of 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 2004 to manage noxious weeds. Fenced enclosures provide four sets of five experimental plots to receive five different treatments: goat grazing pre-bloom, goat grazing pre-bloom and regrowth, goat grazing pre-bloom and herbicide, herbicide only and non-treated.



Figure 22. *Goats grazing on Russian knapweed in study enclosures.*

Pre-treatment monitoring was conducted before goats were brought into the enclosures in June. Goats were held in each grazing treatment plot until approximately 70-80% utilization of knapweed was obtained (Figure 22). The grazing treatments will be repeated annually for at least three years.

Yellowtail WHMA (Goal 2) - Brad Sorensen, Eric Shorma and Craig Swanson



Figure 23. *Personnel mixing concrete for the diversion box.*



Figure 24. *Permanent cover field being irrigated after upgrades.*

A new concrete check, diversion box, 2,560 linear feet of transport pipe, and approximately 1,300 linear feet of gated pipe were installed on a 19 acre and a 12 acre permanent cover field (Figure 23). Irrigation is a critical part of maintaining and improving wildlife habitat on the Yellowtail WHMA. These irrigation improvements will allow Habitat and Access personnel to split the water along the fields resulting in more efficient use of irrigation water (Figure 24). The transport pipe was purchased and donated by Pheasants Forever and the gated pipe was purchased and donated by Wyoming Outdoorsmen.

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

Approximately 275 cubic yards of road base was hauled and spread on one mile of road on the Sunlight WHMA. Proper road maintenance is necessary to facilitate proper WHMA management. Upgrading existing roads will keep the public from “off roading” and causing unnecessary resource damage (Figure 25).



Figure 25. Roadbase being spread and bladed on Sunlight WHMA.

Yellowtail WHMA Diversion Repair (Goal 2) – Laura Burkhardt and Brad Sorensen

The Yellowtail WHMA contains a wide range of wildlife habitats and supports one of the richest concentrations of wildlife species in the state. These wildlife habitats are actively managed with water supplied by the Big Fork Diversion, located on the Lower Shoshone River. Water from the Big Fork Diversion irrigates 925 acres of cereal grains and hay for wildlife and supplies water to eight wetland ponds. The Big Fork Diversion requires substantial annual maintenance because of high sediment and debris load,

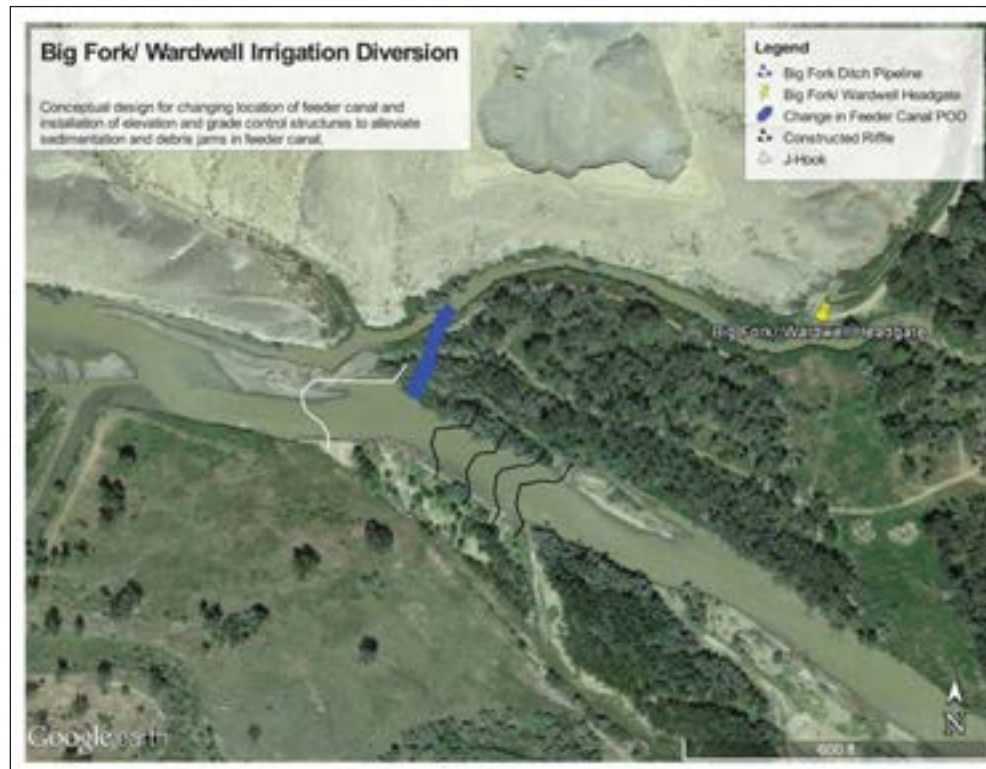


Figure 26. Big Fork Diversion conceptual design.

ice jams, and channel instability in the Lower Shoshone River. The WGFD, in coordination with a private water user and the NRCS, is planning a stream restoration to establish a stable, low maintenance and reliable diversion. The WGFD proposes to shift the point of diversion of the feeder canal downstream and install in stream structures to increase sediment and debris transport past the feeder canal entrance (Figure 26). Construction is proposed for 2019.

Medicine Lodge WHMA Fence Upgrades (Goal 2) – Brad Sorensen, Eric Shorma and Craig Swanson



Figure 27. *Newly constructed wildlife friendly pole-top fence on Medicine Lodge WHMA.*

Approximately 9,286 feet of dilapidated stock fence was removed and converted to wildlife friendly pole top fence on the Medicine Lodge WHMA. Wildlife friendly fencing will enhance migration for elk and mule deer and better manage livestock grazing on the adjacent forest service lands. Replacing this fence with wildlife friendly fencing will allow wildlife to jump over and crawl under easily without injury. Addition of top rails will make this fence visible to ungulates and the public. Gates were installed in high use areas to allow wildlife to move freely between the National Forest and the WHMA during winter months. This fence will help facilitate proper WHMA management and will result in more forage being available for wintering wildlife (Figure 27).

West Slope Juniper Treatments (Goal 2) – Jerry Altermatt

Juniper and other conifers were removed from 85 acres of crucial winter range for elk and mule deer and sage-grouse habitat on private lands on the west slope of the Bighorn Mountains south of Trapper Creek. Conifers were removed through mechanical means utilizing both tracked machinery and chainsaw crews. The purpose of the project was to enhance big game crucial winter range by eliminating conifer encroachment.

Over 1,500 additional acres of treatments were planned to remove encroaching juniper in sagebrush habitats on private and state lands in the Weber Canyon area on the west slope of the Bighorn Mountains. Objectives are to: 1) remove encroaching juniper (and some Douglas fir), 2) restore the natural fire regime, and 3) maintain healthy sagebrush grassland habitat. The treatment areas are in an early phase of juniper encroachment, which presents an opportune time for treatment since removal of junipers is less intensive and understory vegetation has not been significantly altered due to juniper competition (Figure 28). The planned treatments occur on crucial winter range for elk and deer and are within sage-grouse core area. Funding requests were submitted and treatments will start in 2018.



Figure 28. *Conifers encroaching into a sagebrush/grassland community on elk and deer winter range.*

Sunlight WHMA Smooth Brome Treatments (Goal 2) – Brad Sorensen and Craig Swanson



Figure 29. *Test plot post glyphosate application.*



Figure 30. *Test plot showing seed germinations.*

After two years of spring and fall applications of glyphosate to eliminate Smooth brome, four test plots on Sunlight WHMA were planted with Timothy, Orchardgrass, Intermediate wheatgrass, and Sainfoin (Figure 29). These test plots are an effort to see what seeds will germinate, test wildlife desirability, and identify potential weed encroachments. The information gained from these test plots will be used in future management decisions utilizing the new pivot system (Figure 30).

BLM/WGFD Cooperative Prescribed Fire (Goal 2) – Jerry Altermatt

Approximately 350 acres of juniper were treated with prescribed fire in the Little Mountain area near Lovell (Figure 31). The objectives of the treatments were to remove encroaching junipers from sage-



brush communities to improve elk and deer habitat. The burns were conducted by the BLM Cody Field Office with assistance from WGFD and partial funding by RMEF. The treatments are part of a larger prescribed fire project in the Little Mountain area that began in 1997 totaling over 12,000 acres treated.

Figure 31. *Using prescribed fire to reduce juniper encroachment in the Little Mountain area.*

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



Figure 32. Overview of the new Medicine Lodge Creek channel. The State Park Bridge is visible in the upper left and rock drop structures that replaced the Anthony Diversion are on the right.

and Betty Irrigation Diversions and a stable stream channel was constructed allowing for sediment transport, floodplain connectivity and fisheries habitat (Figure 32).

This stream restoration reduced bank erosion by approximately 2,300 tons of sediment per year, eliminating non-point source sediment pollution from entering Medicine Lodge Creek (Figure 33).



Figure 33. Overview of stream channel realignment and the creation of an oxbow wetland.

The project has also provided 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 impairments to Medicine Lodge Creek.

This project was possible due to major funding from WWNRT as well as funding and support from Wyoming State Parks, DEQ, WGFD, a private landowner, and East Yellowstone Chapter TU. North State Environmental performed construction based on designs by Green Watershed Restoration and Five Smooth Stones Restoration.

Sunlight WHMA Grazing Treatment (Goal 2) – Brad Sorensen and Craig Swanson



A grazing treatment was conducted on the Sunlight WHMA during spring 2017. 500 yearling steers grazed two different meadows using a high intensity, short duration approach. This treatment was initiated to reduce litter and stimulate growth on the meadows to provide better forage for wildlife (Figure 34).

Figure 34. Yearling steers grazing Painter Meadow.

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



Figure 35. Contractor lopping and scattering conifers from aspen stand.



Figure 36. Conifer encroached aspen communities in the Upper Gooseberry drainage.

The Cody Region identified the Owl Creek Meeteetse mule deer herd unit to focus efforts as part of the state-wide MDI. Two of the habitat issues identified through the public process involving landowners, hunters and land management agencies, were the loss of aspen communities on summer and transitional ranges and the encroachment of conifers into riparian and sagebrush habitats. A treatment to remove conifers from 120 acres of aspen in the Grass Creek drainage began in 2017 and will be completed in early spring 2018. Conifers were cut with chainsaws and either left as they fell or lopped and scattered (Figure 35). A treatment to remove conifers on 635 acres of sagebrush and riparian habitats in the Iron Creek drainage on BLM lands was also completed using a masticating attachment on a skidsteer.

During fall 2017 several aspen enhancement projects were planned and requests for funding were made. Approximately 140 acres of aspen were identified for treatment on private lands in the Gooseberry Creek drainage starting in 2018 (Figure 36).

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

Yellowtail WHMA has approximately 100 acres of farm fields irrigated for permanent cover. Millet, barley, oats, and triticale were planted for food plots. These food plots benefit waterfowl, pheasants, and wild turkeys by providing cover and a food source. These fields also provide hunting opportunities for the large number of recreationists that utilize the WHMA. Approximately 600 linear feet of gated pipe was purchased and placed on these cover fields to facilitate proper water management. The pipe was purchased and donated by Wyoming Outdoorsmen (Figure 37).



Figure 37. *Yellowtail WHMA cover field.*

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



Figure 38. *2016 during construction of a BDA (left) and 2017 during high flow (right).*

Riparian and stream restoration on Eaglenest Creek on TNC's Heart Mountain Ranch north of Cody continued into its third 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. Four beaver dam analogues (BDAs) were constructed in the creek in 2016 with the objective of raising the water table to support woody vegetation establishment and slowing water flows through stream meanders to reduce bank erosion. In 2017, the terrestrial and aquatic habitat biologists conducted intensive monitoring, including longitudinal profile, cross sections, greenline transects and photopoints, to determine effectiveness of the structures. Tours were conducted with personnel from the Army Corps of Engineers and DEQ who are the permitting agencies for this project. The BDAs appear to be functioning (Figure 38). 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.

Sunlight WHMA Meadow Enhancement (Goal 2) – Brad Sorensen and Craig Swanson



Figure 39. Two center pivots installed on Trail Creek Meadows.

Sunlight WHMA contains 250 acres of irrigated meadows (Figure 39). WGFD’s goal in managing these irrigated meadows is to maximize the forage available as winter range habitat for elk. The previous irrigation system severely limited the quality and quantity of forage for wintering elk.



Figure 40. Aerial map showing the new pivot layout.

With generous contributions from WWNRT, RMEF, WGFD, and the Shoshone Resource Advisory Council, five center pivots were installed to effectively irrigate the 250 acres of meadows. This new irrigation approach will increase elk winter range capacity from 208 to 1,040 elk AUMs (Figure 40).

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



Approximately 3,624 linear feet of stock fence was converted to wildlife friendly high tensile fence (Figure 41) to allow migrant elk and mule deer to move on and off the WHMA with ease. This project was completed in conjunction with Larsen Ranch Company and the Pitchfork Ranch.

Figure 41. Newly constructed high tensile boundary fence on Sunshine WHMA.

Sunlight WHMA Stream Restoration (Goal 2) – Laura Burkhardt

Sunlight Creek, within Sunlight WHMA, has experienced unnatural stream channel movement and severe bank erosion for the last 40 years (Figure 42). These channel movements resulted from changes in land use practices and have been accelerated by subsurface flow of irrigation return flows. Since the 1970s, the Department has attempted to reduce bank erosion on four banks within the project area. However, the methodologies used focused primarily on protecting the toe of the eroding banks with rip-rap, boulders, and trees and did not address larger channel instabilities. These bank stabilization measures have failed and Sunlight Creek continues to shift and erode high terraces.



Figure 42. Sunlight Creek after 100-feet of lateral erosion during 2017 spring runoff.

While channel movement and bank erosion are natural processes, the movement rate is overly high and represents some of the highest rates and most severe bank erosion occurring on Sunlight Creek. Spring runoff was high in 2017 and lateral bank erosion ranged from 40 to 100-feet (Figure 42). During 2017, alternative bank hardening and channel restoration design approaches were vetted with the design team who ultimately contracted a design-build team to address the channel instabilities and erosion through a river restoration approach across a 0.82 mile stretch of creek. Construction is planned for fall 2018.

Sunshine WHMA Crested Wheat Treatments (Goal 2) – Brad Sorensen and Craig Swanson



Figure 43. ATV and drill on one of the test plots.



Figure 44. Test plot seeding with seed germination.

After two years of spring and fall applications of glyphosate to eliminate crested wheatgrass, three test plots were seeded with brome grasses, alfalfas, sainfoin, small burnet and cicer milkvetch (Figure 43). These test plots are an effort to see what seeds will germinate, test wildlife desirability, and examine potential weed encroachments. The information gained from these test plots will be used in future management decisions on the WHMA (Figure 44).

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 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 in the form of Russian olive slash, burned with high intensity and prolonged heat, causing severe fire effects. This resulted in high herbaceous plant mortality and extensive areas of bare ground. Noxious weeds including white-top, Russian knapweed, and Canada thistle have proliferated throughout the burn area but especially in areas of highest fire severity.

In 2017, the CRM conducted herbicide treatments on approximately 800 acres to target infestations of Canada thistle and Russian knapweed. The treatments were conducted using backpack and ATV sprayers. Some of the previously treated areas where native vegetation was lacking were broadcast seeded with a grass seed mix. 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 photos indicate a marked reduction in noxious weeds as a result of herbicide treatments over the last three years (Figure 45).



Figure 45. 2014 (left) and 2017 (right) showing eradication of Russian knapweed after three years of herbicide treatments.

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 2017. The invasives were treated using chemical and mechanical methods to stress the plants. Controlling these noxious plants will enhance habitat while allowing native plants to thrive (Figure 46).

Figure 46. Removing tamarisk in a riparian area.

Yellowtail Area CRM (Goal 2) – Jerry Altermatt



Figure 47. A private contractor sprays Russian olive resprouts.



Figure 48. National Park Service crew chainsawing and spraying mature Russian olive trees.

The Yellowtail Area 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, the Bighorn County Weed and Pest, NRCS, Shoshone Conservation District and other interested parties. 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.

In 2017, over 1,000 acres of salt cedar and Russian olive resprouts and seedlings were treated with herbicide using backpack sprayers (Figure 47). 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 48).

Production/Utilization Surveys (Goal 2) – Jerry Altermatt

Regional wildlife personnel collected production/utilization data at eight sagebrush transects in fall 2017. Annual leader production was significantly higher than their 14-year averages at all sites but one, reflecting near-record high snowfall in many areas during the 2016-2017 (Figure 49). Utilization levels varied widely at nine transects in spring 2017 with one transect showing nearly twice the average utilization level and some showing significantly less than normal. This was undoubtedly due to the concentration of deer and antelope that occurred because of the severe winter conditions.

Herbaceous production and utilization were measured at five sites on the Absaroka Front in areas where monitoring elk use is a priority. Production at most sites were well above average, reflecting higher winter precipitation that was still available to growing plants in the summer (Figure 50). Utilization by elk on winter ranges continues to be high in Sunlight Basin, exceeding 65% at two of the three sites that were monitored.

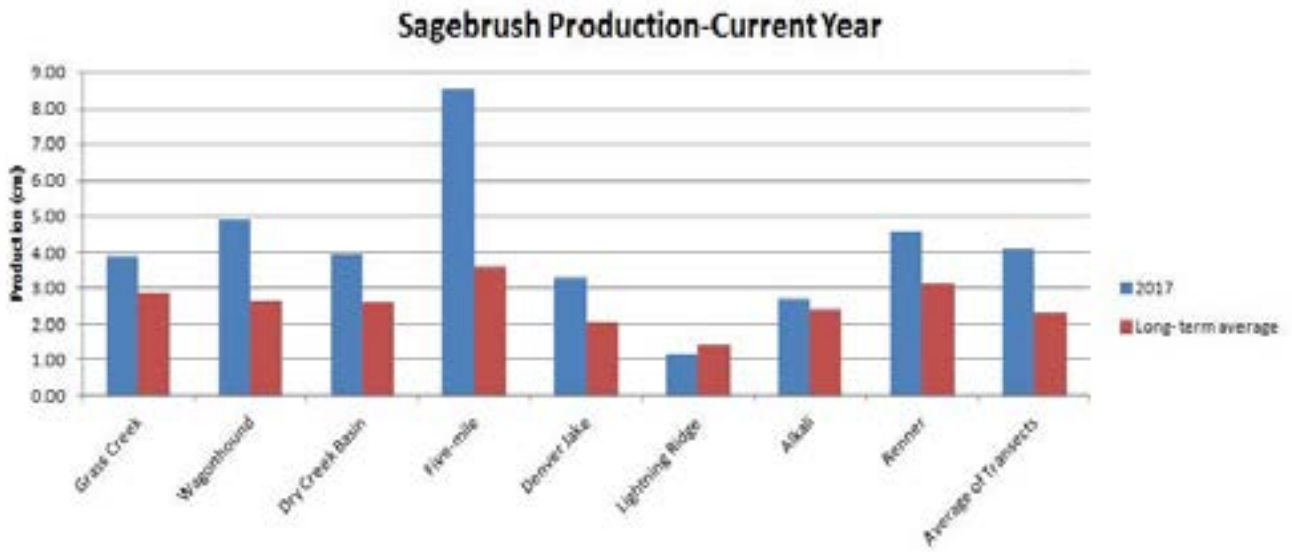


Figure 49. Production of sagebrush expressed as average annual leader length at eight locations in the Cody Region.

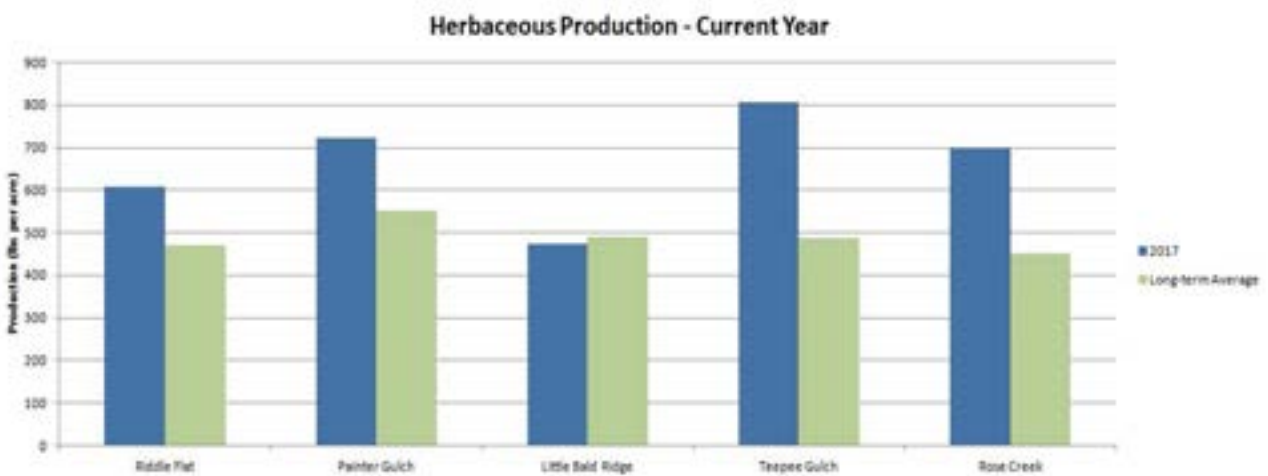


Figure 50. Production of herbaceous vegetation at five locations on the Absaroka Front.

Green River Region



Given a commitment to landscape level, multi-year projects, habitat improvement in the Green River Region in 2017 continued to focus on the control of invasive species, juniper removal in core sage-grouse habitats, improvement of riparian, riparian-cottonwood, and aspen communities, maintaining and improving fish passage and spawning areas, aspen stand and riparian/spring fencing, and enhancing ungulate migration through fence modification. A coordinated effort at spring protection within our more xeric habitats began in 2017.

Monitoring activities were increased in 2017, especially those focusing on habitats within Mule Deer Initiative herd units (Baggs and Wyoming Range Deer in this region), with a significant number of Rapid Habitat Assessments completed. Monitoring also continued within aspen and cottonwood communities using the Live-Dead Index. Sagebrush health assessments and continued mapping of last year's die-off was also an area of focus within the Green River and Pinedale regions. Aquatic and associated terrestrial habitats were assessed throughout the region, including some significant greenline monitoring in the eastern and western ends of the Green River Region.

Projects targeted specifically at improving aspen communities and mountain shrubs were completed or prepped in both Mule Deer Initiative herd units. The planning effort for the southern portion of the Wyoming Range herd unit was drafted and is in final review and awaiting BLM approval.

Habitat and Access employees continued to maintain and enhance public facilities and access points in the Green River Region, with special emphasis on Viva Naughton Reservoir and surrounding areas.

The Green River Region also continues to focus significant time on educating the public about the importance of habitat to our wildlife resources. These efforts ranged from field personnel talking to people one on one to more formal education programs.

Ucross Stewardship Initiative Rangeland Assessment of Currant Creek Ranch (Goal 5) – Kevin Spence

Aquatic habitat personnel participated along with TU in hosting a tour of the upper Currant Creek watershed with a crew of students from the Yale School of Forestry and the University of Wyoming who were participating in an internship program through the Ucross High Plains Stewardship Initiative. Students were tasked with performing a rapid land health assessment and developing rangeland management recommendations for the owners of Currant Creek Ranch. The tour provided students with a historical background of watershed restoration efforts and grazing management issues/improvements that have occurred during the past 25 years, helping set the stage for the student’s assessment of the ranch property.

Blacks Fork/Muddy Creek Invasives (Goal 2) – WLCI, Jim Wasseen

A fair portion of Colorado River headwaters arise in Uinta County, in the very southwest corner of the state. The area includes multiple drainages with several small tributaries feeding the Blacks Fork River. This is a long term effort to minimize tamarisk from encroaching on the stream banks, preserve existing riparian habitat and improve native vegetation capacities. Also, this project involves controlling and decreasing invasive species along the drainage to protect, preserve and maintain the native ecosystem. Headwater Weed Control received a contract and treated salt cedar, perennial pepperweed, thistle complexes and other invasive species occurring on the Blacks Fork River throughout Uinta, Lincoln, and Sweetwater counties (Figure 51). Crews spent over 3 weeks due to undesirable spray weather and high water, which made access more difficult than in past years.



Figure 51. Headwater Weed Control crew re-treating stubborn salt cedar along the Blacks Fork. Photo Credit Headwater Weed Control.



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

This project involves increasing and improving wetlands for a variety of wetland-dependent wildlife by constructing and repairing dikes, water control structures, and a reservoir on flood-irrigated land in Uinta County. Cottonwood Reservoir repair, the final phase of this project, was completed in September 2017 (Figure 52) and creates or enhances 70 wetland acres.

Figure 52. Cottonwood Reservoir after repair. Photo credit USFWS.

Long Draw and Sculpin Creek Fish Barrier Improvements (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner



Personnel from Habitat and Access conducted improvements to fish barriers on Sculpin Creek and Long Draw of the Big Sandy River. Screens were added to each barrier and additional pilings added to enlarge the Sculpin Creek site (Figure 53). These improvements were necessary to the success of the “Three Species” project underway on the Big and Little Sandy rivers.

Figure 53. *Fish screen installation on Sculpin Creek.*

Willow Stand Replacement - Seedskaadee NWR (Goal 2) – Kevin Spence and WLCI, Jim Wasseen

Assistance was provided to Seedskaadee National Wildlife Refuge (NWR) with planting several hundred willow cuttings along a 1,500 ft bank of the Green River near the Highway 28 crossing during early November (Figure 54). Established willow plantings are expected to improve river bank stability, and eventually mature to provide vertical/horizontal riparian habitat structure at the water interface to benefit both terrestrial and aquatic wildlife. A skid steer auger was used to dig holes down into the water table to improve planting survival. The effort was experimental in design to determine the most successful methods for planting willow stakes, so that the knowledge can be used by contractors in upcoming years to complete large scale plantings at key locations on the refuge. Volunteers from the Seedskaadee TU Chapter also participated in the experimental willow plantings.

Figure 54. *Willow pole plantings stabilize 1,500 feet of bank along the Green River at Seedskaadee National Wildlife Refuge.*



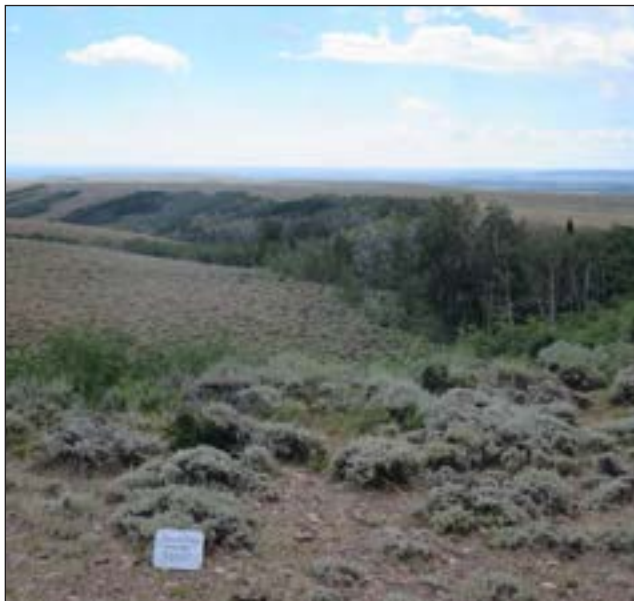
BLM Kemmerer Field Office Cheatgrass Control (Goal 2) – WLCI, Jim Wasseen

Cheatgrass throughout the BLM Kemmerer Field Office (KFO) threatens winter ranges, impacts grazing, and increases wildfire risk and intensity. This effort has three main objectives: to identify and map cheatgrass areas within the KFO; to prioritize cheatgrass treatment areas; and to treat and control or eradicate cheatgrass in small localized areas. Large areas with cheatgrass will be aerially treated by KFO. The BLM continued to work with cooperators Uinta County Weed and Pest, Lincoln County Weed and Pest, private landowners, and the NRCS to map, prioritize, and determine treatment areas regardless of ownership within the KFO. Progress to date includes aerially treating 523 acres of cheatgrass in the Bear River project area, 893 acres in the Uinta project area, and 1,037 acres in the Smith’s Fork Allotment project area. In addition, 250,000 acres of cheatgrass were mapped.

Blue Bell Diversion (Goal 2) – WLCI, Jim Wasseen

The Blue Bell diversion is one of the largest push-up dams on the Henry's Fork River. The landowner has to maintain the dam several times annually, usually in the spring and early-summer. This involves operating large equipment in the river, often during spring run-off and critical native fish spawning periods. If river flows are low, the Blue Bell dam becomes a seasonal fish barrier. Improving this diversion will allow Colorado River Cutthroat (CRC) trout to access habitat needed to complete their life history. Improved connectivity between populations improves the likelihood of persistence. The objectives of this project are to improve fish passage at the diversion and reduce head-cuts and erosion around the diversion. Desired outcomes include: 1) reconnected populations of CRC and other native fishes during critical times of the year, 2) provide producers with a low-maintenance and more efficient irrigation system, and 3) promote increased bank stability, sediment transport and improved water quality. The proposed new structures and head gates achieve all of the desired outcomes. Rock was mobilized in December 2016 but the structure was not completed due to extreme weather conditions and was delayed until fall 2017. Remaining rock was hauled on-site in November 2017 and the project was completed in December 2017.

Mule Deer Initiative, Wyoming Range Mule Deer Herd (Goal 2) – Troy Fieseler



Efforts continued in 2017 within the Wyoming Range to assess important habitats using the Rapid Habitat Assessment (RHA) methodology. Eighteen aspen RHAs totaling 1,126 acres and two range-land RHAs totaling 29 acres were completed in the southern portion of the Wyoming Range (Figure 55). These assessments reflect an effort to increase the number of acres assessed in the southern portion of the herd unit with input and assistance provided by local managers.

Figure 55. An aspen stand located in the Wyoming Range MDI herd that provides important transitional range habitat for deer migrating to and from winter range.

In addition to performing habitat assessments in the area, two public meetings were held in the Green River region to update the public on the status of the

Wyoming Range deer herd. Presentations were given on habitat treatments as well as planned future projects.

Aspen Conservation Joint Venture (Goal 2) – WLCI, Jim Wasseen

The overall objectives of this project are to enhance, maintain, and restore aspen woodland communities in the foothill and montane landscape of the Little Snake River watershed. These objectives will result in: 1) restored aspen woodland communities; 2) enhanced watershed/ecosystem function; 3) improved aquatic and terrestrial wildlife habitat; 4) sustained regional and local economic and aesthetic values of aspen communities; 5) restored crucial winter ranges for mule deer; 6) reduced threats from invasive plant species; and 7) improved wet meadow habitats for sage-grouse. Results to date include 23 acres of aspen ripping by shallow soil ripping with a D8 Caterpillar bulldozer; mechanical mastication and cutting of 671 acres of juniper on mule deer winter range; and mechanical mastication of 72 acres of decadent mixed mountain shrub communities.

Bitter Creek Headcut Stabilization (Goal 2) – WLCI, Jim Wasseen



Figure 56. Bitter Creek Diversion Ditch conveying high water impacting the construction site. Photo credit Sweetwater County Conservation District.

The Sweetwater County Conservation District (SCCD) along with agency and funding partners are working to construct a Bitter Creek drop structure at a point of diversion. Stabilizing the head cut would protect water availability for all users and prevent further erosion. The project helps to raise awareness about the importance of water quality, erosion, and the effects of flooding. The contractor began work fall 2016. Subsequently Bitter Creek began down cutting due to late fall/winter 2016-17 storm events. The contractor dug a diversion ditch to allow water to bypass the structure, until the flows subsided and a new plan could be reached (Figure 56). The SCCD engineer analyzed creek reroute options and decided to finish the drop structure and stilling basin and remove the temporary road within the channel. Major construction work is completed, with vegetation planting and minor bank sloping to be done in spring 2018.

Circle B Ranch Fence (Goal 2) – WLCI Jim Wasseen

This wildlife friendly fence effort is designed to better manage livestock by controlling seasonal movements between BLM, USFS, and Circle B Cattle Company (Circle B) lands. A fence was erected along 5 miles of border between public lands managed by the USFS and Circle B's property on the Mayfield Ranch and connects to an existing BLM/USFS fence. Circle B surveyed the Mayfield property boundaries to ensure fencing is installed on private land; and cleared the fence line along the Forest Service/Mayfield Boundary. The installation of five miles of fence was completed during 2017 (Figure 57).

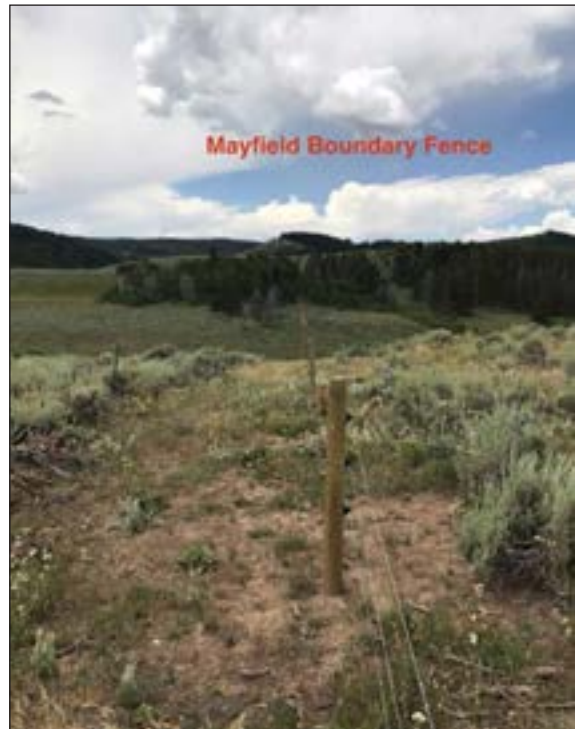


Figure 57. Completed fence along the boundary of the USFS and Circle B Ranch. Photo credit Ashworth Group.

Red Creek Riparian Exclosure Monitoring (Goal 2) – Kevin Spence

During summer 2016, TU and partners erected a portable 6.5 ft steel jack pipe fence exclosure on upper Red Creek near Pine Mountain. The exclosure was built to protect riparian shrubs from chronic ungulate browsing and encourage healthy riparian and stream habitat, with the long term goal of restoring sustainable beaver habitat. To determine the growth response of riparian shrubs to fencing protection, habitat biologists collected data inside the Red Creek steel jack exclosure during June 2017 and again in October 2017 (Figure 58). The amount of riparian shrub canopy over the stream channel was measured because it is important trout cover and provides water cooling shade. The area of stream reach inside the exclosure covered by riparian shrub canopy increased from 2.6% in June to 3.3% in October. Average riparian shrub heights increased from 0.5 ft to 2.4 ft depending on the species between June and October, and riparian shrub canopy coverage in the riparian zone increased from 21% in June to 25% in October.



Figure 58. Favorable increases in riparian shrub heights and canopy cover were observed between June and October inside the Red Creek steel jack riparian exclosure.

Mill Creek Sagebrush and Cheatgrass (Goal 2) – Jill Randall

The Mill Creek Grazing Association, with technical assistance from NRCS, WGFD and Lincoln County Conservation District, completed designs to conduct a Spike herbicide treatment intended to thin sagebrush and increase herbaceous cover on State of Wyoming administered lands northeast of Cokeville. Monitoring and range evaluations (Figure 59) were completed in 2017 to delineate appropriate locations for Spike applications and identify areas for cheatgrass control near the thinning prescriptions. Plans are in place to aerielly treat 750 acres of sagebrush and mixed shrubs with Spike and over 1,000 acres of cheatgrass infestations in 2018.



Figure 59. Monitoring location established in 2017 in a proposed Spike application treatment area.

Sand Creek Salt Cedar Control (Goal 2) – WLCI, Jim Wasseen



Figure 60. *Foliar herbicide treatments to young salt cedar. Photo credit BLM.*

The Sand Creek salt cedar control project includes approximately sixty-five (65) miles of stream bottom, and all infested reservoirs/sites within the BLM checkerboard portion of the Colorado River watershed. Salt cedar, a native to Eurasia, dramatically reduces available surface and groundwater, dries up wetlands, reduces stream flows, and alters channel widths. Salt cedar roots extract salt from deep soil layers and excrete the salt with leaf drop in the fall. Project objectives include inventorying new infestations, treating existing infestations, and monitoring to evaluate treatment effectiveness. Eighty-three reservoirs were inventoried, treated, and monitored in fall 2016 and spring 2017. Thirty-eight of the 83 reservoirs had never been inventoried for weeds before; and 45 of the 83 reservoirs

were last inventoried in 2009, 2010, and 2011. Of the 83 reservoirs, nine had salt cedar or other noxious weeds present. Three of these nine reservoirs with weeds were new locations. Salt cedar inventoried in November 2016, April 2017, and May 2017 were treated chemically. Overall, chemical treatment is proving successful (Figure 60). Thirty-nine known weed locations ranging from 0.1 to 10 acres were monitored with the option for retreatment. Thirteen of the 39 locations were re-treated chemically, and 26 of the 39 previously treated sites were free of salt cedar resprouts and did not require re-treatment. One area that had been treated chemically seven times since 2002 was found to be clean, with many dead stumps visible but no new growth.

Raymond Mountain Invasives (Goal 2) – WLCI, Jim Wasseen

The Raymond Mountain Toadflax project is an effort to remove Dalmatian toadflax on critical winter range. The west side of Raymond Mountain contains the main infestation of Dalmatian toadflax; this area is very rugged and remote, so a helicopter is required to get good control of this noxious weed. Elk and deer winter on the southern faces of the mountain which is where additional Dalmatian toadflax occurs. The goal of this project is to try to decrease the spread of Dalmatian toadflax in these areas and work towards eliminating it. Lincoln County Weed and Pest inventoried what weeds they could from the ground then had a private contractor fly the area. The monitoring of the previous years work was completed and new target areas were identified. The treatments took three days to complete, in which all the area was monitored and the new infestation were treated with herbicide.

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

This project is designed to allow big game to more easily move and migrate across the WHMA, through the removal of existing woven-wire and 6-strand barbed wire fence to a 4-strand wildlife-friendly fence along the Upper Muddy Creek within the Red Rim Grizzly WHMA. Three miles of fence material was bid out and awarded to the Feed Store in Laramie, WY to continue converting fence to wildlife friendly specifications. Approximately 1.5 miles of wildlife friendly fence was built during 2017. Newly constructed fences are monitored following construction to ensure they meet wildlife friendly WGFD design specifications. Converted fences are monitored in the spring for maintenance issues following the winter, and again in summer and fall for potential damage caused by livestock or wildlife.

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



Figure 61. Steel jack fence installation along Trout Creek to protect the riparian corridor. Photo credit Trout Unlimited.

The Little Mountain area is a unique high-elevation desert with a diverse range of sensitive species. The area is home to three populations of Colorado River cutthroat trout (CRC). These three populations live in three different drainages: Sage Creek, Currant Creek and Red Creek. Partners in the Little Mountain Riparian and Trout Habitat Project (LMRP) will build on existing projects to improve CRC populations by pursuing three goals: increase woody material near the streams, improve riparian vegetation and improve fish passage. Three approaches will be used: riparian steel jack enclosure fencing, culvert replacement, and planting. Permitting and planning was completed for a culvert on Currant Creek Ranch, Trout Creek riparian fencing and Gooseberry Creek fencing. Cultural permitting for the Currant Creek riparian fence is in the works and should be completed by fall 2018. The Currant Creek Ranch culvert was replaced with a railroad car bridge and reconnected 14 miles of fish habitat. Gooseberry and Trout Creek fencing (Figure 61) were completed and protect one acre each of riparian areas along 600 feet of each of the streams.

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

Personnel from Habitat and Access performed annual maintenance and monitoring of public access areas in the Green River Region. A new access road culvert was placed at V-Cross PAA (Figure 62) due to spring flooding causing damage to the access road. The Viva Naughton Reservoir PAA campgrounds and facilities were maintained and roads and campsite facilities were graveled to prevent further resource damage. Woodruff Narrows PAA facilities were painted, doors replaced and parking areas graveled. In Lincoln County, Habitat and Access contracted 22 acres to be monitored and 3 acres of noxious weeds to be identified and sprayed on PAAs in 2017.



Figure 62. Road maintenance on Minnie Holden Creek to access V-Cross PAA.

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

This project aims to restore salt-desert shrublands displaced by halogeton. To accomplish this, two exclosures 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 exclosures may be used as the basis for restoration of other Gardner saltbush communities displaced by halogeton. Test plot seedings of 2-5 acres were done. The seedings inside the exclosure showed that broadcast seeding of forage kochia and Russian wildrye were the most successful treatments. This method was used to test a larger scale trial outside the two exclosures in January 2017, approximately 2.5 acres each.

Another aspect of this project includes control of noxious weeds within the FGNRA. Highly specialized watercraft capable of accessing shallow water areas inaccessible by conventional transportation (i.e. ATVs, UTVs, and other OHVs) are used to map and treat noxious weed infestations on the Flaming Gorge Reservoir and tributaries. During the 2017 field season, areas of emphasis included large portions of the Blacks Fork River and Green River. The efficacies of 2017 treatments are estimated to be at > 90%. Noxious weeds of highest abundance include perennial pepperweed, black henbane, thistles, and salt cedar.

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

2017 was the fifth and final year of this project to improve and protect wildlife and agriculture resources through improvements to riparian habitat, vegetative diversity of grasses and forbs as well as mountain shrub and cottonwoods, and control of invasive weed species. Activities completed for this reporting period include invasive weed control through the application of herbicide, and hand picking of invasive plants. Over the course of the project, 2014-2017, invasive species have been reduced dramatically within the project area improving all classes of vegetation: riparian, shrub, and grasses. This improvement is due to the landowners' willingness to manage his grazing at levels below customary stocking rates and over shorter time periods. Other activities include planting willow clippings along the banks of Three Mile Creek and creating a minimum of four pastures within the +1,400 acre project area and moving/rotating livestock regularly. Crop forage for mule deer and other wildlife has been left for their benefit. Fifteen acres of uncut sainfoin was left standing, with an additional 60 acres of (one cut) regrowth of sainfoin (Figure 63). This equates to 105 tons of sainfoin left in the field for wildlife use.



Figure 63. Sage grouse hens bringing their broods to freshly cut sainfoin. Photo credit WDA.

Red Creek Habitat Enhancement (Goal 2) – Kevin Spence and WLCI, Jim Wasseen

The Red Creek Enhancement is a continuation of efforts to protect, maintain and enhance the ecosystem within the Little Mountain and Pine Mountain areas. Historically the Little Mountain ecosystem has shown its resilience during and after wildfire events; however the exclusion of fire taking its natural role within the ecosystem has allowed conifer to expand into the landscape. This expansion of conifers alters the vegetative characteristics and composition within the landscape, which provides critical habitat (terrestrial and aquatic) that many species depend upon. As these conifers mature, their canopies encroach into surrounding areas and understory herbaceous species and sagebrush communities decline. This vegetative composition shift can result in erosion, reduced seasonal stream flows, forage reduction, loss of habitat, introduction of invasive species, and increased risk of uncharacteristic fire behavior. BLM fire staff treated 100 acres in fir and juniper (Figure 64). Most of the subalpine fir treatments, which included lop and scatter, were done on BLM land while horizontal juniper thinning was done on Wyoming State lands. Due to severity of fire season and timing of dates of when Little Red Creek is accessible, minimal work was accomplished. Other planned efforts within The Red Creek Enhancement project are still in the NEPA phase.



Figure 64. Cut subalpine fir on the ground benefitting aspen habitat.

BLM fire staff treated 100 acres in fir and juniper (Figure 64). Most of the subalpine fir treatments, which included lop and scatter, were done on BLM land while horizontal juniper thinning was done on Wyoming State lands. Due to severity of fire season and timing of dates of when Little Red Creek is accessible, minimal work was accomplished. Other planned efforts within The Red Creek Enhancement project are still in the NEPA phase.

Circle B Ranch Spring Developments (Goal 2) – WLCI, Jim Wasseen



Figure 65. Spring at Old Cow Camp before (left) and after (right) improvements. Photo credit Brenda Ashworth, Ashworth Group.

The Circle B Ranch completed spring development/restoration and riparian area protection on Circle B Mayfield property for livestock and wildlife. The effort included installing catch basins, pipelines and water troughs; providing spring and riparian fencing to exclude livestock and protecting and restoring spring and riparian habitats at the Old Cow Camp (Figure 65), Mayfield Cabins, and Waterhouse Canyon springs. Spring rehabilitation, trough construction and placement, and fencing was completed as designed. During winter, valves at the springs are turned off and water flows into the natural drainage.

Southern Wyoming Range Mule Deer Habitat (Goal 2) – Troy Fieseler, Cheyenne Stewart and Jill Randall

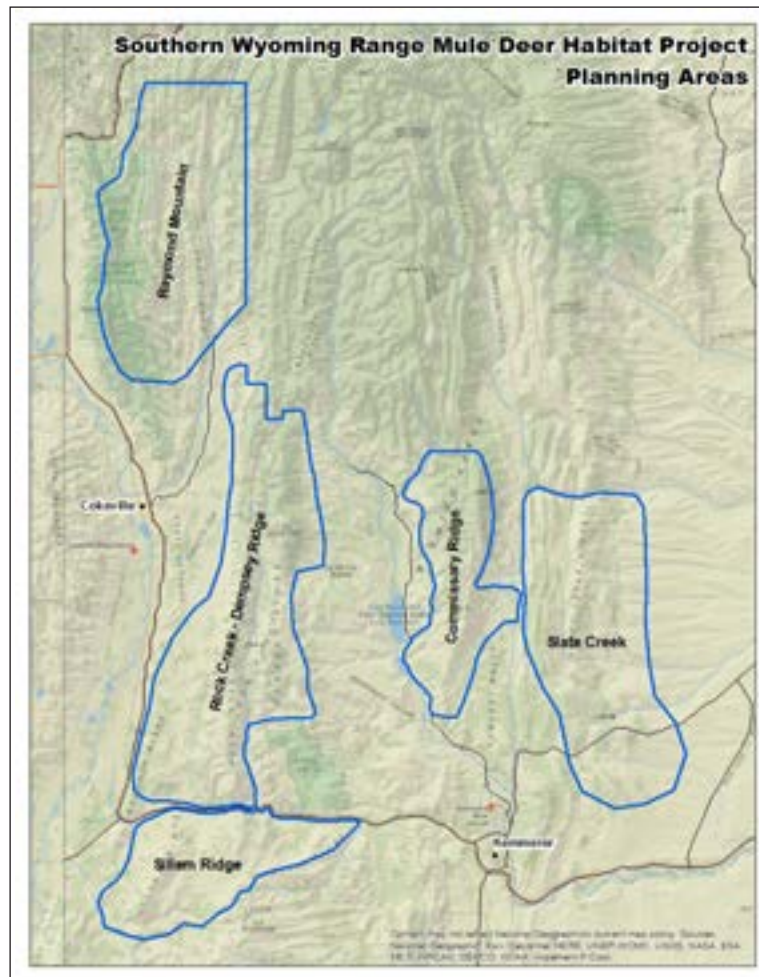
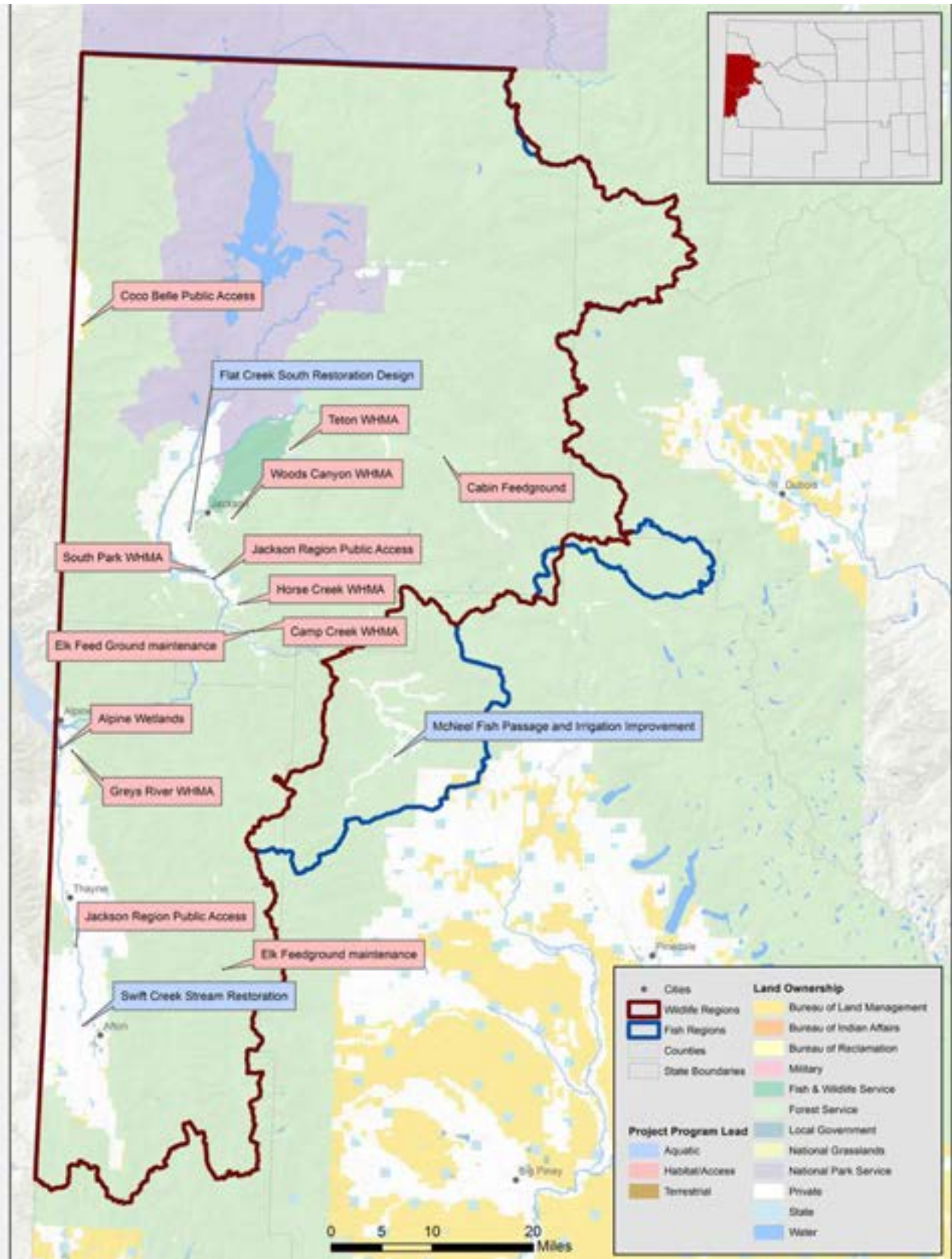


Figure 66. Project planning areas for Wyoming Range mule deer near Kemmerer and Cokeville in southwest Wyoming.

Progress toward eventually implementing treatments in the Southern Wyoming Range has increased exponentially since the hiring of a Terrestrial Habitat Biologist Trainee in 2016. In 2017, Department personnel partnered with the Kemmerer BLM to evaluate treatment potential, current plant community health and appropriate treatment methods in areas heavily utilized by mule deer. As a result, five planning areas (Figure 66) within numerous focus areas were delineated as top priorities for treatment.

This project focuses on improving mule deer transitional ranges including aspen forests, mixed-mountain shrubs, and a combination of mesic and xeric sagebrush communities targeted for treatment. Priority will also be given to reduction/control of invasive plant species. With a Habitat Management Plan completed for the project area in 2017 the Department and BLM anticipate initiating the NEPA process in spring 2018.

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.

Many regional aquatic habitat projects involve restoring stream function through bank stabilization while also facilitating fish passage. One such project in the works involves restoration of a 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 second aquatic habitat project involves bank stabilization on a section of the upper Hoback River near Bon-durant. 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 Game & Fish Department's McNeel Elk Feedground. A more comprehensive stream habitat restoration project is being undertaken through a partnership with Trout Unlimited.

A third riparian improvement project involves four landowners along Swift Creek, a tributary of the Salt River near Afton. The stream has experienced several impacts but instream improvements are planned in lower Swift Creek, which will also maintain the creek's connection to a perennial spring creek with known cutthroat trout spawning value.

Other projects include, regular maintenance of fences and roads at regional WHMAs and PAAs and a haying operation was again conducted on the Horse Creek and South Park WHMAs in 2017. Approximately 120 acres were irrigated to produce 210 tons of hay that is 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 to reduce the amount of hay that needs to be purchased to feed elk in the winter.

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



Figure 67. Harrowing on Horse Creek WHMA.

Annual maintenance and improvements continued on the three WHMAs in the Jackson Region in 2017. The Greys River WHMA received annual fence maintenance on 13 miles of crucial winter range elk fence. Annual fence maintenance continued on the South Park WHMA, seven miles of boundary fence was maintained along with one mile of crucial winter range elk fence. The South Park and Horse Creek elk feeding areas were harrowed in the spring to break up elk manure and promote growth of new grasses (Figure 67). The Horse Creek WHMA received annual maintenance on one mile of crucial winter range elk fence. 775 feet of wildlife friendly pole top fence was installed, replacing dilapidated fencing. 60 acres of grass meadows on Horse Creek WHMA were irrigated before and after haying from May through August. Irrigating

after haying provides nutritious natural forage for elk when they arrive on the Horse Creek feedground prior to feeding in the fall. 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 the spring to break up elk manure 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 68).

In 2017, 24 acres of noxious weeds were treated on WGFC owned and managed lands.

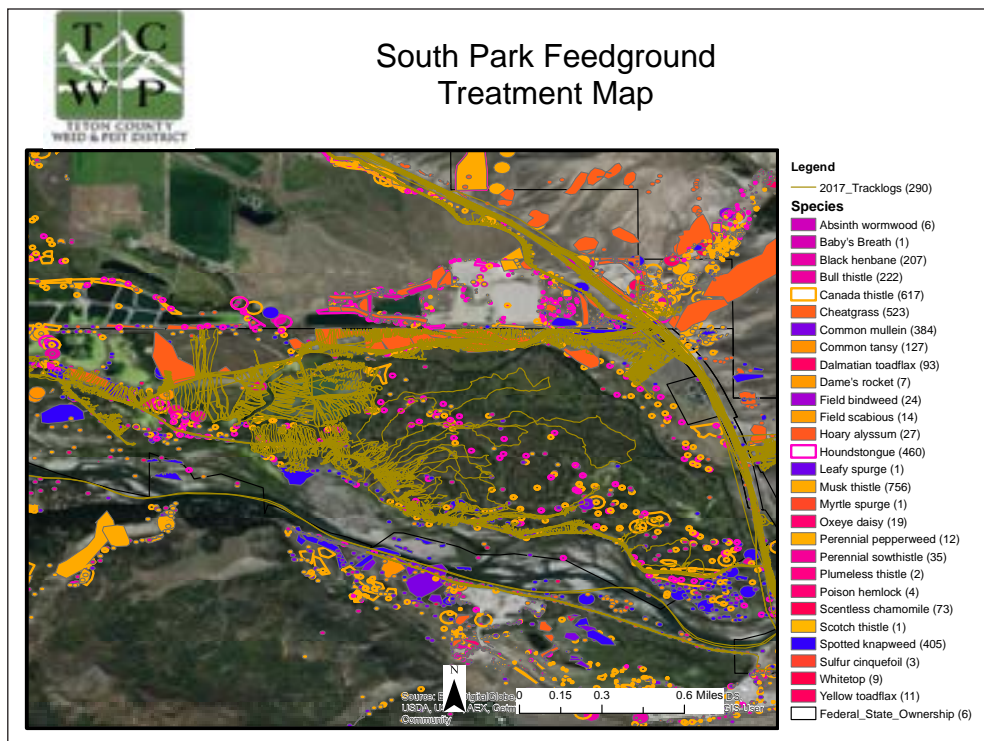


Figure 68. Noxious weed report for South Park WHMA.

Swift Creek Stream Restoration (Goal 2) – Anna Senecal



Figure 69. *Swift Creek eroding banks, dewatered channel and bar formation.*

Swift Creek is an east-side tributary to the Salt River near Afton, Wyoming. Upper portions of the stream are impaired from an on-channel hydropower dam, dewatering and channelization (Figure 69). Lower portions of the creek, however, provide seasonal trout habitat and connection to perennial spring creeks. The native Snake River Cutthroat Trout and wild Brown Trout populations found in the Salt River drainage are not maintained through hatchery culture and stocking. Therefore, maintenance and improvement of spawning habitats is very important for the persistence of these fisheries.



Figure 70. *Design showing Swift Creek channel realignment (red line).*

In 2017, WGFD partnered with TU, USFWS, NRCS and four landowners to improve instream and riparian habitats in lower Swift Creek and maintain the creek’s connection to a perennial spring creek with cutthroat trout spawning value. The creek is extremely unstable throughout the project reach and is at risk of cutting through meander bends and abandoning the spring creek confluence. Partner funds were used to design an improved Swift Creek channel. Design elements include floodplain grading, pool excavation, channel narrowing, riparian planting and fencing, and installation of structures to maintain grade, reduce near bank stress and increase instream habitat complexity (Figure 70). Funds are being raised for final design and project implementation. Partners anticipate construction in fall 2019.

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

Horse Creek and South Park WHMAs were hayed in 2017. In all, approximately 120 acres were hayed and WGFD produced 210 tons of hay that will be fed on the Horse Creek and South Park feedgrounds (Figures 71-72). 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, reducing commingling between elk and cattle on private land adjacent to elk feedgrounds, and reducing the amount of hay that the WGFD needs to purchase each year by feeding hay that we produce on our own lands.



Figure 71. *Raking hay on South Park WHMA.*



Figure 72. *Cut hay on Horse Creek WHMA.*

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



Figure 73. *Channelization and willow removal yielded an overly-wide and shallow Flat Creek channel.*

Flat Creek flows from its headwaters upstream of the National Elk Refuge, through the town of Jackson to eventually meet with the Snake River at the South Park bridge, about 6 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, water for irrigation, 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 points of 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, straight-

ened the creek and produced an over-wide and shallow channel lacking in spawning riffles and deep pools (Figure 73). These channel conditions reduce spawning activity and may restrict seasonal movement because of shallow depths, high summer temperatures, and unstable winter ice.

The WGFD is partnering with a private landowner south of Jackson to restore stream function and cutthroat trout habitat to 1.4 miles of Flat Creek. This project is entering the final design phase. Thirty percent conceptual designs are in hand and will be used as the basis for bidding design build (Figure 74). WGFD will issue a request for proposals and hire a qualified engineer-contractor team to carry this project across the finish line. Project designs address in-channel and riparian habitat limitations, implement grazing management and temporary fencing, and include fish passage at diversion structures. Construction is anticipated to take place during the winter of 2019-20. We anticipate this effort will improve stream connectivity and increase Snake River cutthroat trout spawning habitat availability throughout lower Flat Creek, benefitting the fishery drainage-wide.



Figure 74. Flat Creek stream pattern over time: 1945 (left), 2015 (center), proposed (right).

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



Personnel from Habitat and Access performed annual maintenance and monitoring of regional PAAs. All public access boundary fences were maintained to protect riparian habitat. Public access areas on the Salt River had entry doors replaced on restroom facilities and interiors painted. Vandalized and weathered signs were replaced (Figure 75).

Figure 75. Salt River Access sign replacement.

McNeel Fish Passage and Irrigation Improvement (Goal 2) – Anna Senecal

WGFD, in close partnership with TU, is working to restore a portion of the upper Hoback River corridor heavily impacted through historic willow removal and ongoing land management. The River Bend Ranch, just outside of Bondurant, WY doubles as a Department elk feedground: the McNeel feedground. This site has a history of willow removal, heavy ungulate browse pressure, riparian cattle grazing, flood control (dykes, ditches), and flood irrigation through the use of gravel push-up dams. All of these factors have contributed to the extreme erosion evidenced throughout the property. Extreme bank erosion in 2016 threatened the WGFD stackyard which stores 500 tons of hay for winter elk feeding. While the bank was rip rapped to prevent further erosion, this is not a long-term solution as erosion is likely upstream and downstream of the hardened area. The proposed solution to extreme erosion, pasture loss and irrigation inefficiency will address the loss of the riparian woody shrub community and continual impacts to the stream bed and banks through gravel push-up dam maintenance.

This project will consolidate two gravel push-up diversion dams into a single, stable point of diversion

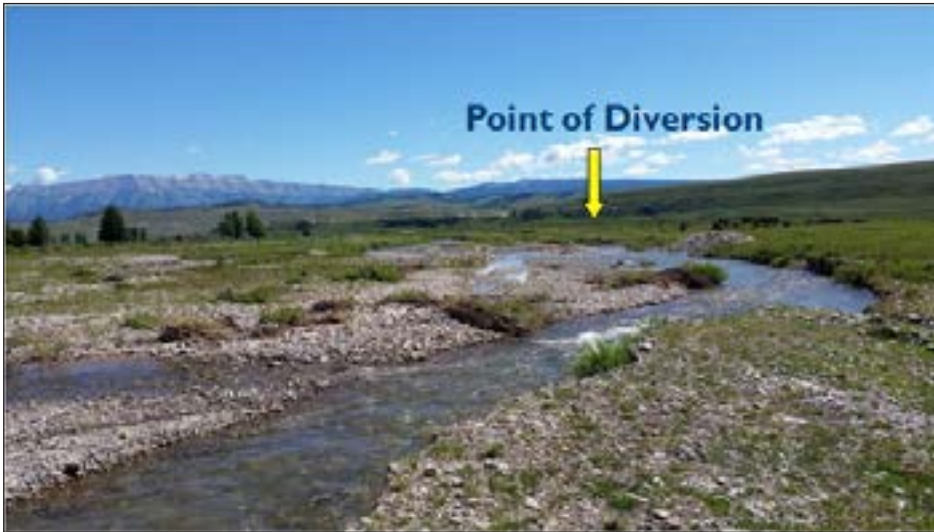


Figure 76. A gravel push up dam on the upper Hoback River results in extreme bank erosion and channel instability.

with a cross vane structure and headgate. Gravel push up dam maintenance requires excavators for manipulating the stream bed and banks every year, multiple times a year, to direct water. This causes impacts, particularly in wide, braided rivers like the Hoback with little rooted woody riparian vegetation holding the banks together (Figure 76). Extreme bank erosion, pasture loss, stream channel abandonment and downcutting result. These

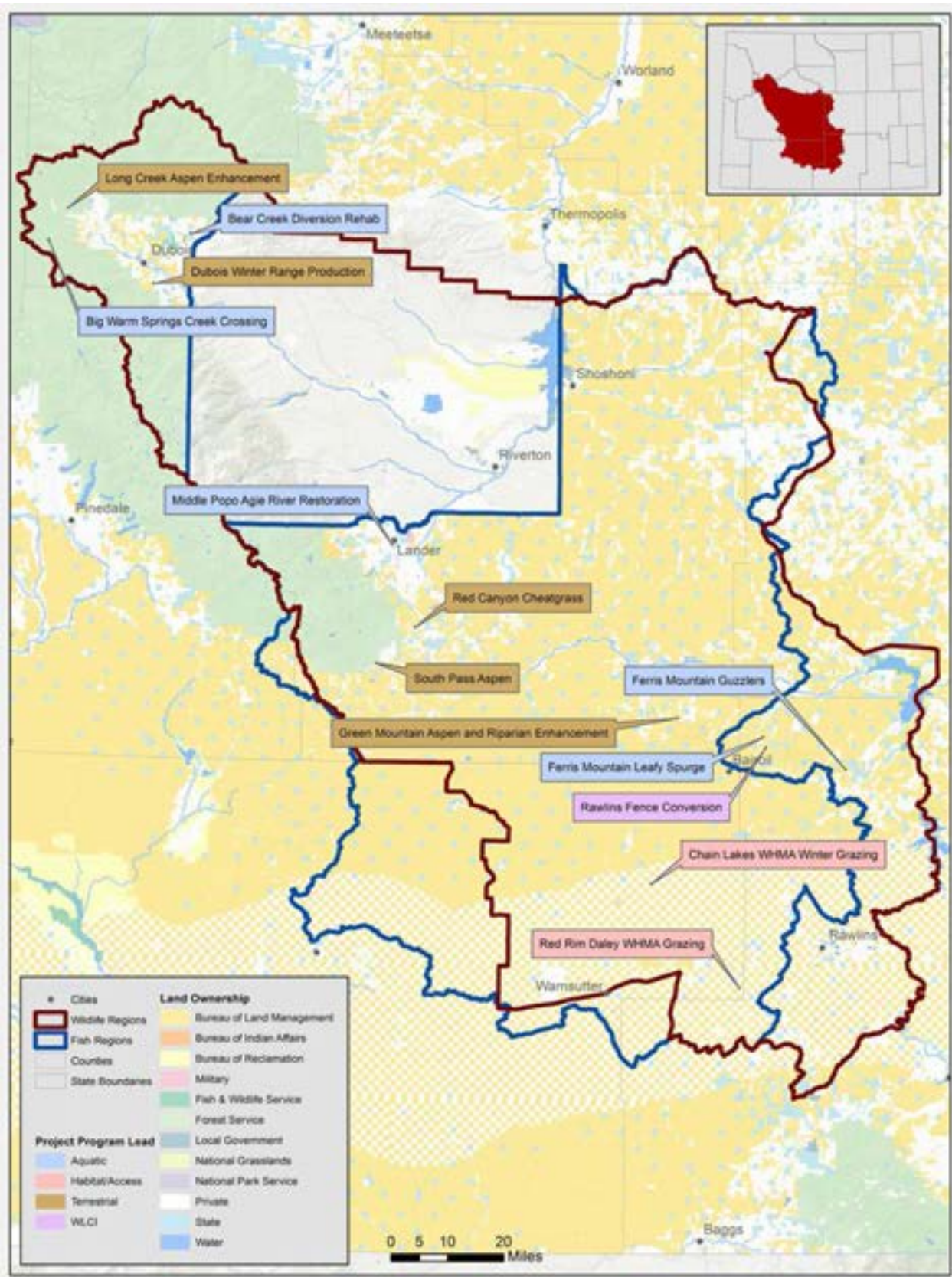
impacts make it even harder for irrigators to divert their water, requiring more and more stream manipu-

lations. Department and partner funds were used to contract engineered designs for the diversion consolidation (Figure 77). Funds are currently being raised for implementation slated for fall 2019. The work outlined here is the necessary first step in a longer-term effort to restore the woody riparian community. Future project phases will include channel stabilization, instream habitat treatments, riparian plantings and elk/cattle exclusion fencing.



Figure 77. Diversion structure design plans on the upper Hoback River McNeil Feedgrounds.

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.

The Game and Fish and project partners collaborated on maintenance to the Middle Popo Agie River restoration project, which was constructed in 2016 to maintain summer trout habitat. After a high spring runoff in 2017 some maintenance to a few structures and banks was needed. Additionally, the fisheries assessment in the restored river section showed good use of the constructed in-stream habitat features by brown and rainbow trout.

Summer 2017 was a busy time on Green Mountain, and many accomplishments were made toward improving habitat within the West Cottonwood Creek Drainage. Habitat concerns were a loss of water in the stream, invasive weeds, and a decline in habitat productivity. In partnership with the BLM and a private landowner on-the-ground work this year included crews cutting back conifers from aspen stands, construction of eight man-made beaver dams (using natural materials), and fencing a fragile riparian area.

The South Pass Aspen project saw its third year of work and a total of 545 acres were treated this year bringing the three year total to 1,206 acres. The first year of follow-up monitoring has shown good response of aspen seedlings post treatment.

Another large effort was managing the 210,000 plus acres of Wyoming Game and Fish 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.

On the Ocean Lake WHMA, improvements and efficiencies were made to irrigation efforts too. And thanks to a partnership with Ducks Unlimited, a shallow wetland was created to provide crucial habitat for migrating ducks.

Red Canyon Cheatgrass (Goal 2) – Amy Anderson



Figure 78. Cheatgrass on a Red Canyon WHMA slope prior to herbicide application.

fluorescens bacteria. However, *Pseudomonas fluorescens* bacteria is currently unavailable due to delays in production and permitting. There are also concerns about how the bacteria might impact fisheries, and whether enough research has been conducted to show significant reductions in cheatgrass to make the cost of application worth the results. As a result, the WGF D decided to proceed with the imazapic (product name Plateau©) application to slow the spread of cheatgrass across the Red Canyon WHMA. The area provides important winter forage for elk and mule deer.

In September, 2017 Sky Aviation used a helicopter to apply imazapic herbicide on 802 acres of WGF D Commission owned lands on the Red Canyon WHMA (Figure 79). Fremont County Weed and Pest along with WGF D biologists prescribed an application of 8 ounces of herbicide combined with five gallons of water per acre. Funding for the Red Canyon Cheatgrass Project came from RMEF, WGBGLC, WWNRT, and Fremont County Weed and Pest.

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 2017. This agreement has historically allowed 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. The Department is currently working on a permanent administrative easement through CM Ranch property to access the Sheep Ridge area of Whiskey Basin WHMA in return for winter grazing use.

Cheatgrass has become increasingly prominent on the Red Canyon WHMA near Lander, Wyoming (Figure 78). This invasive appears to have originated from the roads and is now encroaching up slope on both sides of the canyon. Without treatment, cheatgrass will continue to displace native vegetation important for iconic wildlife species including elk, mule deer, and sage grouse. The original scope of the project prescribed a dual treatment of imazapic herbicide combined with *Pseudomonas*



Figure 79. Sky aviation applying imazapic herbicide on Red Canyon WHMA.

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

The WGFD and project partners collaborated to maintain the Middle Popo Agie River restoration, which was constructed in spring 2016 to enhance summer trout habitat while routing flood flows through Lander City Park. The original design included features to enhance pool habitat and concentrate base flows, such as boulder clusters, cross vanes, and an excavated low flow channel. Two banks and four in-stream structures required maintenance following 2016 runoff (a 17-year event) to prevent further degradation and to maintain in-stream habitat. Maintenance included reconstruction of two J-hook structures, removal of a cross vane, and lowering center rocks of a grade control structure. Two at-risk banks totaling



155 linear ft were also stabilized using sloped angular rock and willow stakes harvested by WGFD and volunteers (Figure 80). The nearly 1,500 willow stakes provide additional riparian habitat and bank stabilization as the root systems develop. Partners for maintenance include the WGFD, Popo Agie Conservation District, Popo Agie Anglers (local TU chapter), City of Lander, USFWS, and Intermountain Aquatics.

Figure 80. *Rock and willow bank stabilization during 2017 runoff.*

Monitoring continued to document channel stability and in-stream habitat following 2017 runoff, which amounted to a 75-year event and one of the largest in recent years. Compared to the uniform aggradation of the low flow channel in 2016, recent cross section profiles depict a balance of deposition and scour throughout the reach and deepening of the low flow channel. Data also show

Figure 81. *Department personnel and public volunteers sampling for Brown and Rainbow Trout downstream of a recently rebuilt J-hook structure.*



narrowing of the river in many locations, especially downstream of boulder structures and along meanders. A fisheries population assessment showed good utilization of in-stream habitat features by Brown and Rainbow Trout (Figure 81). Most trout were in the 6-11 inch range, but Brown Trout over 15 inches and Rainbow Trout up to 14 inches were captured. Monitoring will continue into 2018 and will inform future stream and habitat improvement projects throughout the Popo Agie River Watershed.

South Pass Aspen (Goal 2) – Amy Anderson

The South Pass Aspen Project has had three years of successful conifer removal completed in the areas near Atlantic City, Roundtop Mountain, within the Beaver Creek Nordic Ski Trails, and along the Loop Road. A total of 1,206 acres of treatment have been completed on USFS, BLM, and State of Wyoming lands since 2015. These treatments have consisted of mostly lop and scatter to protect newly sprouted aspen seedlings from excessive browse pressure. Cut and pile treatments were conducted near campgrounds, along main recreation areas, and near historic structures.

In 2017, a total of 545 acres of mechanical treatment occurred on US Forest Service lands using Summit Forestry hand crews. Additionally, USFS and BLM both conducted burns of slash piles within previous years' treatment areas (Figure 82).



Figure 82. Nordic Ski Area on South Pass before (left) and after (right) treatment.

In 2018, 200 acres of BLM and State of Wyoming lands will be treated. Plans to expand the South Pass Aspen project further west into the Rock Springs BLM coverage area and Shoshone National Forest, including Pine Creek and Gold Creek will commence with NEPA being initiated during winter 2018, with treatments scheduled for 2019-2020.

The first year of follow-up monitoring has shown good response by aspen seedlings post treatment, however, ungulate browse pressure exceeds acceptable levels. A meeting with BLM and USFS range staff in winter 2017/18 will focus on ways to reduce browse to protect the investment in South Pass Aspen.

Funding for this work has been provided by WWNRT, WBGGLC, RMEF, WGFD and MDI, USFS, BLM, MFF, and Popo Agie Conservation District.

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

Domestic sheep graze on Chain Lakes WHMA from December through April each year. In 2017, along with our cooperative management partner, the BLM, we accepted applications for a new five-year grazing lease. During 2017, the grazing lessee utilized approximately 900 AUMs. In exchange for grazing, the lessee re-developed an abandoned water well in the north central portion of the WHMA. Additional water resources allow for better utilization of the forage resources on the WHMA by both wildlife and livestock. Controlled overflows from the well create wetlands that are an oasis in the dry desert with concentrations of lush vegetation and abundant wildlife frequenting these areas.

South Wind River/Sweetwater Mule Deer Initiative (Goal 2) – Amy Anderson, Stan Harter, Brady Frude and Teal Cufaude

The South Wind River/Sweetwater Mule Deer Initiative (MDI) is moving forward with habitat improvement work across the Herd Units, including South Pass Aspen, Green Mountain Aspen and Riparian Enhancement, and Red Canyon Cheatgrass Treatment. These projects address concerns outlined in the MDI Working Group’s recommendations and are associated with a recently completed Habitat Management Plan for the MDI in the Lander Region. In addition to the habitat improvement projects, 15 RHAs were conducted in areas identified through mule deer collar data, or within planned habitat treatment areas. RHAs covering 3,614 acres of shrub/rangeland habitats, 736 acres of aspen habitats and 11 acres of riparian habitats were conducted (Figure 83).



Figure 83. *Conducting shrub/rangeland RHAs on Table Mountain.*

Ocean Lake WHMA Shop Fields Pipeline (Goal 2) – Derek Lemon and Brian Parker

The purpose of the project was to convert approximately 1,400 feet of open ditch and 1,250 of dilapidated transport pipe to 2,360 feet of buried pipeline with risers for gated pipe. The reduction in water loss will result in an increase in water use efficiency and operational efficiencies associated with irrigating the shop fields. A new diversion structure associated with the buried pipeline was constructed as part of this project. The system design incorporated valving that allows for continued irrigation of tree rows adjacent to the Shop Fields. Tree rows provide hiding and thermal cover for deer and non-game species.

Meadow Restoration (Goal 2) – Miles Proctor and Kevin Howard

As part of the Spence & Moriarity WMA 10-Year Plan, irrigated fields/meadows have been farmed to increase forage palatability, combat noxious weeds and ultimately generate hay for use on elk feedgrounds. Hay meadow farming is typically accomplished over a two-year period.

The 2017 farming program included:

Sideroll Meadow - farming began on approximately 90 acres;

North Long Meadow - farming began on approximately 20 acres;

Pease Meadow - farming began on approximately 75 acres.

Dubois Hay Production (Goal 2) – Miles Proctor and Kevin Howard



Figure 84. *Haying on Spence and Moriarity WMA.*



Figure 85. *Spence and Moriarity hay headed for elk feedgrounds.*

Lander Habitat and Access continued expanding farming and haying operations across Dubois area WHMAs, with specific focus on the Spence and Moriarity WMA. During the 2017 field season, two 1,000 foot pivot sprinklers were constructed. One located on the basin meadow (90 acres) located on Whiskey Basin WHMA and the second on Pease Meadow (75 acres) located on Spence & Moriarity WMA. These new pivots will increase water efficiency and effectively irrigate these fields for hay production that is used for feeding elk on the feedgrounds.

Dubois staff hayed 819 acres on Spence and Moriarity WMA and Whiskey Basin WHMA (Figure 84), producing 708 tons of hay, which was shipped to Pinedale and Jackson area elk feedgrounds (Figure 85). 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.

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

Red Rim-Daley is comprised of OSLI, BLM, and WGFC-owned properties. Two operators annually graze the Red Rim - Daley WHMA, collectively consuming approximately 1,650 AUMs. Rotational grazing allows for optimal plant development and rangeland health, both on the WHMA and on rested pastures outside the boundaries of the WHMA that are also important wildlife habitats. The grazing lessees also perform fence maintenance, water well maintenance, and other infrastructure improvements and maintenance, as well as deferring grazing on their private ground in exchange for grazing on the WHMA.

Noxious Weed Control (Goal 2) – Miles Proctor and Kevin Howard

Backcountry Spraying applied herbicide across approximately 400 acres of irrigated meadows on Spence and Moriarity WMA to control noxious weeds, largely white-top and Canada thistle, in early June and July. Additionally, Fremont County Weed and Pest sprayed a variety of noxious weed species on irrigated meadows and rangeland starting in July and continuing through fall 2017. Habitat and Access personnel also constructed a spray trailer during winter/spring 2017 and dedicated substantial AWEC time to noxious weed control.

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

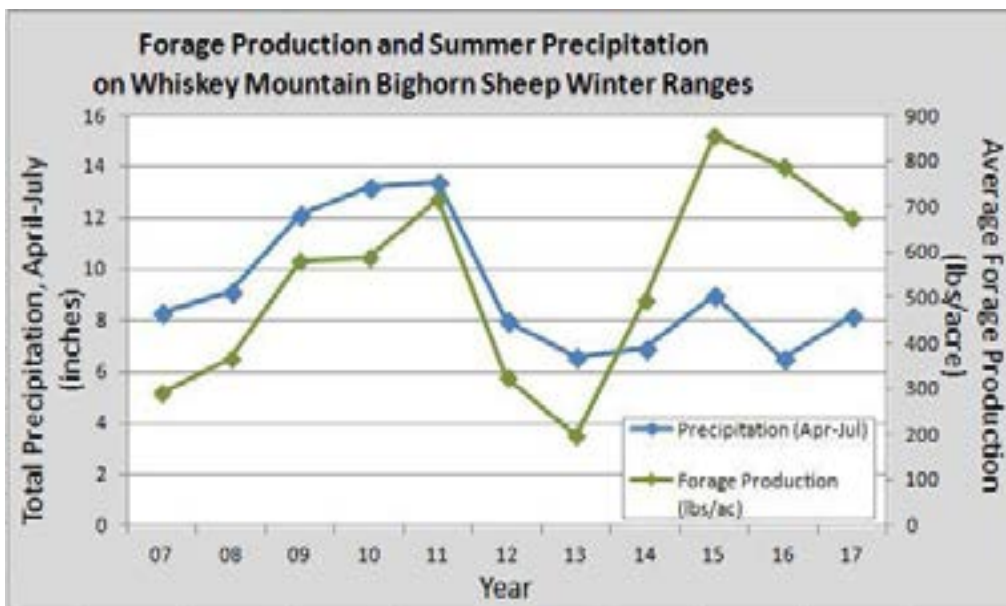


Figure 86. Average herbaceous production and precipitation on Whiskey Basin WHMA.

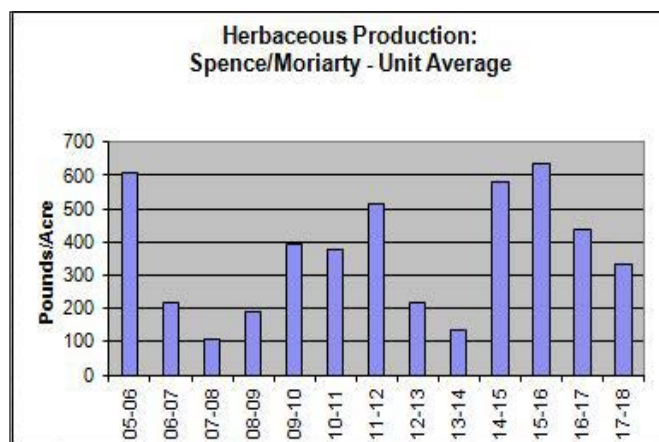


Figure 87. Average herbaceous production on Spence and Moriarty WMA.

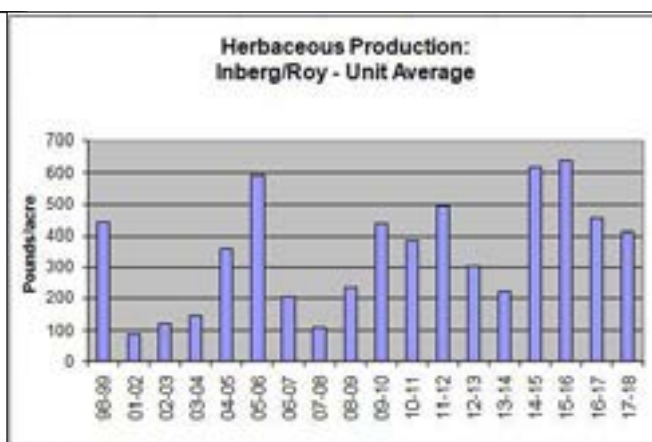


Figure 88. Average herbaceous production on Inberg/Roy WHMA

Annual production and utilization clipping took place on Whiskey Basin WHMA, Spence and Moriarity WMA, and Kirk Inberg/Kevin Roy WHMA again in 2017, with assistance from BLM and USFS biologists. Heavy snow loads and 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 when compared to the previous three years.

Ocean Lake Winter Grazing (Goal 2) – Justin Rhine

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

Long Creek Aspen Enhancement (Goal 2) – Amy Anderson

Through a partnership approach to managing important habitats for mule deer and other iconic wildlife, the Shoshone National Forest is using active vegetation management to enhance mule deer populations, habitat and hunting opportunity in the Long Creek Watershed. The project will use thinning and prescribed fire to restore early seral habitats. Use of commercial timber harvest to thin overstocked stands, remove beetle kill and reduce the threat of landscape-scale wildfire will compliment the aspen project activities. The project will implement an adaptive multi-year plan that takes into account emerging migration information from research being conducted on the Shoshone National Forest.

Project goals include improving mule deer habitat across the landscape to affect long-term positive change in herd-level health, reproductive success and survival to enhance populations and hunting opportunity. The project will improve the health and vigor of aspen communities and increase the extent of aspen, an ecologically important cover type for mule deer, elk, moose and ruffed grouse and many nongame species. It will increase the amount of early seral habitat available across the landscape for mule deer and other early successional wildlife. Additionally, fence impediments will be removed to facilitate mule deer movements and migrations.

During summer 2017, 260 acres of aspen were treated (Figures 89-90). All treatments included mechanical removal of conifer from aspen stands by contracted hand crews. Treatments included either lop-and-scatter or hand piling of conifer slash depending on conifer densities. In units with decadent aspen stands treatments were used where all aspen over sapling size were cut in addition to the conifers. Some pile burning has been initiated from previous cut and pile work.

Funding partners include MFF, USFS, WGFD, MDF, RMEF and WGBGLC.



Figure 89. *USFS Aspen Unit 1 in Long Creek near Dubois, WY before mechanical treatment of conifers.*



Figure 90. *USFS Aspen Unit 1 in Long Creek near Dubois, WY after mechanical treatment removing all conifer and old age class aspen.*

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



Figure 91. *Montana Conservation Corps crew modifying old barbed wire and mesh wire fence to wood post, rail-top and wire fence at Ferris Mountain. Photo credit BLM.*

This project is aimed at facilitating big game movement across existing allotments, ensuring that migration corridors are more easily accessed and reducing stress, energy loss, injury, and mortality. The effort converts 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 switching from non-wildlife-friendly fence (e.g., mesh with barb wire or 5-6 strand barbed wire) to wildlife-friendly fence (e.g., 3-4 strand barbed wire). Past fence conversions have been south and west of Rawlins, where the majority of fences have been converted in conjunction with willing private landowners.

During 2017, the BLM worked with permittees to provide additional labor to address lower funding levels from WLCI. This resulted in more, but smaller projects, primarily in the Bairoil and Ferris Mountain area, including areas where permittees have asked for help with fencing due to damage from elk and wild horses. In 2017, \$10,000 was provided to hire a Montana Conservation Corps (MCC) crew for two weeks. One half mile of wire fence was replaced with wood post, rail-top, and three wire fence on the west end of Ferris Mountain (Figure 91). Two and a quarter miles of the boundary fence between Rawlins and Lander BLM Field Offices located north of Bairoil was modified by permittees and BLM staff to four wire standard design.

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

Summer 2017 was a busy time on Green Mountain, and many accomplishments were made toward improving habitat within the West Cottonwood Creek Drainage. This project was initiated by a private landowner to improve habitat for a declining mule deer herd. The landowner is concerned with the loss of water in the stream, increases in invasive weed species, and declines in habitat productivity. He approached the WGFD about conducting habitat treatments to improve conditions on his private land on Green Mountain. The BLM agreed to partner with WGFD and the private landowner within the West Cottonwood Creek Drainage.



Figure 92. *Conifer removal from an aspen stand and spring on Green Mountain.*

In 2016, the BLM conducted 40 acres of aspen improvement using Summitt Forestry saw crews to reduce conifer encroachment within existing aspen habitat. The crews cut the trees without limbing

them, and left them in a jack-straw array to deter browsing ungulates and feral horses from damaging young aspen sprouts. An additional 55 acres of conifer removal treatment using Summitt Forestry was conducted in 2017 in both aspen and riparian habitat on private land (Figure 92).



Figure 93. BDA located on West Cottonwood Creek, Green Mountain.

The landowner is interested in reintroducing beaver to the West Cottonwood Creek Drainage. The site historically supported beaver colonies, as evident by dams, but decreases in flow and a decline in beneficial vegetation have led to their extirpation. Eight beaver dam analogues were built in West Cottonwood Creek to mimic the structure and function of natural beaver dams. These structures were built using all natural materials such as wood posts, willow branches, cut conifer branches, and sod clumps. A mini excavator and hydraulic post pounder were used to create post lines in the stream and a volunteer group worked for a half day to weave the willow and conifer branches through the posts. The semi-permeable structures will help improve riparian habitat by

increasing floodplain connectivity and retaining water during low flow times of the year. Additionally, the BDAs may bolster future beaver reintroductions on Green Mountain by providing starter dams and pool habitat for beaver. This effort is one of several pilot projects and will be monitored for five years to evaluate BDAs as a riparian restoration option in Wyoming (Figure 93).

A large riparian wetland was fenced using heavy duty steel drill-stem pipe fencing (Figure 94). This fence will eliminate grazing and browsing pressure from four acres within the riparian wetland to help maintain water holding capacity and improve riparian vegetation. The 1,600 feet of fencing was constructed using several volunteer work days and the Lander Habitat and Access crew. The work days included RMEF volunteers from the Bighorn Basin Chapter, Wyoming Wildlife Federation volunteers from Lander, WGFD volunteers from Lander, Riverton, Rawlins and Saratoga, and volunteers the landowner brought with him from Casper. The fencing is extremely sturdy, and easy to put together, but is cumbersome to move. It took two days to complete construction of the riparian fence. Another spring will be protected using the same fencing in 2018 with the help of additional volunteers.



Figure 94. Construction of drill stem pipe fencing around an important riparian wetland located on West Cottonwood Creek, Green Mountain.

Funding was provided by RMEF, Lander Economic Development Association, WGFD MDI, WBG-GLC, MFF -10 Country Chapter, and the Popo Agie Conservation District.

Ocean Lake WHMA NW Corner Irrigation Cells (Goal 2) – Derek Lemon and Nick Scribner



Figure 95. *Newly constructed water control structure.*

One of the limiting factors identified by Ducks Unlimited (DU) in their 2012 survey was a lack of shallow seasonal wetlands within the Ocean Lake WHMA. Such wetlands provide different plant communities and abundant food resources critical to migrating birds. Most wetlands within the watershed are semi-permanent marshes with deep water that provide little food resources for dabbling duck species.



Figure 96. *Flooding of new wetland.*

The northwest corner of Ocean Lake WHMA had several pieces of infrastructure already in place that was conducive to creating seasonal wetlands. Several earthen berms with relic water control structures were in place from preliminary work completed in the 1960s and 70s by WGFD personnel. The goal of this project was to upgrade, reconfigure, and rehabilitate this existing infrastructure (Figure 95) to create 6 individual irrigated cells ranging from 2.5 to nine acres in size. Objectives are to 1) enhance vegetation and increase plant diversity, 2) provide habitat needed for migrating waterfowl, 3) provide additional hunting and wildlife watching opportunities for the public, and 4) reduce sediment input to Ocean Lake.

Work was completed in September 2017. DU retained and managed the contractor for project completion. WGFD personnel assisted DU by regulatory navigation and water right procurement. The project consisted of installing a pump which charges a buried pipeline that is capable of delivering water to each of the six cells. Each cell can be controlled independently to allow the greatest flexibility for managing water levels to produce desirable food plants for waterfowl, control salinity, and maintain open water (Figure 96).

Ferris Mountain Guzzlers (Goal 5) – Ryan Amundson



Figure 97. Guzzler installation crew comprised of personnel from BLM, WGFD and volunteers.



Figure 98. Catchment apron and guzzler installed on Garden Creek.

In July 2017, over 40 individuals (Figure 97) representing the BLM, RMEF, WFWF, WyWSF, BOW and WGFD ascended Ferris Mountain to install four guzzlers and precipitation catchment aprons (Figure 98).



Water sources were limited on the upper elevations, resulting in bighorn sheep and other wild ungulates making long treks to lower elevations in search of water. The guzzlers and aprons were installed high on the mountain, adjacent to preferred bighorn sheep habitats. Remote, infrared trail cameras have been deployed on two of the sites, capturing photo documentation of the wildlife species using the guzzlers (Figure 99).

Figure 99. Elk using a Ferris Mountain guzzler.

Laramie Region



Wildlife in the Laramie Region will benefit from many habitat projects that were completed in 2017.

Aquatic habitat improvements include the completion of a fish passage project on Big Creek, restoring 1,050 linear feet of the Encampment River to address erosion and sediment deposits, and planning for revitalization of Crow Creek through Cheyenne.

Several terrestrial habitat projects were completed in the Platte Valley, including cheatgrass treatments, improving irrigation infrastructure, seeding meadows, mosaic mowing to enhance shrub growth, removing conifers from aspen habitat, converting woven-wire fence to wildlife friendly fence, and developing a 15-year Landscape Vegetative Analysis to improve 360,000 acres of wildlife habitat in the future.

Personnel in the Laramie Region maintained 11 Wildlife Habitat Management Areas and 40 Public Access Areas during 2017. Crews maintained more than 270 miles of fence, treated more than 700 acres of noxious weeds and irrigated more than 1,200 acres. The final 500 feet of the Heward Ditch pipeline was completed on the Wick/Beumee Wildlife Habitat Management Area to increase water delivery to irrigated hay meadows that provide forage for wintering elk and other wildlife.

Significant information and education projects across the region include employing Dynamic Messaging Signs to warn of migrating wildlife on highways, a three-day camp for 35 children to learn about wildlife management and habitat needs, installing nearly 100 information and road boundary signs on various WGFD commission-owned and managed properties, and completing articles and photographs on habitat projects in the Laramie Region newsletter.

ZN Ranch Upland Habitat Enhancements (Goal 2) – Ryan Amundson



Figure 100. *Brush mowing summer 2017.*

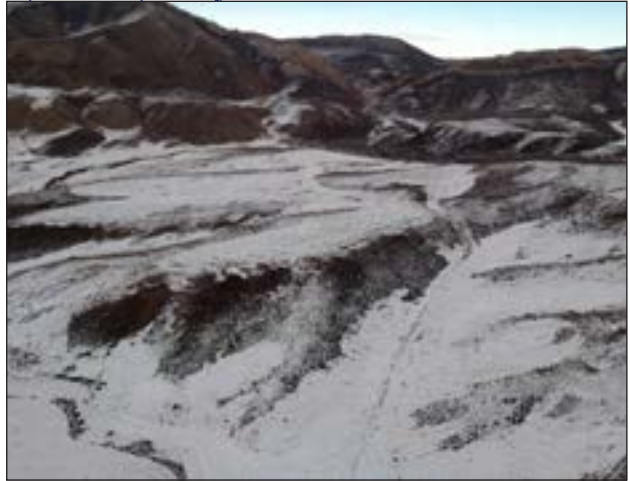


Figure 101. *Mowed areas west of Sheephead Mountain.*

In conjunction with the Department, the ZN Ranch north of Saratoga leased and operated a four wheel drive tractor and batwing brush mower for two months during summer 2017. Over 600 acres of dense sagebrush stands were mowed in a mosaic pattern (Figures 100-101) to promote seedling establishment and provide increased age class diversity in important mule deer transitional ranges. Following mowing in riparian areas along Rattlesnake Creek, broadcast seeding of native forbs and grasses was completed on 100 acres to assist with revegetation following soil surface disturbance. The seed mix is designed to provide early green-up species in the spring and will also serve as brood rearing habitat for sage grouse. Approximately 200 acres of southerly aspects on Sheephead Mountain were treated with Plateau herbicide to control cheatgrass in areas treated by prescribed fire in spring 2015. Funding for this portion of the project was provided by WWNRT.

Diamond Lake PAA Water Delivery Enhancements (Goal 2) – Todd Grosskopf, Kade Clark, Mac Foes and Rick Haremlink

The Water Delivery Enhancement site is located 33 miles west of Laramie and four miles north of I-80 in Carbon County, Wyoming. Historically, Diamond Lake has been known as a very productive fishing location in southern Wyoming. Now, after fifteen years of low water levels due to drought and changing irrigation practices the fishery has new life. In 2017, WGFD installed 5,750 feet of 24" A-2000 PVC SWR pipe, one 24" headgate, and one outfall structure including a flume that connects the Canon Ditch to the lake (Figure 102). With a new agreement with Wheatland Irrigation District and the pipeline installed, up to 1,500 acre feet of water will be delivered each year which will increase water levels needed to sustain a viable fishery. Fish Division stocked 6-7 inch trout in 2016 and by spring 2018 they should grow to 17 plus inches.



Figure 102. *Diamond Lake PAA Flume and outlet.*

Crow Creek Revitalization (Goal 2) – Christina Barrineau



Figure 103. Crow Creek downstream of Interstate 80 in Cheyenne identified for restoration in 2019.

Planning for the restoration of Crow Creek through Cheyenne started once again. Past attempts occurred in the 1990s and early 2000s. In February 2017, the City of Cheyenne authorized a MOU between the City of Cheyenne, Cheyenne Board of Public Utilities and the Laramie County Conservation District for Crow Creek restoration planning and implementation within city limits. The City's resolution also called for coordination among many entities for the restoration. Following this resolution, a group of local, state, and federal government agencies, non-governmental organizations, and interested individuals formed a coordinated group to lead the Crow Creek revitalization efforts. The group calls itself Crow Creek Revival and holds monthly meetings in Cheyenne.

Crow Creek Revival participants include City of Cheyenne, Cheyenne Board of Public Utilities, Laramie County Conservation District, WGFD, Wyoming DEQ, Curt Gowdy Chapter of TU, Laramie County, Cheyenne Chamber of Commerce, TNC, Pathfinder Ranches, and interested community members.

Crow Creek Revival's mission is to promote, enhance, restore, and revitalize the ecological values and functions of Crow Creek and its tributaries for public enjoyment. Crow Creek and Dry Creek are the main focus for restoration. In 2017, the group held a small fundraiser, gave presentations to local civic groups, and started developing a master plan. To jumpstart restoration efforts, Crow Creek Revival identified a reach on Crow Creek (Happy Jack Road to West Lincolnway Ave/Martin Luther King Park) for Phase I restoration efforts (Figure 103). Funds have been secured from WGFD, the City of Cheyenne, Curt Gowdy TU, and Wyoming DEQ to begin restoration planning on this reach. Implementation of Phase I is expected to begin at the earliest in 2019.

Rawhide WHMA Russian Olive/Salt Cedar Removal (Goal 2) – Jerry Cowles Jr.

The project objective is to remove all Russian olive and Salt cedar from the Rawhide WHMA using mechanical treatment and perform a herbicide treatment on re-sprouts. The noxious weed removal on the Rawhide WHMA is a small part of an overall effort to remove noxious weeds along the North Platte River from the Fort Steele Rest Area to the Wyoming/Nebraska State Line. This long term effort will consist of planting native grasses, shrubs, willows, and cottonwoods to help prevent noxious weeds in disturbed areas. Over the past three years a contractor using WWNRT grant funds removed approximately 300 acres of Russian olive with a track-hoe. The contractor ripped the tree's roots and piled the removed debris in windrows for wildlife. A second contractor performed a follow-up Basal Bark Oil and Element 4 herbicide treatment on re-sprout trees from the removal for two consecutive years. This project will improve riparian habitat along the North Platte River within the Rawhide WHMA. Funding partners include WWNRT, Northern Plains NWTF, WGFD, Upper North Platte River Weed Management Area, and Goshen County Weed and Pest.

Taylor, Faerber, Brooks Habitat Enhancements (Goal 2) – Katie Cheesbrough



Figure 104. *Deer using the conifer encroached aspen stands on the Faerber property.*

This project includes treatments to improve big game habitat in important seasonal ranges across the eastern slope of the Sierra Madres. The suite of enhancements includes 275 acres of cheatgrass treatment in 2015, as well as treatments targeting severely conifer encroached aspen stands, mixed mountain shrub enhancements, and riparian improvements. In cooperation with Wyoming State Forestry and the landowner, approximately 33 acres have been identified for aspen en-

hancements through commercial timber harvest on the Faerber property (Figure 104). Timber stand evaluation was completed in 2017 as well as the development of a Forest Stewardship plan. Timber harvest will begin in 2018.

Timber contractors were brought in to evaluate the Taylor aspen enhancement with 13 acres of severely encroached aspen stands slated for harvest. The landowner continued mechanical removal of small diameter conifer from an additional 18 acres of aspen in 2017. Approximately 65 acres of mixed mountain shrub enhancements were completed through a mosaic mowing (Figure 105) within a 120 acre project area on Taylor property in fall 2017.



Figure 105. *Mowing mixed mountain shrubs on the Taylor property to increase age class diversity, forage diversity and nutritional browse quality.*

Bump Sullivan PAA Inlet Ditch Maintenance (Goal 2) – Jacob Sorensen

Located southwest of Yoder, Wyoming sits a small reservoir known as Bump Sullivan that for the last three years has been fortunate enough to receive enough water to sustain a fishery. During the early winter, reservoirs like Bump Sullivan start to fill with water for irrigation. Habitat and Access personnel cleaned 12 miles of inlet ditch from the diversion on Horse Creek to the reservoir with assistance from the local irrigation company. This was the third consecutive year the reservoir was filled and now sustains a warm water fishery. As an irrigation reservoir, the Department maintains a viable fishery by leasing water shares from willing landowners.

Wick/Beumee WHMA Meadow Enhancement (Goal 2) – Micah Morris



Figure 106. *Wick/Beumee meadow enhancement.*

As part of the Wick/Beumee WHMA five year plan, irrigated fields/meadows have been hayed and re-seeded with a wildlife mixture to enhance forage palatability for wintering wildlife and reduce co-mingling between elk and cattle on private lands in the area. The seed mixture included crested wheatgrass, western wheatgrass, pubescent wheatgrass, sainfoin, small burnet, alfalfa and strawberry clover. During the 2017 field season, WGFD worked with a local contractor to harvest 260 acres of decadent vegetation weighing 230 tons (Figure 106). This hay operation allows lands managers to increase plant diversity and provide nutrient rich forage for migrating or wintering wildlife. Producing nutritious forage for wintering wildlife

helps neighboring landowners by reducing commingling between elk and cattle. The haying operation provides the contractor with one cutting per year on 300 acres in exchange for upgrades on the irrigation system and noxious weed control. The upgrades to the irrigation system ensure the Commission owned water rights are used across the adjudicated lands while maintaining return flows to Wagonhound Creek.

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

Maintaining or enhancing rangeland resources and riparian areas in several large BLM grazing allotments within the Shirley Basin is important for wildlife resources including pronghorn and mule deer. There were originally two parts to the proposed project. The first was water development involving spring developments, including approximately 3.5 miles of pipelines, drinking troughs (including wildlife ramps), wildlife exclosures, and a reservoir modification. The second element was the installation of over 20 miles of wildlife friendly fencing to divide large allotments into smaller pastures. The fencing allows managers to convert livestock grazing permits from summer, season-long use to rotated grazing systems incorporating deferment and recovery periods. The final phase was approximately 3 miles of wildlife friendly fence to divide a large pasture and spread use among three pastures (Figure 107). The recently completed fencing allows managers to rotate grazing for better vegetative recovery.



Figure 107. *Completed section of wildlife friendly fence.*
Photo credit Medicine Bow Conservation District.

Wildlife Habitat Management Areas (Goal 2) – Jerry Cowles Jr., Mark Cufaude, Micah Morris and Jacob Sorensen



Figure 108. *Discing hay meadow on Wick WHMA.*

The Laramie Region crew continued annual maintenance and improvements on eleven WHMAs (Figure 108).

The crew maintained 216 miles of fence and reconstructed three miles to wildlife friendly fence and installing 11 metal gates for the public. In 2017, 954 acres were irrigated several times throughout the irrigation season across the Laramie Region that included hay meadows, food plots, and dense nesting cover fields for wildlife. Dense nesting cover consists of green needlegrass, Canada wildrye, tall and intermediate wheatgrass, sweetclover, alfalfa, and prairie clover. With assistance from a contract farmer in Goshen County; 341 acres was planted for wildlife as well as

harvest. The crop included beans, sunflower, and grain sorghum, in which 20% was left standing for wildlife benefits. The crew added wildlife food plots on another 90 acres which consisted of sorghum sudan grass, alfalfa, buckwheat, annual rye grass, bluegrass, timothy, millet, and sweet clover, which was donated by Pheasants Forever Pine Bluffs Chapter. Seven acres of corn was planted, irrigated and harvested through the Exchange of Use Agreement with an adjacent landowner.

463 acres of noxious weeds were treated with both herbicide and biological controls on Laramie Region WHMAs. Road maintenance entailed installation of three cattle guards, four culverts, and 47 miles of road blading in which the crew hired private contractors to completed 29 miles. To keep the public informed and provide legal compliance the crew installed 76 new signs.

Rapid Habitat Assessments (Goal 5) – Katie Cheesbrough

RHAs occurred in MDI herds across the state to better assess habitat conditions in mule deer seasonal ranges (Figure 109). For the Platte Valley mule deer herd, ten rangeland assessments (17,377.5 acres), four aspen assessments (40.9 acres), and eight riparian assessments (228.62 acres) were conducted (~17,647 acres total). The information obtained from these assessments will primarily be used for Herd Objective Reviews (conducted every five years) and annual data will be summarized in Job Completion Reports (conducted annually). These data will provide population managers and the public with tangible information on the current state of mule deer habitat conditions.



Figure 109. *Platte Valley RHA monitoring.*

Platte Valley Invasives (Goal 2) – Katie Cheesbrough

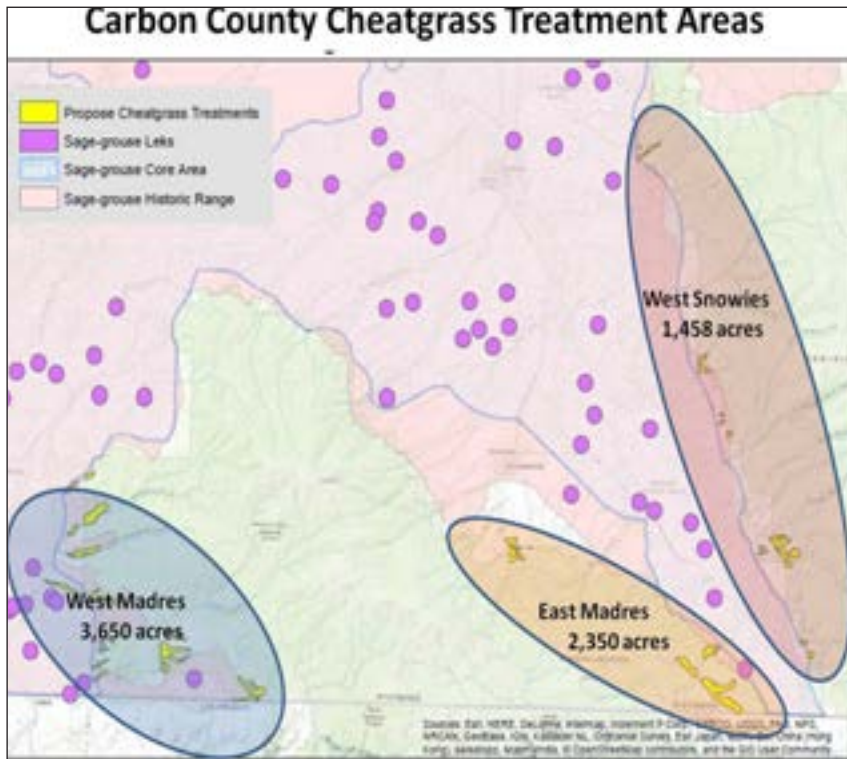


Figure 110. Proposed treatments to continue cheatgrass mitigation in both the Baggs and Platte Valley mule deer herds.

Aerial cheatgrass treatments continue to be conducted throughout the Platte Valley to mitigate the spread of cheatgrass. The BLM in cooperation with the Carbon County Weed and Pest (CCWP) treated approximately 1,643 acres of important big game habitats including 456 acres on Pennock Mountain, 246 acres on Prospect Mountain, and 941 acres on Miner Creek. These cheatgrass treatment efforts allowed the WGFD, CCWP, and USFS to showcase the importance of continued treatments across landownership boundaries including USFS, State, and private lands through funding from a USFS, State and Private Forestry - Sage-grouse Habitat/ Invasive Plant Mitigation Grant proposal. This proposal identified approximately 7,500 acres of cheatgrass treatments on USFS,

State, and private land from the west slope of the Snowy Range to the west slope of the Sierra Madres (Figure 110) and was awarded \$296,980 for treatment and monitoring for the next three years. Another collaborative grant for leafy spurge treatments through the Upper Platte River corridor was also successfully funded at \$143,880 to treat 5,000 acres.

Comfort Station Vent Covers (Goal 5) – Jerry Cowles Jr, Mark Cufaude, Micah Morris and Jacob Sorensen



Figure 111. Comfort station vent covers.

Personnel from the Laramie Habitat and Access performed annual maintenance on 44 comfort stations around the region, and part of the maintenance was installing vent screens (Figure 111). The goal is to save cavity nesting birds from being entrapped in vault toilets, yet allow proper ventilation. Most comfort stations have two vent pipes that mimic the natural cavities preferred by various bird species for roosting and nesting. All 44 comfort stations on WGFC lands in the Laramie region now have vent screens attached. Partners like the Teton Raptor Center, The Wyoming Community Foundation and the Audubon Society made this project affordable and effective for protecting cavity nesting birds.

Encampment River - Riverside Restoration Phase 1 (Goal 2) – Christina Barrineau and WLCI, Jim Wasseen

Construction of the Encampment River – Riverside Restoration Phase 1 was initiated in 2017. The 1,450 linear ft project reach is located directly east of Riverside, Wyoming and directly upstream of the Highway 230 bridge. The reach is immediately downstream of the Encampment River – Grand Valley Diversion Replacement that was completed in 2013. Seven different landowners own property through the project area requiring close coordination.

The Encampment River – Riverside Restoration Phase I reach is a meandering gravel bed stream. Streambank erosion was occurring on several meander bends along with excess sediment deposition in the reach. Landowners were concerned about property protection and trout habitat. The goal was to reduce sediment from streambanks and improve wild trout habitat. Broad project objectives included decreasing streambank erosion and increasing bedform diversity.

Approximately 1,050 linear feet was completed during fall 2017. With the start of Brown Trout spawning (October 15), construction was halted and no further work was completed in 2017. The following structures were installed: one constructed riffle, two j-hooks, one straight vane, and 320 feet of toe wood bank stabilization. Two wetland areas were enhanced to provide additional fill. Additionally, the channel was re-aligned and channel dimensions were adjusted to decrease the width/depth ratio (Figure 112). Phase 1 restoration will be completed following 2018 run-off. Planning efforts are underway for additional phases of Encampment River restoration near Riverside.



Figure 112. *Constructing a narrower and deeper channel at the Encampment River-Riverside Phase I Restoration.*

WWNRT provided major funding. Additional partners included SERCD, NRCS Resource Conservation Partnership Program, WGFD, WLCI, TU, USFWS, and private landowners. The contractor was Olson Excavating and engineering was provided by WWC Engineering and 5 Smooth Stones Restoration.

Public Access Area Maintenance (Goal 2) – Jerry Cowles Jr., Mark Cufaude, Micah Morris and Jacob Sorensen



Personnel from the Laramie Region Habitat and Access performed annual maintenance and monitoring of the 40 regional PAAs (Figure 113). The crews maintained 63 miles of stock fence to protect aquatic and riparian habitats, install and adjusted seven boat docks, improved 24 miles of road conditions, installed informational signage, and repaired damaged recreation facilities for public safety. A private contractor was hired to spot spray 71 acres of noxious weeds throughout the Laramie Region.

Figure 113. *PAA maintenance.*

Pennock WHMA Habitat Improvements (Goal 2) – Katie Cheesbrough and Mark Cufaude

The Pennock WHMA contains important habitat for elk, mule deer, pronghorn, sage grouse, and other wildlife. Habitat enhancements proposed for this project included cheatgrass control, irrigation infrastructure improvements, and meadow interseeding. Cheatgrass treatments and cooperative trials were implemented in 2015 with continued intensive post-treatment monitoring through 2017. Meadow interseeding and irrigation improvements began in 2016 and continued in 2017. An additional 38 acres of



meadows were interseeded (Figure 114) with a mix of legumes and grass to increase available wildlife forage. Irrigation improvements continued in 2017 with the purchase of irrigation pipe (2.83 miles of gated irrigation pipe and 0.84 miles of transport pipe) and supplies necessary to increase irrigation efficiency by 50 acres for wildlife on the WHMA.

Figure 114. *Interseeding irrigated meadows on Pennock WHMA to increase wildlife forage.*

Forage production and utilization monitoring began in 2014 on the Pennock WHMA to determine forage availability. Sites were selected based on elevational ranges and vegetative types and included the irrigated meadow portions of the WHMA. Total production on the WHMA in fall 2016 was measured at 504 lbs/acre.

Forage utilization was measured in spring 2017 at 271.7 lbs/acre. This leaves a balance of 232.3 lbs/acre of residual forage on Pennock WHMA for 2016-2017. Production samples collected on July 19, 2017 amounted to 475 lbs/acre. 2017 production was the lowest exhibited in the past four years (four year average is 540 lbs/acre) which correlates with the lower precipitation received in the area during the 2017 growing season.

Wick Educational Kiosk (Goal 4) – Micah Morris and Jerry Cowles Jr.

With funding assistance from Wyoming Office of Tourism, RMEF, WGF, and WYDOT an educational kiosk was installed with wildlife viewing binoculars at the Wagonhound rest area (Figure 115). There are two informational signs that educate the public. One discusses elk; summer and winter range, diet, and antlers. The other gives the public information about the Wick/Beumee WHMA ranging from instream flow to the historic overland Cherokee Trail.



Figure 115. *Wick educational kiosk.*

Big Creek Fish Passage (Goal 2) – Christina Barrineau



Figure 116. *Big Creek Diversion before fish passage construction.*



Figure 117. *Big Creek Fish Passage rock ramp fishway after construction.*

Fish passage at the Henry and Casteel Diversion on Big Creek was completed in 2017. The diversion is located on Big Creek Ranch approximately 11.5 miles upstream from the confluence with the North Platte River. The channel spanning diversion supplies two headgates, one on each side of the river. Casteel Ditch services hay meadows to the north, while the Henry Diversion supplies hay meadows to the south. Before construction, the diversion dam was a concrete structure with a steep grouted rock face on the downstream side (Figure 116). The ranch did not want major changes to occur to their irrigation operations, so the location of the headgates and diversion wall remained.

The construction of the 315 ft Big Creek Fish Passage reach took approximately 16 days in September. The contractor was Lefthand Excavating and engineering was provided by Green Watershed Restoration and WWC Engineering. A new rock ramp fishway was constructed on the downstream side of the diversion dam. The former steep, grouted rock face was replaced with a less steep grouted rock face (Figure 117). Large boulders were strategically placed within the grouted surface to provide favorable velocities and resting areas for Brown Trout and Rainbow Trout passage. Two boulder structures were placed downstream of the diversion dam to provide additional grade control. Eroding banks downstream of the diversion were graded to a more stable angle. Several willow clumps were added to the streambanks along with native seeding of disturbed areas.

WWNRT was a major funder. Additional partners include WGFD, Saratoga Encampment Rawlins Conservation District, TU, WBGGLC, Trout and Salmon Foundation, NRCS Regional Conservation Partnership Program, USFS, BLM, and Big Creek Ranch/Cody Resources LP.

Red Rim Grizzly WHMA Grazing (Goal 5) – Mark Cufaude

Red Rim Grizzly WHMA is comprised of 38,000 acres. This includes 9,451 acres of OSLI land, which is leased by the Commission, 26,920 acres of BLM and 1,664 acres of WGFC fee title lands. Three cattle operators annually graze the Red Rim Grizzly WHMA, collectively consuming approximately 5,882 AUMs. In exchange for grazing on Red Rim Grizzly, the grazing lessees defer grazing on important wildlife habitats on private and BLM lands. The operators also provide labor on the Red Rim Grizzly such as construction of stock or wildlife water tanks, replacing stock fence to wildlife friendly designs and habitat improvements.

Platte Valley Habitat Partnership (Goal 5) – Katie Cheesbrough

The Platte Valley Habitat Partnership (PVHP) continued in its fourth year of collaborative project implementation. In anticipation of the USFS Landscape Vegetation Analysis (LaVA) finalization and a need to complete implementation of previously funded projects, new project applications were not submitted in 2017. However, extensive coordination with cooperators to prepare a large, multi-year proposal in 2018 is underway. The BLM continues to implement their large-scale conifer encroachment project with mechanical removal of junipers and follow-up prescribed burning. In cooperation with the Carbon County Weed and Pest (CCWP), the BLM also expanded efforts to mitigate cheatgrass in the Platte Valley with an additional 1,643 acres of aerial cheatgrass treatments. The WGFD expanded irrigated meadow enhancements on the Pennock WHMA as well as continued work with landowners on aspen enhancement projects and mechanical shrub enhancements.

Rob Roy and Hog Park PAA Boat Dock Replacement (Goal 3) – Micah Morris and Jerry Cowles Jr.

With assistance from the Medicine Bow National Forest, two new floating boat docks were installed on Rob Roy and Hog Park Reservoir (Figure 118). The docks replaced unsafe floating docks and now allow sportspersons to safely enter and exit the reservoir with boats. The new dock will stay in position during high wind events as well as reduce maintenance.



Figure 118. *Boat dock replacement.*

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

The Upper Platte Valley Weed Management Area project entails inventorying, monitoring, and treating noxious weeds; mainly leafy spurge, musk thistle, Canada thistle, and spotted knapweed. Treatment consists of herbicide application and manual treatments to control weeds (Figure 119). One of the main goals is preventing weed encroachment onto adjacent USFS and private lands and restricting weed infestations to the currently affected landscape. A secondary goal is removing or containing other noxious weeds to prevent further degradation and improve wildlife habitat quality and livestock forage. The Upper Platte Valley area provides crucial winter habitat and seasonal habitat for elk, deer, antelope, 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. Inventory for weeds, chemical treatments of known and new infestations, and monitoring of past treatments were carried out on state, federal, and private lands in June and July, September and October 2017. Regularly treating this area in the past has thinned infestations to the point that the majority of locations do not need aerial treatments. To continue reducing infestation density, on-the-ground infestation maintenance must continue. Treatments were also completed by the ranch owners and CCWP.

Figure 119. *Mature (5+ year old infestation) leafy spurge treated with herbicide. Photo credit BLM.*

Baggs Mule Deer Initiative (Goal 5) – Katie Cheesbrough

The Baggs MDI Working Group applied for their first round of MDI funds in 2016. In cooperation with the Little Snake River Conservation District (LSRCD) and BLM, work began in 2017 on serviceberry thinning on private land and cheatgrass treatments in the Poison Buttes Allotment (1,795 acres). The Baggs MDI working group completed a draft of the Baggs MDI Planning Document which will guide habitat work into the future.

Wick WHMA Heward Ditch (Goal 2) – Todd Groskopf, Mac Foos, Kade Clark and Rick Harmelink



Figure 120. *Heward Ditch outlet.*

man protection to ensure water is correctly transported to meadows (Figure 120). Funding partners include WWNRT, RMEF, and WGFD.

The WGFD Habitat and Access Crew has converted approximately 10,600 feet of open Heward Ditch on steep-side hills into 42” Duromaxx HDPE pipe in the foothills of the Snowy Range Mountains. 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 3,700 linear-feet of 42” Duromaxx pipe during the summer 2015, 6,400 linear feet during summer 2016, and completed the remaining 500 feet in 2017. In addition to installing 10,600 feet of linear pipe, a 42” Femco head-gate structure was installed to ensure correct water distribution between WGFD and other water rights holders. Also, during the 2017 field season the WGFD installed a steel corrugated metal outlet structure 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 120). Funding partners

Platte Valley Migration Messaging Signs (Goal 5) – Katie Cheesbrough

In 2017, two Dynamic Messaging Signs (DMS) were purchased to help reduce wildlife/vehicle collisions in the Platte Valley in big game high-use/migration areas. The WGFD and WYDOT worked cooperatively to identify specific locations and times where wildlife/vehicle collisions are highly probable with both collision data and mule deer GPS collar data. The two DMS were then deployed in fall 2017 (Figure 121) with messages indicating that wildlife are on the road and that motorists should reduce their speed. These signs were moved to different areas of the valley based on wildlife movements and to ensure that motorists didn’t become habituated to the signs. We intend to continue to work with WYDOT to analyze collision and animal movement data to quantify reductions in collisions.



Figure 121. *Dynamic messaging signs deployed by WGFD and WYDOT in big game high use areas.*

Table Mountain WHMA Water Delivery Enhancements II (Goal 2) – Jacob Sorensen and Jerry Cowles Jr.



Figure 122. *Agri-Drain being installed (left) and after installation (right). Photo courtesy DU.*

Water Delivery Enhancement Phase II was completed with assistance from Ducks Unlimited (Figure 122). This allows WGFD to better apply and control available water supplies throughout the eight impoundments located on the Table Mountain WHMA. The Habitat and Access Crew performed 7,392 feet of dike maintenance that included hauling 2,200 yards of fill material and concrete riprap donated by area landowners. The crew was able to stabilize eroding dikes between the impoundments and stockpile materials for contractors. Working with Ducks Unlimited and contractors, the installation of five agri-drain water control structures, and 1,100 feet of 18” water transport pipe were installed during 2016 - 2017 winter. Water level adjustments provide land managers the opportunity to develop wetland plant communities by fluctuating water levels in the impoundments and provide waterfowl habitats throughout the Table Mountain WHMA. The objective is to promote growth of early succession vegetation communities that provide seeds and substrate for invertebrates that will attract and nourish foraging waterfowl species. Funding partners include WWNRT, DU, and WGFD.

Springer WHMA Pivot (Goal 2) – Jacob Sorensen and Jerry Cowles Jr.

As part of the Springer WHMA 5-Year Plan, irrigated fields are being farmed to restore nutrient conditions for the soil while providing grain or nesting cover to waterfowl and upland birds. During the 2017 field season, the WGFD worked with a local contractor to harvest 285 acres of grain crops while leaving stubble for wildlife cover, providing noxious weed control, and updating irrigation. This operation allows lands managers to increase plant diversity and provide crop rotation to improve soil conditions. The upgrades to the irrigation system ensure the Commission owned water rights are used across the adjudicated lands while supporting fisheries. This pivot will be used to irrigate both farmed acreage as well as dense nesting cover on the WHMA which creates food sources and habitat for pheasants, turkeys and waterfowl, as well as deer and many other types of wildlife. Applying irrigation to the adjudicated acres provides managers flexibility in crop selection by adding food plots, grain crops, and cool season grasses for waterfowl and upland birds sustainability. This new irrigation pivot also increases opportunities for hunting and wildlife viewing. The irrigation pivot allows managers the flexibility to irrigate the field under the pivot or use it as a mainline and transfer the water to several ponds for waterfowl. Funding for the project comes from WGFD and farming contracts.

USFS Landscape Vegetation Analysis Project (LaVA; Goal 5) – Katie Cheesbrough and Ryan Amundson

In 2017 biologists from WGFD worked with the USFS and a variety of other federal, state, and local cooperators on planning the Landscape Vegetation Analysis (LaVA) project for the Medicine Bow National Forest. LaVA institutes conditional NEPA, thereby increasing efficiencies for planning vegetation treatments intended to work toward a more natural and healthy forest landscape. This project proposes to treat up to 360,000 acres over the next 15 years using a variety of treatment methods to diversify age classes and types of forest communities. Implementation of the LaVA project will have many benefits for wildlife as it will extend habitat work being done within the Mule Deer Initiatives (MDIs) in the project area. The Platte Valley, Sheep Mountain, and Baggs MDI efforts will be able to more efficiently move forward with implementing large-scale, cross-boundary treatments in big game summer and transition ranges.

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



Figure 123. Leafy spurge infestation in 2015 (left) and in 2017 (right). Note the reduction of leafy spurge and increase in the native vegetation community. Photos courtesy Jen Skeldon, BLM.

The Ferris Mountain Wilderness Study Area (WSA) Leafy Spurge project involves an informal partnership between the BLM, the State of Wyoming, WLCI, CCWP District, and the owners of the 47 Ranch and Ferris Mountain Ranch. This effort entails inventorying, monitoring, and treating the WSA and adjacent hogback ridges for invasive weeds; mainly leafy spurge, whitetop, and Russian knapweed. Treatment consists of applying herbicide to control weeds in this extremely rugged area (Figure 123). The main goal is restricting weed infestations to the currently affected landscape. A secondary goal is removing or containing other noxious weeds to prevent further degradation and improve wildlife habitat and livestock forage. Chemical treatments, inventory, and monitoring were carried out on state, federal, and private lands in June 2017. Regularly treating this area in the past has thinned infestations to the point that aerial treatments have not been conducted and may not be necessary in the future. On-the-ground infestation maintenance must continue to reduce weed densities. Treatments were also implemented by the ranch owners. Six new infestation locations were found during the 2017 treatment season and subsequently treated.

Platte Valley Fence Conversions (Goal 2) – Katie Cheesbrough



Figure 124. Before (left) and after (right) fence conversion in the Platte Valley.

Approximately 26 miles of fence throughout the Platte Valley mule deer herd unit have been collaboratively identified for conversion to wildlife-friendly design with the WGFD, BLM, and Saratoga-Encampment-Rawlins Conservation District (SERCD). The proposed fence conversions cross mule deer migration paths and high-use areas as identified by GPS collar data. These fence conversions are intended to increase overall habitat connectivity and decrease big game mortalities. In 2017, approximately 8.6 miles of woven wire or other hazardous fence were converted to wildlife friendly designs (Figure 124). Ten additional miles of fence have been targeted for conversion in 2018.

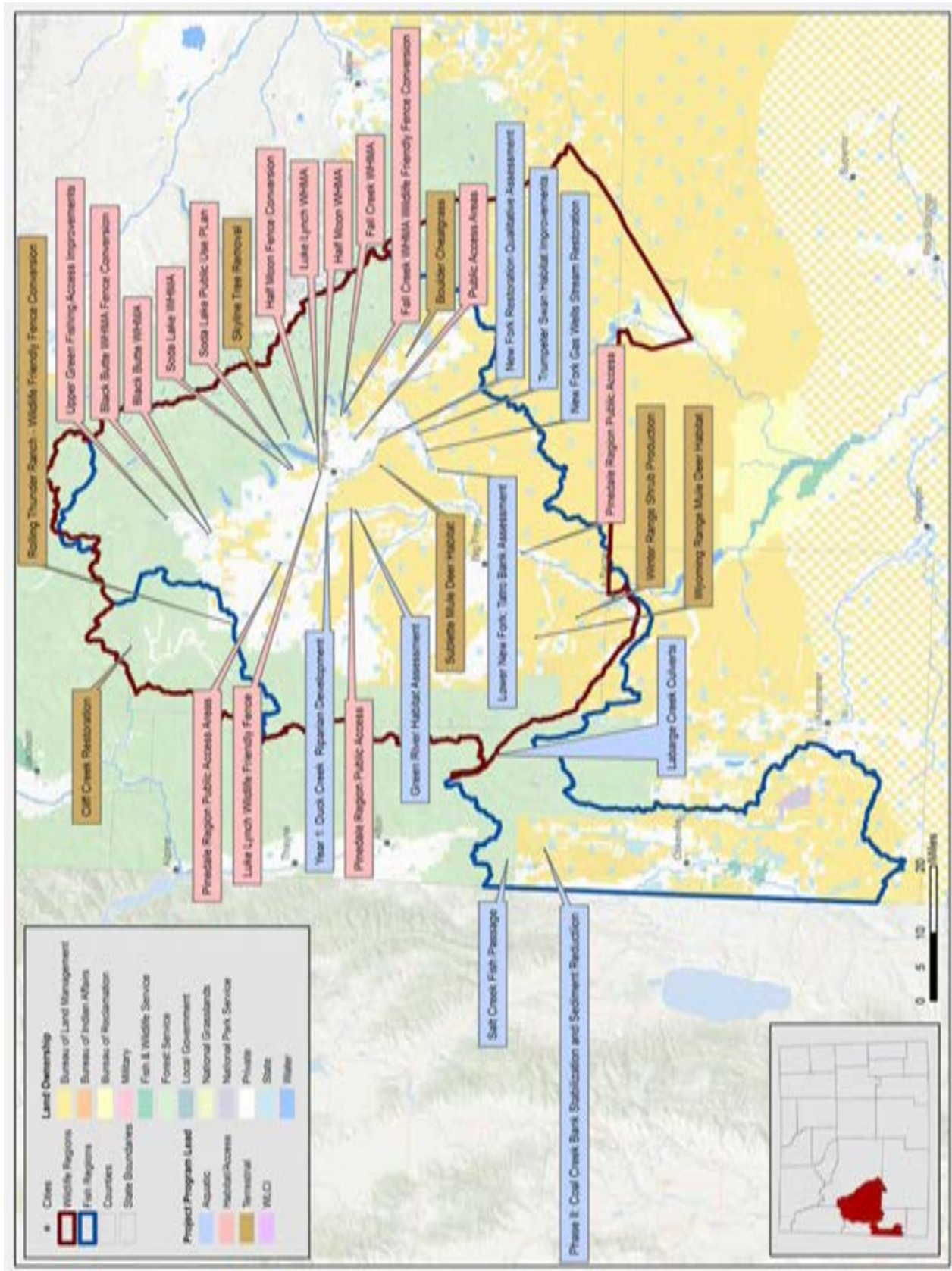
Platte Valley Conifer Encroachment (Goal 2) – Katie Cheesbrough

As part of the collaborative PVHP effort, the BLM is continuing large-scale conifer encroachment efforts in the Platte Valley. The South Corral Creek project focuses mostly on removal of encroaching juniper in mixed mountain shrub communities through lop and scatter methods with some additional understory conifer slash and broadcast burning in limited aspen habitats. In 2017, approximately 136 acres of juniper lop and scatter treatments were implemented, completing the 502 acres of work originally proposed in the South Cottonwood, North School Creek, and South School Creek units. As follow up to the School Creek mechanical juniper removal treatments and Teddy Creek aspen enhancements completed in 2015 and 2016, an estimated 79 acres of slash piles were burned (Figure 125). Lastly, in the Barrett Ridge area where mechanical juniper treatment and subsequent prescribed burns were conducted, follow up invasive weed treatments were implemented on nine acres targeting musk thistle, leafy spurge, and toadflax.



Figure 125. Slash piles from juniper encroachment treatments burning in the School Creek project unit.

Pinedale Region



Pinedale Region



The Pinedale Region essentially encompasses the area between the Wyoming, Gros Ventre and Wind River mountain ranges in western Wyoming.

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 it continues 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.

Much of the aquatic habitat related activities focus on riparian habitat improvements and the development of wetlands. Riparian habitats have been improved through channel improvements to allow fish passage, sediment reduction and livestock grazing management. One riparian habitat project on private land west of Pinedale involved transplanting willow cuttings to serve as a research project while also improving bank stabilization.

The wetland developments are part of a large-scale, multi-year effort between the WGFD 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 corridor, determined to be the longest big game migration in the contiguous 48 states.

Rolling Thunder Ranch - Wildlife Friendly Fence Conversion (Goal 2) – Troy Fieseler, PAPO, Phil Damm and WLCI, Jim Wasseen



Figure 126. Newly constructed fence on the Rim Ranch is intended to decrease wildlife fence-related mortalities.

This is a continuation of efforts to improve both habitat within migration corridors and provide overall habitat quality improvements on the Rolling Thunder and Rim Ranches. With both properties fully encompassed by the WGFD-designated Sublette Mule Deer Herd crucial migration corridor, conversion of traditional 5-strand barbed wire fences to wildlife friendly designs is a priority. Following progress exhibited in 2016 with approximately six miles of fences converted, an additional 3.97 miles was completed in 2017. Fences were constructed with a wooden top rail followed by three strands of wire including a smooth bottom strand (Figure 126). With the completion of this project, all boundary and interior fences on these properties (over 20 miles) now adhere to wildlife friendly standards.

This project will not only help mule deer, but all big game animals that move through the area. This effort could not have been accomplished without funding from partners including Pinedale Anticline Project Office, WGBGLC, WLCI, and WWNRT.

Upper Green River Fishing Access Improvements (Goal 3) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Fishing access improvements were made to three sites on the upper Green River. USFS and WGFD plans were implemented to create access roads and parking areas delineated with boulder barriers to prevent resource damage. Two primitive ramps were improved and a Geoweb ramp installed at Dollar Lake in the upper Green River area (Figure 127). Further planning and repairs are scheduled for 2018.



Figure 127. Geoweb ramp installation at Dollar Lake.

New Fork River Qualitative Habitat Assessment – Luke Schultz



In fall 2017, several float trips were completed on the New Fork River from Pinedale to the confluence with the Green River to evaluate habitat along this reach, familiarize the Pinedale Aquatic Habitat Biologist with landowners, and identify and prioritize current and potential habitat issues. At specific banks, measurements were taken to estimate sediment contributions and prioritize future treatments. Moving forward, a restoration plan for the New Fork is being drafted to address habitat issues along this corridor (Figure 128).

Figure 128. Eroding bank on the New Fork River to be addressed following comprehensive planning.

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

The Wyoming Range Mule Deer Habitat Project is a cooperative endeavor between WGFD and Pinedale BLM targeting improvements to mule deer habitat in the Big Piney and LaBarge areas. This habitat project is intentionally landscape-scale and will be conducted over a 10 year period, starting in 2014. Over 30,000 acres of vegetation treatments on winter and transitional ranges are being targeted and an additional ~20,000 acres are slated for cheatgrass control (Figure 129). The treatments target many vegetation types including Wyoming and mountain big sagebrush, bitterbrush, true mountain mahogany, salt desert shrub and aspen communities. Implementation techniques include brush mowing, Lawson aerator, Dixie harrow, seeding, Spike, herbicide, fencing, conifer thinning, and prescribed burning.

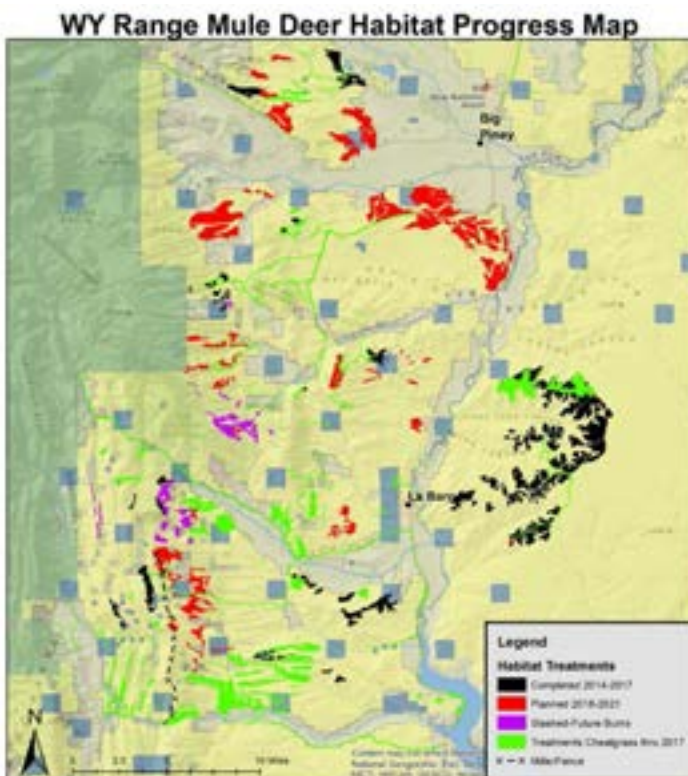


Figure 129. Completed treatments and areas to be completed from 2018-2021.



Figure 130. Pine Grove prescribed burn.

Cumulative project accomplishments (2014-2017) include: 11,627 acres of sagebrush thinning, 2,886 acres of aspen mechanical preparation, 911 acres of aspen prescribed burns, 12,350 acres of cheatgrass herbicide application, 3,824 acres of cheatgrass hand grubbing, eight livestock riders, 11 miles of fence construction, and one reservoir renovated to influence livestock distribution.

Figure 131. Overall excellent herbaceous response to sagebrush mowing three years post-treatment located west of Fontenelle Reservoir.

In 2017 accomplishments included: 3,175 acres of sagebrush mowing, 778 acres of aspen mechanical preparation (slashing and cut-pile), 707 acres of prescribed burning in aspen communities (Figure 130), 6,242 acres of cheatgrass herbicide application, 1,730 acres of cheatgrass hand grubbing, and hiring of four livestock riders to manage livestock distribution post-treatment.





Figure 132. *Favorable aspen seedling response to a prescribed burn west of Miller Mountain in Dutch George Creek; pre-burn (left) and one year post-burn (right).*



Figure 133. *Seedling sagebrush responding to favorable growing conditions one year post-mowing in the Little Colorado Desert.*



Figure 134. *A fawn mule deer born in an area with good forage resulting from a previous prescribed burn to enhance aspen habitat. This deer was collared as part of an ongoing research project conducted by UW, Haub School of ENR and WGFD.*

Extensive vegetation monitoring has been conducted throughout the project area. The data and reports have been compiled by WGFD and are available upon request. Generally, vegetation has responded very well to disturbance (Figure 131) with increased aspen density within prescribed burn areas (Figure 132), improved leader lengths on sagebrush plants, increased herbaceous species production (Figure 133), reduction of cheatgrass, and establishment of newly seeded species in treatments. A summary report will be generated in 2018 summarizing monitoring results from 2014-2017. Overall objectives include improving forage for mule deer (Figure 134) in order to improve doe nutritional condition, thereby increasing fawn survival and ultimately increasing overall population numbers.

Nearly \$4.2 million has been secured and over \$100,000 of in-kind support has been contributed by BLM and WGFD from 2014-2017. Partner funding includes contributions from WWNRT, WLCI, Denbury Energy, Exxon, MFF, RMEF, WGBGLC, BLM and WGFD.

Wyoming Temperature Metrics and Database (Goal 1) – Luke Schultz

Water temperature data are routinely collected in Wyoming and each aquatic habitat biologist has been collecting annual stream temperature records from at least two sites in each region. These records provide an informational baseline and allow periodic analysis for water temperature changes. In 2017, WGFD began developing a data storage methodology and a set of standard reporting metrics. Much of the early development of the data storage approach involved working with collaborators at the U.S. Geological Survey to tailor existing stream temperature databases to Wyoming needs.

A suite of reportable metrics was developed to describe thermal regimes in terms of magnitude, frequency, duration, and timing of events. These metrics were gleaned from the literature and refined based on questions specific to Wyoming streams and fisheries. These metrics are recommended for summarizing annual stream temperature datasets and will allow comparison between years and across regions. However, these metrics can also be modified to address other hypotheses or management questions.

Winter Range Shrub Production (Goal 5) – Jill Randall and Troy Fieseler

Generally, the amount of new shrub growth (production) is tied to the amount of precipitation during the growing season. The more precipitation falling April-June usually equates to an increase in production of winter range shrubs. In 2017 we did not see this trend, however, we recorded excellent true mountain mahogany production as compared to the previous year (Figure 135). 2017 leader production on true mountain mahogany increased from an average of 4.14 inches in 2016 to 5.13 inches across five monitoring transects. You may be wondering what may have contributed to increased production despite the dry spring conditions? The answer is the winter of 2016/2017. The significant snowpack created a moisture reserve that plants were able to tap into well into the growing season, therefore offsetting a relatively dry spring.

This appears to be a potential silver lining for the tough 2016/17 winter. An extreme winter with heavy snow pack acts as a “recharging” mechanism placing more moisture into the soil profile where plants can take advantage of it. Increased forage quantity paired with fewer mouths to feed equals healthier animals. The deer that survived last winter were able to reap these benefits and showed up on winter ranges with great body condition.

WGFD continued to monitor other shrub species within habitat treatments, documenting in some cases a four-fold production increase in treated versus untreated areas (Three Buttes Dixie Harrow treatment completed in 2014), with many areas at least doubling production two years post-treatment. When applying treatments in shrub communities, WGFD is looking to not only increase plant production, but also increase age-class diversity by creating conditions favorable to the establishment of younger shrubs. This ensures long-term viability of these communities which will help support deer populations into the future.

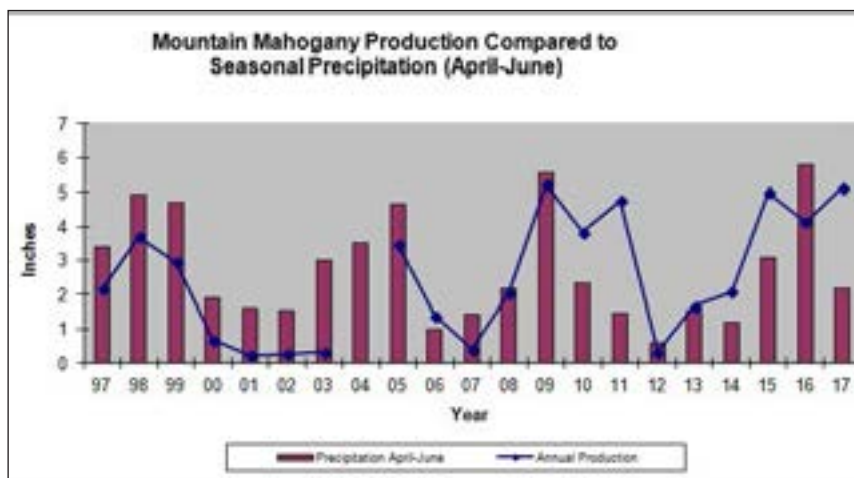


Figure 135. Production on true mountain mahogany compared with precipitation for April through June, as collected on the Calpet winter range.

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

A 2017 cheatgrass management program located in the Boulder area was the largest and most aggressive attack on invasive annual grasses completed in Sublette County to date. Cooperative efforts between private landowners, Sublette County Weed and Pest, NRCS, BLM and WGFD resulted in 12,936 acres treated through aerial and ground application methods. Monitoring efforts were cooperatively completed on over eight locations including pre- and post-treatment efforts. There are also five separate cheatgrass trials in various phases of completion occurring on Fall Creek and Half Moon WHMAs, as well as private land and roadsides in Sublette County.

Additionally, the Sublette Invasives Task Force has successfully encouraged the Bridger Teton National Forest to initiate a NEPA analysis allowing for the use of aerial application of herbicides to control annual invasive grasses. The EIS process was started in 2018 and treatment implementation could occur in 2020.

Coal Creek Stabilization (Goal 2) – Luke Schultz and WLCI, Jim Wasseen

Coal Creek is a primary perennial tributary to the Thomas Fork River, and the watershed contains an important population of Bonneville Cutthroat Trout and relatively intact assemblage of native fishes. Aquatic habitats and stream function in Coal Creek have been degraded by high sediment levels from various sources. In particular, the Coal Creek Road has been identified as a major contributor because portions of the road were constructed within the active floodplain. Additionally, fish passage at several locations in Coal Creek is impaired by undersized and perched culverts at road crossings. Road access is limited by poor road conditions near the stream during inclement weather.

To address these habitat and road access issues, this project was initiated in the late 2000s and will be completed in two phases. The first phase replaced two undersized culverts on Coal and Little Muddy Creeks in 2015, and Phase II began in fall 2017 and will be completed in 2018. Phase II addresses habitat and road access maladies by restoring riparian and upland vegetation, constructing bankfull benches and toe wood along stream banks, completes borrow ditch and road drainage upgrades, and reduces bank angles at ten remaining sites along a 2-mile section of Coal Creek Road. A contractor has been hired to complete the remaining project sites in 2018.



Figure 136. *Several meetings with project partners and engineers on the Coal Creek project helped to refine designs and prioritize sites for construction in 2018.*

In 2017, several site visits with project partners (BLM, WGFD, private landowners) were conducted to coordinate project activities, revise project designs, and communicate project time lines (Figure 136). Adjustments and refinements were made to site treatment approaches that reduced estimated project costs and assured long term stability of the stream restoration.

Considerable funding contributions were provided by WWNRT and WLCI, with additional contributions from WGFD and the Western Native Trout Initiative. In-kind contributions from WGFD and BLM have also been critical.



Soda Lake Public Use Plan/Campsite Construction (Goal 3) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Improvements continued on Soda Lake WHMA to address increased use. Eight campsites were improved with access road and parking resurfacing. Boulder parking barriers and signs were placed to prevent resource damage from off road vehicles. Permanent campfire rings were added for safety and picnic tables were added for the public to use while enjoying Soda Lake (Figure 137). Additional work to address the public use plan and WHMA management goals is scheduled for 2018.

Figure 137. Map of improved campsites on Soda Lake WHMA.

Cliff Creek Ungulate Nutrition Research (Goal 5) – Ben Wise, PAPO, Phil Damm and Jill Randall

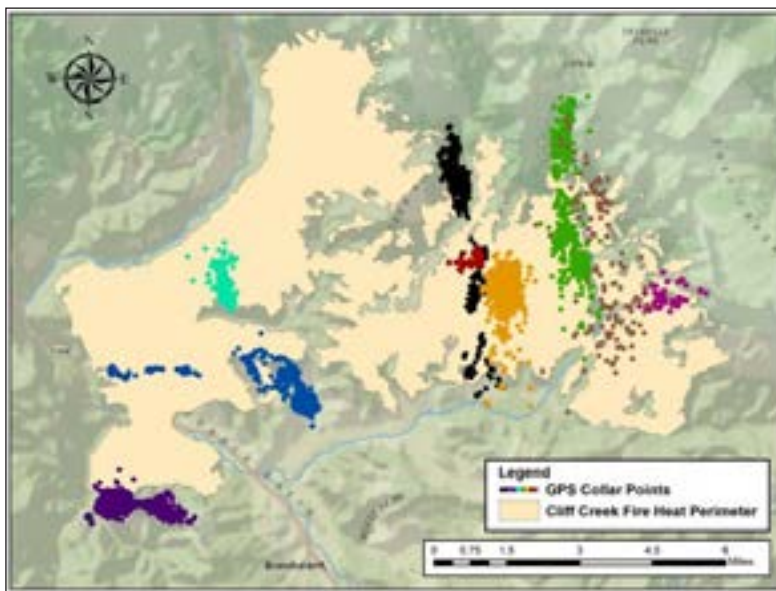


Figure 138. In 2017 nine collared adult female mule deer from the Sublette Mule Deer Herd spent the summer within the Cliff Creek Wildfire burn area.

An ongoing graduate research study coordinated through the University of Wyoming COOP is evaluating different migratory strategies employed by mule deer in the Sublette mule deer herd. Strategies include long-distance, medium distance, and short-distance migrants. The multi-year nature of this study provides an opportunity to evaluate how mule deer respond to landscape changes, such as removal of fencing barriers, habitat enhancements, or forest fires on summer range, such as the Cliff Creek Wildfire. One component of the project specifically evaluates how the Cliff Creek Wildfire could alter use and habitat quality of mule deer summer ranges for those individuals that migrate to the Hoback Basin (Figure 138).

In summer 2016, prior to the Cliff Creek Wildfire, six collared adult female mule deer from this herd spent the summer within the burn area and three individuals migrated through the burn area (two individuals had stopover sites within the fire boundary). Comparatively, in summer 2017, after the Cliff Creek Wildfire, nine collared adult female mule deer spent the summer within the burn area and four individuals migrated through the burn area (one individual had a stopover site within the fire boundary). Throughout summer 2017, COOP graduate student Anna Ortega and two field technicians sampled three different mule deer summer ranges within the Cliff Creek burn area (Figure 139), at three intervals throughout the summer (i.e., early June, late June/early July, late July). At each



Figure 139. Field work was completed in the Cliff Creek Wildfire and other locations throughout the Sublette Mule Deer Migration corridor.

site, they conducted vegetation transects, collected plants known to be in the mule deer and elk diet (n=61) to assess protein/nutrients availability, and collected mule deer and elk fecal samples (n=55) to evaluate diet composition.

Ortega will begin analyzing mule deer habitat selection and movement relative to the Cliff Creek Fire beginning in 2018 and will add elk to the resource use and selection modeling once GPS data from elk become available. Some of the analyses will also include comparing percent body fat and fawn recruitment between mule deer summering in the Cliff Creek Fire versus those individuals that summer outside the burn area (e.g., Upper Green River Basin, Porcupine Creek). Field work and additional data collection is planned through at least 2019.

Salt Creek Fish Passage and Habitat Restoration (Goal 2) – Luke Schultz

A collaborative team was formed among representatives from the USFS, Trout Unlimited (TU) and WGFD to address habitat and passage on Salt Creek (Figure 140). This tributary to the Thomas Fork River in western Wyoming provides valuable Bonneville Cutthroat Trout habitat and is an easily accessible and highly-visible fishery along US Highway 89. However, numerous past and on-going practices impact fish habitat and water quality and the creek is crossed by a Forest Service road with an undersized and perched culvert. The site also has an active salt mine within the floodplain, and has instream structures spanning approximately two miles upstream of the salt mine/culvert that were constructed beginning in 1982. While these structures helped resolve many of the habitat issues they were intended to address when they were constructed, some have outlived their life expectancy and are currently impairing stream function.



Figure 140. Project partners (TU, USFS, WGFD) met with several consultants to tour the floodplain salt mine on Salt Creek. Vegetation has been denuded and the river can easily access the salt mine during high flow events.

The new project will address these issues in Salt Creek and improve fish passage and habitat along this 2-mile reach. Addressing the interaction between the river and the salt mine will also improve water quality and reduce sedimentation downstream in Salt Creek and the Bear River. In 2017, Biota Research and Consulting, Inc. was selected to complete a full assessment and draft designs. Currently, project designs are being refined and the NEPA process has been initiated. Construction is anticipated in 2019.

Sublette Mule Deer Habitat (Goal 2) – Phil Damm



Figure 141. Mechanical treatments in Wyoming big sagebrush communities release younger, more vigorous individuals, providing better quality forage on winter ranges.

Sublette Mule Deer Habitat projects are a direct response to cumulative declines in the Sublette Mule Deer Herd in addition to population declines associated with natural gas development in the Pinedale Anticline Project Area near Pinedale, WY (a segment of the Sublette Herd). Primary project cooperators and funders include the Pinedale Anticline Project Office, WWNRT, WGBGLC, many grazing permittees and private landowners and Pinedale BLM.

Approximately 6,000 acres of habitat treatments are scheduled in decadent sagebrush, mountain shrub, and aspen communities, with a primary goal of improving habitat forage quality and quantity for mule deer. Additionally, over 55 miles of livestock fences within the designated migration corridor will be converted to wildlife friendly specification, which is in addition to over 20 miles already completed on the Rolling Thunder and Rim Ranches. All treatments and fences occur in either mule deer winter or summer ranges, in addition to migration corridors. Projects under the

umbrella NEPA for BLM lands commenced in summer of 2016 and will continue through 2020. Proj-

ects on private lands are ongoing and additional projects are likely to occur as relationships with new landowners develop.

To date, big sagebrush has been mechanically treated by WGFD personnel on nearly 3,200 acres of key mule deer ranges, with over 1,700 acres completed in 2017 (Figure 141). Also in



Figure 142. Prescribed fire in mountain big sagebrush stands on east facing slopes in mule deer winter range prepare sites for mixed-mountain (serviceberry and chokecherry) shrub planting.

2017, 600 acres of big sagebrush-bitterbrush communities were treated with Spike herbicide. Livestock grazing on treatments completed in 2016 was managed by a combination of two riders and deferment in 2017. Across 50 acres of prescribed burns completed in spring 2017 (Figure 142), over 4,000 serviceberry and chokecherry seedlings were planted in the fall. Pre-treatment monitoring was established and read for 2017 treatment areas. Nearly 12 miles of wildlife friendly fence was constructed in 2017 (Figure 143); additionally, approximately 20 miles was constructed/converted by WYDOT in cooperation with the Pinedale Wildlife Biologist. A four acre welded pipe fence was constructed by WGFD personnel around a green zone created for wildlife, including migrating mule deer, in the Boulder Lake area with materials donated by Ultra Resources.



Figure 143. *New wildlife friendly fence construction is often more cost effective than retrofitting old livestock fence, as illustrated by this new wildlife friendly fence constructed in 2017 along the Sublette Mule Deer Migration Corridor. Retrofitting the fence in the background to wildlife friendly specification would be about two-thirds of the cost of a new fence and would not have the longevity of new construction.*

WGFD allocated considerable resources in 2017 to developing new partnerships and projects for Sublette mule deer work. This work included assessing site-wide habitat conditions, fence inventories, and coordinating and collaborating with partners, including NRCS, private landowners, grazing permittees, and BLM. This groundwork resulted in adding several projects under the Sublette Mule Deer Habitat heading, including about 1,500 acres of big sagebrush/antelope bitterbrush habitat treatment, 23 additional miles of wildlife friendly fence conversion, and a large scale mixed mountain shrub planting on crucial mule deer winter range. Continued relationship building efforts with additional landowners and land managers throughout the Pinedale-area range of the Sublette Herd will likely yield complimentary projects in the near future.

WGFD seized opportunities throughout 2017 to provide information/education on the Sublette Mule Deer Herd population, its challenges and habitat treatments

developed to mitigate these challenges. These opportunities included partnering with about 60 students and parents of the Big Piney High School to plant 4,000 mixed mountain shrubs (Figure 144), presenting to about 50 educators from across the country through Safari Club International’s American Wilderness Leadership School, presenting to about 20 Sublette County Chamber of Commerce members and interested members of the public, and presenting information to about 30 fourth/fifth grade Kelly Elementary (Jackson, WY) students (Figure 145).



Figure 144. *Big Piney high school students and parents assisted with planting approximately 4,000 mixed mountain shrubs on sites prepped with prescribed fire. The green tubes provide protection from ungulate browse and a miniature “greenhouse” climate.*



Figure 145. *Fourth and fifth grade Kelly Elementary (Jackson, WY) students attempt to locate a hidden mule deer GPS collar with telemetry equipment during a field trip to Pinedale.*

Green River Qualitative Habitat Assessment – Luke Schultz

The Green River is one of the most popular fisheries in the Pinedale region and attracts anglers from across western Wyoming and the surrounding states. In recent years, a perceived uptick in usage of the Green River has been expressed by many long-time river users. In addition, river habitat conditions have been degraded from historical quality from a variety of stressors including: water developments and diversions, log drive operations in the 1800s, and historical overgrazing in the watershed along the floodplain.



Figure 146. *Rapid aerial surveys of the Green River were used to identify major habitat issues, view past projects and familiarize the new aquatic habitat biologist with the river corridor.*

Because of the importance of this fishery, rapid habitat surveys were conducted along the Green River to view access points and habitat projects, identify habitat issues, plan restoration projects, and evaluate angler use (Figure 146). These surveys were done with a combination of public fishing area site visits, drift boat float trips and flight surveys. Flights on the Green River were conducted in conjunction with an ongoing Fish Management section research project, studying invasive burbot in the Green and New Fork Rivers.

Luke Lynch WHMA Wildlife Friendly Fence Conversion (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner

Approximately 1.25 miles of outdated stock fence was replaced with wildlife friendly pole-top fence thanks to generous donations by WWNRT, MFF and WGFD (Figure 147). This improvement was necessary to make fence crossings wildlife friendly and less stressful along the bi-annual Red Desert to Hoback Mule Deer Migration route. Completing this fence better manages livestock grazing on adjacent lands to preserve crucial big game winter range and improves public awareness by setting a good example of proper stewardship on public lands.



Figure 147. *Wildlife friendly fence conversion.*

Pinedale-Jackson Regional Elk Feedground Maintenance (Goal 2) – Miles Anderson, Derek Lemon and Kyle Berg



Figure 148. *New hayshed and stackyard on Horse Creek WHMA/Feedground.*



Figure 149. *New hayshed at Franz Feedground.*

Annual maintenance and improvements to 22 WGF D managed elk feedground continued and include repairs and maintenance to feedground structures, corrals, stackyards, elk migration fences, stock fences, and grounds. New steel haysheds were constructed at Horse Creek and Franz Feedgrounds (Figures 148-149). 24 uprights were replaced on various older haysheds, and two horse corrals and hay stackyards were rebuilt. Emergency shelters for winter feeding were added at two feedgrounds for contract feeders' safety.

Trumpeter Swan Habitat Improvements (Goal 2) – Jill Randall and WLCI, Jim Wasseen

Since 2007, WLCI has worked to construct and restore shallow water wetland habitat on private lands in the Green River Basin to increase high quality summer habitat for the growing population of resident Trumpeter Swans and other waterfowl, water birds, and wildlife. One of the many ponds that have been constructed with WLCI funds isn't functioning as intended and is need of repairs. The pond is on the Lazy River Ranch along the New Fork River in Boulder, WY which is a major swan flyway and nesting area. The plan is to decrease the pond size to five acres to develop the pond at a size that can be managed and store water into later months of the summer season. Alder Environmental was hired to further evaluate the Lazy River Ranch pond site, water inflow, soil percolation, and storage capacity. With the information gained from field evaluations, a modified site plan was developed with a reduced pond footprint and the water source modified to include both irrigation ditch and groundwater sources. Repairs will be implemented prior to June 2018.

Skyline (Goal 2) – Jill Randall



Figure 150. *Prescribed burning is conducted after mechanical preparation of stands.*

The Skyline Wildland Urban Interface Fuels Reduction Project is comprised of 2,247 acres and is located adjacent to Pinedale, WY on the Pinedale District of the BTNF. Within the project area, 1,443 acres are slated for mechanical thinning with prescribed fire follow up and 833 acres are slated for hand thinning and prescribed fire follow up. Implementation began in 2016. Accomplishments through 2017 include 390 acres of mechanical treatments and 147 acres of prescribed burns (Figure 150).

The majority of the existing vegetation in the project area consists of conifer encroached old-aged aspen communities, lodgepole pine communities and Douglas fir/mix conifer stands. From 2003-2006 a mountain pine beetle epidemic occurred causing widespread mortality of lodgepole pine. Along with

high mortality in lodgepole pine stands, an overall decrease in aspen across the landscape is evident. Due to wildfire suppression, aspen is now in danger of losing both viable root systems and over-story stems to maintain clones. This project should help to restore aspen and shrub vegetation types.

Duck Creek Riparian Development (Goal 2) – Luke Schultz

WGFD began working with a landowner on Duck Creek under a conservation easement just upstream from Pinedale. The landowner expressed interest in improving fish habitat and fenced off the riparian corridor 10-15 years ago to facilitate riparian recovery. Approximately four miles of publicly accessible river are immediately downstream, so actions can have substantial indirect benefits for local anglers.

Site visits in spring 2017 revealed riparian areas along Duck Creek have varying coverage of riparian willow. Reaches without willow cover were generally wider and shallower than reaches with willow cover. Following these visits, the landowner became interested

in planting willow cuttings. Because of the proximity to Pinedale, it presented a good opportunity to evaluate willow cutting and planting techniques as well as increase woody vegetation coverage along this riparian area. In October, Booth's Willows and Geyer's Willows were collected from mature stands and trimmed for planting. In total 400 stems were planted to evaluate spring vs. fall planting and clipping the cutting at the ground surface vs. clipping the cutting surface 4-7" above ground level. In addition, we tested the two different species by planting 100 cuttings in each treatment group. The same number of cuttings for each treatment will be replicated again in spring 2018, and will be monitored annually for 5 years to evaluate relative success of each method. This experiment will help identify the optimum procedure for willow cuttings in the Pinedale Region.



Figure 151. *WGFD employees use a stinger jet pump to plant willow cuttings along Duck Creek near Pinedale.*

Half Moon WHMA Wildlife Friendly Fence Conversion (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg and Brandon Werner



The adjacent landowner to Half Moon WHMA, Fayette Ranch, partnered with Pinedale H&A to construct 1.8 miles of boundary fence on Half Moon WHMA (Figure 152). Deteriorated fencing was replaced with steel drill pipe wildlife friendly top rail fencing. Fencing will improve mule deer migration abilities on the Hoback to Red Desert Migration Corridor while reducing wildlife/livestock co-mingling and protecting winter forage.

Figure 152. *Half Moon WHMA fence project map.*

Sublette Healthy Forest Collaborative (Goal 5) – Jill Randall

In 2014, Wyoming Governor Matt Mead established a Forest Health Taskforce which recommended forming groups to proactively engage local stakeholders and develop projects to improve forest health. In 2016, the Sublette County Conservation District and the Sublette Board of County Commissioners received grant funds to convene an inclusive process to tackle forest health issues. The Sublette Healthy Forest Collaborative was created which included 13 different groups including federal, state and county governments, non-governmental organizations, livestock grazing permittees, outfitters, and recreationists. Due in large part to the highly collaborative partnerships already functioning amongst local stakeholders, the group quickly developed a report including objectives and actions to be implemented across multiple land ownerships in coming years.

Several projects were identified and initially prioritized, including both wildlife, fuels, and timber objectives. The first areas identified include the Hoback Rim and Bondurant Basin. WGFD is actively involved with planning the Monument Ridge aspen enhancement project (Figure 153) with BTNF as a result of this collaborative effort. NEPA is expected to be complete in 2018 and implementation will begin in 2019.



Figure 153. *Aspen stand with significant conifer encroachment within the Monument Ridge project area.*

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

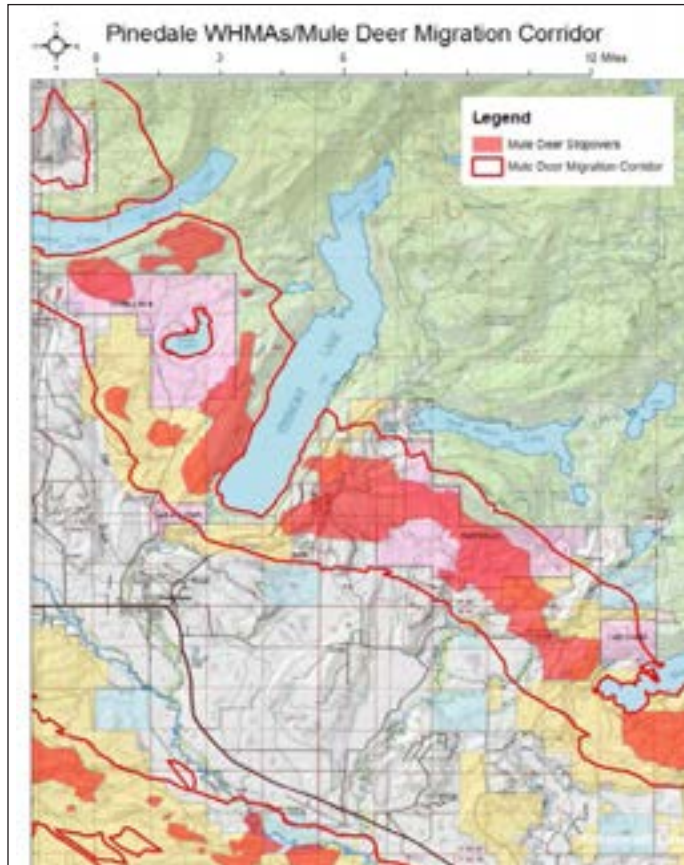


Figure 154. Pinedale WHMAs/Mule Deer Migration Corridor map.

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 annual road maintenance performed. On Muddy Creek Feedground 1.25 miles of crucial winter range elk fence was maintained. On Fall Creek WHMA fenceline relocation and road improvements were made for completion of wildlife friendly fence conversion project and new WHMA signs were installed. Wildlife friendly fence projects continue on all Pinedale WHMAs (Figure 154) as part of the migration initiative. On Half Moon WHMA 11.6 miles of crucial winter habitat boundary fence was maintained. Sections of WHMA roads were re-graveled and annual road maintenance performed. On Black Butte WHMA, livestock grazing of 335 AUMs (525 acres) were used to improve nutritional quality of rangeland health and forage. One half mile of pole top fencing was replaced and 3.9 miles of crucial winter habitat boundary fence was maintained. On the recently acquired Luke Lynch WHMA, 1.25 miles of elk fence was maintained, public parking areas with boulder travel barriers were developed and information-

al signs were placed to protect resources and educate visitors about the Hoback to Red Desert mule deer migration corridor. In Sublette County, 30 acres of noxious weeds were identified and sprayed on PAAs, WHMAs and Feedgrounds.

Lower New Fork Restoration - Tatro Bank Assessment (Goal 2) – Luke Schultz

A landowner on the Lower New Fork has been working with WGFD for several years to address bank instability on an outside bend approximately 1 mile downstream of the Remmick Access Area (Figure 155). A ~5-7' vertical eroding right bank annually loses 1-2' laterally. In July, WGFD used a model to estimate that 290 tons of sediment is lost annually from the 1,600' long bank. The landowners are very interested in addressing this bank and have offered substantial in-kind contributions. A more detailed assessment will be conducted in 2018 to develop project designs; we anticipate implementation in 2019.

Figure 155. Landowner on the Lower New Fork standing on an eroding bank slated for repair.



Cliff Creek Restoration (Goal 2) – Jill Randall



Figure 156. *Monitoring point established to document vegetation recovery in the Granite Creek drainage within the Cliff Creek Wildfire area.*

In 2016, the 34,000 acre Cliff Creek Wildfire occurred in the vicinity of Cliff Creek and Granite Creek north of Bondurant, on the BTNF. The fire burned in a mosaic of severity throughout the fire perimeter, which is ideal for vegetation health and recovery. The burned area consists of important spring, summer and fall habitat for elk, moose, mule deer, and pronghorn as well as crucial winter range elk habitat due to its immediate proximity to the Dell Creek Feedground. The burned area overlaps four US Forest Service cattle allotments. In order to maximize the benefits to wildlife, active grazing management was implemented through the use of electric fencing and the hiring of a rider. This approach allowed for succulent new vegetation to receive rest from livestock grazing so that it could reach a more mature/established stage.

Noxious weed control is another significant management concern after wildfires occur. Weed inventory work in 2017 included over 22,000 acres of survey work and direct herbicide control on over 10 acres (spread throughout the fire perimeter). Five monitoring points were also established to document ground cover, species composition and successional changes as recovery occurs for the next several years (Figure 156). This project involves many partners including BTNF, WGFD, Sublette County Weed and Pest, Sublette County Conservation District, and ten livestock permittees.

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



Figure 157. *Road culvert addition and repairs at Airport Access on the New Fork River.*



Figure 158. *Parking area and access road repairs at Green River Fear access.*

Personnel from Habitat and Access performed annual required maintenance and monitoring of regional PAAs. All public access boundary fences were maintained to protect riparian habitat and road and parking area maintenance and repairs conducted. High spring flows on local rivers created additional maintenance repairs. Airport PAA required additional culverts to be installed and access road graveled to repair damage to access the New Fork River (Figure 157). Public access areas along the Green River had road and boat ramp repairs, and parking area improvements completed (Figure 158). Rock was placed along area boat ramps at Soda, Boulder, and Fremont lakes to prevent erosion of boating access improvements.

New Fork Gas Wells Boat Access and Habitat Improvements (Goal 2) – Luke Schultz

The New Fork River provides one of the best river fisheries and most popular boatable waters in the Pinedale region, and angler pressure across the New Fork has increased considerably in recent years. However, stream habitat for trout is degraded in the Lower New Fork River. Hence, there is considerable interest in expanding the productive portions of the river, while also increasing angler access points to spread pressure across more of the river.

The lower New Fork River passes through an area of high density natural gas fields downstream from the East Fork River. One of these gas wells is situated within a few hundred feet of the river near a historical boat access area known as the “Gas Wells” site; the site is located on BLM land along approximately two miles of river (Figure 159). However, the boat ramp and many of the stream banks have eroded into the river as the channel has migrated laterally. Currently, the eroding bank approaches six feet along this site, and low quality habitat is the norm. In addition to contributing enormous amounts of sediment to the river, the historical boat access has been lost and the stream channel is migrating into the former parking area.



Figure 159. The “Gas Wells” site on the New Fork River historically supported a boat ramp, but has been lost due to a lateral migration of the river channel.

In 2017, Inter Mountain Aquatics finalized designs and fundraising activities began for implementation in 2018. This phase will reconstruct the boat ramp and associated access facilities and restore stream habitat in approximately 0.6 miles of river. Funds from WGFD, Wallop-Breaux boating access, DEQ 319, and in-kind contributions from BLM and WGFD will be used to complete Phase I.

Wyoming Range and Sublette MDI RHAs (Goal 5) – Jill Randall, Troy Fieseler, and Numerous Regional Personnel



Figure 160. Mixed mountain shrub conditions were evaluated on the Three Buttes site southwest of Big Piney.

Efforts continued within the Wyoming Range and Sublette Herd Units to assess important habitats using RHA methodologies. In the Wyoming Range Herd Unit 442 acres of aspen RHAs and 436 acres of rangeland RHAs were completed in the northern portion of the herd unit (Figure 160). In the Sublette Herd Unit 1,001 acres of aspen RHAs and 1,395 acres of rangeland RHAs were completed. This effort is part of a goal to increase the number of RHAs completed in MDI herds encompassing the Pinedale, Jackson and a significant portion of the Green River Regions. Additionally, three public MDI meetings were held to further engage stakeholders regarding population and habitat management, as well as ongoing research conducted in collaboration with UW Haub School of the Environment and Natural Resources.

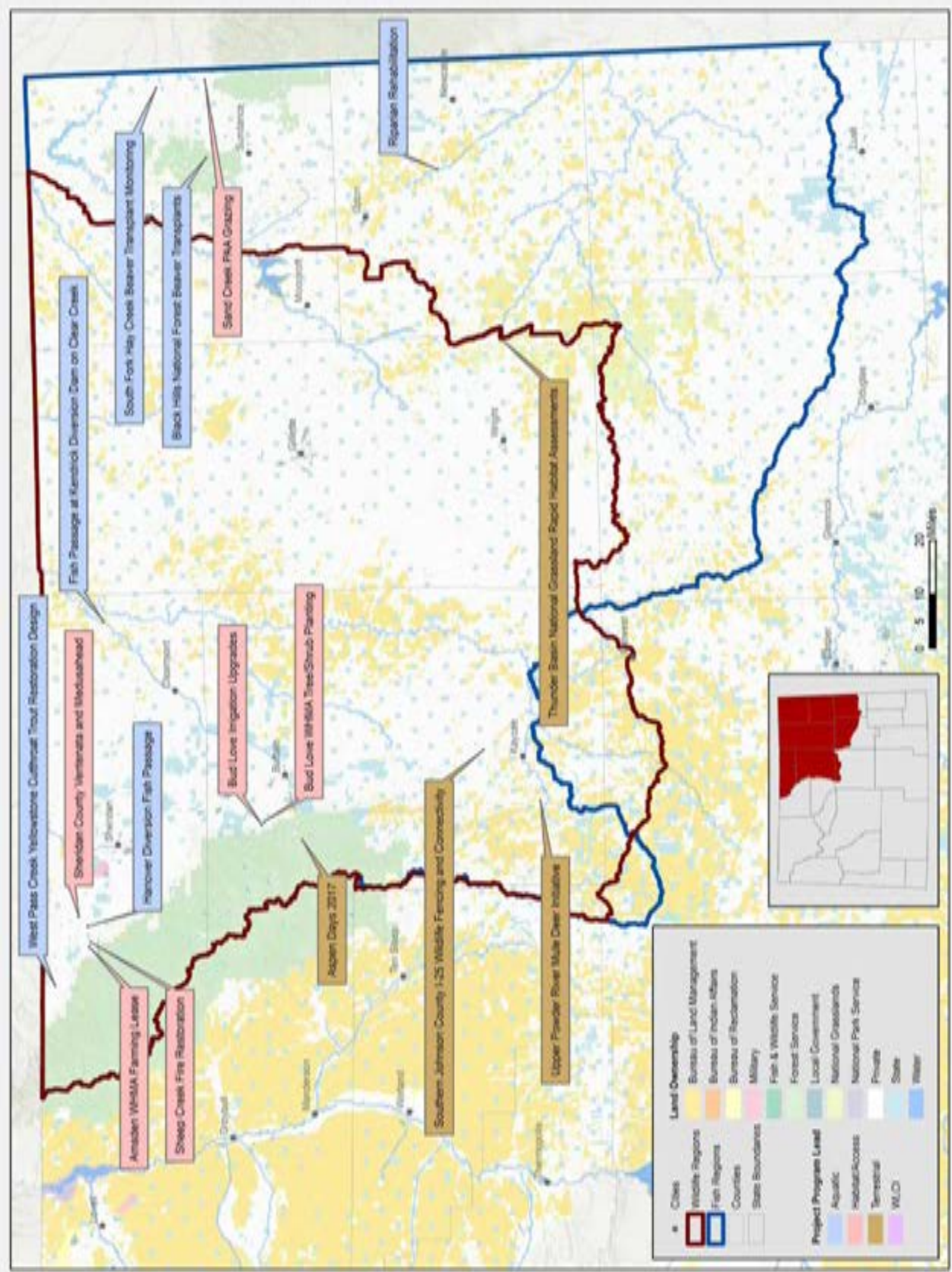
Fall Creek WHMA Wildlife Friendly Fence Conversion (Goal 2) – Miles Anderson, Derek Lemon, Kyle Berg, Brandon Werner and Kade Clark



Figure 161. *Wildlife friendly pipe fence on Fall Creek WHMA.*

This project was a multi year effort to complete 4.1 miles of fence conversion on Fall Creek WHMA (Figure 161). Fall Creek is crucial winter range for elk and is part of the Greater South Pass Sage Grouse Core Area. The WHMA boundary fence also lies within the Red Desert to Hoback Mule Deer Migration Corridor. The conversion to wildlife friendly fence allows for safer passage of migrating wildlife through the WHMA while protecting winter range forage and reducing potential wildlife/livestock disease transmission. Deteriorated fences were converted to steel drill pipe top rail and wire fence, which will last three times longer than pressure treated pole top fence.

Sheridan Region



Sheridan Region

The Sheridan Region extends from the top of Bighorn Mountains east to the Black Hills and from the Montana/Wyoming state line south to northern Natrona and Converse Counties. This area includes the Powder, Tongue, Little Bighorn, Belle Fourche, Little Missouri and Cheyenne River drainages.

Aquatic and terrestrial wildlife habitat enhancements in northeast Wyoming focus on streams and their associated riparian areas. Re-connecting streams



with structures to aid fish passage and attention toward managing rangelands to meet the needs of mule deer and sage-grouse for food and cover are given high priority.

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 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, which have fragmented the 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 habitat available 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 associated 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 that is essential for numerous wildlife species. Work on all of these aspects took place in 2017.

West Pass Creek Yellowstone Cutthroat Trout Restoration Design (Goal 2) – Travis Cundy

Expanding a native Yellowstone Cutthroat Trout population in the West Pass Creek watershed is an ongoing project in northwest Sheridan County. Constructing fish barriers will be necessary to prevent other trout species from moving upstream and mixing with Yellowstone Cutthroat trout populations. The X-X Ranch is a cooperator who controls about two-thirds of the six miles of stream corridor available for Yellowstone Cutthroat Trout restoration (Figure 162). Design engineers completed preliminary designs for a temporary fish barrier on the North Fork of West Pass Creek and a permanent barrier on the main stem of West Pass Creek. The temporary barrier will secure a little over two miles of stream habitat to hold native trout in the North Fork of West Pass Creek while treatments occur to remove competitors to the native trout from the South Fork and main stem of West Pass Creek. Completion of the barriers is not likely until 2019.



Figure 162. Six miles of stream outlined in yellow is available for expanding the distribution of native Yellowstone cutthroat trout.

Sand Creek PAA Grazing (Goal 3) – Seth Roseberry

Cattle from the Ox Yoke Ranch graze on the Sand Creek PAA annually within a mid May to mid June time frame. During 2017, 314 pairs and 10 bulls grazed the area from June 1 through June 11 totaling 120 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 with a weed management plan for the area. Sand Creek PAA is treated annually for noxious weeds by a licensed applicator.

Riparian Rehabilitation (Goal 2) – Travis Cundy and Todd Caltrider



Figure 163. *ATV mounted water pump and stinger attachment for planting cuttings.*

Habitat personnel worked with landowners to plant plains cottonwood, streambank willow, and red osier dogwood cuttings at two riparian rehabilitation sites. The cuttings were collected at available sources and planted using a water jet stinger (Figure 163). About 300 streambank willow cuttings and 14 mixed willow and dogwood vertical bundles were planted to stabilize the toe of eroding banks at a site on Piney Creek in Sheridan County. Another 50 cottonwood and 160 streambank willow cuttings were planted in Beaver Creek in Weston County to provide seed stock to promote the expansion of these species along the riparian corridor.

Thunder Basin National Grassland Rapid Habitat Assessments (Goal 2) – Todd Caltrider, Erika Peckham and Dustin Kirsch

Rapid Habitat Assessments (RHAs) were conducted in key mule deer habitats in portions of the Thunder Basin National Grasslands. The Thunder Basin National Grasslands provide important habitat for a variety of sagebrush/grassland dependent species and also include a large percentage of the publicly accessible land for sportsmen in Campbell County. The purpose of conducting the RHAs in the Thunder Basin National Grasslands is to provide WGFD with an idea of current habitat conditions and identify possible habitat improvement projects. During 2017, a total of 12 RHAs were completed in the Thunder Basin National Grasslands. Six riparian RHAs covering 418 acres (Figure 164), and six shrub/rangeland RHAs were completed covering 1,075 acres.



Figure 164. *Example of a riparian area assessed in the Thunder Basin National Grassland.*

Amsden WHMA Farming Lease (Goal 2) – Seth Roseberry

The Amsden WHMA has approximately 38 acres of hay meadows irrigated and harvested by a contract farmer. The first cutting of hay is harvested by the contract farmer in exchange for area improvements as part of an Area Improvement Plan Agreement. The second growth of hay is left as standing forage for wintering wildlife. These fields also provide hunting opportunities for recreationists that utilize the WHMA and help to minimize wintering wildlife damage on neighboring private lands.

Hanover Diversion Fish Passage (Goal 2) – Travis Cundy

Numerous projects have occurred over the years, or are ongoing with the Sheridan County Conservation District to restore fish passage and stream corridor functions in the Tongue River watershed. In 2017, renovations that began in 2016 were completed at the Hanover Diversion on the Tongue River to improve the function of the diversion structure to sustain fish passage. Completion included retrofitting the drop board sluiceway with a liftgate (Figure 165). Improved management of the sluiceway gate will allow bedload mobilizing flows to be focused over the center of the ramped vane diversion structure, which was completed in 2016, rather than through the sluiceway.



Figure 165. *New sluiceway liftgate (upper left of photo) at the Hanover Diversion structure on the Tongue River.*

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



Figure 166. *Assessing browse pressure on Curl-leaf mountain mahogany shrubs in Buffalo Creek Canyon (left). Assessing mule deer habitat in Bobcat Basin (right).*

Sheridan regional personnel finished conducting RHAs in key mule deer habitats in the Upper Powder River mule deer herd unit (Figure 166). During 2017, a total of eleven RHAs were completed in the Upper Powder River mule deer herd unit. Four riparian RHAs covering 443 acres, six shrub/rangeland RHAs covering 2,052 acres and one aspen RHA was completed covering 272 acres. The 2017 data will be combined with previously collected data and will be analyzed and summarized as part of the five year herd objective review scheduled to occur in 2018 for the Upper Powder River Mule Deer Herd.

Bud Love WHMA Tree/Shrub Planting (Goal 2) – 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 in 2017 included larger 3-4 feet Nanking Cherry and Black Chokecherry. The objective is to establish forage for wildlife and birds, increase snow accumulation along plantings and improve hiding cover for all species.



Figure 167. Plank Stewardship Initiative personnel plant deep rooted cottonwoods on Bud Love WHMA.

Additional work included a cooperative effort with John Heyneman with Plank Stewardship Initiative to plant 30 narrowleaf cottonwoods along a seasonal stream on the south side of the Bud Love WHMA. Plank Stewardship donated 30 deep-rooted cottonwood plantings, protective tubes and man power to test survivability and attempt to replace aging cottonwoods on the WHMA (Figure 167).

Black Hills National Forest Beaver Transplants (Goal 2) – Travis Cundy



A mated pair (Figure 168) of beaver were released at a relict beaver pond on Middle Redwater Creek during September. The purpose was to use beaver to build low profile dams and raise the water table along sections of the floodplain corridor. Slowing flows and increasing flow access on the floodplains will raise the water table. Improved flow retention in the water table will improve plant community development and ultimately reduce the channel down-cutting occurring in segments of the riparian corridor. The release site provided standing water to provide security cover for beaver. Woody riparian vegetation is abundant along about one mile of stream corridor above the release site. Observations in November indicated the pair had built-up the dam at the relict pond since their release.

Figure 168. Beaver released on Middle Redwater Creek.

Aspen Days 2017 (Goal 5) – Todd Caltrider



Figure 169. *Aspen Days participants discuss aspen management near Steamboat Point.*

On day two the meeting kicked off at Bearlodge Resort in Burgess Junction with presentations on aspen ecology by Paul Rogers, Tim Assal (USGS), and Jeff Beck (UW). Following the presentations, participants toured the Steamboat Aspen Project located at the top of the Tongue River Canyon (Figure 169).

Day three found Bernie Bornong giving a short presentation on a large water quality improvement project in the Clear Creek watershed, and solicited feedback from the group on potential aspen treatment management actions. Then the

group toured various past aspen projects conducted in the Powder River District of the Bighorn National Forest (Figure 170). On the last day, participants toured an aspen project in the works on State of Wyoming Trust Land in Billy Creek, and then toured the Eschrich and Rueb Ranches. The Eschrich and Rueb families are currently working with the WGFD on an aspen regeneration project on their ranches. John Eschrich gave a talk to participants on private landowner perspectives regarding aspen forest management. Approximately 40 people attended Aspen Days 2017. Funding was provided by the Wyoming Wildlife Foundation and the WGFD.

Aspen Days is a professional workshop hosted annually by WGFD to provide an opportunity for both natural resource managers and researchers who focus on aspen forest systems to get together in the field to discuss aspen ecology and management. The workshop provides an excellent opportunity for field managers to learn about the latest research regarding aspen ecology and management, while researchers get the opportunity to interact with field managers working in aspen forests and learn about research needs. During summer 2017, Aspen Days was hosted by the Sheridan Region in the Bighorn Mountains. The four day event started off with a talk open to the public located at the Sheridan County Fulmer Library, where participants learned about aspen ecology and local aspen projects. Talks were given by Paul Rogers (Western Aspen Alliance), Kelly Norris (Wyoming State Forestry), Bernie Bornong (USFS), and Todd Caltrider (WGFD). After the talks, participants were treated to a raffle with items donated by local businesses from Sheridan and Buffalo.



Figure 170. *The group stops to look at aspen regeneration following the Lost Fire.*

South Fork Hay Creek Beaver Transplant Monitoring (Goal 2) – Travis Cundy



Three beaver, including a mated pair, were released on the South Fork of Hay Creek in September 2016. The landowner wanted the beaver to raise the streamside water table and enhance productivity of streamside plant communities. Despite very dry conditions, beaver activity was evident near the transplant site during August 2017. Streambank willow, which provide food and cover for beaver and other riparian dependant wildlife, responded to the raised water table associated with beaver activity with increased canopy development (Figure 171).

Figure 171. Streambank willow canopy growth upstream of a small beaver pond.

Sheridan County Ventenata and Medusahead (Goal 2) – Todd Caltrider and Seth Roseberry

In 2016, two invasive grasses Ventenata and Medusahead were identified on several large portions of public land in northwest Sheridan County. Several lands surrounding the Amsden WHMA were identified as having these two invasive grasses and Ventenata was identified on the Amsden WHMA following post fire monitoring in 2016. Following the Sheep Creek Wildfire, funding was in place to aid in habitat restoration and management of invasive species on this critical wildlife winter range. In 2017, a large scale herbicide application was implemented to begin control and monitoring of Medusahead and Ventenata in Sheridan County by Sheridan County Weed and Pest and the newly established North East Wyoming Invasive Grass Working Group (NEWIGWG). WGFD joined the efforts through the NEWIGWG and aided the 2017 treatment efforts by utilizing funds provided by WWNRT for the Sheep Creek Wildfire Restoration. WGFD and WWNRT agreed that the threat of increased establishment of these new species and the threat to critical wildlife habitat necessitated cooperative efforts on a landscape scale. Twenty-thousand dollars of WWNRT funding was combined with \$85,000 from the NEWIGWG to treat a total of 2,600 acres. Continued treatments, monitoring, mapping, outreach and follow-ups are planned for the foreseeable future (Figure 172).

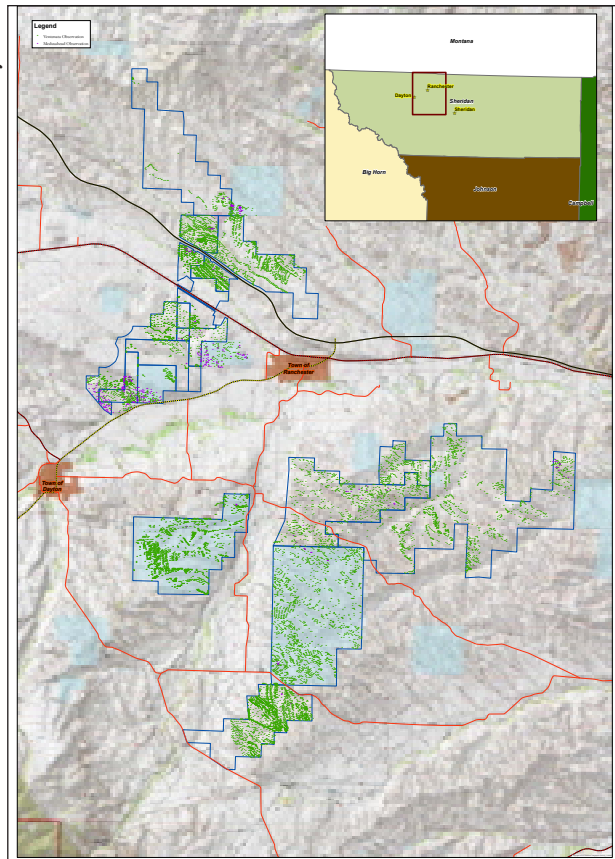


Figure 172. Medusahead and Ventenata Treatment in Sheridan County 2017.

Southern Johnson County I-25 Wildlife Fencing and Connectivity (Goal 5) - Todd Caltrider



One of the major issues identified in the Upper Powder River MDI was mule deer mortality on I-25 north of Kaycee. WGFD has been working with WYDOT to find a solution to reduce mule deer/wildlife collisions on this stretch of I-25. In April, WGFD hired Dr. Huijser, a highway ecologist, to provide a talk regarding wildlife crossing infrastructure to WY-

Figure 173. BLM, WYDOT and WGFD personnel evaluate existing infrastructure on I-25 as potential locations to funnel mule deer attempting to cross the interstate.

DOT and WGFD. Following Dr. Huijser's presentation, Dr. Huijser, WGFD, BLM, and WYDOT toured the area in question along I-25 north of Kaycee (Figure 173). Dr. Huijser provided a draft proposal outlining a research project addressing the mule deer/vehicle collision concerns. The research would evaluate effectiveness of fencing off I-25 to prevent mule deer crossing and funneling mule deer to existing interstate infrastructure for crossing (Figure 174). WGFD submitted a grant application to the Federal Highway Administration to fund this project, however, the project was not selected for funding. During spring 2018, WGFD and Dr. Huijser will install game cameras to document the occurrence of mule deer crossings at existing interstate underpasses designed for machinery and stream crossings. The collection of additional data regarding mule deer crossings along this section of I-25 may assist with increasing the probability for obtaining future funding.



Figure 174. Deer hair on a fence underneath an interstate bridge over Middle Fork Crazy Woman Creek, indicating mule deer are using this underpass.

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

Approximately 132 acres of invasive plants were treated by Sheridan Region Habitat and Access personnel and private contractors during 2017. 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 for native plants to thrive.

Fish Passage at Kendrick Diversion Dam on Clear Creek (Goal 2) – Travis Cundy



Figure 175. Sauger caught in June 2017 in Clear Creek about four miles upstream of the fish bypass channel around Kendrick Diversion Dam.

The Kendrick Diversion Dam was completed in 1913. The dam's completion stopped fish movements from the Powder River to 36 miles of Clear Creek upstream of the dam. The 2010 completion of a fish bypass channel around the dam restored seasonal access of fish upstream of the dam. Figure 175 depicts the first sauger to have been caught by WGFD personnel in the reach of Clear Creek upstream of the dam. The capture occurred June 22, 2017. Previously in early July 2012, we learned that a tagged sauger used the bypass when it passed a tag sensor located in the bypass channel.

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

Over 600 feet of gated irrigation pipe has been installed to increase efficiency and enable increased forage production. The Bud Love WHMA irrigation system is being revitalized to enable greater forage production on the historic hay meadows utilized by a variety of wildlife. Continued work to improve water distribution systems and revitalize meadows is planned for the next five years.

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 Amsden WHMA rangelands, WGFD quickly obtained funding to conduct cheatgrass treatments on Amsden WHMA following the fire. On September 10-15, 2015, WGFD facilitated aerial cheatgrass treatment on 620 acres of Amsden WHMA. Funding was also obtained to treat noxious weeds and 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. In 2017, additional herbicide treatments were conducted to focus on both cheatgrass and *Ventenata dubia* which was recently discovered in Sheridan County and within the Amsden WHMA. Continued monitoring and follow up treatments are scheduled for 2018. Funding was provided by WWNRT, the Wyoming Wild Sheep Foundation, RMEF, and the Wyoming Sportsmen's Group.

WGFD would like to recognize Jessie Reece for her diligence in compiling the 2017 SHP!

Personnel Directly Implementing The Strategic Habitat Plan

Administration or Statewide, 5400 Bishop Blvd., Cheyenne, WY 82006

Aquatic Habitat

Paul Dey, Aquatic Habitat Program Manager, Cheyenne	(307) 777-4505
Lara Gertsch, Aquatic Habitat Supervisor, Buffalo	(307) 684-5607
Tom Annear, Water Management Supervisor, Cheyenne	(307) 777-4559
Mike Robertson, Instream Flow Biologist, Cheyenne	(307) 777-4559

Habitat and Access

Ray Bredehoft, Branch Chief, Cheyenne	(307) 777-4682
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Lands Administration

Sean Bibbey, Supervisor, Cheyenne	(307) 777-4596
Kerry Olson, Lands Branch Coordinator, Cheyenne (retired)	(307) 777-4508
Daryn Kramer, Lands Branch Coordinator, Cheyenne	(307) 777-4508
Brian Rognon, Appraisal Reviewer, Lander	(307) 335-2606

Statewide Wildlife and Habitat Management

Ian Tator, Terrestrial Habitat Program Manager, Cheyenne	(307) 777-4565
Jessica Reece, Office Manager, Cheyenne	(307) 777-4576
Ryan Amundson, Statewide Habitat Biologist, Wheatland	(307) 331-0787

Information and Publications Work Unit

Renny MacKay, Communication Director	(307) 777-4594
Sara DiRienzo Information Specialist	(307) 777-4540
Jeff Obrecht, Information Specialist	(307) 777-4532
Ray Hageman, Audio Visual Production Specialist	(307) 777-4533
Rebekah Fitzgerald, Conservation Education Outreach Supervisor	(307) 777-2596
Amy Bulger, Wyoming Wildlife Editor	(307) 777-3543
Justin Joiner, Visuals Specialist	(307) 777-4547
Chris Botkins, Webmaster	(307) 777-4604
Chris Martin, Digital Content Creator	(307) 777-3401

Wyoming Landscape Conservation Initiative

Jim Wasseen, Coordinator	(307) 352-0313
--------------------------	----------------

Statewide Habitat Access Crew

Todd Grosskopf, Supervisor, Cheyenne	(307) 777-4537
Cordell Perkins, Coordinator, Casper	(307) 473-3429
Rick Harmelink, Biologist, Lander	(307) 332-2688
Mac Foos, Biologist, Casper	(307) 233-6404
Kade Clark, Biologist, Jackson	(307) 733-2321

Casper Region - 3030 Energy Lane, Casper, WY 82601

Aquatic Habitat

Vacant, Aquatic Habitat Biologist	(307) 233-6414
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Habitat and Access

Matt Pollock, Coordinator	(307) 473-3426
---------------------------	----------------

Terrestrial Habitat

Justin Binfet, Wildlife Management Coordinator	(307) 473-3408
--	----------------

Keith Schoup, Terrestrial Habitat Biologist (307) 473-3424
 Willow Bish, Wildlife & Terrestrial Habitat Biologist, Douglas (307) 298-2269
 Todd Caltrider, Terrestrial Habitat Biologist, Gillette (307) 283-3410

Information and Education

Janet Milek, Senior Public Relations Specialist (307) 233-6404

Cody Region - 2820 State Hwy 120, Cody, WY 82414

Aquatic Habitat

Laura Burckhardt, Aquatic Habitat Biologist (307) 527-7322, ext. *829
 Erin Leonetti, Fish Passage Biologist (307) 527-7322, ext. *839

Habitat and Access

Brad Sorensen, Supervisor (307) 527-7322, ext. *818
 Craig Swanson, Biologist (307) 527-7322, ext. *834
 Eric Shorma, Biologist (307) 527-7125, ext. *834

Terrestrial Habitat

Tim Woolley, Wildlife Management Coordinator (307) 527-7125
 Jerry Altermatt, Terrestrial Habitat Biologist (307) 527-7322, ext. *813

Information and Education

Tara Hodges, Senior Public Relations Specialist (307) 527-7322

Green River Region - 351 Astle, Green River, WY 82935

Aquatic Habitat

Kevin Spence, Aquatic Habitat Biologist (307) 875-3225, ext. 253

Terrestrial Habitat

Mark Zornes, Wildlife Management Coordinator (307) 875-3223

Information Branch

Lucy Diggins-Wold, Senior Public Relations Specialist (307) 875-3225, ext. 224

Jackson Region - Box 67, Jackson, WY 83001

Aquatic Habitat

Anna Senecal, Aquatic Habitat Biologist (307) 733-2383, ext. 235

Habitat and Access Maintenance

Derek Lemon, Coordinator (307) 733-2383, ext. 239
 Brandon Werner, Specialist (307) 733-2383, ext. 232

Terrestrial Habitat

Doug McWhirter, Wildlife Management Coordinator (307) 733-2321 ext. 230

Information and Education

Mark Gocke, Senior Public Relations Specialist (307) 733-2321, ext. 231

Lander Region - 260 Buena Vista, Lander, WY 82520

Aquatic Habitat

Betsy Morgan, Aquatic Habitat Project Biologist (307) 332-7723
 Nick Scribner, Fish Passage Coordinator (307) 335-2641

Habitat and Access

Brian Parker, Supervisor (307) 335-2612
 Justin Rhine, Biologist (307) 335-2640
 Miles Proctor, Biologist (307) 455-2421
 Kevin Howard, Biologist (307) 455-2421

Terrestrial Habitat

Daryl Lutz, Wildlife Management Coordinator (307) 335-2616

Amy Anderson, Terrestrial Habitat Biologist (307) 335-2604
Information and Education

Rene Schell, Senior Public Relations Specialist (307) 335-2630

Laramie Region - 528 S. Adams, Laramie, WY 82070

Aquatic Habitat

Christina Barrineau, Aquatic Habitat Biologist (307) 745-5180, ext. 240

Habitat and Access

Jerry Cowles, Supervisor (307) 745-5180, ext. 248

Micah Morris, Biologist (307) 745-5180, ext. 246

Jacob Sorensen, Biologist (307) 532-2387

Mark Cufaude, Biologist (307) 745-4046, ext. 248

Terrestrial Habitat

Corey Class, Wildlife Management Coordinator (307) 745-4046

Katie Cheesbrough, Terrestrial Habitat Biologist, Saratoga (307) 760-0486

Information and Education

Robin Kepple, Senior Public Relations Specialist (307) 777-4523

Pinedale Region - 117 S. Sublette Ave., Pinedale, WY 82941

Aquatic Habitat

Luke Schultz, Aquatic Habitat Biologist (307) 367-4347, ext. 243

Habitat and Access

Miles Anderson, Supervisor (307) 367-4347, ext. 225

Kyle Berg, Biologist (307) 367-4347, ext. 252

Terrestrial Habitat

Brandon Scurlock, Wildlife Management Coordinator (307) 367-4347, ext. 224

Jill Randall, Terrestrial Habitat Biologist (307) 367-4347, ext. 242

Troy Fieseler, Wildlife Biologist (307) 367-4347, ext. 241

Brucellosis-Feedground-Habitat

Eric Maichak, Brucellosis Biologist (307) 367-4347

Habitat Mitigation

Phillip Damm, Habitat Mitigation Biologist, Jonah Interagency Office (307) 367-5387

Information and Education

Mark Gocke, Senior Public Relations Specialist (307) 733-2321, ext. 231

Sheridan Region - 700 Valley View, PO Box 6249, Sheridan, WY 82801

Aquatic Habitat

Travis Cundy, Aquatic Habitat Biologist (307) 672-8003, ext. 230

Habitat and Access Maintenance

Seth Roseberry, Coordinator (307) 672-8003, ext. 240

Terrestrial Habitat

Lynn Jahnke, Wildlife Management Coordinator (retired) (307) 672-7418

Dan Thiele, Wildlife Management Coordinator (307) 672-7418

Todd Caltrider, Terrestrial Habitat Biologist, Gillette (307) 283-3410

Information and Education

Bud Stewart, Senior Public Relations Specialist (307) 672-7418

List of Acronyms

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